



Argument realization in Hindi caregiver–child discourse

Bhuvana Narasimhan^{a,*}, Nancy Budwig^b, Lalita Murty^c

^aMax Planck Institute for Psycholinguistics, Post Box 310, 6500 AH Nijmegen, The Netherlands

^bClark University, Worcester, MA, USA

^cUniversity of York, York, UK

Received 21 June 2003; received in revised form 13 January 2004; accepted 27 January 2004

Abstract

An influential claim in the child language literature posits that children use structural cues in the input language to acquire verb meaning (Gleitman, 1990). One such cue is the number of arguments co-occurring with the verb, which provides an indication as to the event type associated with the verb (Fisher, 1995). In some languages however (e.g. Hindi), verb arguments are ellipted relatively freely, subject to certain discourse-pragmatic constraints. In this paper, we address three questions: Is the pervasive argument ellipsis characteristic of adult Hindi also found in Hindi-speaking caregivers' input? If so, do children consequently make errors in verb transitivity? How early do children learning a split-ergative language, such as Hindi, exhibit sensitivity to discourse-pragmatic influences on argument realization? We show that there is massive argument ellipsis in caregivers' input to 3–4 year-olds. However, children acquiring Hindi do not make transitivity errors in their own speech. Nor do they elide arguments randomly. Rather, even at this early age, children appear to be sensitive to discourse-pragmatics in their own spontaneous speech production. These findings in a split-ergative language parallel patterns of argument realization found in children acquiring both nominative-accusative languages (e.g. Korean) and ergative-absolutive languages (e.g. Tzeltal, Inuktitut).

© 2004 Elsevier B.V. All rights reserved.

Keywords: Argument realization; Discourse-pragmatics; Hindi; L1-acquisition; Input; Ellipsis; Ergative construction

* Corresponding author. Tel.: +31-24-352-1231; fax: +31-24-352-1213.
E-mail address: bhuvana@mpi.nl (B. Narasimhan).

1. Introduction

The lexicon plays a central role in any theory of grammar which assumes that syntactic behavior is driven by the properties of lexical heads. Children's acquisition of the lexicon, especially verb argument structure, paves the way for the acquisition of the grammar of their language. The question as to how children establish a correspondence between the meaning of a verb and its syntactic argument frame(s) in the input is hence one which has received considerable attention in the literature, largely in the context of the "bootstrapping" problem. Bootstrapping proposals focus on: (a) how children use syntactic cues to infer verb meaning (Fisher, 1995; Fisher et al., 1994; Naigles, 1990; Naigles and Kako, 1993; Naigles et al., 1993; Gleitman, 1990), as well as (b) how children use (verb) meaning to figure out how its arguments are realized in the syntax of the language (Grimshaw, 1994; MacNamara, 1982; Pinker, 1989).

One assumption underlying both types of proposals is that all the arguments of the verb are overtly specified in the input whenever the verb is used in a particular situation (Grimshaw, 1994; Fisher, 1995). This overt specification is a key cue which helps the child establish a mapping between verb semantics and its argument structure(s). For instance, a situation in which a child breaks a glass can be viewed as a causal event involving two participants, and described with two arguments, as in He broke the glass. Alternatively, a non-causal, single participant perspective could be taken on the event, described using one argument as in the glass broke. The correspondence between event type(s) (causal or non-causal) and verbs is established using the number of explicitly specified arguments which co-occur with the verb.¹

However, a cue such as the number of arguments is not an absolutely reliable indicator of verb meaning. In some contexts, not all the arguments associated with a given verb are overtly realized. As a result, verbs used for causal two-participant events can occur with a single argument. For instance, in certain contexts, the second argument of a causal verb such as clean can be omitted, as in (John cooked and) Jill cleaned. The verb in this particular frame does not mean that Jill became clean, nor does it imply a non-causal activity with no resulting state of cleanliness (as can happen with the action described as scrubbing, for instance). In a language which allows argument omission relatively freely, it is also possible to get sentences such as the dishes cleaned where the causer argument is elided. Yet, in all these cases, the verb still implies a causal event despite the overt presence of only one argument.

Hence, as a prerequisite to associating syntactic argument structure(s) and verb meaning, the child first has to figure out whether differences in the number of arguments co-occurring with a given verb reflect argument structure alternations corresponding to different event types associated with the verb (causal versus non-causal events as in the boy broke the vase versus the vase broke), or whether they are actually variable surface syntactic realizations

¹ In talking about the overt number of arguments associated with the verb, we are referring to the "syntactic transitivity" of the verb, or the number of arguments associated with a "construction" (Goldberg, 1995). That is, a verb which is "semantically" transitive (e.g. with agent and patient arguments) might surface in a passive construction which is syntactically *intransitive*. In this paper, when we talk about the number of arguments which index the "event types" associated with a verb, we are referring to "syntactic" transitivity.

corresponding to the same type of event (as in John cleaned the dishes versus John cleaned (while Bill vacuumed)). In a language such as English, this type of argument omission is rare, whereas it is pervasive in a language such as Hindi (see Fisher et al., 1994: 363 for a similar observation regarding Chinese). Since languages differ with respect to the ease with which the arguments of a verb can be omitted (see Bickel, 2002 for a discussion), children have to learn how reliably the number of arguments associated with a verb can be used as a cue to verb meaning in their language. More specifically, the child can make the following assumptions when confronted with variation in the surface realization of arguments of a verb in the input:

- (a) The verb is associated with multiple argument structures: Alternations in the number of arguments that co-occur with a verb (e.g. dho ‘wash’) correspond to different argument structure frames (and types of events) associated with that verb:²

dho¹: intransitive (with an “understood reflexive object” (Levin, 1993: 35)) corresponding to an activity; e.g.: “the boy washes daily”

dho²: unaccusative intransitive corresponding to a state-change; e.g.: “the dishes washed (clean)”

dho³: transitive corresponding to an accomplishment; e.g.: “the boy washed the dishes”

- (b) The verb is associated with a single argument structure: Alternations in the number of arguments that co-occur with a verb constitute pragmatically licensed ellipses of arguments of the *same* (two-argument) frame and event type associated with a verb such as dho:

dho: [the boy washed the shirt]
 [0 washed the shirt]
 [the boy washed 0]
 [0 washed 0]

In English, argument omission is restricted and overtly specified arguments index the argument structure(s) associated with the verb relatively reliably, hence children acquiring English can safely assume a one-to-one correspondence between the number of overt arguments and the argument structure associated with the verb, as in (a). While children acquiring English also have to pay attention to discourse pragmatics (e.g. in determining whether the referential form of arguments is lexical or pronominal), the role of this factor in licensing *null* arguments (which is responsible for surface variability in the argument

² Note that surface variability in argument number is compatible with (at least) *three* possibilities: (a) pragmatically licensed ellipsis of the same argument structure (John washed and John washed the dish), (b) different argument structures lexically associated with the “same” verb (he rolled the ball and the ball rolled), or (c) the same argument structure but with one argument syntactically demoted as a result of operations such as passivization (she ate the cookie and the cookie was eaten (by her)). We shall not focus on the thorny issue of how exactly the child makes the relevant distinction between the latter two possibilities, although overt morphology presumably plays a role in languages which overtly mark voice alternations.

structure patterns associated with a verb) is limited in the language.³ How early children acquiring English acquire sensitivity to such factors is a matter of empirical investigation. In this paper, we shall focus on the case of children acquiring Hindi.

Hindi is an SOV language with relatively free word order, and is spoken mainly in Northern India. Verbs in Hindi are inflected for tense/aspect as well as (person, number, gender) agreement, and since the language has a morphologically split-ergative case system, case-marking on the nominals varies based on tense/aspect marking on the verb. The subject of the transitive verb is marked with the ergative case-marker -ne when the verb is affixed with past/perfective inflection, otherwise it receives null marking. The object of the transitive verb and the subject of the intransitive verb get null inflection regardless of the tense-aspect marking on the verb.⁴ In Hindi, verbs rarely occur with all their arguments, hence children acquiring Hindi have to realize that, in the vast majority of cases, multiple surface realization patterns of arguments often correspond to instantiations of a single argument frame, as in (b). For instance, in the speech of Hindi mothers, transitive verbs appear with two overt arguments (pronominal or lexical NP) extremely rarely. In one Hindi mother's speech to her child in our database of spontaneous caregiver-child discourse, the verb toR-‘break’ appears only once with both arguments:⁵

- (1) aap-ne guDDii-kii eyes-0 toR Daalii, naa?
 you-Erg doll-Gen eyes-Nom break put-Sg.Prf.Fem. no?
 ‘You broke the doll’s eyes, didn’t you?’
 (va.cha)⁶

The same verb occurs with one argument six times, and twice with no arguments at all:

- (2) ghaNTii-0 bhii toR dii.
 bell-Nom also break give-Sg.Fem.Prf.
 ‘(You) broke the bell too’

³ As pointed out to us by Melissa Bowerman, argument ellipsis is also licensed in languages such as English when the identity of the referent is unknown, as in “you wash and I’ll dry” (see Fillmore, 1996). See Rispoli (1991) for an account of English-acquiring children’s sensitivity to the pragmatic motivation for such types of ellipsis.

⁴ The term “split-ergative” is used for languages in which a split in morphological case-marking occurs in the subjects of transitive verbs, as well as for languages where there is a split in how the subjects of *intransitive* verbs are case-marked. In Hindi, the split occurs in the transitive verb class; further, the case-marking patterns are more complex than the term “split-ergative” would suggest, since case on subject (ergative, nominative) and object (nominative, accusative) can vary independently (cf. Mohanan, 1994).

