Extending PT to split ergative marking and differential object marking: Some hypotheses for L2 Hindi

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Abstract

This chapter proposes a developmental sequence for the L2 acquisition of two linguistic phenomena in Hindi, namely split ergativity and differential object marking. The proposal builds on the universal key mechanisms of Processability Theory, i.e., the transfer of grammatical information between constituents (i.e., so-called 'feature unification') and the linking of arguments and constituents to grammatical functions (so-called 'a-to-f mappings' or 'c-to-f mappings'), which have been successful in explaining the acquisition of case markers cross-linguistically, i.e. in L2 German, L2 Russian, and L2 Serbian. In addition, the proposal will build on newer developments within PT, which give greater weight to semantic considerations, as evident from a study

on differential object marking in L2 Spanish. The present chapter will argue for a development that starts with emerging mappings between prototypical semantic characteristics of thematic roles and case marking, and that evolves to eventual associations of these mappings with grammatical functions.

1. Introduction

Recent work in Processability Theory (PT) (Pienemann, 1998) has shown a surge of interest in understanding the foreign language acquisition of case systems. The two central concepts of PT, i.e., feature unification and mapping processes, have been used in previous studies to explain the development of case systems in several languages which have (remnants of) nominative-accusative alignment: e.g., L2 German (Baten, 2013), L2 Russian (Artoni & Magnani, 2013) and L2 Serbian (Di Biase, Bettoni & Medojevic, 2015). In languages with nominative-accusative alignment, an opposition is made between the transitive subject (A) and the intransitive subject (S) in the nominative case on the one hand, and the direct object/patient (O) in the accusative case on the other. The findings of these studies are cross-linguistically quite similar. Learners begin by using the nominative form for all arguments (i.e., there is no feature unification). They then proceed with direct mapping and positional marking. Direct mapping involves a binary case differentiation between initial nominative arguments and non-initial or post-verbal accusative arguments (i.e., there is no differentiation between accusative

and dative marking), positional marking means that cases are linked to the canonical position of the arguments. In other words, with ditransitive verbs, learners are capable of differentiating between accusative and dative markers, and thus marking the second argument in the dative and the third in the accusative (the first argument is still marked in the nominative). Both direct mapping and positional marking involve a linear, rather than a functional relationship between the constituent structure (c-structure) and the functional structure (f-structure), hence linear c-to-f-mapping. It is important to note that direct mapping and positional marking can be considered as sub-steps within a stage, in which learners gradually extend their case forms, from post-verbal accusative forms only (1) to post-verbal accusative and dative forms (2).

(1) *Direct mapping*

Der Lehrer	gibt	*den Jungen	den Apfel	
The-NOM teacher	gives	the-ACC	boy	the-ACC apple

(2) *Positional marking*

Der Lehrer	gibt	dem Jungen	den Apfel	
The-NOM teacher	gives	the-DAT	boy	the-ACC apple

In addition, it is crucial to understand that the use of accusative and dative markers in (1) and (2) does not imply that the accusative and dative case *function* has been acquired. Learners display functional marking of arguments only in the next stage when they show target-like use of case markers in utterances with non-canonical word order (as in (3)), which implies inter-phrasal feature unification and non-linear c-to-f-mapping.

(3) *Functional marking*

Den Apfel	gibt	der Lehrer	dem Jungen
The-ACC apple	gives	the-NOM teacher	the-DAT boy
Dem Jungen	gibt	der Lehrer	den Apfel
The-DAT boy	gives	the-NOM teacher	the-ACC apple

In the studies on the development of case systems mentioned above, function specification by case is linked to word order. However, case is not only a matter of mapping c-structure and f-structure (Bresnan, 2001: 187). It also serves as "an extra piece of information that helps determine the mapping between GFs [=grammatical functions] and thematic roles" (Butt, 2009a: 64). Analogous to the development in c-to-f-mapping from linear to non-linear, PT hypothesizes that the mapping between the grammatical functions and the thematic roles of the argument structure (a-structure) develops from default to non-default mapping (Pienemann, Di Biase & Kawaguchi, 2005). Applied to case development, this means that learners will first assign nominative case to the highest available thematic role, accusative case to the next highest, etc., before being able to use non-default cases in non-default mappings. Indeed, in L2 Icelandic learners are observed to first use nominative case on both agent and experiencer subjects before being able to differentiate between nominative on agent subjects and dative on experiencer subjects (Þorvaldsdóttir & Garðarsdóttir, 2013).

These previous studies show that the explaining mechanisms of PT apply to L2 acquisition of case marking across typologically different languages when the function of case is identifying grammatical functions and

thematic roles. However, case is also used "to signal differences in agency, animacy, definiteness/specificity, […] tense/aspect" (Butt, 2009b: 27). It is cross-linguistically common to divide subjects and direct objects into different classes for overt case marking. For example, the subject of transitive verbs (A) is marked differently from the subject of intransitive verbs (S) in languages with ergative-absolutive alignment (Dixon, 1994). In those languages, A will be marked with the ergative case, whereas S will be marked with the nominative. This is in contrast with nominative-accusative languages, which mark both A and S with the nominative case, in opposition to the direct object (O), which is marked with the accusative case. When researching languages with ergative-absolutive alignment, it is important to know that fully ergative languages are rare. This differentiation between A and S may additionally be conditioned by factors like agentivity, tense, or aspect (or others). A will then only be marked with the ergative under certain conditions (e.g. only when the verb is in the perfective verb form), resulting in so-called split ergativity. Similarly, direct objects can be divided into different classes for overt case marking depending on different factors, where case can then signal differences in, e.g., animacy, definiteness/specificity. This linguistic phenomenon is known as differential object marking (Bossong, 1985).

