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Case Systems: Beyond Structural Distinctions

Miriam Butt and Tracy Holloway King

In this paper we argue that a simple division of languages into accusative and ergative is insufficient for an understanding of the case system of a language and obscures the systematic semantic contribution of case markers. We investigate two genetically unrelated split ergative languages, Urdu and Georgian and provide a unifying analysis of their synchronic case systems which models a complex interaction of case markers and the verbal argument structure in terms of interacting structural and semantic constraints.[1]

The paper is organized as follows. We first discuss the history of the term "ergative" and the types of constructions covered by this term in Section 1. In Section 2 we discuss some formal accounts of ergativity, while in Section 3 we introduce a view of case based on Lexical-Functional Grammar (LFG) and in Section 4 LFG's linking theory. Data from Georgian and Urdu are presented in Section 5 and then analyzed in Section 6. Finally, in Section 7 we summarize our conclusions.

1 Ergativity: An Introduction

The ergative marker was first so named as a special marker for subjects[2] in reference to Caucasian languages such as Georgian (Dirr 1928).[3] The same type of case marker was discussed for languages such as Basque and Greenlandic (Pott 1873), but was generally referred to as an "agentive nominative" as opposed to a "neutral nominative" (what is called nominative or absolutive today). The semantic parameter of "agentivity", which had been consistently remarked on by the linguists of the last century in connection with the ergative, has been replaced by a purely structural division within many theories in this century.

This development can be traced to Fillmore's (1968) influential article "The case for case", where he proposes a typological classification of languages as predicted by the formulation of Case Grammar. The typology is constructed according to how case marking patterns with respect to sentences of the three types shown in (1) (Fillmore 1968:53–54).

(1) V+A   intransitive sentences with active 'subjects'
     V+O+A   transitive sentences with agents
     V+O   intransitive sentences with inactive 'subjects'

Under this schema, a language is ergative if it marks the agent of a transitive sentence with a marker that is distinct from the other arguments. Plank (1979:4) concisely summarizes the basic idea as follows:

1. A grammatical pattern or process shows ergative alignment if it identifies intransitive subjects (S_i) and transitive direct objects (dO) as opposed to transitive subjects (S_t).

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[2]The notion subject is controversial, as many linguists assume that only an argument which is nominative and agrees with the verb has subject status. In Urdu, not all subjects agree with the verb, while objects may agree. Georgian has a complex system of verbal agreement which involves subjects, objects, and indirect objects. We assume the notion of subjecthood fundamental to LFG, whereby subjects can be identified via tests such as control, reflexive antecedents, etc. These tests are largely language dependent. For Urdu, we follow the subjecthood tests developed in Mohanan (1994). These include reflexive antecedents, obviation, participial control, gapping, and coordination; only in some cases is verb agreement indicative of subjecthood. For Georgian, we follow Harris (1981). In the present and aorist series, the subject is clearly defined by verb agreement as well as tests such as reflexive antecedents; the situation is more complicated in the perfect series that shows inversion.

[3]The term "ergative" was actually already in use before it was applied to the Caucasian languages. It was first used for a type of locative/comitative in the Eastern Torres Straits language Meriam Mir (Ray and Haddon 1873). This language also had what we would today consider an ergative, but which Ray and Haddon (1873) referred to as a "nominative of the agent" in the original description of the language. The transfer in terminology appears to be based on a mistake by Pater Schmidt (1902:88), who attributed the term "ergative" to the agentive nominative in Meriam Mir. This mistake was perpetuated by Trombetti (1903), who was also in touch with Dirr. See Manaster Ramer (1994) for details.

2. It shows accusative alignment if it identifies S_i and S_t as opposed to dO.

Figure (2) shows the now standard terms for this distributional pattern (e.g. Dixon 1994:9). These terms are based on work on Australian languages by Silverstein (1976) and Dixon (1979). Nominative-accusative languages mark transitive subjects (A) and intransitive subjects (S) with the nominative, in contrast to transitive objects (O) which are marked with accusative. Ergative-absolutive languages mark transitive subjects (A) with the ergative, while marking intransitive subjects (S) and transitive objects (O) with the absolutive.

(2)

$$
\begin{array}{l}
\text{nominative} \left\{ \begin{array}{l} \text{A ergative} \\ \\ \text{S} \end{array} \right. \\
\text{accusative} \hspace{1em} \left. \begin{array}{l} \\ \text{O} \end{array} \right\} \text{absolutive}
\end{array}
$$

A = transitive subject (Agent);
S = intransitive subject;
O = transitive object

The distinction Fillmore (1968) made between what is now known as unaccusative vs. unergative intransitives has been reinstated into the typological division due to work by Alice Harris, who introduced the term *active* for languages like Georgian which display a split marking for intransitive sentences (Harris 1985). The table in (3) thus shows a three-way distinction.[4] Active languages are ones in which the case marking of intransitive subjects (S) depends on whether they occur with unergative verbs, in which case they are more agentive and hence marked like transitive subjects (A), or with unaccusative verbs, in which case they are more patient-like and hence marked like transitive objects (O).[5]

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[4]Plank (1995) describes six distinct typological classifications based on this schema: ergative, accusative, active, neutral, double-oblique, tripartite.

[5]The term "absolutive" has generally been used for the null or unmarked case in ergative systems and the term "nominative" for the unmarked case in accusative systems. It has recently been recognized that this division is unhelpful (see Mohanan (1994), Woolford (1997), and Johns (2000) for some discussion) and the term "absolutive" is therefore now often abandoned in favor of the term "nominative", a strategy which we follow in this paper. In addition, we avoid the term "unmarked" since in many languages the nominative is, in fact, morphologically marked, e.g. in Georgian, and is often not the default case (i.e. the case assigned if no other case has been assigned).

(3)

Clause Type	Language Type		
	Ergative	Accusative	Active
Transitive	Erg-Abs	Nom-Acc	Erg-Abs
Intransitive (Unacc.)	Abs	Nom	Abs
Intransitive (Unerg.)	Abs	Nom	Erg

There are large numbers of nominative-accusative languages that follow the pattern predicted above. However, most ergative languages are *split ergative*. As such, they show the ergative case marking pattern under certain conditions and the accusative pattern under others. One common split is the NP split, in which some pronouns or NPs display ergative patterns, while the rest display accusative patterns. Another common split is over tense/aspect in which only some tenses/aspects (usually the past or perfective) display ergative patterns. Both of the languages examined in this paper are split case marking languages and can be characterized as split active languages.

However, we argue that a good understanding of ergativity in these languages can only be accomplished by understanding the interaction of the ergative with other case markers. In particular, we demonstrate that Georgian and Urdu show evidence for a complex interaction of semantic and structural constraints associated with the case markers themselves. These interactions go beyond a strictly structural division and cannot be understood properly if viewed only through the divisions in (3).

Our paper is by no means the first or only work to point out that semantic considerations play an important role in understanding case marking patterns (e.g. Wierzbicka 1981). For South Asian languages, this has been noted over and over again. The contribution this paper tries to make is to understand case alternations in terms of a complex interaction between syntactic and semantic constraints.

2 Formal Accounts

In the early days of generative syntax, the occurrence of ergative case was often dealt with by recourse to more familiar structures or concepts. One strategy was to view an ergative construction as a type of passive. However, this analysis was generally found to be wanting as the syntax of ergative languages became better understood. Another strategy was to view the appearance of ergative case as an instance of "quirky" or "lexical" case. In this scenario, individual verbs or verb forms lexically stipulate the appearance of the ergative case. However, this approach was not optimal because the ergative has a more systematic distribution than what would be expected from purely lexical stipulation.

With the compilation of a larger body of work on different types of ergative languages, current analyses pursue a more complex description of the factors which govern the ergative case. Moreover, the failure to arrive at a unifying account for all ergative languages has led to the realization that there are different syntactic types of ergative languages which must be accounted for in terms of structural differences in the languages (e.g. Bittner and Hale 1996a,b). A well-known division is the one between *syntactic* ergativity and *morphological* (surface) ergativity. Syntactic ergativity is associated with an inverse mapping from thematic roles to grammatical relations: in transitive sentences, themes/patients are realized as subjects, whereas agents are realized as secondary grammatical relations. Morphological ergativity, on the other hand, employs a fundamentally accusative system (themes/patients are realized as objects, agents as subjects) but groups S and O together morphologically.

Manning (1996) and Johns (2000) provide an overview of the approaches taken to different types of ergative languages. With respect to this paper, we confine ourselves to outlining and discussing only those analyses of ergativity which have focused on Georgian and Urdu/Hindi.[6] Urdu/Hindi and Georgian are notorious for resisting formal accounts of case. We argue that this is because the relevant semantic factors governing the appearance of ergative case in these languages have not been sufficiently incorporated into the analyses. As such, an analysis based solely on structural factors is bound to fall short.