⁵ Glosses: Erg: Ergative; Nom: Nominative; Acc: Accusative; Dat: Dative; Gen: Genitive; Loc: Locative; Ins: Instrumental; NF: Non-finite verb; Pst: Past tense; Pres: Present tense; Fut: Future tense; Sg: Singular; Msc: Masculine; Fem: Feminine; Impf: Imperfective; Conj.Prt.: Conjunctive Participle; Prf.: Perfective; Ind.caus: Indirect causative; DM: Discourse Marker; Inch: Inchoative. We gloss -ko marking as accusative case when it appears on the direct object, but as dative case when it appears on experiencer subjects and goals (see Mohanan, 1994 for detailed arguments in support of this terminology).

⁶ The filename “va.cha” indicates which child sample these examples are taken from; a list of filenames and associated demographic information is provided in Table 2.

- (3) toR diyaa aap-ne.
break give-Sg.Msc.Prfl you-Erg.
'You broke (it)'
- (4) toRii hae.
break-Sg.Fem.Prfl be-3.Sg.Pres.
'(You) broke (it)'

Not only does the child acquiring Hindi have to discover that the basic transitivity of the verb cannot be inferred directly from patterns of overt realization of arguments, but s/he must also understand the role of discourse-pragmatic factors in licensing argument ellipsis. Such an understanding is essential if the child is to rely more on alternative strategies to discover the mapping between verb meaning and argument structure, for instance by tracking the occurrence of arguments of a verb *across* turns in the discourse (Küntay and Slobin, 1996).⁷

In examining whether children acquiring Hindi are aware of the role of discourse pragmatics in the licensing of null-arguments, we rely on the account of "preferred argument structure" (PAS) described in Du Bois (1985, 1987). According to this account, there is a three-way linking between discourse pragmatics, grammatical role (S, A, O), and referential form (lexical NP, pronominal, null) in natural language discourse.⁸ The syntactic argument configuration across clause tokens in discourse tends to be limited to one argument per clause, and the role of this argument tends to be S or O—these constitute the grammatical dimensions of the "quantity" and "role" constraints respectively (1987: 829). The pragmatic dimension of the "quantity" and "role" constraints is formulated in terms of the tendency for only one new argument to be introduced per clause, and for this argument to occur in either the S or the O role (p. 829). Preferred argument structure thus reflects the nature of information flow in discourse; speakers tend to introduce only one new argument per clause, which usually bears the S or O role. Further, the morphological form of the argument also reflects pragmatic status, since lexical NPs, more than pronominal or null forms, are used to introduce new information (Clancy, 1993; Allen and Schroeder, 2003; Allen, 2000).

The form and the grammatical role of realized arguments in Du Bois' account are linked to pragmatic status in the following way (Table 1). Lexical NP arguments tend to encode newly introduced referents, and S and O arguments tend to provide information about inanimate, theme or patient referents, often new or confusable with other referents in the context. As a consequence, the patterns of argument realization in discourse, "preferred argument structure", exhibit an "ergative" skewing such that the S and O roles are treated alike as loci for the realization of new information (using lexical NPs), whereas the A role is treated as the locus for the realization of given information (using null/pronominal forms).

⁷ Küntay and Slobin (1996) use the term "variation set" for a series of utterances produced across multiple consecutive turns in the discourse. Since the utterances have a common underlying communicative intention, variations in phrasing (e.g. in terms of lexical substitution, word order, and omission of elements) provide valuable information about the nature of the relation between verb meaning and patterns of argument realization.

⁸ Following Dixon (1987), the S, O, and A roles refer to the subjects of intransitive verbs, the objects of transitive verbs, and the subjects of transitive verbs, respectively.

Table 1
Preferred argument structure in discourse

Grammatical role	Information structure	Referential form
A	Given	Pronominal/null
S/O	New	NP

Du Bois suggests that this discourse tendency constitutes the basis for the morphological grouping of S and O arguments in ergative languages. In contrast, a competing tendency also exists for topical entities, usually human protagonists, to be realized in S and A roles. Such a tendency, if it “wins”, forms the basis for the morphological grouping of S and A roles in nominative-accusative languages. Both motivations exist and compete, independently of the case patterns of a particular language. Hence, topic continuity groups together the S/A positions even in a language such as Sacapultec Maya which is ergative, and new arguments are realized using lexical NPs in S/O position even in nominative-accusative languages (Du Bois, 1987: 843). Du Bois suggests that the tendency of topical entities to occur in S/A position and that of new arguments to occur in S/O positions is not *caused* by the morphological case-marking system of a language, on the contrary, it is the motivating factor for such systems (1987: 839).

Whether or not “the ergative patterning of discourse” does indeed constitute “the basis... of the grammatical phenomenon of ergativity” (Du Bois, 1987: 806), it is nevertheless the case that the task for the language-learning child involves identifying the (multiple) bases for the grouping of the same set of core arguments in his/her particular language. Based on discourse-pragmatic factors, the child must eventually acquire the patterns of argument realization in adult speech. These patterns can be characterized by the correlation of newness and lexical realization with the S and O grammatical roles, and correspondingly, non-newness and null/pronominal realization with the A grammatical role. Depending on the case typology of the language, those arguments which are realized, are then grouped for the purposes of case-marking, with S/O treated alike if the language is ergative-absolutive, or with S/A roles treated similarly if the language is nominative-accusative. Research concerning children acquiring ergative-absolutive languages such as Tzeltal and Inuktitut (Brown, 1998; Allen, 2000; Allen and Schroeder, 2003) as well as nominative-accusative languages such as Korean (Clancy, 1993, 1997) suggests that children are sensitive to the “ergative skewing” of arguments on the basis of discourse-pragmatic factors, regardless of the type of language they are learning.

Hindi is especially interesting to study in this regard, owing to its morphologically split-ergative properties. Du Bois does not provide a detailed discussion of how such systems might have arisen (with the exception of a comment in a footnote, 1987: 845, footnote 24), and there is no account of the acquisition of “preferred argument structure” in split-ergative languages in the child language literature. A child acquiring Hindi is faced with a situation where realized arguments (either lexical NPs or pronominal forms) are grouped together in one way when the verb is marked with perfective inflection, but in a different way when the verb does not get perfective inflection. In perfective contexts, A is marked with -ne (ergative case), and S and O get null-marking (depending on animacy, definiteness/specificity, O is marked with accusative (-ko) case). In non-perfective contexts, A and S

receive null-marking;⁹ O receives null-marking unless it is animate/definite/specific (in which case it receives accusative case).¹⁰

Other work suggests that, by three to 4 years of age, children acquiring Hindi demonstrate an understanding of the groupings of verbs into transitive and intransitive constructions in the language (Budwig and Narasimhan, 2002). However, whether the variable grouping of arguments at the morphological level in the target language influences the child's ability to discern the ergative grouping of arguments at the discourse–pragmatic level is an empirical issue in crosslinguistic studies of L1-acquisition—an issue which this paper aims to explore.

In the remainder of this article, we examine naturalistic caregiver-child discourse in Hindi in order to better understand acquisitional issues concerning argument realization in Hindi. More specifically, we examine the issue of whether determining verb transitivity is indeed a problem for children acquiring Hindi by analyzing the extent to which arguments are ellipted in Hindi caregiver input. We also analyze whether Hindi-acquiring children make transitivity errors in their spontaneous productions, which would be an indicator that absence of arguments in the input is a problem for the purposes of assigning argument structure to verbs. Finally, we investigate whether Hindi-speaking children elide arguments randomly or whether they exhibit sensitivity to discourse-pragmatic constraints on the realization of arguments in their own spontaneous utterances. In the following three sections, we address each of these questions in turn. Our general aim is to suggest that children rely on multiple cues to discover language structure (cf. Rispoli, 1995; Hirsh-Pasek and Golinkoff, 1996), and that syntactic cues in the input provide only one of a variety of wedges for children's acquisition of grammar (see Budwig, 1995, 2001; Budwig and Narasimhan, 2002; Slobin, 1985; Tomasello, 1998).

2. Ellipsis patterns in the input

Although verbs rarely occur with all their arguments in adult language in Hindi, it might be the case that caregivers adopt a style characterized by relatively more redundancy when talking to children, realizing the arguments of the verb explicitly most or all of the time. Since the omission of an argument is optional, caregivers can choose to be more overtly informative about verb argument structure without violating grammaticality.

⁹ Depending on verb and construction semantics, A can be marked with other non-nominative cases such as dative irrespective of tense-aspect (see Mohanan, 1994).

¹⁰ In his discussion of ergativity in Sacapultec, Du Bois (1987: 216) suggests that there is a marking strategy at work in the language which leads to the avoidance of “double-positives”—a situation where a given referent is overtly marked both by cross-referencing on the verb and by the overt use of a lexical NP. Interestingly, in Hindi, which has nominal case as well as verbal “agreement” (with one of the arguments in the transitive clause), a verb can agree with an argument *only* when that argument is null-marked. In situations where *both* arguments of a transitive clause are null-marked it is the A argument with which the verb agrees, which also happens to be the argument most likely to be elided. While this situation is not analogous to the cases of double-positives in Sacapultec, the avoidance of multiple-marking of grammatical relations, and the interplay of null-marking on nominals and verbal agreement in Hindi discourse deserve further exploration.

Table 2
Demographic information of Hindi children

Child	Gender	Age	SES grouping	Filename
Akshit	Male	3;6	Upper	ak.cha
Aman	Male	3;7	Upper	am.cha
Anubhav	Male	3;3	Upper	aj.cha
Isha	Female	2;10	Upper	is.cha
Tanya	Female	3;7	Upper	ta.cha
Varun	Male	3;11	Upper	va.cha
Abhay	Male	3;5	Lower	ab.cha
Anshu	Male	3;8	Lower	an.cha
Archana	Female	4;0	Lower	ar.cha
Christina	Female	3;6	Lower	ch.cha
Lisa	Female	4;3	Lower	li.cha
Nishal	Male	3;6	Lower	ni.cha
Mean age		3;7		

In this section, we examine Hindi caregiver discourse in order to determine the extent to which argument ellipsis is indeed a characteristic of input to children acquiring the language.