The question arises whether PT's typological plausibility also extends to the development of case with these aspects of case marking. This brings us to the central question of this chapter: Can PT account for the acquisition

of target languages where case markers alternate for the same grammatical function? In other words, we aim to explore if PT is equipped to formulate developmental hypotheses that include split ergativity and differential object marking. We will therefore focus on L2 Hindi, a language that portrays these linguistic phenomena. Hindi is part of the Indo-Aryan language family, to which also languages like Nepali, Gujarati, Marathi, and Bengali belong. These languages share a number of case-marking and agreement patterns, however, these patterns are not uniform across the languages (for a presentation on the range of variation in this respect, see Deo & Sharma, 2007). Therefore, the developmental hypotheses presented in this chapter only apply to the acquisition of case marking in L2 Hindi. Hindi has partly ergative-absolutive alignment unlike most Indo-European languages, which have (remnants of) nominative-accusative alignment. Most ergative languages feature a split in the system. In a split ergative language like Hindi, both "nominative" and "absolutive" can designate the same form-function unit, the S-argument. Note that we will further not use the term "absolutive" as this leads to unnecessary confusion. Split ergativity in Hindi results in ergative *ne*-marking of the subject (A), conditioned by the factors transitivity/perfectivity. The subject (A) will thus receive *ne*-marking only when the verb is transitive and perfective. Like many other languages, Hindi also features Differential Object Marking (DOM). *Ko*-marking of the direct object is conditioned by the factors animacy/specificity respectively (Kachru, 2006). Depending on the animacy/

specificity of the DO, the DO will receive either nominative or *ko*-marking. Table 1 summarizes the marking pattern of split ergativity and DOM in Hindi.

Table 1. Split ergativity and differential object marking in Hindi.

	Split Ergativity			**Differential Object Marking**	
Verb	Perfective	Imperfective		Specific	Non-specific
Transitive	-ne	Ø	Animate	-ko	-ko
Intransitive	Ø	Ø	Inanimate	-ko or Ø	Ø

Both *ne*-marking and *ko*-marking will be discussed in more detail in section 3 of this chapter.

The structure of the chapter is as follows: First, we will present the empirical and theoretical findings of the studies that have examined the L2 acquisition of case in languages with nominative-accusative alignment. Then we will describe the Hindi case-marking system focussing on split ergativity and the differential object marking of this language. After that, we will discuss previous findings on the L2 acquisition of Hindi case marking. Finally, we will formulate some developmental hypotheses regarding split ergativity and differential object marking.

2. PT on L2 Case Acquisition

Some recent studies have drawn on Processability Theory (PT) (Pienemann 1998) to explain the L2 development of case in languages with nominative-accusative alignment: e.g., Baten (2013) on L2 German, Artoni and Magnani

(2013) on L2 Russian, and Di Biase, Bettoni and Medojevic (2015) on L2 Serbian. More particularly these studies have relied, to varying degrees, on two of the central concepts of the theory: the transfer of grammatical information between constituents and the linking of arguments and constituents to grammatical functions.

The transfer of grammatical information between constituents in PT draws on the notion of 'feature unification' in the linguistic model of grammar representation called Lexical-Functional Grammar (LFG, Bresnan, 2001). This model assumes that language production is lexically driven, which implies that every entry in the speaker's mental lexicon is "annotated" with features containing grammatical information. In sentence generation, the grammatical information of the different lexical entries is exchanged and unified. PT assumes that the developmental trajectory is determined by the processing cost associated with the exchange and unification of features. Following Levelt's (1989) model of speech production, grammatical information that needs to be exchanged within phrasal boundaries (e.g. between a numeral and a noun within a NP) requires less processing cost than grammatical information that needs to be exchanged beyond phrasal boundaries (e.g. between a NP and a VP). For the L2 learner, the following developmental sequence is assumed: (i) no feature unification (i.e., no exchange of grammatical information); (ii) phrasal unification (i.e., exchange of grammatical information within the NP/PP/VP); and, (iii) inter-phrasal feature unification (i.e., the exchange of

grammatical information between phrases).

As to the second central concept, the linking of arguments and constituents to grammatical functions, PT adopts three of the levels of representation that exist in LFG: 1) argument structure (a-structure: agents, patients, goals/locations, etc.); 2) functional structure (f-structure: the grammatical functions subject, object, oblique, etc.); and 3) constituent structure (c-structure: the internal sentence structure, generated by phrase structure rules). Mapping processes occur when the a-structure is mapped onto the f-structure, and the c-structure onto the f-structure, thus generating the sentence. According to PT, in the initial state, the L2 learner directly maps semantic roles onto grammatical functions and fixed constituents. The resulting sentence structure is called *unmarked alignment*. Examples of such direct mappings are agents – subjects – sentence-initial position (*someone does something*); goals/locations – obliques – sentence-last position (*someone moves something to a place*). Departures from unmarked alignment occur later in L2 development, because of the higher processing cost that arises from the fact that grammatical information needs to be stored in a syntactic buffer (Pienemann et al., 2005). Examples of marked alignment are passives, where the patient is mapped onto the subject, and topicalizations, where, for instance, the direct object takes the sentence-initial position.

Two PT studies on L2 case development link the developmental stages that they observed to the level of feature unification and the level of c-to-f-

mapping (Table 2) and thus provide empirical evidence for these two central PT concepts. At stage 2, there is no feature unification, and arguments are directly mapped onto a functionally underspecified constituent structure. Case markers at this stage only mark the direct positions, and not the functions. At stage 3, features can be stored by the language processor and unified within phrase boundaries. As a result, case government within, for example, prepositional phrases emerges. Finally, at stage 4, grammatical information can be exchanged across phrases, so inter-phrasal feature unification is possible (such as the exchange of case information between the VP and an NP). In addition, at this stage arguments do no longer necessarily take their canonical positions. So, case markers are used functionally, because they mark the function of the arguments, irrespective of the position these arguments take in the sentence. In this stage, learners show target-like use of case markers in utterances with canonical word order as well as in utterances with non-canonical word order.