2.1 Urdu

Bittner and Hale (1996a) analyze the Hindi ergative as a marked Structural Case assigned by I^0. While this is an improvement over viewing the ergative as quirky case, they do not take into account semantic factors which interact with the structural nature of the ergative. Bittner and Hale account for ergative subjects of intransitives by analyzing unergative intransitives as underlyingly transitive. However, it remains a mystery why the ergative is obligatory with overtly transitive perfect clauses, but is optional with perfect unergative intransitives. Thus, the ergative-nominative alternation on the subjects of unergatives which correlates with volitionality receives no explanation under this approach, nor does the ergative-dative subject alternation which is also correlated with volitionality (see Section 5.2).

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[6]The South Asian languages Urdu and Hindi are closely related. Both are among the sixteen official languages of India and are spoken primarily in the north of India. Urdu is the official language of Pakistan. The data presented in this paper are drawn primarily from the dialect of Urdu spoken in Lahore, Pakistan and Delhi, India, as well as from examples cited in the literature on Urdu and Hindi.

There are several reasons that Urdu/Hindi case resists syntactic analysis. One is that the full range of data with regard to the scope and distribution of ergative marking in Urdu/Hindi is often not taken into account. Another is that the restrictive view of case in terms of ergative vs. accusative systems leads the researcher to ignore case alternations like dative vs. ergative or genitive vs. instrumental.

Woolford's (1997) notion of a four-way case system presents a step in the right direction. However, she treats the ergative as a lexical (or inherent) case, whereas the Urdu/Hindi ergative is sensitive to both syntactic and semantic factors. This mixed nature of the Urdu/Hindi ergative is acknowledged by researchers who work primarily on Hindi. Mahajan (1990), for example, proposes that argument noun phrases in Hindi may have both structural and inherent Case. Structural Case is assigned in SpecAgrP, SpecIP, or in the complement to V position. The inherent Case of an argument is specified in the lexical entry of a particular verb form. The overt case morphology is treated as an instance of inherent Case.[7] Inherent Case marked noun phrases may also be assigned structural Case if they are in the appropriate position. This dual system of Case assignment applies to direct objects marked with *ko* and ergative subjects because these nouns function as direct arguments which are also overtly marked with case clitics. A shortcoming of Mahajan's analysis is that the ability to assign Structural Case must be linked to the verbal form. Psych-predicates (dative subjects) and verbs with perfect morphology are taken to lack the ability to assign Structural Case, which is why the object moves to a functional agreement position, leaving the subject inside the VP and vulnerable to the assignment of Inherent Case. Furthermore, as Mahajan (1990) formulates a purely structural approach to ergativity, he cannot account for the ergative-nominative and ergative-dative case alternations discussed in Section 5.2.

Davison (1999) provides the most complete account of the pattern of Hindi ergative marking to date. Her research is based on a careful survey of case marking across several verb classes. She treats the ergative as a structural Case which interacts with the specifications of the lexical entry of the verb. She proposes the licensing conditions in (4).

(4) a. *Verb condition:* the lexicon specifies which verbs have [ERG] external arguments.

    b. *Aspect condition:* perfective Aspect licenses [ERG].

    c. *Tense condition:* finite Tense licenses [ERG]

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[7] This has the effect that the noun phrases which only have structural Case are exactly the nominative arguments, whereby nominative in Urdu is phonologically null (see Fn. 5).

Davison's proposal is very close to the one presented here: information coming from the verbs' lexical entries interacts with information provided by the ergative. However, under her account, the semantic factors involved in case-alternations are associated with the lexical entry of a verb. We instead believe that while some inherent case marking information must be relegated to the lexicon, a more general story can be told with respect to the case alternations observed in Urdu/Hindi.

De Hoop (1999) and Wunderlich and Lakämper (2000) present Optimality Theoretic approaches to case marking. Urdu/Hindi is one of the languages they consider. Wunderlich and Lakämper (2000) account for the full range of data associated with ergativity and case alternations in Urdu (cf. Butt and King 1999) via an interaction of semantic and structural constraints. However, we do not always agree with the nature of their constraints which arise out of the particular assumptions of Wunderlich's (1997) Lexical Decomposition Grammar.[8]

De Hoop (1999) sketches an account of case marking which relies on the semantic notions of weak and strong Case presented in previous work (de Hoop 1992). If developed in more detail, her account should be compatible with our account and supplement our approach with more detailed semantic machinery than we have available at the moment.

2.2 Georgian

From the Georgian perspective, Harris (1981) provides a detailed Relational Grammar (RG) analysis of the entire Georgian case system. Because RG allows reference to both grammatical functions and underlying thematic roles (via the initial assignment of roles 1, 2, and 3), Harris's analysis of the Georgian split active system is similar to ours. However, her approach does not take into account potential semantic factors which govern the distribution of ergative and dative case, although she

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[8]The basic deviation between our account and that of Wunderlich and Lakämper (apart from Optimality Theory) lies in the treatment and understanding of feature space. LFG's linking theory assumes an abstract notion of features in which both thematic roles and grammatical functions are classified via the features [±o(bjective)] and [±r(estrictive)] in a manner ostensibly similar to that employed by Wunderlich's (1997) Lexical Decomposition Grammar. However, we are unsure about the status and use of these features: [±hr](=there is a higher role or there is no higher role) and [±lr](=there is a lower role or there is no lower role). For example, lexical specifications may introduce a feature like [−lr] even when there is a lower role (Wunderlich and Lakämper 2000, ex. 22). Furthermore, features like [±ho](=there is a higher object or there is no higher object) and [+instr(umental)] are introduced to account for languages like Chicheŵa and Urdu, respectively. In our opinion, the postulation of such further features poses a threat to the restrictiveness of the linking theory as originally formulated and also mixes differing theoretical concepts in an undesirable fashion (thematic roles with grammatical relations with case labels).

describes some of these factors herself (Harris 1981, 1985).

Bittner and Hale (1996a) assume that Georgian has an incorporated light verb 'have' which licenses the appearance of ergative case on intransitive unergatives. Given that the ergative is not optional on unergatives in Georgian, there are no semantically conditioned case alternations to be accounted for. However, Georgian is well-known for its complicated tense/aspect system which interacts with the realization of dative as well as ergative subjects. Section 5.1 presents the basic patterns and shows that systematic generalizations can be drawn if the dative is examined in conjunction with the ergative.

McGinnis (1998a,b) examines a number of languages, including Georgian, and explores a view of case which distinguishes *quirky inherent case* and *nonquirky inherent case*. The former encompasses the familiar notion of "quirky" or "lexical" case in that it describes those case markers whose distribution cannot be described in a general way. Nonquirky inherent case involves appearances of nonstructural (i.e. not nominative and not accusative) case which follow from generalizable properties of the language. For McGinnis, this includes the dative.

McGinnis further assumes that aspectual morphology (or light verbs) appears in semantically/aspectually motivated projections such as vP and contributes to the case marking requirements of a clause. In a dative subject construction, for example, Georgian verbal morphology projects something akin to English *had* in *The professor had his students walk out on him.* (i.e., the professor was adversely affected by the students walking out). Ergative subjects, on the other hand, are triggered by a light verb or piece of morphology denoting agentive 'have' in a manner similar to Bittner and Hale (1996b). We agree with McGinnis's approach in that we see the basic elements which determine the appearance of nonnominative subjects to be the result of an interaction of structural and semantic factors. In additon, we also argue for a separation of true quirky case from the type of nonstructural case that is the subject of generalizable properties of the language.

3   Case in LFG

In LFG, information from different components combines to constrain one another to produce a consistent and coherent analysis of a given clause. The differing modules of grammar (e.g. grammatical functions, semantics, and phonological information) are encoded in terms of projections from lexical entries and phrase structure rules, which in turn encode syntactic and morphological constituency. This is informally illustrated in (6) for the Georgian sentence in (5).