2.1. Method

The participants in this study stem from a larger study of Hindi-speaking children and their caregivers (Budwig and Chaudhary, 1996). Twelve children from the larger sample of 46 families were selected randomly, with the single exception that the children equally represented the larger socio-economic status (SES) backgrounds represented in the study. For this purpose, the children in the larger sample were divided into two groups—those representing the lower end of the SES spectrum and those representing the upper end. Six children were then selected from each of these two groups with balance for age. The children ranged in age from 2;10 to 4;3 with a mean age of 3;7. Seven children were males and five were females. The children all lived in New Delhi and were acquiring Hindi as a first language. Table 2 provides an overview of the participants.

The children were recorded in their home setting with their caregivers for approximately one hour. The video and audio recordings included both free interaction and semi-structured play. At the onset of the visit the children and caregivers engaged in whatever activities they desired. Often this included meal preparation or drawing and writing exercises. In addition, each dyad was given plastic blocks to play with for a 15 minute period, as well as a story book to look at together. As part of a study of early communicative development, caregivers had already been recorded in dyadic interaction with their children when the children were infants (see Chaudhary, 1995, 1999). The caregivers were aware of the researchers' general interests in communicative development and were asked to spend the video time interacting with the focal child. Some of the children had siblings who occasionally entered the room where taping took place, and on occasion other

adults made brief appearances, but the bulk of the time recording consisted of caregiver and child interaction.

All data was transcribed using a modified version of the CHAT system (MacWhinney and Snow, 1985). All utterances were then coded in terms of a multi-level coding scheme which examined (a) grammatical transitivity of the clause in which the verb occurred (b) number of arguments realized, and (c) case-marking on overt arguments. Transitivity in Hindi has been described as constituting a continuum (Bhatia, 1981; Kachru, 1981; Pandharipande, 1981, cited in Hock, 1985). However, for current purposes, the following criteria were adopted in order to classify verbs on the basis of transitivity: if the verb, in active declarative contexts, semantically entails a single participant, it was coded as intransitive. Intransitive uses include predicate nominal constructions with the verb *ho* ‘be/become’, where the verb establishes a possession or an identity relation between the two arguments:

- (5) *aesaa hii book-0 is-ke paas bhii hae.*
 like this only book-Nom s/he-Gen near also be-3.Sg.Pres.
 ‘S/he has a book like this too’
 (li.cha)
- (6) *duusraa hogaa peT-0, haan.*
 another be-3.Sg.Msc.Fut. stomach-Nom, yes.
 ‘(The) other (one) must be the stomach, yes’
 (ab.cha)

If the verb entails two or more participants and the subject of the verb receives the ergative marker *-ne* in the perfective/past tense, then the utterance was coded as transitive; elsewhere, the utterance was coded “mediotransitive” (e.g. *siitaa ko bhuukh lagii* ‘siitaa-Dat hunger-Nom strike-Sg.Fem.Prf.’ “Siitaa felt hungry”).^{11,12} (For a more detailed discussion of coding criteria and examples of each transitivity class, please see Appendix A). In order to measure the reliability of the analyses, a second coder independently coded the data for 10% of the total corpus of the caregivers’ utterances and the children’s utterances respectively. The percentage of agreement was 91% for the caregivers’ utterances and 87% for the children’s utterances.¹³

¹¹ Since our focus is on “syntactic” transitivity, if the construction in which the verb appeared (e.g. the passive or the perfect participle constructions) entailed a different number of arguments than entailed by the verb in isolation, the transitivity value of the verb was taken to be the same as that of the construction. Hence, a single verb (e.g. *khaa* ‘eat’) can be associated with two overt syntactic arguments in an active sentence, or just one, in a passive construction (see also footnote 1 and the detailed coding criteria provided in the Appendix A).

¹² There were no “control” type constructions involving obligatory null arguments (e.g. *voh ghar jaanaa caahtaa hae* “he-Nom house-Dat go-INF want-Sg.Msc.Imprf. be-3.Sg.Pres.” “he wants to leave”) in the child or caregiver utterances in this particular dataset.

¹³ The measure of interrater reliability was computed using the following formula:

$$\text{C.R. (coefficient of reliability)} = \frac{2m}{n_1 + n_2}$$

where m = number of coding decisions which the two raters agreed on; n_1 = the number of coding decisions made by the first rater; n_2 = the number of coding decisions made by the second rater.

Table 3
Overt arguments in Hindi caregiver discourse

	0	1	2
Intransitive (<i>n</i> = 559) (%)	52.2	47.7	–
Transitive (<i>n</i> = 854) (%)	44	49	7
Mediotransitive (<i>n</i> = 44) (%)	15.9	65.9	18.2

2.2. Results

Our study reveals that there is massive ambiguity in the input with respect to verb transitivity.

Table 3 shows a fairly equal distribution of transitive verbs occurring in one argument and no argument contexts, with few (7%) transitive verbs occurring in a two-argument use. Even mediotransitive verbs, which have a relatively higher rate of realization of both arguments, occur in null or one-argument contexts 81.8% of the time.

Tables 4 and 5 provide examples of two-argument verbs which occur at least five times in the mothers' utterances (29 types), and the percentage of time that the verb occurs with both its arguments, as opposed to just one argument. The verbs include those classified as "mediotransitive" and "transitive" (which includes ditransitive verbs).

We find that only 17 of the 29 verbs classified as mediotransitive or (di)transitive appear with both arguments (ranging from 2 up to 33% of their total uses). All 29 verbs also appear with just a single argument (ranging from 15 to 100% of their total uses), or (barring one verb: *pehen* 'wear'), with no argument at all.

We also examined the use of case-marking when a transitive verb appeared with only one overtly realized argument. Since transitive verbs are associated with a set of case-markers distinct from intransitive verbs, such cues might help the child determine the transitivity of the verb even if it occurs with just one argument. The occurrence of a verb (from the list in Tables 4 and 5) with a single argument in the accusative case (object arguments), ergative case and dative case (subject arguments) is indicated in Table 6, along with the number of tokens of use for each verb.

The use of distinctive case-marking associated with transitive verbs is relatively rare in the input. For instance, occasionally, accusative and ergative case markers occur with the more "prototypically" transitive verbs such as *kar* 'do' and *toR* 'break':

- (7) *is-ko aese karenge.*
this-Acc like this do-1.Pl.Msc.Fut.
'(We) will do this like this' (ab.cha)
- (8) *aap-ne kaese kiyaa thaa?*
you-Erg how do-Sg.Msc.Pr. be-3.Sg.Pst.?
'How did you do (this)?' (aj.cha)
- (9) *aap-ne... paer-0 maar maar kar toR diyaa hae.*
you-Erg...feet hit hit-Conj.Prt. break give-Sg.Msc.Pr. be-3.Sg.Pres.
'You have broken (it) by repeatedly kicking (it)' (va.cha)

The instances of distinctive case-marking in “mediotransitive” predicates involving dative subjects (examples (10) and (11)) are also vanishingly rare:

- (10) mujhe yeh-0 caahiye.
I-Dat this want.
'I want this (one)' (ni.cha)
- (11) nahiin mujhe pataa hae.
no, I-Dat know be-3.Sg.Pres.
'No, I know (it)' (aj.cha)

Hence, out of the 792 tokens of use of the 29 transitive verbs listed in Tables 4 and 5, occurrences in disambiguating contexts, with both arguments (56 tokens) or with a distinctive case-marking on the single argument (34 tokens), occurred only 11.4% (90/792) of the time. In the remaining cases, the verb occurs in contexts which overlap with those of intransitive verbs in terms of the number of co-occurring arguments and (null) case-marking on the realized arguments.

Table 4
Occurrence of transitive verbs with two arguments (includes ditransitives and mediotransitives)

Transitive verbs	Occurrence with two arguments	English gloss	Occurrence with 2 arguments (%)
biThaa (5)	biThaa (0)	seat	0
caahiye (10)	caahiye (0)	want	0
calaa (22)	calaa (0)	drive	0
gaa (7)	gaa (0)	sing	0
khol (13)	khol (0)	open	0
lagaa (34)	lagaa (0)	attach	0
paRh (19)	paRh (0)	read	0
pakaR (6)	pakaR (0)	hold/catch	0
pataa (5)	pataa (0)	know	0
pehen (7)	pehen (0)	wear	0
rakh (20)	rakh (0)	put	0
sulaa (6)	sulaa (0)	cause to sleep	0
dekh (96)	dekh (2)	see	2
khel (73)	khel (2)	play	3
bataa (30)	bataa (1)	tell	3
bol (51)	bol (2)	say	4
le (45)	le (2)	take	4
dikhaa (41)	dikhaa (2)	show	5
de (37)	de (2)	give	5
kar (66)	kar (8)	do	12
sunaa (16)	sunaa (2)	cause to listen	13
toR (8)	toR (1)	break	13
paRhaa (22)	paRhaa (3)	teach	14
khiinc (13)	khiinc (2)	pull	15
nikaal (6)	nikaal (1)	remove	17
kah (11)	kah (2)	say	18
laa (33)	laa (6)	bring	18
banaa (84)	banaa (16)	make	19
mil (6)	mil (2)	receive	33

Table 5

Occurrence of transitive verbs with one argument (includes ditransitives and mediotransitives)

Transitive verbs	Occurrence with one argument	English gloss	Occurrence with one argument (%)
khol (13)	khol (2)	open	15
bataa (30)	bataa (9)	tell	30
dekh (96)	dekh (33)	see	34
calaa (22)	calaa (8)	drive	36
paRh (19)	paRh (7)	read	37
khel (73)	khel (27)	play	37
dikhaa (41)	dikhaa (17)	show	42
bol (51)	bol (22)	say	43
sunaa (16)	sunaa (7)	cause to listen	44
khiinc (13)	khiinc (6)	pull	46
de (37)	de (18)	give	49
banaa (84)	banaa (41)	make	49
mil (6)	mil (3)	receive	50
nikaal (6)	nikaal (3)	remove	50
rakh (20)	rakh (10)	put	50
kah (11)	kah (6)	say	55
paRhaa (22)	paRhaa (12)	teach	55
biThaa (5)	biThaa (3)	seat	60
le (45)	le (27)	take	60
pataa (5)	pataa (3)	know	60
toR (8)	toR (5)	break	63
kar (66)	kar (44)	do	67
laa (33)	laa (22)	bring	67
pakaR (6)	pakaR (4)	hold/catch	67
sulaa (6)	sulaa (4)	cause to sleep	67
lagaa (34)	lagaa (24)	attach	71
gaa (7)	gaa (5)	sing	71
caahiye (10)	caahiye (9)	want	90
pehen (7)	pehen (7)	wear	100