Table 2. Developmental stages of L2 case marking in German and Russian based on Baten (2013) and Artoni (2013).

PT stage	Feature unification	C-to-f-mapping	L2 German	L2 Russian
2	None	Unmarked alignment	Nominative only	/
			Direct case mapping (= Nom vs. Non-Nom)	Post-verbal Nacc
				[Dat to <goal>]
3	Phrasal		Positional case-marking	V Ncase

4	Inter-phrasal	Marked alignment	Functional case-marking	TOP-OBLdat V TOP-OBJacc V

Baten (2013) performed a longitudinal study with 11 Dutch-speaking L2 learners of German. 9 students had no prior knowledge of German before the start of the study. Baten found that these learners start out by using nominative case, which is evident from, a.o., their frequent use of the nominative form of the German article *der* ("the"). According to the structuralist account, the nominative is the "zero case" (which is formally characterized by the absence of case marking) and cases only exist by oppositions (see Jakobson, 1971 [1936]), i.e. we can only speak of a nominative case when there is a functional opposition with, e.g., the accusative case. Baten (2013) thus argues that the use of the nominative form of nouns and articles by the L2 learners in his study is not yet to be interpreted as representing *case*, because there is no opposition to one or more other cases. Such an opposition, albeit rudimentary, soon emerges in his study when most learners start to differentiate between the use of nominative articles for the first argument and non-nominative articles for other arguments. Most of these non-nominative articles are accusative forms, but Baten (2013) again argues that these accusative *forms* cannot be regarded as representing the accusative case *function* because the learners use them for all non-subject functions. In the next stage, some learners also systematically begin to use datives. As a result, an accusative-dative opposition emerges. However, this opposition only occurs in canonical sentences, which means that

the markers were associated with the canonical positions of the arguments, and not necessarily with their grammatical functions. Only in the final stage do some learners display full functional marking and use appropriate case markers on arguments in non-canonical positions. Summing up, the stages observed for case development in L2 German, are as follows: all-nominative > direct mapping > positional marking > functional marking.

Similar stages to Baten's (2013) were found in research on L2 Russian, even though the labels to designate the stages are different (Artoni, 2013; Artoni & Magnani, 2013; Artoni & Magnani, 2015). From the beginning of data collection, Artoni and colleagues already observe a direct mapping stage which they call a post-verbal accusative stage. Even though some learners mark several utterances with nominative only, they do not find an all-nominative stage before this (which might be due to the cross-sectional design of the study). Similar to Baten (2013), it is claimed that the accusative forms do not entail any functional assignment at this stage, because their use is assigned by their post-verbal default position. Next, some of the L2 Russian learners add dative markers and instrumental markers to their repertoire of case forms. The first addition is semantically motivated by the default connection with the thematic role <goal>, and hence more a matter of a-to-f-mapping (therefore, the square brackets in Table 2), whereas the second addition is considered as proof of phrasal feature unification. It remains unclear why dative forms and instrumental forms should be differently motivated, as the latter could just as

well be connected to a thematic role and the former treated as grammatical information exchange within the VP. Nevertheless, whatever the underlying motivation, the empirical data show accusative and dative markers first in canonical positions, and at the last stage also on topicalized direct and indirect objects respectively, which again runs parallel to Baten's (2013) functional marking stage.

Another study relevant in this regard is a study on Serbian as a heritage language. Di Biase et al. (2015) investigated the development of case among three teenage Serbian-Australian bilinguals, using two elicitation tasks focusing on spoken production. They confirm that a restricted case system entails a rigid use of canonical word order patterns, whereas a developed case system enables learners to use a wider range of non-canonical word order patterns. However, one should be careful in considering case responsible for making non-canonical word order patterns available – thus freeing up canonical word order - rather than the other way around. Both Baten (2013) and Artoni (2013) found that learners were able to produce non-canonical structures before they were able to add the appropriate morphological markers. Indeed, PT does not predict morphology and syntax to develop in tandem. Instead, developmental trailers may exist, which refer to the temporal gap between producing the linguistic context for a particular structure and its actual rule application (Pienemann & Keßler, 2012; Baten, 2019b). Follow-up studies with migrant learners in Germany (Baten, 2019a) and university learners outside of Germany (Baten,

2019b) show that learners produce OVS structures without appropriate case makers.

The three PT studies on the L2 acquisition of case discussed above, have focused on its structural role of identifying the grammatical relationships of a sentence, and show that when c-to-f mapping is linear and feature unification is not active, the learners produce utterances in canonical word order and either do not use case or associate case with a specific position in the utterance. When c-to-f-mapping is non-linear and feature unification is active, information at the phrasal and inter-phrasal level becomes available and learners start using different case markers and start producing utterances with non-canonical word order. The learners thus develop from positional marking to functional marking. However, case is more than a marker of a grammatical function and is also used to signal different semantic encodings, such as agency, animacy, specificity, and aspect (Butt, 2009b). According to Butt and King's Differential Case Theory (DCT) (1991, 2003), case is a phenomenon at the semantic and morphosyntactic interface. Referring to Butt and King's DCT, Artoni (2013) already included a notion of semantic case assignment. He linked dative to <goal> and assumed beneficiaries, recipients, and experiencers to be instances of goal, implying that these different thematic roles can be unified by positing an underlying abstract notion of (metaphorical) goal/target (see also Mohanan 1994 for a more detailed theoretical account). However, as mentioned above, it is difficult to disentangle grammatical and semantic motivations when they

both assign the same case. This brings us to our central question: What about target languages where case markers alternate for the same grammatical function?