(5) nino-∅   Ceril-s   Cers.   [Georgian]
Nino-NOM letter-ACC write-3SGS;3O
'Nino is writing a letter.' (Transitive; Present)

(6) a. Constituent-structure:[9]

```
            S
    _____|_____
   NP      NP       V
   /\      /\      Cers
  /__\    /__\
  nino   Cerils
```

b. Functional-structure:

$$
\begin{bmatrix}
\text{PRED} & \text{'write<SUBJ, OBJ>'} \\
\text{TENSE-ASPECT} & \text{PRES} \\
\text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'Nino'} \\ \text{CASE} & \text{NOM} \\ \text{PERS} & 3 \\ \text{NUM} & \text{SG} \end{bmatrix} \\
\text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'letter'} \\ \text{CASE} & \text{ACC} \\ \text{PERS} & 3 \\ \text{NUM} & \text{SG} \end{bmatrix}
\end{bmatrix}
$$
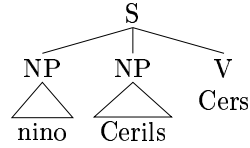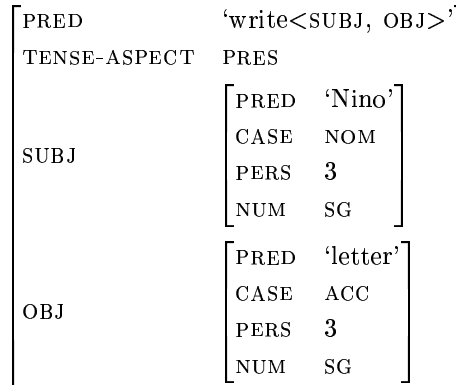
A sentence like (5) has two syntactic structures associated with it. The first is a phrase structure tree, referred to as the c(onstituent)-structure. LFG avoids the use of traces. The c-structure therefore closely reflects the actual string and contains a faithful representation of linear order and constituency information. The grammatical functions are encoded in the f(unctional)-structure as an attribute value matrix (AVM). Note that different word orders of (5), which are possible since Georgian is a "free" word order language, will have different c-structures but identical f-structures; the correlated differences in discourse-functions can be encoded in a separate projection (King 1997) or in the f-structure. Thus the c-structure in (7) also corresponds to the f-structure in (6b).