Table 6

Distinctive case-marking on overt arguments of transitive verbs (includes ditransitives and mediotransitives)

Accusative	Ergative	Dative
banaa 'make'	2	de 'give' 1 caahiye 'want' 1
biThaa 'seat'	3	kar 'do' 1 pataa 'know' 3
kar 'do'	2	lagaa 'attach' 1
dekh 'see'	3	toR 'break' 2
sulaa 'sleep-Caus'	4	
khol 'open'	1	
lagaa 'attach'	5	
paRhaa 'teach'	1	
pakaR 'hold/catch'	2	
rakh 'put'	2	
Total	25	5 4

2.3. Discussion

Our analysis of ellipsis patterns in Hindi-speaking caregiver input suggests that the two classes of transitive and intransitive verbs are almost indistinguishable in their surface distribution patterns in the majority of the utterances produced in the input. Rispoli finds similar patterns in the input of Japanese-speaking caregivers to their children and concludes that “if Japanese children relied only on syntactic information for the classification of verbs into the intransitive class, they would have to wait for a set of very rare input sentences to accomplish this classification” (1995: 342). In the next section, we turn to an examination of Hindi-acquiring children’s use of transitive and intransitive verbs in order to determine whether sparse argument structure information in the input impedes the acquisition of verb transitivity in the language.

3. Error analysis in child Hindi

We have demonstrated that there is a massive amount of argument ellipsis in Hindi caregivers’ speech to young children; this results in extensive overlap in the surface environments in which transitive and intransitive verbs appear. If the Hindi child assumes that there is a direct correspondence between the surface realization of the arguments of a verb and the argument structures associated with it, we would expect to see many transitivity errors in the child’s own spontaneous utterances. For instance, s/he might assume that a transitive verb such as *banāa* ‘make’ (which can occur with two overt arguments or only one) has both a transitive and an intransitive variant. The child might then erroneously use the verb in contexts which are compatible mainly with intransitive verbs. Alternatively, s/he might assume that an intransitive verb can also occur in transitive contexts. Erroneous assumptions in either direction would lead to errors in patterns of use as well as of distribution in linguistic contexts. In this study, we shall focus on the uses of the verbs in different linguistic contexts.

3.1. Method

Our database for the purposes of this analysis consisted of the spontaneous production data from 12 caregivers and their 3–4-year-old children described in Section 2.2 of this paper. A total of 680 utterances produced by the children were extracted from the database, and the linguistic contexts of use were noted. We examined two diagnostic linguistic environments which overtly distinguish between transitive and intransitive verbs. These include co-occurrence with ‘light’ verbs and the use of case-morphology (we cannot use the number of arguments as a diagnostic since, as we have observed earlier, the realization of both arguments with transitive verbs is not obligatory in Hindi).¹⁴ Within each of these

¹⁴ The term “light verb” is used to refer to the semantically bleached verb which occurs together with a host element, and shares the predicative burden (see Jespersen, 1954; Mohanan, 1994). Compound verb (Verb–Verb) constructions consist of a non-finite or stem form of a main “host” verb used in combination with the finite form of the “auxiliary” or “vector” verbs (which we term “light verbs”), which are taken to contribute aspectual information (Hook, 1991), as well as more fine-grained semantic information such as volitionality (Butt, 1995).

diagnostic contexts, we scrutinized the data for any errors indicating the inappropriate assignment of a verb to a transitivity class.

In Hindi, the intransitive light verb jaa ‘go’ is almost exclusively used with intransitive verbs, while the transitive light verbs de ‘give’ and le ‘take’ occur with transitive verbs:¹⁵

- (12) ham-ne us-ko le *gayaa /liyaa.
we-Erg he-Acc take *go-Sg.Msc.Prf./take-Sg.Msc.Prf.
‘We took it (for ourselves)’
- (13) bacche-0 ghar bhaag *diye /gaye.
children-Nom home-Dat run *give-Sg.Msc.Prf./go-Sg.Msc.Prf.
‘The children ran (away) home’
- (14) Dibbaa gir *liyaa /*diyaa /gayaa.
box-Nom fall *take-Sg.Msc.Prf./give-Sg.Msc.Prf./go-Sg.Msc.Prf.
‘The box broke’

The combination of an intransitive light verb such as jaa ‘go’ with a transitive verb, or a transitive light verb such as de ‘give’ or le ‘take’ with an intransitive verb would be coded as involving a transitivity error.

A second diagnostic context involved the use of case morphology. Since Hindi is a split-ergative language, the subject of the transitive verb is marked with the ergative case-marker -ne when the verb gets past/perfective morphology, otherwise it receives nominative case (i.e. is null-marked). The single argument of the intransitive case is, with the exception of a small set of lexical exceptions, always in the nominative, i.e. it receives null marking whatever the tense-aspect morphology on the verb.¹⁶

We consider the following two types of case-marking errors children might make in assigning a verb to the wrong transitivity class: (a) the use of nominative case on the subject argument of transitive verbs (misclassified as intransitive) in the past-perfective context, (b) the use of ergative case on the subject of intransitive verbs (misclassified as transitive) in the past/perfective context. For instance, use of transitive verbs with past/perfective morphology requires that the subject argument be assigned ergative case as in the case of the transitive verb dekh ‘see’ (15). But if the verb dekh were assigned to the class of intransitives, we would expect the child to produce sentences such as (16) where the subject is assigned nominative case:¹⁷

- (15) siitaa-ne mujhe dekhaa
siitaa-Erg I-Dat see-Sg.Msc.Prf.
‘Sita saw me’

¹⁵ Exceptions to these generalizations exist (e.g. khaajaa ‘eat go’), which however are relatively infrequent.

¹⁶ Since the arguments of mediotransitive verbs are associated with a number of cases other than ergative in the past/perfective (e.g. dative, genitive, and nominative), we exclude them for the purposes of this particular analysis.

¹⁷ The use of nominative case on the single argument of a transitive verb is compatible with two possibilities: (a) the single argument is the subject of an intransitive verb, or (b) the argument is the object of a transitive verb. For instance, in vohkholaa ‘he/it-Nom open-Sg.Msc.Prf’, voh is a pronoun (meaning ‘it/he/she’) which can either refer to the (erroneously case-marked) agent or the (appropriately case-marked) patient. In ambiguous cases, we used the discourse context to distinguish between these possibilities.

- (16) *siitaa-0 dekhii.
 *siitaa-**Nom** see-Sg.Fem.Prf.
 ‘Sita saw’

Conversely, children might use an intransitive verb with the ergative case in past/perfective contexts (17) as opposed to the (correct use of the) nominative case (18):

- (17) *us-ne giraa
 she-**Erg** fall-Sg.Msc.Prf.
 ‘she fell’
- (18) wo-0 girii
 she-**Nom** fall-Sg.Fem.Prf. . .
 ‘she fell’

The use of nominative case on the subject argument of transitive verbs or the use of ergative case on the subject of intransitive verbs in the past/perfective context would, for the purposes of this analysis, be coded as involving transitivity errors.

3.2. Results

We begin with children’s use of light verbs. The data show that the children never make errors in combining light verbs with the appropriate main verb. Transitive verbs such as banaa ‘make’ and nikaal ‘remove’ (examples (19) and (20)) and intransitive verbs such as TuuT ‘break-Inch’ and gir ‘fall’ (examples (21) and (22)) are always used with the appropriate light verb (indicated in boldface):

- (19) mammii, gaaRii banaa do.
 mother, car-Nom make **give**-Imp
 ‘Mother, make (me) a car’ (ab.cha)
- (20) maen-0 saare khilaune-0 nikaal luungaa.
 I-Nom all toys-0 remove **take**-1.Sg.Msc.Fut.
 ‘I will take out all the toys’ (an.cha)
- (21) are yeh-0 TuuT gaii.
 oh this-Nom break **go**-Sg.Fem.Prf.
 ‘Oh, this broke’ (an.cha)
- (22) gir gayaa meraa kaemraa-0.
 fall **go**-Sg.Msc.Prf my camera-Nom.
 ‘My camera fell’ (aj.cha)

Table 7 provides a full listing of children’s combinations of the light verbs jaa ‘go’, le ‘take’ and de ‘give’ with transitive and intransitive verbs. Turning now to the use of case-marking, we had predicted that if children assign verbs to the wrong transitivity class, we would find errors in case-marking as a consequence of this erroneous assignment. However we find that, out of the 30 contexts where an intransitive verb is used in the past/perfective with an overtly realized argument, not one involved the erroneous use of the ergative case marker.