So far, PT has not extensively dealt with the L2 development of such case marking alternations as split ergativity and differential object marking. Recently, however, Di Biase and Hinger (2015) dealt with differential object marking (DOM) in L2 Spanish, and Charters and Muagututi'a (2015) examined early alignments in L2 Samoan, an ergative language. Both studies step away from the purely syntactic perspective in c-to-f-mapping, albeit to different degrees. The main claim in Charters and Muagututi'a (2015) is that PT's unmarked alignment hypothesis (i.e., mapping of agent – subject – initial-position) and topic hypothesis (i.e., no initial differentiation between subject and topic) (see Pienemann et al., 2005) cannot be upheld because grammatical functions (such as the subject) are assumed to be absent in the initial L2 mental grammar. They argue that assigning topic and subject functions entails greater processing abilities than early learners are capable of. They propose an alternative account, which holds that processing in early learners is related to semantic prominence, which is defined as the hierarchy of semantic roles in the argument structure (see above). According to this proposal, there is no alignment with the 'syntactic subject' in the stage of unmarked alignment, but one with the 'argument structure subject; a transition to syntactic processing, including the emergence of subject and other grammatical functions, only

happens later in the development. This is an important suggestion for the L2 development of ergativity in that the emergence of an ergative marker may be associated with semantic notions. However, according to Lenzing & Pienemann (2015), the reversed challenge for the proposal in Charters and Muagututi'a (2015) is how to account for the transition from semantic concepts to grammatical concepts.

In their account of the acquisition of DOM in L2 Spanish, Di Biase and Hinger (2015) do not go as far as to dismiss grammatical functions altogether at the initial stages. Instead, they assume that grammatical functions are underspecified. Before presenting their developmental hypotheses on DOM in L2 Spanish, let us briefly describe Spanish DOM. With limited space, this description can inevitably only be very simplified. Spanish uses the preposition *a* to mark animate, specific objects (as in (1a)), but animate objects need not be *a*-marked if they are not specific (1b). The latter is not absolute, however, as non-specific, animate objects can still be *a*-marked (1c) (the examples are taken from Di Biase & Hinger, 2015, 219).

(1) a. Necesito a un abogado
I need PREP a lawyer (specifically a lawyer, not a doctor)

b. Necesito un abogado
I need a lawyer (any lawyer)

c. No necesito a ningún abogado

I don't need PREP any lawyer

To add to the complexity of Spanish DOM, the preposition *a* is also used to mark the OBL_{goal} function.

From an L2 developmental perspective, Di Biase and Hinger (2015) hypothesize that in the initial stage all objects (and all other grammatical functions, for that matter) are underspecified and their status of animacy and specificity will be left unmarked. In other words, *a*-marking will not occur. At the next stage, learners will start to distinguish animate from inanimate arguments in the contexts of obliques for, respectively, goals (*José da pan a los niños*, 'José gives bread to the children') and locations (*ahora vivo en Barcelona*, 'now I live in Barcelona'). The emerged *a*-marking in oblique animate contexts will serve as a resource for marking objects differentially. The main cue for learners appears to be animacy. However, at this functional stage, they will still have difficulties with DOM due to the complexities arising from the feature specificity.

Di Biase and Hinger's argument to associate the emergence of *a*-marking to semantic instead of syntactic considerations relates to Tippets' (2011) and Dalrymple and Nikolaeva's (2011) motivation for DOM. The former treats the object marker as a marker of relative prominence, the latter as a marker of topicality. Note the connection to the proposal of Charters and

Muagututi'a (2015) to align topicality and semantic prominence. These authors share the claim that the differential object marker marks the secondary prominence of an argument. Consider the following two examples of Awtuw (Feldman, 1986):

(2) a. *Tey tale yaw d-æl-i*
3FS woman pig FA-bite-P
'The woman bit the pig

b. *Tey tale-re yaw d-æl-i*
3FS woman-ACC pig FA-bite-P
'The pig bit the woman'

Usually, animate, specific arguments have the highest prominence as agents, subjects, and topics, like in example 2a: both nouns are unmarked for case, and it is their position on the animacy hierarchy that defines their role/function. Hence, in 2a, the human animate noun for 'woman' is unmistakenly the subject (A), whereas the non-human animate noun for 'pig' is the DO. However, in example 2b, the human animate noun for 'woman' is the DO and the noun is marked with the accusative. When animate, agentive-like arguments are mapped onto the object, the differential object marker ensures that they are interpreted as non-subjects, bearing a TOP_2 function. The implication for second language development is that before learners can use DOM, they first rely on semantic notions and information structure to differentiate between arguments, which are initially functionally underspecified.

The studies above provide some interesting impulses for L2 developmental hypotheses on split ergativity and differential object marking in Hindi, which we discuss in section 4. In the following section, we first present the Hindi case-marking system and summarize the few studies on its acquisition.

3. Hindi case-marking

The Hindi case system is based on postpositional marking, i.e. cases are indicated by a postposition/marker following the noun. In Hindi, bare nouns and pronouns occur in the nominative by default. Several postpositions, like *ne* and *ko*, indicate the case role of the arguments (Kachru, 2006). When a noun is combined with such a postposition, the noun takes the oblique form, for example, *laṛk-ā* ('boy') becomes *laṛk-e*. The oblique form is then followed by a postposition, such as, for example, the genitive marker *kā* (m.sg.) in *laṛk-e=kā*, which means 'of the boy'. A lexical item in the oblique form rarely occurs on its own in Hindi. The exceptions are place or direction names; in these contexts, the postposition *ko* may be omitted, resulting in a pure oblique form. The present chapter will only focus on the postpositions that indicate core arguments: the ergative case marker *ne* and the objective case marker *ko*.