(7)
```
            S
    _____|_____
   NP      NP       V
   /\      /\      Cers
  /__\    /__\
 Cerils   nino
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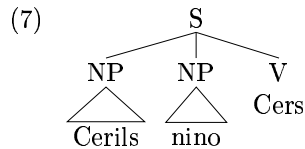
[9]LFG allows for functional projections and X′ syntax; we use S here merely for expository purposes. See Bresnan (2001) on constraints on LFG phrase structure rules.

Case phenomena have been extensively analyzed in LFG. Of particular interest here is the idea of Constructive Case, proposed by Nordlinger (1998). The basic idea behind Constructive Case is that nominal constituents with case morphology can define the larger syntactic context in which they appear.[10] Consider the Wambaya example in (8) (I stands for Class I, which translates roughly to masculine gender).

(8) galalarrinyi-ni gini-ng-a   dawu bugayini-ni
     dog.I-ERG   3SG.MASC.A-1.O-NFUT bite big.I-ERG
     'The big dog bit me.'   (Nordlinger 1998:96)   [Wambaya]

In (8), *galalarrinyi-ni bugayini-ni* 'big dog' is a discontinuous constituent, but both parts of the constituent are marked with ergative case. Under Nordlinger's analysis, the ergative case itself specifies that it is an ergative and that it must be part of a subject for the clause to be grammatical. This is outlined in the lexical entry in (9); the first line indicates that the noun phrase has ergative case, while the second states that it must be a subject.[11]

(9) *ni* ($\uparrow$ CASE) = ERG
          (SUBJ $\uparrow$)

Together with the predicate value for 'dog' supplied by the noun, this entry for the case marker results in the (simplified) syntactic f-structure in (10) for *galalarrinyi-ni* 'dog-Erg'.

(10) $\left[\text{SUBJ} \begin{bmatrix} \text{PRED} & \text{'dog'} \\ \text{CASE} & \text{ERG} \end{bmatrix} \right]$

This structure can then be unified with the representation projected by the adjective (adjunct) *bugayini-ni* 'big-Erg' in (11) to give a coherent analysis of the subject of the clause, as in (12).

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[10]Technically, this is accomplished by inside-out functional uncertainty constraints associated with the cases (Halvorsen and Kaplan (1988), Dalrymple (1993), Andrews (1996)).

[11]We do not discuss the details of the LFG formalism here; these can be found in Bresnan (2001) and references therein. Basically, the up arrows ($\uparrow$) encode mappings between nodes of the phrase structure tree and the functional-structure. The '$\uparrow$' refers to the particular AVM that the phrase structure node in question corresponds to. So, in the examples in this paper, the '$\uparrow$' refers to the functional-structure of the noun phrase containing the case marker. For example, in (9) the '$\uparrow$' refers to the AVM with PRED 'dog' in it in (10); thus, the first line of (9) states that this part of the functional-structure contains the pair CASE ERG, as is seen in (10), while the second states that this part of the functional-structure is contained within the SUBJ of the next bigger AVM, as is also seen in (10). The notation (SUBJ $\uparrow$) is an instance of inside-out functional uncertainty.

(11)
$$\left[\text{SUBJ} \left[\begin{array}{ll} \text{CASE} & \text{ERG} \\ \text{ADJUNCT} & \left[\text{PRED} \quad \text{`big'} \right] \end{array} \right] \right]$$

(12)
$$\left[\text{SUBJ} \left[\begin{array}{ll} \text{CASE} & \text{ERG} \\ \text{PRED} & \text{`dog'} \\ \text{ADJUNCT} & \left[ \text{PRED} \quad \text{`big'} \right] \end{array} \right] \right]$$

As can be seen from these examples, Constructive Case allows the case markers to play an active role in the clause. Not only do they assign case, but they can also specify information about the syntactic environment in which they occur, e.g. attaching to subject nominals in the example of the Wambaya ergative.

Within this system, we argue for three types of case: quirky case, semantic case, and structural case. Here we are concerned with semantic case and structural case.[12]

Semantic case markers are characterized by selectional restrictions on semantic inferences over parameters such as volitionality; these are sometimes expressed as a restriction on thematic roles. In addition, semantic case is also often sensitive to grammatical function, e.g., the particular case can only appear on a subject, only on an oblique, etc. Finally, semantic case does not just affect the noun phrase to which it attaches; instead, it can affect the clausal semantics, e.g. through aspectual affectedness, specificity, partitivity, etc.

An example of semantic case is the Urdu dative: the dative in Urdu and South Asian languages in general is associated with a goal argument (Verma and Mohanan 1990, cf. also Woolford 1997). The dative case is therefore associated with a constraint which captures this fact; an LFG

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[12]Our notion of semantic case must be distinguished from a more generally known usage in which semantic case is taken to refer to case on adjuncts, but not structural arguments. Under our approach, semantic case represents a mixture of structural and semantic constraints, all generalizable properties of the language. Quirky case then is restricted to lexically, inherently stipulated case that does not follow from any generalizable property in the language. An example of this is the Urdu verb *la* 'bring' which, being a transitive verb, should take an ergative subject with perfect morphology (Section 5.2) but instead takes a nominative.

(i) nadya   kıtab   la-yi   [Urdu]
    Nadya.F.Nom book.F.Nom bring-Perf.F.Sg
    'Nadya brought a book.' (Transitive; Perfect)

(ii) *nadya=ne   kıtab   la-yi   [Urdu]
    Nadya.F=Erg book.F.Nom bring-Perf.F.Sg
    'Nadya brought a book.' (Transitive; Perfect)

As there is no semantic or syntactic reason for this difference, the nominative case must be stipulated in the lexical entry of this particular verb.

formalization is shown in (13).

(13)   ko $(\uparrow$ CASE$)=$DAT
               $($GOAL $\uparrow_{arg-str})$

The first line of (13) associates the case clitic *-ko* with the dative case. The second line states that it must correspond to a goal in argument structure.[13] Nothing is said about the grammatical function of the dative: the fact that datives can be either subjects or obliques follows from constraints in other parts of the grammar.

Structural case in LFG is not necessarily associated with a particular phrase structure position; in fact, this is the least common way case is assigned.[14] Instead, the relevant notion is the grammatical function of the case marked noun phrase. In our model, the case does not itself assign the grammatical function but instead helps to characterize the grammatical functions via wellformedness conditions. That is, the information contributed by the case marker provides further constraints on the grammatical functions. This is an important point as case markers do not define grammatical functions: the grammatical function in question must be supplied by another part of the grammar. Conversely, grammatical functions do not exclusively determine the case marking. For example, the ergative in Georgian is always associated with subjects, but does not define a subject. An LFG formalization is shown in (14).

(14)   -m(a) $(\uparrow$ CASE$)=$ERG
                $($SUBJ $\uparrow)$

The first line in (14) states that the case of the noun with the *-m(a)* ending is ergative. The second requires it to be associated with a subject, but does not provide the specification of one.

4   Linking

Before moving on to the data, one further theoretical construct remains to be introduced: linking theory. The discussion is brief because linking theory is assumed in this paper, but not relied on exclusively for the account of case marking. Linking theory involves two levels of syntactic representation: argument structure (for thematic roles) and functional structure (for grammatical functions).

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[13]See Footnote 11 on the meaning of the up arrows; in this paper, subscripted arrows refer to projections other than the functional-structure, namely the argument-structure and the semantic-structure.

[14]Assignment of structural case via phrase-structure position may occur in structural genitives, such as the English genitive. However, since these also receive a unique grammatical function assignment, the case assignment can be done via reference to the grammatical function instead of to position.

We assume the version of LFG's Lexical Mapping Theory (LMT) developed in Butt (1998). For an overview of standard LMT see Bresnan and Zaenen (1990). In LMT grammatical functions and thematic roles are classified by means of two features: [± r(estricted)], [± o(bjective)].

(15) **Grammatical Function**   **Features**
     SUBJ $[-r, -o]$
     OBJ $[-r, +o]$
     OBJ$_\theta$ $[+r, +o]$
     OBL$_\theta$ $[+r, -o]$

The thematic roles are restricted to a very basic set: *agent, goal, theme, locative* (this is nonstandard). Given the restricted set of thematic roles and the linking possibilities explored by Butt (1998) and Butt, Dalrymple, and Frank (1997), thematic roles are related to grammatical functions via the principles in (16) (also nonstandard).

(16) **Linking Principles**
     Theme: $[-r]$ (neutral) or $[+r]$ (semantically restricted)
     Goal: $[+o]$ or $[-r]$
     Default: $[-o]$

The linking from thematic roles to grammatical functions is illustrated briefly for an English transitive (based on Bresnan and Zaenen 1990), an Urdu unergative, and an Urdu unaccusative.[15]

(17)   a-structure   *pound*   <   ag   th   > (transitive)
                                    $[-o]$ $[-r]$
                                     | |
       f-structure   SUBJ   OBJ

(18) a. ram=ne   bol-a   [Urdu]
          Ram.M=Erg say-Perf.M.Sg
          'Ram talked.'

     b.   a-structure   *bol* 'talk'   <   ag   > (unergative)
                                         $[-o]$
                                        |
         f-structure   SUBJ

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[15] The argument structure is represented within angle brackets. This mirrors standard practice. However, in the analysis and implementation followed in this paper, the argument structure is represented as an attribute-value matrix.

(19) a. ram   gır-a   [Urdu]
   Ram.M.Nom fall-Perf.M.Sg
   'Ram fell.'

  b. a-structure *gır* 'fall' < th > (unaccusative)
              [−r]
               |
    f-structure   SUBJ