Table 7
Combination of main and light verbs in children's speech

	Verbs with <u>de</u> 'give' (n = 40)	Verbs with <u>le</u> 'take' (n = 14)	Verbs with <u>jaa</u> 'go' (n = 56)
Transitive contexts	<u>(goli)</u> <u>maar</u> 'bullet/hit/shoot' (3) <u>baaa</u> 'make' (7) <u>calaa</u> 'drive' (1) <u>choR</u> 'leave' (2) <u>de</u> 'give' (2) <u>khiinc</u> 'take/pull' (1) <u>khol</u> 'open' (2) <u>laa</u> 'bring' (1) <u>lagaa</u> 'attach' (8) <u>nikaal</u> 'remove' (2) <u>phaaR</u> 'tear' (1) <u>rakh</u> 'put' (6) <u>toR</u> 'break' (4)	<u>(Thiik)</u> <u>kar</u> 'right do' (1) <u>baaa</u> 'make' (2) <u>khol</u> 'open' (1) <u>lagaa</u> 'attach' (4) <u>le</u> 'take' (3) <u>nikaal</u> 'remove' (2) <u>toR</u> 'break' (1)	0
Intransitive contexts	0	0	<u>(band)</u> <u>ho</u> 'close' (1) <u>(kharaab)</u> <u>ho</u> 'spoil' (1) <u>aa</u> 'come' (11) <u>baiTh</u> 'sit' (1) <u>ban</u> 'form' (6) <u>cal</u> 'go' (2) <u>gir</u> 'fall' (4) <u>haT</u> 'move' (6) <u>ho</u> 'be' (6) <u>kaT</u> 'cut-Inch' (1) <u>khinc</u> 'take-Inch' (4) <u>kho</u> 'lose' (1) <u>khul</u> 'open-Inch' (1) <u>rah</u> 'stay' (1) <u>rone lag</u> 'cry begin' (2) <u>TuuT</u> 'break-Inch' (8)
Mediotransitive contexts ^a	0	0	0

^a Mediotransitive contexts also involve verbs in the infinitive form combined with the (light) verb aa 'come', but this light verb has different aspectual and semantic properties than the (light) verb jaa 'go' considered here.

The range of verbs found in such contexts is given in Table 8, and examples of such uses include the following:

- (23) ek laRkii-0 ban gayii.
 one girl-Nom become go-Sg.Fem.Prf.
 'A (toy) girl got made' (ab.cha)
- (24) caacuu-0 to dukaan gaye haen.
 uncle-Nom DM shop go-Pl.Msc.Prf be-3.Pl.Pres.
 'As for uncle, he's gone to the store' (aj.cha)

Table 8

Case-marking on realized subjects in past/perfective contexts in children's speech

	Ergative case	Nominative case
Transitive contexts	<u>rakh</u> 'put' (2) <u>lagaa</u> 'attach' (1) <u>nikaal</u> 'remove' (1) <u>kar</u> 'do' (1) <u>khol</u> 'open' (1) <u>banaa</u> 'make' (3) <u>laa</u> 'bring' (1)	<u>laa</u> 'bring' (1) <u>rakh</u> 'put' (1)
Intransitive contexts	0	<u>aa</u> 'come' (3) <u>bac</u> 'remain' (1) <u>baiTh</u> 'sit' (1) <u>ban</u> 'form' (6) <u>gir</u> 'fall' (4) <u>jaa</u> 'go' (6) <u>kaT</u> 'cut-Inch' (1) <u>khinc</u> 'take-Inch' (1) <u>khul</u> 'open-Inch' (1) (u _{band}) <u>ho</u> 'close' be' (1) <u>rah</u> 'stay' (1) <u>ho</u> 'be' (1) <u>TuuT</u> 'break-Inch' (3)

Transitive verbs occurred in the past/perfective with an overtly realized subject argument in (12) utterances in total (Table 8). With the exception of one indeterminate case (to be discussed in example (27)) and one lexical exception (example (28)), all arguments received the appropriate ergative case-marking (examples (25) and (26)):

- (25) mae-ne hii rakhaa hae chupaa ke.
 I-Erg only place-Sg.Msc.Prf be-3.Sg.Pres. hide-Conj.Prt.
 'I have placed (it), hiding (it)' (aj.cha)
- (26) mae-ne to khol diyaa.
 I-Erg DM open give-Sg.Msc.Prf.
 'As for me, I opened (it)' (ta.cha)

In one instance (example (27)), although the verb itself is transitive, the construction in which it appears is ambiguous as to transitivity. It could be interpreted as an intransitive construction in which the transitive verb rakh 'place' is used as a perfective participle, used adverbially in conjunction with the copula ho 'be' (similar to the English construction in the biscuits are placed (on the table)). However, it is incorrectly assigned transitive classification, since a second, agentive argument ("I") also occurs in the construction, in which case we have one instance of a (syntactic) transitivity error:

- (27) **maen-0** chupaa ke paal biskut-0 rakhe hue haen.
 I-Nom hide-Conj.Prt "paal" biscuits-Nom place-Pl.Msc.Prf. be-Pl.Msc.Prf. be-3.Pl.Pres.
 'The "paal" biscuits are placed (somewhere), by me hiding (them) (ab.cha)

On an alternative analysis, the construction is transitive and assigns ergative case-marking on the subject (a related construction in English would be I have placed the biscuits on the table).¹⁸ Under this analysis, the grammatical transitivity is correctly assigned to the construction, however there is a case-marking error on the subject (it should be assigned ergative case). While we can only conjecture about the source of the error, this example does suggest that further research is necessary to investigate how children acquire changes in the semantic valence of the verb associated with morphologically marked construction types.

Finally, in one case, the verb *laa* ‘bring’ was used, correctly, with nominative case on the subject argument (example (28)). The verb *laa* is a well-known lexical exception to the generalization that transitive verbs in the past/perfective occur with ergative case-marking on the subject.¹⁹

- (28) *aanTii* *laaii* *hae*.
 aunty-Nom bring-Sg.Fem.Prf. be-3.Sg.Pres.
 ‘Aunty has brought (it)’ (ab.cha)

3.3. Discussion

Although there is massive overlap in the contexts of use of intransitive and (di-)transitive verbs in adult input in terms of the number of arguments co-occurring with the verb and the case-marking, children’s spontaneous speech is almost wholly free of confusion regarding the transitivity of the verb.²⁰ There are thus considerable grounds for suggesting the role of other cues which might potentially be used by children to infer verb transitivity. These include verb morphology (agreement provides a clue about the person/number/gender of an omitted argument) as well as information derived from contexts of use of the verb as to the number and role of the participants associated with the verb (cf. Pinker, 1984). Using such cues, children learning Hindi could have converged on the appropriate argument structure(s) of the verbs in their lexicon, even when they

¹⁸ Not everyone would agree that this construction can take an ergatively case-marked subject. In written Hindi as well as standard spoken Hindi, the use of the ergative marker *-ne* is *not* preferred with the NP subject of these predicative stative participial constructions; however it might be permissible in some colloquial registers or [dialectal] variants (based on email communication with Peter Hook (12 June 2002); and Mahendra Verma (6 December 2002)).

¹⁹ By our criteria, it could be classified as a mediotransitive verb. However, the verb does not pattern with the other mediotransitive verbs in other respects (e.g. it allows passivization), hence we have classified it as a transitive verb.

²⁰ Rispoli (1995: 343–345) suggests that children acquiring Japanese have acquired the meaning of verbs and use them in ways which are “appropriate to the valence description of the verbs”, however, they still make errors in their case-marking even as late as four and five years of age (1995: 343). This suggests a dissociation between case-marking and transitivity, which might undermine the use of case-marking as a diagnostic for transitivity. However, while errors in case-marking might not necessarily imply that children have made transitivity errors, the converse case, viz. correct use of case-marking (as in our data) does imply correct assignment of verbs to their transitivity class(es), since it would be impossible to productively assign case to nominals without a corresponding understanding of verb argument structure.

cannot avail themselves of information about transitivity from the number of arguments co-occurring with the verb and their case-marking.

While the lack of transitivity errors in the database suggests that children acquiring Hindi are indeed *not* assuming a one-to-one correspondence between the semantic transitivity of the verb and the patterns of overtly realized arguments in the input, we cannot claim that they are therefore aware of the role of discourse pragmatics in constraining the overt occurrence of arguments. That is, although children acquiring Hindi might be able to uncouple the patterns of overt realization of arguments from the basic transitivity of the verb, they might very well assume that arguments are ellipted randomly. In order to demonstrate that children not only realize *that* information structure influences argument realization, but also that they understand *how* it does this, we investigated the linking of argument realization with information structure in children's own spontaneous utterances in naturalistic contexts.

4. An examination of “preferred argument structure” in Hindi child discourse

We formulate our specific predictions on the basis of the account of “Preferred Argument Structure” (PAS) in Du Bois (1985) which links the patterns of realization (and ellipsis) of arguments to statistical tendencies motivated by information flow in the discourse. As discussed in Section 1, Du Bois' account of PAS predicts that speakers introduce one new argument per clause; this argument tends to be a lexical NP rather than a null/pronominal form, and it occurs in the S/O rather than the A role (which is reserved primarily for given information). The PAS constraints have to do with *quantity*, pertaining to how many new arguments/lexical NP arguments are introduced per clause, as well as with *role*, i.e. having to do with the grammatical role of the argument.

In our examination of PAS in Hindi child discourse, we ignore quantity constraints, and focus instead on the correlation patterns of role, morphological form, and newness that we might expect to find in Hindi child language. We formulate our predictions based on accounts in both the adult and the child language literature on PAS (Du Bois, 1987; Clancy, 1993; Brown, 1998; Allen and Schroeder, 2003; Allen, 2000), using the term *pragmatic prominence* (Clancy, 1993: 310) to include not just newness of information, but also a number of other features of “informativeness” (Clancy, 1993, 1997; Allen and Schroeder, 2003), to be discussed further in Section 4.1.

Referential form: Lexical NPs are more likely to be pragmatically prominent than are pronominal or null arguments, since “lexical verbalization involves selection from a large open class, in contrast to pronominal or affixal verbalization; it thus carries more information” (Du Bois, 1987: 814).²¹

Grammatical role: Relative to A arguments, S or O arguments are more likely to be associated with pragmatic prominence since they are linked to inanimate, theme or patient referents, often new or confusable with other referents in the context.

²¹ The term “affixal verbalization” (Du Bois, 1987: 814) refers to the case where there is no overt nominal argument realized (we refer to this case as one where we have “null arguments”); however, information about one or more of the core arguments is reflected in the agreement or “cross-referencing” information on the verb.