Concerning ergativity, it is important to know that, cross-linguistically, separate case markers (and separate agreement patterns, for that matter) distinguish between transitive subjects (A) and intransitive subjects (S). In Hindi, this separate case marker is the ergative case marker *ne*. It is important

to note again that pure ergativity is rare, and most languages referred to as ergative, including Hindi, combine both ergative and nominative-accusative features (Verbeke, 2013). Ergativity in Hindi is additionally conditioned by the aspect of the verb. In particular, the ergative features only occur in the presence of a finite perfective verb form, hence the term *split* ergativity (Das, 2006; Keine, 2007; Ura, 2006). The following examples illustrate the use of the ergative case marker in greater detail.

(3) ***ādmī.ø*** *soyā*

man[M]NOM.SG sleep.PFV.M.SG

"The man slept."

(4) ***ādmī.ø*** *laṛkī=ko* *dekhtā+thā*

man[M]NOM.SG girl[F]=OBJ see.IMPFV.M.SG

"The man was seeing a/the girl."

(5) ***ādmī=ne*** *laṛkī=ko* *dekhā*

man[M]NOM.SG girl[F]=OBJ see.IMPFV.M.SG

"The man saw a/the girl."

(6) ***ādmī=ne*** *ciṭṭhī* *dekhī*

man[M]=ERG letter[F]NOM.SG see.PFV.F.SG

"The man saw the letter."

Example (3) includes an intransitive verb in the perfective tense. However, even though the verb form is perfective, the subject does not receive the ergative marker, because the verb is intransitive. Example (4) includes a transitive verb, but because of the imperfective aspect, the transitive subject does again not receive the ergative marker. In (5) the subject is transitive and the verb form is perfective. Accordingly, the subject is marked by *ne*.

Let us now turn to the use of *ko*. Like the ergative *ne*-marking, the objective *ko*-marking is conditional in Hindi. Whereas the indirect object is obligatorily marked with *ko*, the marking of the direct object with *ko* depends on two factors: animacy and specificity (Malchukov, 2008; Klein & de Swart, 2011; Aissen, 2003; de Hoop & Narasimhan, 2005; de Hoop & Malchukov, 2008). The following examples (taken from Mohanan, 1994) illustrate the DOM pattern for Hindi.

(7) *ilā=ne* ***bacce=ko*** *uṭhāyā*
Ila[F]=ERG child[M]=OBJ lift.PFV.M.SG
"Ila lifted a/the child"

(8) *ilā=ne* ***hār=ko*** *uṭhāyā*
Ila[F]=ERG necklace[M]=OBJ lift.PFV.M.SG
"Ila lifted the/*a necklace."

(9) *ilā=ne* ***hār*** *uṭhāyā*

Ila[F]=ERG necklace[M]NOM.SG lift.PFV.M.SG

"Ila lifted a/the necklace."

(10) *Rita* *Sita=**ko*** *akhbār*

Rita[F]NOM.SG Sita[F]=OBJ newspaper[F]NOM.SG

degī

give.FUT.F.3SG

"Rita will give (a/the) newspaper to Sita."

The direct object in (7) is marked with *ko* because it is animate. It can be interpreted as either specific or non-specific. In the next two examples, the direct object is inanimate. It will be interpreted as specific in (8) because of the presence of *ko*, whereas its specificity in (9), relies on discourse. (9) undoubtedly creates a difficulty for the L2 learner, because the absence of the objective marking calls for both a non-specific and a specific interpretation. In this regard, Klein and de Swart (2011) differentiate between the *trigger* and the *effect* of the marking. Whereas animacy *triggers* objective marking (i.e., an animate direct object is always marked with *ko*), specificity is the *effect* of the marking. Finally, (10) illustrates that indirect objects are always marked by *ko* (Vasishth, 2008: 3), i.e., DOM does not apply to indirect objects.

4. L2 Acquisition of Hindi case-marking

Hindi has only recently come to the attention of SLA researchers. This recent interest is a first step in closing the typological gap in SLA research, where the main focus is on western languages (which is why volumes like this one on languages in the Pacific region are much welcomed). Studies on the L2 acquisition of Hindi consider different learner populations and different language areas. Lakshmanan (2006), for example, investigates the acquisition of negation patterns among child L2 learners, whereas Montrul et al. (2012; 2015) examine the acquisition and possible loss of case and agreement among heritage speakers of Hindi in the US, and Baten and Verbeke (2015) and Ponnet et al. (2016) explore the development of different aspects of the case system among foreign language learners. We will only describe the studies on case here.

Montrul et al. (2012) examine the accuracy of oral language production of the ergative *ne*-marker and the objective *ko*-marker among Hindi heritage speakers (i.e., 2nd generation immigrants in the US), comparing it with that of native speakers. The analysis shows that heritage speakers use these case markers less often than native speakers. Whereas the ergative marker *ne* shows 36% omission errors (vs. 95% accuracy rate for native speakers), *ko* as a marker of the direct object shows 15% omission errors (vs. 97%). Interestingly, *ko* as a marker of the indirect object was rarely omitted. According to the authors, the difficulties with ergative *ne* and *ko* as a marker of the direct object are the result of the complex syntax-semantic factors that determine their use. By contrast, as

a marker of the indirect object, *ko* only involves direct mapping of the form (objective) on the function (indirect object). As plausible explanations for the omission errors, the authors consider the reduced amount of exposure to the heritage language, a case of arrested development, and the dominant language contact with English. Because of the insufficient input and use of the heritage language, Hindi heritage speakers seem less able to grasp the complex and opaque form-function mappings and transfer the nominative-accusative pattern from English. However, the authors do not explain why the omission errors of the ergative *ne*-marking are higher than those of the direct object *ko*-marking.