None of the examples dictate the case marking of the arguments involved. However, in cases where different linking options exist, the information provided by case markers can be used to select one of the possibilities. In this way, our approach allows case markers to function as "linkers" in the sense of Kiparsky (1987). However, we take the function of case markers to go beyond the determination of grammatical functions in that case marking is the result of an interaction of specifications carried by the case markers themselves with semantic and syntactic information specified in other parts of the grammar. The grammatical functions as related to the predicate-argument structure via linking theory are a part of the grammar which case marking interacts with. Linking theory does not exclusively determine case marking, nor does case marking exclusively determine the choice of grammatical function.

5 The Data: Georgian and Urdu

In this section we introduce the case marking data that we analyze in this paper. Particular attention is paid to ergative/dative alternations which are semantically conditioned.

5.1 Georgian

Georgian is usually described as a split ergative[16] language. The split is according to the tense and aspect of the verb. However, as argued by Harris (1985), Georgian is more accurately described as split active.

Georgian has six cases which are outlined in Table (20). In this paper we focus on the nominative, ergative, accusative, and dative[17] cases,

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[16]The Georgian ergative is traditionally referred to as *motxrobiti* or 'narrative' case.

[17]The accusative and dative are identically marked in Georgian and are collapsed into the dative case by Harris (1981). However, as the behavior of the Georgian dative/accusative is similar to that of Urdu, we treat them here as two different cases with identical morphological realization (see Section 6.5).

Harris (1985:159–161) contains an interesting discussion surrounding the possible origin of the dative object. Zorell (1930) proposes that the dative originated as a locative expression which can be compared to nontelic English usages such as *He shot at the bear*. This proposal of a semantically motivated origin is interesting in light of the fact that (roughly) telic vs. nontelic distinctions have been shown to play

which are the cases primarily associated with verbal dependents. The table in (21) outlines the basic case marking patterns of verbs.

(20)

Georgian Cases	
Case	Form
Nominative	-i/∅
Ergative	-m(a)
Dative/Accusative	-s
Genitive	-(i)s
Instrumental	-it/-ti
Adverbial	-(a)d

(21)

	Georgian Case Alternations		
	'Present' (Accusative)	'Aorist' (Active)	'Perfect' (Inversion)
Transitives	NOM-ACC	ERG-NOM	DAT-NOM
Unacc. Intrans.	NOM	NOM	NOM
Unerg. Intrans.	NOM	ERG	DAT

The basic uses of the three tense/aspect series are described in (22).

(22)   Present: present, future, imperfect, conditional,
                    conjunctive present and future
        Aorist: aorist, optative
        Perfect: present perfect, future perfect

Transitive verbs take nominative subjects and accusative objects in the present series; as such, they pattern like an accusative language. In the aorist series, transitive verbs take ergative subjects and nominative objects; as such, they pattern like ergative or active languages. Finally, in the perfect series, the subject is in the dative and the object in the nominative. This construction has been called an "inversion" construction based on the RG and traditional grammarians' intuition that in transitives the dative is functioning as the subject, while the nominative is functioning as the object.

Georgian is split active because unaccusatives and unergatives behave differently. In the present series, they both appear with nominative subjects. However, in the aorist series, unaccusative subjects are nominative, while unergative subjects are ergative, a classic active pattern.

The present tense of transitive, unergative, and unaccusative verbs is illustrated in (23). In each of these the subject is in the nominative and

a role in case marking alternations across languages (e.g. Kiparsky 2001, Ramchand 1997, de Hoop 1992).

triggers subject agreement on the verb (Georgian also has object and indirect object agreement, but the agreement marker is null for most third person objects).

(23) a. nino-∅ Ceril-s Cers.   [Georgian]
   Nino-NOM letter-ACC write-3SGS;3O
   'Nino is writing a letter.' (Transitive; Present)

  b. nino-∅ mγeris.   [Georgian]
   Nino-NOM sing-3SGS
   'Nino is singing.' (Unergative; Present)

  c. Kar-i iγeba.   [Georgian]
   door-NOM open-3SGS
   'The door opens.' (Unaccusative; Present)

In the aorist series, the case marking changes, as in (24): the transitive and unergative intransitive subjects are in the ergative, while the unaccusative subject is still in the nominative (note that the unaccusative subject cannot be in the ergative, as shown in (24d)). However, with all three types of verbs the subject triggers subject agreement; subject agreement is not blocked by the ergative (unlike in Urdu, Section 5.2).

(24) a. nino-m Ceril-i daCera.   [Georgian]
   Nino-ERG letter-NOM wrote-3SGS;3O
   'Nino wrote a letter.' (Transitive; Aorist)

  b. nino-m imγera.   [Georgian]
   Nino-ERG sang-3SGS
   'Nino sang.' (Unergative; Aorist)

  c. Kar-i gaiγo.   [Georgian]
   door-NOM opened-3SGS
   'The door opened.' (Unaccusative; Aorist)

  d. *Kar-ma gaiγo.   [Georgian]
   door-ERG opened-3SGS

Thus, in the aorist series, Georgian has an active case marking system with, roughly speaking, external arguments being marked with the ergative[18] and internal arguments being marked with the nominative. In contrast, in the present series, all subjects are marked with the nominative, regardless of their thematic role or the number of arguments.

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[18]Subjects of transitive verbs are marked with the ergative even if they are not agentive (King 1994a).

(i) xe-m cxvar-i moKla.   [Georgian]
  tree-ERG sheep-NOM killed-3SGS
  'The tree killed a sheep (e.g., when it fell).' (Transitive; Aorist)

Inversion constructions are a complex part of Georgian syntax. In these constructions, the external argument is in the dative and triggers indirect object agreement, while the internal argument is in the nominative and triggers subject person agreement. Number agreement is more complex as the verb agrees with third person datives in number (triggering subject agreement), but not with the third person nominative (Harris 1981, McGinnis 1998a,b). See Section 5.3 for discussion on the relationship between case and agreement. The basic patterns in the perfect series are shown in (25).

(25) a. turme   nino-s   Ceril-i   dauCeria.   [Georgian]
        apparently Nino-DAT letter-NOM wrote-3SGS;3O
        'Apparently Nino wrote a letter.' (Transitive; Perfect)

    b. turme   nino-s   umɣeria.   [Georgian]
        apparently Nino-DAT sang-3SGS
        'Apparently Nino sang.' (Unergative; Perfect)

    c. turme   Kar-i   gaɣila.   [Georgian]
        apparently door-NOM opened-3SGS
        'Apparently the door opened.' (Unaccusative; Perfect)

Of interest to us is that this construction appears to have semantic alternations. That is, a difference in case marking is systematically associated with a difference in clausal semantics. Harris (1985:288) sees psych predicates like (26) as being marked for unintentionality. With these predicates, the logical subject is in the dative and the logical object is in the nominative in all series, not just in the perfect series.

(26) nino-s   rezo-∅   uqvars.   [Georgian]
     Nino-DAT Rezo-NOM love-3SGS;3O
     'Nino loves Rezo.' (Psych predicate; Present)

Similarly, Harris postulates that unintentionality is at the root of the evidential reading in (27b) and the experiencer reading in (28b). The ergative versions of these verbs are provided for contrast.

(27) a. rezo-m   samajur-i   deda-s   ačukia.   [Georgian]
        Rezo-ERG bracelet-NOM mother-DAT gave-3SGS;3O;3IO
        'Rezo gave a bracelet to his mother.' (Transitive; Aorist)

    b. turme   rezo-s   samajur-i   učukebia   [Georgian]
        apparently Rezo-DAT bracelet-NOM gave-3SGS;3O
        ded-is-tvis.
        mother-GEN-for
        'Apparently Rezo gave a bracelet to his mother.'
        (Transitive; Perfect)

(28) a. deideb-ma nino-∅   damales.   [Georgian]
        aunts-ERG Nino-NOM hide-3PLS;3O
        'The aunts hid Nino.' (Transitive; Aorist)

    b. deideb-s   nino-∅   daemalat.   [Georgian]
        aunts-DAT Nino-NOM hide-3PLS;3O
        'The aunts had Nino hidden on them.' (Transitive; Perfect)
        (the aunts were adversely affected by someone hiding Nino)

Semantically conditioned case alternations of this type are also found in Urdu (Section 5.2). In Georgian, however, they appear to have become associated with morphological aspectual marking on the verbs, so that while semantic factors are at the root of the distribution of case marking patterns in Georgian, these factors are conditioned indirectly via the morphological marking of the verb. Harris (1982) concludes that case marking in Georgian cannot be analyzed as being directly semantically conditioned: the determination of case marking falls within the realm of syntax. However, the determination of case marking in Harris's RG analysis is dependent on an interaction with grammatical relations, whose initial value is determined on semantic grounds. We believe that Harris's (1982) view of Georgian case marking is compatible with our approach.

To sum up, in the aorist and perfect series, Georgian has an active case marking system with external arguments being marked with the ergative and dative, respectively, and internal arguments being marked with the nominative. In contrast, in the present series, all subjects are marked with the nominative, regardless of their thematic role or the number of arguments present.

5.2   Urdu

Next we examine Urdu, which shows some similar case marking patterns to Georgian even though they are genetically unrelated languages. Urdu has six cases, shown in Table (29). Note that the case markers are clitics, not inflections on the noun or postpositions (Mohanan 1994, Butt and King 1999).[19] We are primarily concerned with the nominative, ergative, and dative cases here.

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[19]Pronouns behave exceptionally as they may take an inflectional dative/accusative -e instead of the dative/accusative clitic ko.

(29)

Urdu Cases		
Case	Clitic Form	Form
nominative	∅	direct
ergative	ne	oblique
dative/accusative	ko	oblique
instrumental	se	oblique
genitive	k-	oblique
locative	mẽ, par, tak, ∅	oblique

All overt cases and the null locative (i.e. all cases but the nominative) require an *oblique* form of the noun, whereby not all nouns show necessarily have oblique forms.[20]

Unlike in Georgian, all the case markers may appear on subjects in Hindi/Urdu (Mohanan 1994). However, there are a large number of verbs that show the same split active pattern found in Georgian. This is summarized in (30).