Distribution: Lexical NPs, which identify the referent more unambiguously than do pronominal/null forms, are predicted to be S and O arguments rather than A arguments.

We predict that, if Hindi-acquiring children of 3–4 years of age are attuned to the discourse–pragmatic factors influencing argument realization in the language, the three-way linkage of morphological form, grammatical role, and pragmatic information should be found in their own spontaneous speech production.

4.1. Method

Our database for the purposes of this analysis consists of the spontaneous caregiver–child production data described in Section 2.1 of this paper. We coded a nominal argument in our database as *pragmatically prominent* if information about its referent could not be easily inferred from nonlinguistic context or the preceding discourse. Several factors determine the extent to which information about the referent of a nominal argument is inferable, including animacy, type of speech act, recency of prior mention, and contrastiveness with other potential referents in the discourse and physical context, among others (Clancy, 1993, 1997; Allen and Schroeder, 2003; Allen, 2000).²² For the purposes of our analysis, a particular nominal referent is coded as being pragmatically prominent if:

- (a) it is **inanimate**, since typically in caregiver–child interactions, there are many more inanimate entities one could be referring to than there are animate entities.²³ Hence, “the search space” for animate referents is relatively small compared to that for inanimate referents (Allen and Schroeder, 2003);²⁴
- (b) it is the **answer** to a query, since it is referents which are ambiguous or unknown that are queried in the first place;
- (c) the referent had **not been talked about** within three prior utterances, hence it is not information that is currently “active” for the conversational participants;²⁵
- (d) it **contrasts** with other referents, since if there is more than one potential referent in the discourse or physical context, the identity of the referent is ambiguous. That is, there is

²² Although based on the analyses of Clancy (1993, 1997), Allen and Schroeder (2003), Allen (2000), our study does not adopt identical criteria to determine pragmatic prominence. For instance, we have not coded a referent as pragmatically prominent simply by virtue of its presence in the context (Clancy, 1993: 310, 1997: 641); nor do we automatically assume first and second person referents to be non-new as in Allen and Schroeder (2003) (cf. also Du Bois, 1987).

²³ The term “prominent” can be slightly misleading if interpreted as “salient”; for instance, inanimate entities are typically less salient and more likely to change location or disappear than animate entities. However, we use the term “prominence” to mean “salient for the purposes of overt mention”—in this case, stable, salient animate entities are less prominent than are transient, more changeable inanimate entities.

²⁴ When it was difficult to determine animacy from context, we coded the argument as “ambiguous”.

²⁵ Note that our criterion is formulated in terms of *aboutness*, i.e. a referent is coded as involving prior mention if s/he or it is being “talked about” within three prior utterances, rather than in terms of explicit mention within three prior utterances. Hence, we are more conservative than Clancy (1993, 1997) or Allen and Schroeder (2003) in coding a referent as being pragmatically prominent on the basis of prior mention (as we define it) since referents are talked about more frequently than they are explicitly mentioned. Further, the number of prior utterances for the purpose of determining prior mention varies, ranging from the immediate prior utterance (Clancy, 1993) to 20 preceding clauses (Allen and Schroeder, 2003). We have settled on three prior utterances for the purposes of this analysis.

more than one possible referent “bearing the same relation to the same predicate . . . or bearing a parallel relation to a similar type of predicate” (Clancy, 1997: 641).

If *any one* of the above criteria was fulfilled, the argument was coded as being pragmatically prominent. Conversely, for an argument to be coded as not pragmatically prominent, *none* of the criteria given above should apply. If we could not determine pragmatic prominence for an argument, it was coded as “other”.²⁶ A second coder independently coded 10% of the children’s utterances selected randomly; intercoder agreement was 85%.

4.2. Results

Our results show that both the grammatical role and the referential form of realized arguments are linked to pragmatic prominence in early Hindi child language. As early as 3–4 years of age, children appear to be aware of aspects of information structure in discourse and how they impinge on language. As predicted, both grammatical role and referential form are linked with pragmatic prominence. While S and O arguments are pragmatically prominent (according to our criteria) 90% of the time on average, A arguments are prominent only about 39% of the time (Tables 9).²⁷

Similarly, lexical NP arguments are more likely to be pragmatically prominent (95% of the time) as compared to pronominal/null arguments (64% approximately) (Table 10). The pragmatic prominence associated with both referential form and grammatical role of realized arguments suggests that S and O role argument are more likely to be realized with a lexical NP than is an A role argument. As Table 11 shows, in mediotransitive and transitive contexts, children realize the A argument as a lexical NP only about 2% of time, while S and O arguments are realized as lexical NPs between 23 and 24% of the time.

Chi-square analyses conducted over pooled data (collapsing together the S-arguments, and the O-arguments for the mediotransitive and transitive utterances) suggest that the pragmatic prominence of S and O arguments (pooled together) is significantly higher than

²⁶ We included referents of nominal arguments if they were actions or events since they are comparable to object/person referents with respect to ellipsis, e.g. *tum-ne kaam kar liyaa?* (‘you-Erg study do take-Sg.Msc.Prf.’ ‘‘have you done (the) work?’’) can be followed by *kar liyaa* (‘do take-Sg.Msc.Prf.’ ‘‘(I) have done (the) work’’). However, the verbal noun arguments of the light verbs *kar* ‘do’ or *ho* ‘be’ were excluded if the verbal-noun + light verb complex licensed an object argument (e.g. *aadmii-ne us-ko golii maar dii* ‘he-erg she-acc bullet shoot give-Sg.Fem.Prf’ ‘‘the man shot her’’); adverbial complements of the light verbs *kar* ‘do’ or *ho* ‘be’ were not counted as arguments. For instance, *siidhaa* ‘straight’ and *jaldii* ‘haste’ in *siidhe kar* ‘straight do’, *jaldii kar* ‘hurry do’ respectively were not counted as arguments of the light verb *kar* ‘do’.

²⁷ One of our reviewers suggests that the low percentage of pragmatic prominence for A arguments (39%) could have to do with their animacy value, hence the coding practice reflects semantic rather than pragmatic information (this was also pointed out to us by Ina Bornkessel and Matthias Schlesewsky). This possibility is indeed real; our transitive class of predicates (e.g. *banaa* ‘make’, *dikhaa* ‘show’, etc.) is typically used with animate A arguments and inanimate O arguments (see Budwig and Narasimhan, 2000). However, the semantic characteristics of an argument and its pragmatic import are not mutually exclusive—animate entities are relatively salient and stable, and are typically the speech participants in child–caregiver interactions—hence much more likely to be topical or “given”. Arguments encoding animate referents are thus prime candidates for exclusion from the category of pragmatically prominent arguments.

Table 9
Proportions of S, A, and O role arguments which are pragmatically prominent

Grammatical role	High-prominence	Non-high-prominence ^a
A-medtr (<i>n</i> = 43)	41.9% (18)	58.1% (25)
A-trans (<i>n</i> = 328)	36.9% (121)	63.1% (207)
S (<i>n</i> = 309)	77% (238)	23% (71)
O-medtr (<i>n</i> = 43)	97.7% (42)	2.3% (1)
O-trans (<i>n</i> = 328)	92.1% (302)	7.9% (26)

^a In this and the following tables, “non-high-prominence” arguments are those whose referents did not possess any of the features of high-prominence, as well as ambiguous cases (coded “other”) which could not be clearly defined as high-prominent.

Table 10
Pragmatic prominence of arguments with different referential forms

Referential form	High-prominence	Non-high-prominence
Zero (<i>n</i> = 541)	63.2% (342)	36.8% (199)
Pronominal (<i>n</i> = 345)	64.6% (223)	35.4% (122)
Lexical (<i>n</i> = 165)	94.6% (156)	5.4% (9)

Table 11
Proportions of S, A, and O role arguments which are lexical NPs and null/pronominal NPs

Grammatical role	Lexical	Null/pronominal
A-medtr (<i>n</i> = 43)	0% (0)	100% (43)
A-trans (<i>n</i> = 328)	2.1% (7)	97.9% (321)
S (<i>n</i> = 309)	22.7% (70)	77.3% (239)
O-medtr (<i>n</i> = 43)	23.3% (10)	76.7% (33)
O-trans (<i>n</i> = 328)	23.8% (78)	76.2% (250)

that of A arguments ($\chi^2 = 258.06$, d.f. = 1, $P < 0.001$). The pragmatic prominence associated with lexical NPs is also significantly higher in comparison with pronominal/null forms ($\chi^2 = 61.16$, d.f. = 1, $P < 0.001$). Similarly, the realization of arguments as lexical NPs' is higher in S- and O- arguments (pooled together) versus A arguments ($\chi^2 = 82.66$, d.f. = 1, $P < 0.001$) (Tables 12–14).

Table 12
Frequency with which S, A, and O role arguments are pragmatically prominent: pooled data

Grammatical role	High-prominence	Non-high-prominence
A (<i>n</i> = 371)	139	232
S + O (<i>n</i> = 680)	582	98

$\chi^2 = 258.06$, d.f. = 1, $P < 0.001$.

Table 13
Pragmatic prominence of arguments with different referential forms: pooled data

Referential form	High-prominence	Non-high-prominence
Lexical ($n = 165$)	156	9
Zero/pronominal ($n = 886$)	565	321

$\chi^2 = 61.16$, d.f. = 1, $P < 0.001$.

Table 14
Frequency with which S, A, and O role arguments are lexical NPs: pooled data

Grammatical role	Lexical	Non-lexical
A ($n = 371$)	7	364
S + O ($n = 680$)	158	522

$\chi^2 = 82.66$, d.f. = 1, $P < 0.001$.

Since our database consisted of a relatively high number of imperatives (23.2% of all utterances), and we wanted to exclude the possibility that the low rates of realization of the A argument might occur due to a high number of (medio-)transitive imperatives, we reanalyzed the data after excluding imperatives (Tables 15–17).