In a later comparative study, which examines acceptability ratings of DOM across different heritage languages (Spanish, Hindi, and Romanian), Montrul et al. (2015) again find signs of arrested development. Interestingly, DOM appears to be affected in the Hindi of the heritage speakers, but not in that of the first generation of adult Hindi-speaking immigrants.[1] As in the earlier study, the structural complexity of DOM and the influence of English are assumed to have contributed to the eradication of DOM in the grammars of the heritage speakers. Because the errors made by heritage speakers are similar to those made by L2 learners (see, e.g., Montrul, 2012), one could expect to find them also among foreign language learners of Hindi, who in all probability

[1] The same pattern applies to Romanian heritage speakers vs. first-generation adult Romanian immigrants, but a different pattern emerges for Mexican heritage speakers and first-generation immigrants, seeing that both groups accept non-target sentences without DOM.

have even less exposure to the language. The omission rates (and the flip-sided accuracy rates) suggest the following order of difficulty, from least to most difficult: *ko* as a marker of the indirect object > *ko* as a marker of the direct object > the ergative *ne* marker. However, the order of difficulty from a cross-sectional study cannot simply be equated with developmental stages, seeing that the structures that are produced accurately are not necessarily the structures that have emerged early (and vice versa) (Håkansson, 2013, 118). Indeed, accuracy rates reveal to what extent a learner masters a certain structure, but they cannot establish when the linguistic structure first emerged in the interlanguage.

An exploration in this direction comes from Baten and Verbeke (2015), who investigate the development of the ergative case marker among Dutch-speaking learners of Hindi in an instructed language learning environment. Baten and Verbeke (2015) analysed their data adopting the emergence criterion, and argue for a three-staged development based on the use of the *ne*-marker by their participants.

(11) *Three-staged development of ergative* ne *in Baten and Verbeke (2015)*

(i) default nominative marking

(ii) marking of transitive subjects and overgeneralization to intransitive subjects, in perfective contexts

(iii) differentiation between intransitive perfective contexts and transitive perfective contexts

The first two stages for ergative marking locate at Stage 2 of the PT hierarchy, and the last stage at Stage 4. Regarding the overgeneralizations, Baten and Verbeke (2015) observed that the use of *ne* was especially overgeneralized to intransitive subjects, suggesting that for foreign language learners the factor transitivity is more problematic than perfectivity. This finding aligns with the findings of Ranjan (2016), who investigates the acquisition and processing strategies of the ergative case by L1 English learners of L2 Hindi. The results of his grammaticality judgment task, as well as production task, show that his learners first relate *ne*-marking with perfectivity (using the marker with both transitive and intransitive verbs), and only later restrict its use to transitive verbs only. This precedence of perfectivity over transitivity among foreign language learners is quite different from what L1 research has found, as children do not experience difficulties in distinguishing transitive subjects from intransitive subjects (Narasimhan, 2005; Narasimhan et al., 2005). Cross-linguistic L1 research has established that the problem is not ergativity itself, but the various conditions under which ergativity, i.e. the "split", occurs (Van Valin, 1992).

As a rationale for the overgeneralizations to intransitive subjects, Baten and Verbeke (2015) assumed a direct c- and f-mapping between the subject in sentence-initial position and the marker *ne* (similar to the direct mapping of post-verbal accusative in German and Russian). This direct mapping between subject and *ne* cannot be upheld, however, because learners do not have access to the grammatical functions and their features yet. Moreover, Pienemann and Lenzing (2015) point out that over-use of a form is normal in learner language, and that, despite the overgeneralizations, learners still seem to make a systematic distinction between the use of *ne* and the non-use of *ne* according to perfectivity and transitivity. In other words, the results are inconclusive about the role of perfectivity vs. transitivity.

Furthermore, it is crucial to note that imperfective contexts were not produced in the production task of Ranjan's study, which means that an association of *ne* with perfective contexts (vs. a zero-marker with imperfective contexts) cannot be assumed unequivocally. In addition, Ranjan (2016) applied an accuracy criterion, which inevitably holds the reserves referred to above. Summing up Ranjan's study, it may be said that English-speaking learners of L2 Hindi are eventually able to acquire the ergative case (an uninterpretable feature in Ranjan's generative terminology), even if this feature is not available in their L1. However, still little is known about what happens before a target-like functional differentiation regarding the *ne* marking is reached.

The same picture applies to the L2 acquisition of DOM in Hindi. In a

cross-sectional study on the oral language use of 30 foreign language learners, Ponnet et al. (2016) show that learners do not have difficulties with the concept of DOM in itself — they know that not every direct object needs to be marked —, but rather with the variable conditions under which it occurs. Accuracy rates are relatively high when the two factors involved in Hindi DOM align: 98% correct production for nominative case (in inanimate/non-specific contexts) and 65% for objective case (animate/specific contexts). However, when the two factors interact (i.e., animate/non-specific and inanimate/specific) the accuracy rates drop to 15%. In addition to these group measures, Ponnet et al. (2016) also conducted individual analyses. They used the emergence criterion to distinguish five developmental profiles. The cut-off point for emergence was at least one use of the *ko*-marker with the appropriate context. The authors thus deliberately speak of profiles to distinguish them from developmental stages. The profiles reflect the variable degree to which the three contexts (i.e., animate/specific; animate/non-specific; inanimate/specific) are appropriately marked with the objective case. The most relevant observation from these profiles is that animacy seems to be more problematic than specificity, which is in contradiction to the hypotheses on DOM in L2 Spanish in Di Biase and Hinger (2015). Nevertheless, in absence of longitudinal data, one can say, as above, that L2 learners of Hindi are eventually able to acquire DOM, but that still little is known about the preceding stages.