(30)

Urdu Case Alternations		
	Nonperfect (Accusative)	Perfect (Active)
Transitives	NOM-ACC/NOM	ERG-ACC/NOM
Unacc. Intrans.	NOM	NOM
Unerg. Intrans.	NOM	ERG/NOM

The ergative appears on the subjects of transitive verbs when the verb is marked with perfect morphology (*-a/-i/-e*). In other categories, these subjects are nominative. The subjects of unergatives are nominative in nonperfect tenses; in the perfect, they are ergative if they express volitionality and nominative otherwise. The subjects of perfect unaccusatives, in contrast, are in the nominative. Unlike in Georgian, the case marking of the object does not depend on the case of the subject. The case marking on the object (accusative vs. nominative) in Urdu/Hindi

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[20]The distinction between the "direct" nominative and the oblique forms required by the other cases has been taken to be indicative of a three-layered system of case marking whereby the direct vs. oblique distinction provides the first layer, the overt case clitics in Table (29) constitute the second layer and post positions (which are linked to the noun via the genitive case) make up the third layer (e.g. Payne 1995, Masica 1991). We do not follow this view and instead treat the "direct" form as nominative case on a par with the other cases, while instituting a separate post positional category for expressions which employ a frozen form of the genitive such as *ke nic*^h*e* 'under (lit. of under)'. See Butt and King (1999) for a detailed discussion of these issues.

is orthogonal to subject case marking because the appearance of the accusative is tied to specificity (Butt 1993) in a manner very similar to that in Turkish (Enç 1991), even though Turkish does not have an ergative case.

Nonperfect examples of transitives, unergatives, and unaccusatives are shown in (31). In each sentence, the subject is nominative and the verb agrees with it.

(31) a. nadya   gaṛi   cɑla-ti   hɛ   [Urdu]
     Nadya.F.Nom car.F.Sg.Nom drive-Impf.F.Sg be.Pres.3.Sg
     'Nadya drives a car.' (Transitive; Nonperfect)

    b. nadya   naha-e-g-i   [Urdu]
     Nadya.F.Nom bathe-3.Sg-Fut-F.Sg
     'Nadya will bathe.' (Unergative; Nonperfect)

    c. nadya   ja-e-g-i   [Urdu]
     Nadya.F.Nom go-3.Sg-Fut-F.Sg
     'Nadya will go.' (Unaccusative; Nonperfect)

When these appear in the perfect, the subject of a transitive verb must be ergative (32a), while the subject of unergatives may optionally take an ergative (32b-c). This optionality is correlated with a more volitional reading for the ergative. Unaccusative subjects remain in the nominative, as in (32d). Unlike in Georgian, Urdu verbs do not agree with ergative subjects; instead, they agree with their highest nominative argument, i.e. either subject or object, whereby subject is higher than object (Mohanan 1994). The verb defaults to masculine singular third person agreement if there is no available nominative subject or object in its predicational domain (i.e. the local clause).

(32) a. nadya=ne   gaṛi   cɑla-yi   hɛ   [Urdu]
     Nadya.F=Erg car.F.Sg.Nom drive-Perf.M.Sg be.Pres.3.Sg
     'Nadya has driven a car.' (Transitive; Perfect)

    b. nadya=ne   naha-ya   [Urdu]
     Nadya.F=Erg bathe-Perf.M.Sg
     'Nadya bathed (on purpose).' (Unergative; Perfect)

    c. nadya   naha-yi   [Urdu]
     Nadya.F.Nom bathe-Perf.F.Sg
     'Nadya bathed.' (Unergative; Perfect)

    d. nadya/*=ne   gɛ-yi   [Urdu]
     Nadya.F.Nom/=Erg go-Perf.F.Sg
     'Nadya went.' (Unaccusative; Perfect)

The fact that the ergative-nominative alternation on unergatives is correlated with volitionality is better illustrated with the example in

(33), taken from Tuite, Agha and Graczyk (1985:264), who discuss precisely this issue.

(33) a. ram   kʰãs-a   [Urdu]
        Ram.M.Nom cough-Perf.M.Sg
        'Ram coughed.' (Unergative; Perfect)

    b. ram=ne   kʰãs-a   [Urdu]
        Ram.M=Erg cough-Perf.M.Sg
        'Ram coughed (purposefully).' (Unergative; Perfect)

Another interesting alternation involves dative subjects. An example is shown in (34) with noun-verb complex predicates (Mohanan 1994). The ergative/dative case alternation correlates with a difference in the choice of light verb: agentive 'do' vs. unaccusative 'come'.

(34)   nadya=ko   kɑhani   yad   a-yi   [Urdu]
        Nadya.F.Sg=Dat story.F.Sg.Nom memory come-Perf.F.Sg
        'Nadya remembered the story (the story came to Nadya).'

        nadya=ne   kɑhani   yad   k-i   [Urdu]
        Nadya.F.Sg=Erg story.F.Sg.Nom memory do-Perf.F.Sg
        'Nadya remembered the story (actively).'

The dative *ko* marks a goal or experiencer in the manner of psych predicates in (34a), while the ergative *ne* marks agentivity or volitionality in (34b), thus confirming the rough semantic correlation between the ergative case and volitionality.

Furthermore, in a departure from the split-ergative pattern in which ergative case is tied to the presence of perfect morphology, Urdu allows the ergative to appear with an infinitive in combination with a present or past form of the verb 'be'.[21] This construction shows a systematic alternation between ergative and dative subjects, which coincides with

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[21] There is a tendency for prescriptive speakers of Hindi to deny the existence of this construction with an ergative subject. However, Bashir (1999) documents the use of sentences like (35a) in Urdu TV-dramas, which are popular in both India and Pakistan. In addition, one of the authors has overheard this construction being used in Delhi, India. For example, in March 2000, a Hindi speaking child uttered (i) in a restaurant in Delhi in the context of wanting to feed some goldfish in a small pool, just as his brother had done.

(i) mɛ̃=ne bʰi kʰɪla-na   hɛ   [Hindi]
    I=Erg also feed-Inf.M.Sg be.Pres.3.Sg
    'I also want to feed.'

Therefore this construction is part of (standard) Hindi, contra McGregor (1995). There is some speculation (Yamuna Kachru, p.c.) that this construction is tied to areas in which Punjabi is also spoken and that the usage of the ergative *ne* is a transfer from the Punjabi dative *nu*, which would be used in constructions like (35b). This speculation remains to be investigated.

a difference in modality, as illustrated by (35).

(35) a. nadya=ne   zu   ja-na   hɛ   [Urdu]
         Nadya.F=Erg zoo.Loc go-Inf.M.Sg be.Pres.3.Sg
         'Nadya wants to go to the zoo.'

     b. nadya=ko   zu   ja-na   hɛ   [Urdu]
         Nadya.F=Dat zoo.Loc go-Inf.M.Sg be.Pres.3.Sg
         'Nadya wants/has to go to the zoo.'

In this infinitive construction, the ergative is marked and entails a subject who has control over the action. The dative is the unmarked or elsewhere case: the dative subject may or may not have control over the action, the precise interpretation depends on the context (Bashir 1999). For a detailed LFG analysis of this construction see Butt and King (1999).

5.3   Case and Agreement

A tenet held by early instantiations of generative syntax and which continues to form part of the Minimalist program (Chomsky 1995) is that case and agreement are fundamentally interconnected. As LFG has no such requirement, and because it is a nontrivial problem to have agreement and case interact in a natural way in Georgian and Urdu, we postulate no deep syntactic interaction between the two.

In Georgian, agreement is not directly linked to case as both ergative and nominative subjects trigger subject agreement, while both accusative and nominative objects trigger object agreement. Georgian has both person and number agreement. Number agreement follows a more complex pattern than person agreement as third person objects rarely trigger number agreement and a third person dative in the perfect series triggers number agreement, but a third person nominative does not (see Harris (1981) and King (1994b) on Georgian case and agreement).

Urdu has number, gender, and person agreement; these are spread out over different types of verb forms, as sketched in (36). Some morphemes indicate number and person agreement, while others indicate number and gender agreement. The future is marked doubly for number. There are historical reasons for this situation, as former adjectival participles agree in gender and number, while the inflectional morphology surviving from Sanskrit agrees for number and person. The future is composed of the old subjunctive (Row 2 in (36)), which marks person and number, and a formerly adjectival component -*ga*, which marks number and gender; as a result, the future marks person, number, and gender (Row 3 in (36)).

(36)

Verb Type	Number and Gender	Number and Person
Past, Perfect, Imperfect, Progressive, Past 'be'	√	—
Imperative, Subjunctive, Nonpast 'be'	—	√
Future	√	√

Agreement patterns in neither Georgian nor Urdu show a semantic motivation. This is unlike the pattern of case marking displayed by these languages, which involves both structural and semantic constraints. We therefore see the fact that LFG does not require a syntactic connection between agreement and case as a feature of the theory.

6 Analysis

In this section we provide an analysis of the case marking patterns. We first examine Georgian transitive verbs and then intransitives. These are compared to Urdu intransitives and finally an analysis is provided for standard Urdu transitives, as well as for a dative subject.

6.1 Georgian Transitive Verbs

Consider first the Georgian transitive examples repeated in (37). In the present, the subject is in the nominative and the object in the accusative; in the aorist, the subject is in the ergative and the object in the nominative. In both cases, the subject triggers subject agreement and the object triggers (in this case, null) object agreement.

(37) a. nino-∅   Ceril-s   Cers.   [Georgian]
        Nino-NOM letter-ACC writes-3SGS;3O
        'Nino is writing a letter.' (Transitive; Present)

      b. nino-m   Ceril-i   daCera.   [Georgian]
        Nino-ERG letter-NOM wrote-3SGS;3O
        'Nino wrote a letter.' (Transitive; Aorist)

The verb provides basic predicate argument and tense/aspect information, as shown in (38). (38a) shows the information from the verbal stem, while (38b) and (38c) show the tense/aspect information as well.

(38) a.   -Cer-   (↑ PRED)='write<SUBJ, OBJ>'

      b.   Cers   (↑ PRED)='write<SUBJ, OBJ>'
                (↑ TENSE-ASPECT)=PRES

      c.   daCera   (↑ PRED)='write<SUBJ, OBJ>'
                   (↑ TENSE-ASPECT)=AORIST

In Georgian, it is not perspicuous to include case assignment information in the root of the verb since the case patterns vary according to the verb's tense/aspect. On the other hand, it is possible to include such information in the inflected forms of the verb, e.g. in (38b) and (38c). For example, (38b) could be further expanded as (39).