Table 15
Frequency with which S, A, O role arguments are pragmatically prominent (non-imperative utterances)

Grammatical role	High-prominence	Non-high-prominence
A ($n = 252$)	87	165
S ($n = 290$)	224	66
O ($n = 252$)	239	13

Table 16
Pragmatic prominence of arguments with different referential forms (non-imperative utterances)

Referential form	High-prominence	Non-high-prominence
Lexical ($n = 145$)	136	9
Zero ($n = 352$)	233	119
Pronominal ($n = 297$)	181	116

Table 17
Frequency with which S, A, and O role arguments are lexical NPs (non-imperative utterances)

Grammatical role	Lexical	Null/pronominal
A ($n = 252$)	7	245
S ($n = 290$)	70	220
O ($n = 252$)	68	184

Table 18

Frequency with which S, A, O role arguments are pragmatically prominent (non-imperative utterances): pooled data

Grammatical role	High-prominence	Non-high-prominence
A ($n = 252$)	87	165
S + O ($n = 542$)	463	79

$\chi^2 = 209.37$, d.f. = 1, $P < 0.001$.

Table 19

Pragmatic prominence of arguments with different referential forms (non-imperative utterances): pooled data

Referential form	High prominence	Non-high-prominence
Lexical ($n = 145$)	136	9
Zero/pronominal ($n = 649$)	414	235

$\chi^2 = 50.12$, d.f. = 1, $P < 0.001$.

Table 20

Frequency with which S, A, and O role arguments are lexical NPs (non-imperative utterances): pooled data

Grammatical role	Lexical	Null/pronominal
A ($n = 252$)	7	245
S + O ($n = 542$)	138	404

$\chi^2 = 59.3$, d.f. = 1, $P < 0.001$.

Chi-squares on the reduced data set replicate our findings for the association of pragmatic prominence with the (pooled) S/O grammatical roles ($\chi^2 = 209.37$, d.f. = 1, $P < 0.001$) and with lexical NPs ($\chi^2 = 50.12$, d.f. = 1, $P < 0.001$), as well as the association of lexical NP arguments with the (pooled) S/O roles ($\chi^2 = 59.3$, d.f. = 1, $P < 0.001$) (Tables 18–20).

4.3. Discussion

Our results demonstrate that patterns of argument realization in the speech of children between the ages of three and four who are acquiring Hindi are not random, but are predictable in terms of the complex interaction of discourse pragmatics, grammatical role, and referential form. While several studies have documented children's acquisition of the verb-argument structure mapping patterns in their language by the age of 3–4 years (Dodson and Tomasello, 1998; Tomasello and Brooks, 1998; Tomasello, 2003), the vast majority of such work has been done for languages such as English, where there is a relatively direct route to verb transitivity from overt cues in the input. The focus on such languages has led to the formulation of strategies the child might avail him-/herself of, such as an “analogical mapping”

strategy using surface structural cues like the number and linear order of arguments, which might help the child in acquiring verb-argument structure correspondences (Fisher, 1995). However, in languages such as Hindi, which have massive argument ellipsis (as well as relatively free word order), an analogical mapping procedure using the number and order of arguments is not an optimal strategy for the language-acquiring child.

We have shown however, that despite extensive ellipsis in the input, children acquiring Hindi seem to have arrived at a similar level of mastery of transitivity patterns of verbs as their counterparts learning languages with more explicit cues. Clearly, there are other cues to verb transitivity (and meaning) which the child might recruit in the input, such as verb morphology, light verbs, and case-marking on realized arguments. Other cues suggested in the literature include frequency-sensitive information about the number and types of complements which typically occur with a verb in the input (Fisher, 2003), and for languages such as Tzeltal, differential patterns of O argument ellipsis with semantically heavy versus light verbs which influence children's strategies for inferring verb meaning (Brown, to appear). These cues, taken in conjunction with children's awareness of typically salient events and objects in the physical context (Pinker, 1984), might prove to be reliable guides in establishing the verb argument structure-meaning correspondence.

Regardless of which cues the Hindi-acquiring children do use, an additional complication which they are required to tackle involves developing a sensitivity to the discourse-pragmatic constraints governing the overt realization of the arguments of the verb. The nature of this sensitivity is a complex issue. For instance, Clancy suggests that the existence of PAS patterns in children's speech does not necessarily entail that children have mentally represented grammatical roles such as A, S, and O; rather, children might have "learned to introduce new information in certain argument positions with particular verbs, as well as how to use referential forms in accordance with the information status of the referent" (2003: 82).

A further possibility, which remains to be explored, is that early awareness of discourse-pragmatic influences might actually itself constrain the child's (implicit) hypotheses as to the relation between the overt occurrence of arguments and the meaning and argument structure associated with the verb. We demonstrate that such a sensitivity is present as early as in the period between 3 and 4 years of age in children acquiring Hindi. Further investigation with children at younger ages would help determine to what extent such a sensitivity is evident even earlier.

5. Conclusions

Our study contributes to the debate on the acquisition of argument structure in the following ways. First, we demonstrate that the conditions for verb learning for the Hindi-speaking child differ from what is assumed in several influential studies to be the canonical situation, viz. the appearance of a verb with both arguments overtly represented in the input. We show that there is massive argument ellipsis in speech directed to children by Hindi-speaking caregivers, obviating the possibility of establishing a simple

mapping between verb argument structure in the input and the situational event in the majority of the cases, even if we take disambiguating case-marking information into account.

We suggest that if children acquiring Hindi assume that variation in the occurrence of overt arguments in the input reflects variation in the basic transitivity of the verb (an assumption which would prove fairly robust for a child learning English), they are likely to make extensive errors in their assignment of verbs to transitive and intransitive classes. We show, however, that argument ellipsis in the input does not prove to be a hindrance to establishing transitivity. Children between 3 and 4 years of age who are acquiring Hindi do not make argument structure errors in their spontaneous production, which suggests that they use other cues in establishing argument structure, including verb morphology and nonlinguistic contexts of use.

However, this in itself does not show that the children are aware of the complex interaction between discourse pragmatics and the form and grammatical role of realized arguments. Having figured out the nature of the mismatch between basic verb transitivity and overt arguments in the input, children might adopt a strategy of randomly eliding arguments owing to their ignorance about the pragmatic licensing of null arguments in Hindi. However, we show this not to be true. By the age of 3–4 years, children acquiring Hindi display sensitivity to the discourse-pragmatic factors which mediate the overt realization of arguments in their own spontaneous production, although (as suggested in Clancy, 2003) the degree to which this knowledge emerges from other functional considerations, and the role of additional factors not considered here, such as the role of joint attention (Skarabela and Allen, 2003), need to be carefully explored.

These results also provide evidence, from a split-ergative language, for the “ergative” patterning of argument realization based on discourse-pragmatic factors, a pattern which has also been demonstrated in the acquisition of nominative-accusative languages such as Korean (Clancy, 1993, 1997), as well as ergative-absolutive languages such as Tzeltal (Brown, 1998) and Inuktitut (Allen and Schroeder, 2003; Allen, 2000).

Further research with children at younger ages is required to establish whether children figure out verb transitivity independently of knowledge of discourse-pragmatic constraints on argument realization, or whether they can actually use such knowledge to figure out the argument structure of the verb. Such knowledge would work in two ways. Knowledge *that* information structure influences argument realization could help children constrain their initial hypotheses as to the basic transitivity of the verb when there is surface variation in cues to transitivity in the input. That is, children might adopt a tentative stance towards assigning a verb a specific transitivity value without necessarily knowing how exactly argument realization is influenced by discourse-pragmatic factors. Alternatively, children might be able to use knowledge of *how* information structure influences argument realization to “reconstruct” the argument structure of a verb. For instance, if children know that new referents in the discourse must be overtly realized, then the non-realization of a new referent as an argument of the verb suggests that it is highly likely that the verb is intransitive. Similarly, if a verb appears with one argument, but all potential referents are “given” from an information-

structure point of view, then the child might reasonably conclude that the verb potentially has more than one argument which, however, is not overtly realized.

In general, our findings suggest that children use multiple cues to converge on argument structure patterns in their language (cf. Rispoli, 1991, 1995; Hirsh-Pasek and Golinkoff, 1996). Early awareness of the role of pragmatic factors could help constrain the child's early hypotheses about verb argument structure. Semantics, different kinds of argument realization patterns in the input, verb morphology, discourse pragmatics, and light verbs have different degrees of "cue-prominence" crosslinguistically. Children must identify the cues and their ranking, although much empirical research is required to determine the extent to which this process is fed by experience and/or in-built biases.

Acknowledgements

This research was supported in part by a grant from the Spencer Foundation. The writing of this article was assisted, for the second author, by sabbatical support from the Max Planck Institute for Evolutionary Anthropology, Department of Comparative and Developmental Psychology, Leipzig, Germany. We thank Nandita Chaudhary for her assistance in the collection of the data upon which this paper is based and for her collaboration on general issues of the role of caregiver talk in Hindi-speaking children's development. We also thank the audiences at the South Asian Languages Analysis Roundtable, Konstanz University, 2001, the Workshop on Variation in Form and Variation in Meaning, Nijmegen, 2002, the Linguistic Society of America meeting, 2003, and the Georgetown University Roundtable in Language and Linguistics 2003 for feedback on prior versions of the paper presented there, as well as one of our reviewers, and our colleagues at the Max Planck Institute of Psycholinguistics for helpful comments on the issues discussed in this paper. We are solely responsible for the views presented in this paper, as well as for any errors.