Summarizing, the available cross-sectional data illuminates, to some

extent, the learning process related to the Hindi case-marking system. However, longitudinal data are needed to investigate the trajectory from emergence to mastery of the case markers individually, in relation to each other as well as in relation to verb agreement (i.e., subject-agreement and object-agreement). To the best of our knowledge, there are no such longitudinal studies of Hindi foreign language learners. We are presently conducting such a study, in which we will verify or falsify the developmental hypotheses which we present next.

5. Developmental hypotheses on split ergativity and DOM in L2 Hindi

The developmental hypotheses presented here build on the classic concepts of PT and newer developments within PT, as well as on traditional and newer accounts on case in LFG. With the classic concepts of PT, we refer to the key mechanisms feature unification and the linking of arguments and constituents to grammatical functions, which we described above. For the traditional LFG account on the role of case, we refer to Zaenen, Maling and Thráinsson (1985), who were the first to describe a set of association principles for Icelandic and German. According to these authors, case plays only an abstract role in the linking between a- and f-structure, which is based on two features, [±restrictive] and [±objective]. It would go beyond the scope of the present chapter to discuss these features and their linking (for more information, see Butt (2009b), Baten (2013) and Artoni (2013)). Suffice it to say that in a recent PT approach (i.e., the *multiple constraints hypothesis*), Lenzing (2013) argues that these features,

which represent the syntactic side of the a-structure, are not annotated for syntactic features at the initial stage of the L2 acquisition, and as a result, the f-structure is inaccessible. Consequently, semantic considerations gain importance, which is also evident from later LFG accounts on case. These accounts do not directly integrate case into the linking between a- and f-structure, but they do attribute a larger role to case markers in the analysis of a sentence. For example, Nordlinger's (1998) notion of *constructive case* regards case markers as active components in constructing the syntax of a sentence, and Butt and King's (1991, 2003) notion of *semantic case* (as part of their *differential case theory*) allows semantic information that is held in the lexical entry of case makers to determine the interpretation of a sentence.

In both Nordlinger (1998) and Butt and King (2004), explicit lexical entries for case markers are proposed, which encode pieces of syntactic information and semantic information. Butt and King (2004: 179) propose the following lexical entries for the ergative *ne* and the objective *ko*.

(12)

ne	ko
(↑CASE) = ERG	(↑CASE) = ACC
(SUBJ↑)	(OBJ↑)
(SEM-PROP CONTROL) = INT	(↑SEM-PROP SPECIFIC) = +
V	V
((SUBJ↑) OBJ)	(↑CASE) = DAT
((SUBJ↑) VFORM) = PERF	(OBJ_{goal}↑)
	(↑SEM-PROP CONTROL)

The lexical entry for *ne* states that there is a subject and that it is ergative. This means that ergatives are always subjects, but subjects are not always ergative. In terms of semantics, the entry states that the subject has control, in the sense that in semantically unmarked conditions, *ne* entails that the subject is accompanied by a compulsory object and a perfective verb form. Similarly, *ko* encodes syntactic (OBJ and OBJθ) and semantic information (specificity and goal). Note, however, that the encoding for experiencer subjects is not dealt with in this chapter, because we will not include *ko* as a marker of the experiencer subject.

From the perspective of the language learner, the lexical entries for *ne* and *ko* are of course not fully annotated for their syntactic and semantic information. The question now is: How does this knowledge become gradually available to the second language learner? In an attempt to answer this question, we follow PT's sequence of processing procedures in incremental language generation (i.e., category, phrasal, sentence procedure).

At the level of the category procedure, L2 learners will linearly organize their syntax, which will yield a very limited range of L2 structures. For L2 Hindi, this will include SV or SOV structures. Importantly, at this initial stage, grammatical functions are assumed to be present in the learner grammar, but they are not accessible due to the lack of syntactic features in the a-structure (Lenzing, 2013). As mentioned above, Charters and Muagututi'a (2015) even claim that the grammatical functions are not present in the initial L2 mental

grammar, but as Lenzing and Pienemann (2015) contend, this claim leads to the problem of an explanation of why grammatical functions emerge at a later stage of L2 development. Whatever the position one takes, it is clear that beginning L2 learners of Hindi will be unable to use case markers to mark for grammatical functions.

Nevertheless, previous PT research on L2 case acquisition has shown that beginning learners quickly use nominative and accusative (or rather: non-nominative) case markers to differentiate pre-verbal from post-verbal arguments (Baten, 2013; Artoni, 2013). Unlike earlier suggestions in Baten and Verbeke (2015), however, we do not expect this kind of (syntactically underspecified) direct mapping to occur for L2 Hindi, as it would imply an emerging opposition between *ne*-marked arguments in initial positions and *ko*-marked arguments in non-initial positions. In Baten and Verbeke (2015) the overgeneralizations of *ne* to intransitive subjects are seen as instances of such a direct mapping principle, but as discussed above, these overgeneralizations are actually normal elements in the interlanguage of learners differentiating between the use and non-use of *ne*. Also, their learners do not start to mark all subjects with *ne*; they seem to know that some subjects are marked, and some subjects are not.

Instead, we argue for a kind of semantic mapping, for which we refer to the notion of 'relative prominence' (Mohanan, 1994), i.e. the way in which the arguments of a predicate are structured, and thus relate to one another. One way

of looking at relative prominence is through the thematic hierarchy: agent > goal > patient/theme > locative. Another way is through proto-role entailments, such as volition, sentience, causation, etc. (Dowty, 1991). These entailments deconstruct traditional notions, like 'agent', into more basic components, i.e., 'proto-agent entailments'.