(39) Cers ($\uparrow$ PRED)='write<SUBJ, OBJ>'
            ($\uparrow$ TENSE-ASPECT)=PRES
            ($\uparrow$ SUBJ CASE)=NOM
            ($\uparrow$ OBJ CASE)=ACC

However, we will see that this design decision does not fit well with the Urdu data, where semantics plays a more direct role in the determination of case alternations. As such, we generalize the constructive case analysis to Georgian as well as to Urdu, and do not use the type of entry shown in (39), although using such entries in conjunction with constructive case for Georgian still results in the desired syntactic structures.

Next consider the information provided by the case endings to their noun phrases. The ergative provides ergative case, while requiring that it appear as the external argument,[22] and hence subject, of an aorist verb. This is represented in (40).

(40) -m(a) ($\uparrow$ CASE)=ERG
             (SUBJ $\uparrow$)
             (EXT-ARG $\uparrow_{arg-str}$)
             ((SUBJ $\uparrow$) TENSE-ASPECT)=AORIST

The relevant entry for the accusative is shown in (41).[23] The marker assigns accusative case and is required to occur on the object of a present series verb. There are no constraints on the argument structure; these fall out of the restriction on appearing on objects.

(41) -s ($\uparrow$ CASE)=ACC
           (OBJ $\uparrow$)
           ((OBJ $\uparrow$) TENSE-ASPECT)=PRES

Finally consider the nominative, which occurs on subjects of all present series verbs and objects of aorist verbs. Note that Possibility 1 is extremely broad in that it can assign nominative case to any subject, regardless of the tense or argument structure of the verb. This is treated as obeying the Elsewhere Condition: it will only apply if no more specific

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[22]In the representation in (40), EXT-ARG is meant to represent the external argument of a predicate at argument structure (Section 4).

[23]Recall that there are other uses of the accusative/dative marker, such as inversion constructions, which are dealt with by a seperate entry for the marker.

rule can apply and can be thought of as a type of default assignment.[24]

(42) -i/∅   (↑ CASE)=NOM
             Possibility 1   (SUBJ ↑)
             Possibility 2   (OBJ ↑)
                             ((OBJ ↑) TENSE-ASPECT)=AORIST

These lexical entries combine to produce the syntactic structures in (43) and (44) for the sentences in (37). The structures are identical in predicate argument structure and differ only in tense and case marking and the additional argument-structure restriction on the ergative noun phrase. Because of the argument structure information specified in the entry of the ergative, an additional fragment relating the argument-structure of the ergative subject to the familiar syntactic functional-structure is included in (44). The line indicates the corresponding functional and argument projections of the noun phrase *nino-m* 'Nino-ERG'.

(43)
$$
\begin{bmatrix}
\text{PRED} & \text{'write<SUBJ, OBJ>'} \\
\text{TENSE-ASPECT} & \text{PRES} \\
\text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'Nino'} \\ \text{CASE} & \text{NOM} \end{bmatrix} \\
\text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'letter'} \\ \text{CASE} & \text{ACC} \end{bmatrix}
\end{bmatrix}
$$

(44)
$$
\begin{bmatrix}
\text{PRED} & \text{'write<SUBJ, OBJ>'} \\
\text{TENSE-ASPECT} & \text{AORIST} \\
\text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'Nino'} \\ \text{CASE} & \text{ERG} \end{bmatrix} \\
\text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'letter'} \\ \text{CASE} & \text{NOM} \end{bmatrix}
\end{bmatrix}
\begin{bmatrix} {}_{arg-str} & \text{EXT-ARG} & [\ ] \end{bmatrix}
$$

---

[24]The entry in (42) posits a null morpheme for the nominative with some nouns. This can be avoided by having the information provided in the sublexical rule (e.g. in the morphology) that combines the noun stem with the case endings. A simplification of such a rule would be as in (i). (i) requires case on the noun and allows for an optional case marker. If the case marker is present, it provides the case; if it is not, the equations under the noun stem provide nominative case.

(i)   N ⟶   Nstem   (CaseMarker)
             (↑ CASE)
             ((↑ CASE)=NOM ...)

6.2 Georgian Intransitive Verbs

The case assignment patterns of both the intransitive unergatives in (45) and the intransitive unaccusatives in (46) follow from the above case entries in conjunction with the relevant predicate-argument and tense information for the verbs.

(45) a. nino-∅   mγeris.   [Georgian]
          Nino-NOM sing-3SGS
          'Nino is singing.' (Unergative; Present)

      b. nino-m   imγera.   [Georgian]
          Nino-ERG sang-3SGS
          'Nino sang.' (Unergative; Aorist)

(46) a. Kar-i   iγeba.   [Georgian]
          door-NOM open-3SGS
          'The door opens.' (Unaccusative; Present)

      b. Kar-i   gaiγo.   [Georgian]
          door-NOM opened-3SGS
          'The door opened.' (Unaccusative; Aorist)

First consider the unergatives. In the present tense, the information in the entry for the nominative in (42) is compatible with the subject, as in (47a). In the aorist, on the other hand, the conditions are met for the ergative case in (40) to be wellformed since the subject is the external argument and the verb is aorist, as in (47b). Nominative case is not possible in (45b) since the conditions on the ergative are more specific than those on the nominative.

(47) a. $\begin{bmatrix} \text{PRED} & \text{'sing<SUBJ>'} \\ \text{TENSE-ASPECT} & \text{PRES} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'Nino'} \\ \text{CASE} & \text{NOM} \end{bmatrix} \end{bmatrix}$

      b. $\begin{bmatrix} \text{PRED} & \text{'sing<SUBJ>'} \\ \text{TENSE-ASPECT} & \text{AORIST} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'Nino'} \\ \text{CASE} & \text{ERG} \end{bmatrix} \end{bmatrix}$ $\begin{bmatrix} \text{arg-str} & \text{EXT-ARG} & [\ ] \end{bmatrix}$

Next consider the unaccusatives. In this case, no more specific case rule can apply, and so the nominative is assigned as a result of the Elsewhere Condition. As such, both the present and aorist unaccusative verbs have nominative subjects; the relevant syntactic structures are shown in (48).

(48) a.
$$\begin{bmatrix} \text{PRED} & \text{`open<SUBJ>'} \\ \text{TENSE-ASPECT} & \text{PRES} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`door'} \\ \text{CASE} & \text{NOM} \end{bmatrix} \end{bmatrix}$$

b.
$$\begin{bmatrix} \text{PRED} & \text{`open<SUBJ>'} \\ \text{TENSE-ASPECT} & \text{AORIST} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{`door'} \\ \text{CASE} & \text{NOM} \end{bmatrix} \end{bmatrix}$$

As we have seen, in Georgian the case marking patterns are strictly associated with the different tense/aspect series. That is, if the verb class (transitive, unaccusative, unergative) is known and the tense/aspect of the verb is known, the case of the arguments can be predicted. This is in part because shifts of meaning are encoded in Georgian by the verbal morphology itself, reducing the semantic load on the case markers. This is discussed in detail in Holisky (1981). For example, she discusses how unergative verbs such as *Tiris* 'cry' can be causativized (indicated by the *a*- prefix) and then detransitivized (indicated by the *-d* suffix) to produce an unaccusative class verb such as *aTirdeba* 'start to cry'. As she shows, the difference we have been describing as unergative versus unaccusative is primarily aspectual for this particular class of morphologically derived verbs. Such a difference can be captured under the LFG constructive case system by stating constraints on semantics in addition to constraints on argument structure. We do not explore the Georgian data further here, but move to the case alternations in the Urdu data which show a clear need for case to state restrictions on semantics as well as syntax.

6.3 Urdu Intransitive Alternations

Consider the Urdu alternation in (49) in which the same verb form appears with either a nominative or an ergative subject, with a corresponding difference in meaning. This type of alternation is not found in Georgian. Such examples provide evidence for an analysis in which the case markers themselves provide semantic information to the construction. That is, the ergative in (49b) provides the added meaning of volitionality to the basic meaning of the predicate.

(49) a. ram   kʰãs-a   [Urdu]
        Ram.M.Nom cough-Perf.M.Sg
        'Ram coughed.' (Unergative; Perfect)

    b. ram=ne   kʰãs-a   [Urdu]
       Ram.M=Erg cough-Perf.M.Sg
       'Ram coughed (purposefully).' (Unergative; Perfect)

The entry for the Urdu ergative is shown in (50). The first three lines are similar to those of the Georgian ergative: they assign the ergative case and require the ergative noun phrase to be a subject and an external argument.[25] Once these conditions are met, there are two possibilities for the ergative. The first is that the ergative noun phrase is volitional in semantic structure; this is illustrated in Possibility 1. The second is that subjects of perfect transitive verbs are always ergative; this is captured by Possibility 2. The requirement for Possibility 2 is similar to the Georgian requirement for an aorist verb, except that here the perfect morphology does not translate into semantically conditioned aspectual distinctions, but is just a condition on the overt morphological type.

(50)   ne   ($\uparrow$ CASE)=ERG
                  (SUBJ $\uparrow$)
                  (EXT-ARG $\uparrow_{arg-str}$)
                  Possibility 1   ($\uparrow_{sem-str}$ VOLITIONALITY)=+
                  Possibility 2   ((SUBJ $\uparrow$) OBJ)
                                      ((SUBJ $\uparrow$) VFORM)=PERF

The relevant partial structures for (49b) are shown in (51). Here only Possibility 1 of the ergative entry can apply, as the verb is not transitive and therefore does not fulfill the object condition in Possibility 2.

(51)

$$
\begin{bmatrix}
\text{PRED} & \text{'cough<SUBJ>'} \\
\text{VFORM} & \text{PERF} \\
\text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'Ram'} \\ \text{CASE} & \text{ERG} \end{bmatrix}
\end{bmatrix}
$$

$$\begin{bmatrix} _{arg-str} & \text{EXT-ARG} & [] \end{bmatrix} \quad \begin{bmatrix} _{sem-str} & \text{VOLITIONALITY} & + \end{bmatrix}$$

---