We assume that both the thematic roles and the proto-role entailments will determine the emergence of Hindi case markers. We expect two kinds of associations to emerge. The first involves ergative *ne* and agentive-like arguments, i.e., the controller of an action causing a change, or a sentient being. This association will particularly apply to transitive subjects, but sometimes also to intransitive ones with proto-agent properties such as those of intransitive verbs like *cough, sneeze,* etc. Because inter-phrasal grammatical information exchange with the verb is not possible yet, we furthermore assume that the association will occur with all verb forms. The second association to emerge in the initial stages of L2 Hindi development is between objective/dative *ko* and goal arguments, such as beneficiaries and recipients. It is important to emphasize that these associations are underspecified for grammatical functions (as in Di Biase and Hinger, 2015). Due to the latter association, we are a bit reluctant to propose a third association between objective/accusative *ko* and patient arguments because we expect beginning learners to associate one form with only one type of proto-role entailments. Our hypotheses so far are reminiscent of previous findings on case acquisition. Narasimhan (2005), for

example, also hypothesized that in child acquisition the ergative *ne* would be linked with the notion of agentivity, and as such yield overextended ergative case marking on the subjects of agentive imperfective and intransitive verbs. Regarding the association of dative *ko* with goal arguments, Artoni (2013) found an early emergence of dative on indirect objects. Also, recall that Montrul et al. (2012, 2015) attested high accuracy rates for the dative use of *ko*.

Moving up to PT's level of phrasal procedure, we expect further developments for the objective/accusative *ko* marker. Analogous to Di Biase and Hinger (2015), we assume that the use of dative *ko* on OBL_{goal} will serve as a trigger for the use of accusative *ko* on objects. The learners will mark secondary prominence of arguments with proto-patient entailments which are agentive-like. The reason for locating the emergence of accusative *ko* at this stage is because of the differentiation of the functionally underspecified arguments OBJ and OBL_{goal} within the VP, but also because of the active role attributed to the Hindi case markers in present LFG accounts.[2] Within this account, Butt and King (2004) assume a Kase Phrase (KP), where K is not restricted to a case value but includes grammatical function information and semantically relevant material (see lexical entries in (11)).

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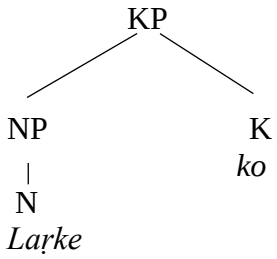
[2] This is different from Spanish where the 'case marker' is a preposition. In earlier research on Spanish DOM (Farley & McCollam, 2004) within the framework of a pre-PT-based schedule (Johnston, 1995), *a*-marking was in fact also located at the phrasal procedure stage.

(13) Laṛke=ko

Boy.M.Sg=OBJ



Given the importance of the feature specificity over animacy for Hindi *ko* marking (Verbeke and Ponnet, forthcoming), we assume that learners will first associate objective/accusative *ko*-marking with specificity. This is in line with Ponnet et al.'s (2016) findings, but contrary to the hypotheses formulated for L2 Spanish DOM, which ascribe a more important role to the feature animacy (Di Biase and Hinger, 2015). However, the importance given to animacy in the latter study may be attributed to the fact that obliques for goals are mostly animate and require the preposition *a*, whereas those for location tend to be inanimate and require *en*. Seeing that this differentiation also largely coincides with a differentiation in the use of prepositions (*a* vs. *en*), it is perfectly valid to assume an emerging link between animacy and *a*-marking. However, this reasoning cannot be transferred to Hindi, where both animate and inanimate obliques can receive *ko*-marking (e.g. animate arguments of goal, inanimate arguments of direction). In other words, seeing that the criteria for DOM are language-specific (Witzlack-Makarevich & Seržant 2017), it is equally valid to assume different driving forces at play for different languages, being specificity in the case of Hindi.

Finally, at PT's stage of the sentence procedure, when grammatical functions become accessible, functional assignments are in place and all grammatical and semantic restrictions can be applied. For the ergative *ne* marker this means that learners will be able to restrict the differentiation between transitive subjects (*ne*-marked) and intransitive subjects (not *ne*-marked) to perfective contexts only. For the objective *ko* marker, this means that *ko* will be distinguished according to grammatical functions (OBJ and OBL). Furthermore, learners will start to differentiate animate objects from inanimate ones, which implies that they can link animate arguments to both subjects and objects. At this last stage, it is also expected that learners will show functional differentiation in other areas of morphosyntax, such as subject-verb and object-verb agreement.

6. Conclusion

This chapter aimed to formulate developmental hypotheses about the second language development of split ergativity and differential object marking in Hindi. Taking into account PT's key mechanisms (*feature unification* and *the linking of arguments and constituents to grammatical functions*) and its new developments (i.e., the *multiple constraints hypothesis*), as well as LFG's *constructive case* and *differential case theory*, we have formulated developmental hypotheses which are driven by semantic mapping. We assume that L2 learners of Hindi will associate case markers with the notion of 'relative prominence' in terms of thematic hierarchy and proto-role entailments. We

claim that the semantic associations that emerge in the early stages of the L2 Hindi development will eventually lead to functional case marking when the S-procedure is reached. For the ergative marker *ne*, on the one hand, this involves a developmental trajectory from initial mapping on agentive-like arguments to functional differentiation according to transitivity/perfectivity, and for the objective/accusative marker *ko*, on the other, a development from marking specificity to marking the interaction specificity/animacy. Some of our hypotheses coincide with earlier findings from child language learners, second language learners, or heritage learners of Hindi, others do not. Therefore, longitudinal data are needed to empirically validate the developmental hypotheses presented here.

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