[25] One reviewer wonders why we follow the conclusions arrived at within RG (to whom the notion of unaccusativity is due), encoding the difference between unaccusatives and unergatives in terms of a syntactic distinction such as "external argument" and instead of semantic parameters such as volitionality. Rosen (1984) explores the idea of tying the distinction directly to semantics but concludes that neither crosslinguistic nor language internal data warrant such an analysis. See also Holisky (1981) and Harris (1982) for discussion of Georgian along similar lines. We therefore take the line that while the unaccusative/unergative distinction has some semantic correlates, it cannot be taken to be exclusively determined by semantics: syntax serves as an organizational interface level.

Because of the semantic and argument structure information specified in the entry of the ergative in (50), two additional fragments relating the argument-structure and semantic-structure of the ergative subject to the functional-structure are included in (51).

The nominative variant of *Ram* in (49a) is arrived at by default rules and specification encoded in the grammar (not in the lexical entries). This option is available as an alternative to the ergative variant and is chosen when no specification as to volitionality is intended.

Thus, we see that the analysis of the Urdu ergative requires reference to both syntactic and semantic information in order to capture the ergative-nominative alternation on the subjects of perfect unergative intranstives. The Urdu transitive is simpler to account for and follows the Georgian analysis outlined in Section 6.1. In what follows, we analyze some additional case alternations found with the case clitic *ko*, which functions as a dative and as an accusative.

6.4   Object Alternations with *ko*

Consider the contrast in the two examples below. Each sentence involves a perfect transitive verb with an ergative subject (the identical contrast is found with the nominative subjects of nonperfect verbs). However, in (52a) the object is in the nominative case and as a result has a nonspecific interpretation, while in (52b) the object carries accusative case marking and as a result has a specific interpretation (Butt 1993).

(52) a. ram=ne   jiraf   dek^h-i   [Urdu]
          Ram=Erg giraffe.F.Nom see-Perf.F.Sg
          'Ram saw a/some giraffe.' (Transitive; Perfect)

      b. ram=ne   jiraf=ko   dek^h-a   [Urdu]
          Ram=Erg giraffe.F=Acc see-Perf.M.Sg
          'Ram saw the (particular) giraffe.' (Transitive; Perfect)

In order to capture this distinction, we provide the relevant entry for the case marker *ko* in (53). The first line assigns the accusative case, the second ensures that the *ko* marked noun phrase is an object, and the third marks the noun phrase as specific in the semantic-structure.

(53)   ko   ($\uparrow$ CASE)=ACC
             (OBJ $\uparrow$)
             ($\uparrow_{sem-str}$ SPECIFICITY)=+

When the information from the accusative case marker is combined with the information from the ergative and that from the verb, the desired functional- and semantic-structures result. Again, the nominative is a viable option as well, though associated with a different semantics.

6.5 Subject Alternations with *ko*

The case clitic *ko* also functions to mark indirect objects and experiencer (or psych) subjects. This homonymity has prompted some researchers (e.g. Mahajan 1990) to assume that Urdu only has a dative case and to view the *ko* which participates in the specificity alternation on direct objects (52) as an instance of the dative.

However, we follow Mohanan (1994) in assuming a distinction and motivate this by a difference in distribution and functionality. The dative *ko* is restricted to goals and behaves differently under passivization than the accusative *ko* (see Mohanan 1994:91–101). Furthermore, the *ko* on indirect objects never engages in case alternations, while the *ko* on direct objects does (as seen above). This behavior reflects a difference in distribution and functionality (see Butt 1995:17–19 for further references).

A more complete entry for *ko* is shown in (54). Possibility 1 allows for the accusative and Possibility 2 for the dative functionality. As a dative, the *ko* can appear on either subjects or indirect objects (OBJ$_{go}$).

(54) ko

  Possibility 1 $(\uparrow \text{CASE}) = \text{ACC}$
  $(\text{OBJ } \uparrow)$
  $(\uparrow_{sem-str} \text{SPECIFICITY}) = +$

  Possibility 2 $(\uparrow \text{CASE}) = \text{DAT}$
  $(\text{GOAL } \uparrow_{arg-str})$
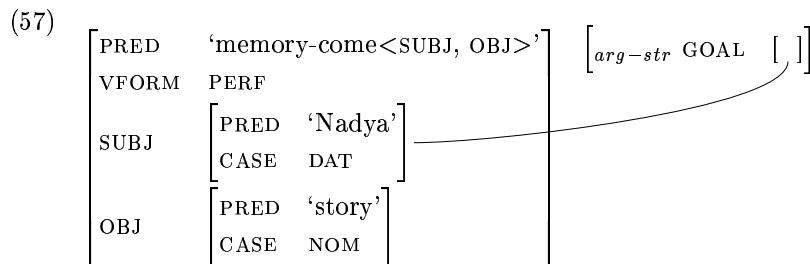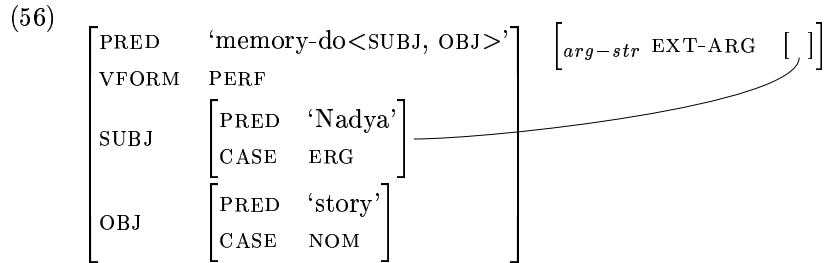 $(\text{SUBJ } \uparrow) \lor (\text{OBJ}_{go} \uparrow)$

We illustrate the analysis of the ergative-dative alternation with noun-verb complex predicates, repeated in (55), in order to illustrate the dative disjunct of the entry in (54). Information at semantic structure is not directly involved in the analysis of this alternation, in contrast to the ergative-dative alternation with infinitives (35), where semantic notions of control are involved (see Butt and King 1999).

(55) a. nadya=ne   kahani   yad   k-i   [Urdu]
       Nadya.F.Sg=Erg story.F.Sg.Nom memory do-Perf.F.Sg
       'Nadya remembered the story (actively).'

    b. nadya=ko   kahani   yad   a-yi   [Urdu]
       Nadya.F.Sg=Dat story.F.Sg.Nom memory come-Perf.F.Sg
       'Nadya remembered the story (the story came to Nadya).'

We do not go into the formation of complex predicates via argument structure merger here (Mohanan 1994, Butt 1995, 1998). For our purposes, 'memory-do' and 'memory-come' function like transitives, whereby

the subject is linked to a goal argument in (55b), but not (55a).

Because the subject is not linked to a goal in the 'memory-do' construction in (55a), the dative is not possible. The ergative is chosen because the predicate is transitive (has an object) and the form of the verb is perfect, as in (56). On the other hand, the dative marker is compatible with the 'memory-come' construction in (55b) because the subject here is linked to a goal, as in (57).

(56)
$$\begin{bmatrix} \text{PRED} & \text{'memory-do<SUBJ, OBJ>'} \\ \text{VFORM} & \text{PERF} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'Nadya'} \\ \text{CASE} & \text{ERG} \end{bmatrix} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'story'} \\ \text{CASE} & \text{NOM} \end{bmatrix} \end{bmatrix} \quad \begin{bmatrix} _{arg-str} & \text{EXT-ARG} & [\ ] \end{bmatrix}$$

(57)
$$\begin{bmatrix} \text{PRED} & \text{'memory-come<SUBJ, OBJ>'} \\ \text{VFORM} & \text{PERF} \\ \text{SUBJ} & \begin{bmatrix} \text{PRED} & \text{'Nadya'} \\ \text{CASE} & \text{DAT} \end{bmatrix} \\ \text{OBJ} & \begin{bmatrix} \text{PRED} & \text{'story'} \\ \text{CASE} & \text{NOM} \end{bmatrix} \end{bmatrix} \quad \begin{bmatrix} _{arg-str} & \text{GOAL} & [\ ] \end{bmatrix}$$

The difference in analysis between this dative-ergative alternation and the accusative-nominative alternation (Section 6.4) makes an interesting point. The accusative-nominative alternation results in truth-conditional differences, but the dative-ergative alternation with noun-verb complex predicates does not. While there is a difference in emphasis on experiencer/goal vs. agent, the difference is not as semantically strong as the specificity alternation (accusative-nominative). The noun-verb complex predicates thus show that not all case alternations are equal in terms of their syntactic and semantic status. This is a point which remains to be explored further and which should generally be considered in work on case and case systems.

7 Conclusion and Discussion

We have argued that semantic information, in addition to syntactic information, must be taken into account in the analysis of the Urdu and Georgian case systems. This semantic information is a productive part of the case system and hence differs from true quirky case. Our analysis

is based on the premise that case markers themselves provide information about the syntactic and semantic environment in which they occur, thus allowing them to influence the meaning of the clause. This type of analysis, where detailed information is provided by the lexical entry of the case markers, goes beyond the structural notion of split ergative and split active systems because it takes the entire case system of a language into account, not just the core structural argument cases.

Consider Manipuri, a Tibeto-Burman language discussed by Dixon (1994:28–35).[26] Dixon posits Manipuri as having semantically based case marking in that it relies primarily on semantic information while concepts such as A, S, and O are relegated to a peripheral role. However, as Dixon's discussion shows, and as is confirmed by Bashir's (1986) study of Wakhi, a Pamir language spoken in Pakistan and Chinese Turkestan (cited as further evidence for semantically based systems by Dixon), these languages employ an interaction of syntactic and semantic constraints of the type described in this paper. For example, the Manipuri case marker -ne is used only on subjects and is sensitive to volitionality information, just as the Urdu ergative ne (Section 5.2). The Manipuri cases -bu and -de appear on all kinds of objects, including causees, and are sensitive to (but not exclusively determined by) semantic parameters such as animacy and affectedness. From the perspective of an articulated theory of grammatical relations in conjunction with a theory of linking such as LFG's Lexical-Mapping Theory, the distribution of the case markers seems to entirely be predictable. Manipuri is therefore a case in point for our paper: syntactic and semantic considerations enter into a complex interaction. This interaction must be analyzed by means which go beyond purely structurally motivated typological distinctions, but which cannot be purely semantically conditioned either.

Our approach models this complex interaction by not simply relegating case assignment information only to lexical entries, but instead allowing information from differing modules of the grammar (including the lexicon) to interact with one another. Thus, our approach allows variations in the treatment of case alternations, depending on the precise information contributed to the analysis of the clause.

The approach to case sketched in this paper has implications for historical change. Butt (2001), for example, proposes that Indo-Aryan did not experience a structural shift in case system, as often claimed. Rather, a semantically conditioned system of case alternations has been present from Vedic times down into modern Urdu/Hindi, suggesting that while the surface form of individual case markers may have changed, the

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[26]We wish to thank an anonymous reviewer for bringing Manipuri to our attention.

basic case system has remained the same. However, this perspective can only follow from an approach which considers cases such as the dative, genitive or instrumental on a par with cases such as ergative, nominative and accusative.

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