Appendix A. Transitivity coding procedure

	Instruction	Example	Gloss
1	Pick out the main clause, excluding all adjunct clauses	<i>banaa ke <u>mujhe dikhaao</u></i> <i>gend mez par rakhii gaii hae.</i> <i><u>mujhe voh aadmii maalum hae</u></i> <i>gend mez par hae</i>	‘make something and <u>show it to me</u> ’ ‘ball on table has been placed’ ‘ <u>I know that man</u> ’ ‘ <u>The ball is on the table</u> ’
2	Pick out the verb phrase and identify the main verb	<i>dikhaao</i> <i>rakhii hae</i> <i>maaluum hae</i> <i>hae</i>	‘show-Imperative’ ‘placed’ ‘know’ ‘be’
3	Put the verb in the infinitive and see if it takes two “core” arguments (i.e. can take either <u>-ne</u> , <u>-ko</u> or null marker) when you use the verb with the <i>same</i> meaning it has in the construction	<i>dikhaa = X shows Y (something) ‘show’ X Y</i> <i>rakh = X places Y (somewhere) ‘place’ X Y</i> <i>maaluum ho = X knows Y ‘know’ X Y</i> <i>ho = X is (somewhere) ‘be’ X</i>	
4	If it takes only one core argument, it is intransitive	<i>XY par hae</i>	ho = INTR
5	If it takes two core arguments, put the verb in the past/perfective and see if the subject argument gets <u>-ne</u> marking	<i>X <u>ne</u> Y <u>ko</u> (kuch) dikhaayaa showed’</i> <i>X <u>ne</u> Y <u>ko</u> mez par rakhaa</i> <i>(somewhere) placed’</i> <i>X <u>ko</u> Y maalum hae</i>	‘ X-erg Y-acc something’ ‘ X-erg Y-acc ’ ‘ X-dat Y knows’

- 6 If the subject argument does *not* get –ne marking, it is **mediotransitive**
- 7 If the subject *does* get –ne marking, when the verb is put in perfective/ past tense: look again at the construction in which the verb actually occurs, and check if both the arguments of the verb can be used in *that* construction.
- 8 If both arguments of the verb *can* be used felicitously in the construction, code the utterance **transitive**
 If both arguments cannot appear (e.g. one of the two arguments is obligatorily omitted, as in a passive), then it is **intransitive**

X ko Y maalum ha.

banaa ke mujhe dikhaao --->
tum Y (banaa ke) mujhe dikhaao
gend mez par rakhii gatii hae --->
**X ne gend mez par rakhii*
gatii hae...

dikhaa ‘show’ = TRANS
rakh ‘place’ = INTR

maaluum ho ‘know’ = MEDTR

‘You (make) something
 (and) show me’
 *‘**X the ball was placed on the table**’

A.1. Further details of transitivity coding decisions:

1. Examples of intransitives:

yeh idhar aataa hae ‘he-Nom here come-Sg.Msc.Imprf be-3.Sg.Pres.’ “He comes here”
voh bahut acchii hae ‘she-Nom very good be-3.Sg.Pres.’ “She is very good”
aaj kuch nahiin huaa ‘today something not be-Sg.Msc.Prpf.’ “Nothing happened today”
bacche soyenge “children sleep-3.Sg.Msc.Fut.” “The children will sleep”

Equatives[NP-1 be/become NP-2]:

yeh laRkii rohini hae ‘this girl-Nom Rohini-Nom be-3.Sg.Msc.’ “this girl is Rohini”
voh baRaa aadmii ban gayaa hae ‘he-Nom big man-Nom become go-Sg.Msc.Prpf. be-3.Sg.Pres.’ “he has become an important man”
duusrii kaun hae? ‘other-Nom who-Nom be-3.Sg.Msc.?’ “who is the other (one)?”

Possessives[NP-1 is NP-2-possessive]

choTii vaalii to mohan kii hae ‘small one-Nom DM Mohan-Gen be-3.Fem.Sg.’ “the small one is Mohan’s”
us-ke paas sirf ek hae ‘s/he-Gen near only one be-3.Sg.Msc.’ “she has only one”

2. Mediotransitives included the following types:

Dative subject constructions[NP-1-dative verb NP-2]

mujh-ko (kuch) maalum hae ‘I-Dat (something-Nom) know be-3.Sg.Pres.’ “I know (something)”
us-ko (kuch) dukaan se lenaa hae ‘he-Dat (something-Nom) shop-Abl take-Inf be-3.Sg.Msc.’ “he wants to get (something) from the store”

3. Light verbs were treated forming a complex with the main verb: kar liyaa ‘do take-Sg.Msc.Prpf.’ “have done”; gir gayaa ‘fall go-Sg.Msc.Prpf.’ “have fallen”; dekh legaa ‘see take-3.Sg.Msc.Fut.’ “will (manage to) see” (context was used to distinguish when an utterance contained one complex verb dekh legaa, versus two separate verbs dekh, legaa ‘see, take-3.Sg.Msc.Fut.’ “see, (someone) will take (something)”).
4. Not all arguments correspond to objects/persons: e.g. in complex predicates built out of Noun + Verb parts, the nominal is actually a predicate. However, since the light verb often exhibits agreement with the nominal, we still counted it as an argument: e.g. paRhaaii kar ‘study do’; kaam kar ‘work do’, niind aa ‘sleep come’, bhuukh lag ‘hunger feel’, choT lag ‘hurt feel’
5. A distinction was made between Noun + Verb complex predicates, and Adverb/ Adjective + Verb predicates: e.g. jaldii kar ‘hurry do’, udhar ho jaa ‘there go’, the verb combines with adverbs, not nouns, hence are not counted as a separate argument of the verb.
6. In *some* Noun + Verb complex predicates, there is an extra argument, e.g. maen-ne uskii sevaa kii ‘I-Erg she-Gen service do-Sg.Fem.Prpf.’ “I service-did/served her”; in such a case, the object is this extra argument, and sevaa ‘service’, even though it is a nominal argument, is treated as part of the verbal predicate sevaa kar ‘service-do/serve’.

7. All complexes composed of English word + Verb were treated as one complex unit: e.g. study kar ‘study do’ and smile kar ‘smile do’ are the equivalent of “study” or “smile”, and are not treated as the arguments of kar ‘do’ in spite of the fact that they are nominals (just as paRhaaii ‘study’ is). In such cases, the “kuch test” was used (see 11 above) to determine transitivity, kuch study kar ‘something study do’ is transitive (takes two arguments), and *kuch smile kar ‘something smile do’ is intransitive (a second argument is infelicitous).
8. Arguments *not* counted as a core argument included the following:

Source: vahaan se nikal gayaa ‘there-Abl emerge go-Sg.Msc.Pr.’ “(he) emerged from there”

Goal: mez par giraa ‘table-Loc fall-Sg.Msc.Pr.’ “(it) fell on the table”; dillii jaa ‘Delhi-Dat go-Imper’ “go to Delhi”; mere paas aao ‘I-Gen near come-Imper’ “come to me”; voh kamre-ke andar ghusaa ‘he-Nom room-Gen inside-Nom enter-Sg.Msc.Pr.’ “he entered the room”

Instrument: caakuu-se kaaTo ‘knife-Inst. cut-Imper’ “cut with the knife”

Benefactive: us-ke liye banaayaa hae maen-ne yeh miThaaii ‘he-Gen sake make-Sg.Msc.Pr. I-Erg this sweet-Nom’ “I have made this sweet for him”

9. Verbs with more than two arguments (where the dative-marked and locative-marked nominals are recipient/goal arguments) are not treated separately, but classified as transitive: maen-ne us-ko paisaa diyaa ‘I-erg he-Dat money-Nom give-Sg.Msc.Pr.’ “I gave him money”; us-ne ruumaal-ko mez-par rakhaa ‘he-Erg handkerchief-Acc table-Loc place-Sg.Msc.Pr.’ “he placed the handkerchief on the table” are both treated as transitive.
10. Different pronominal, or pronominal-type forms are treated as arguments: duusrii laal waalii ciiz le lo ‘other red one thing-Nom take-Imper’ “take the other red one thing”; duusrii laal waalii le lo ‘other red one take-Imper’ “take the other red one”; duusrii laal le lo ‘other red take-Imper’ “take the other red”; duusrii le lo ‘other take-Imper’ “take the other” are progressively elliptical forms of the same argument (the object of the verb le ‘take’).
11. With some verbs it is difficult to determine how many arguments it has: ham tumhen ghar aane-ko bol rahe haen ‘we-Nom you-Dat home-Dat come-Inf.Obl-Acc tell stay-Pl.Msc.Pr. be-3.Pl.Pres.’ “we are telling you to come home” has a clausal argument for bol ‘tell’ (ghar aane ko ‘home-Dat come-Inf.Obl-Acc’ “to come home”) as does ham tumhen bataa rahe haen ki wahaan do bacche khel rahe haen ‘we-Nom you-Dat tell stay-Pl.Msc.Pr. be-3.Pl.Pres. that there two children-Nom play stay-Pl.Msc.Pr. be-3.Pl.Pres.’ “we are telling you that there are two children playing there.” In each case use the kuch test (‘something’ test); can you say X ne kuch bolaa/bataayaa ‘X-Erg something-Nom say-Sg.Msc.Pr./tell-Sg.Msc.Pr.’ “Did X say/tell anything”? If yes, then the verb has an object. Other examples: unhon-ne kuch dekhaa ‘they-Erg something-Nom see-Sg.Msc.Pr.’ “they saw something”, ham kuch khelenge ‘we-Nom something-Nom play-3.Pl.Msc.Fut.’ “we will play something”
12. Since our focus is on “syntactic” transitivity, if the construction in which the verb appeared (e.g. the passive or the perfect participle constructions) entailed a different

number of arguments than is entailed by the verb in isolation, the transitivity value of the verb was taken to be the same as that of the construction. Hence, a single verb (e.g. khaa ‘eat’) can be associated with two overt syntactic arguments in an active sentence, or just one, in a passive construction, and hence can receive either of two values for transitivity depending on the construction in which it appears. Different construction types were treated differently with respect to their transitivity:

Passives: Passives allow only one argument of a transitive verb to appear hence are coded as intransitive: voh kutte-ko maarta hae ‘he-Nom dog-Acc hit-Sg.Msc.Imprf. be-3.Sg.Pres.’ ‘he hits the dog’ but not *voh kuttaa maaraa jaata hae ‘he-Nom dog-Nom beat-Sg.Msc.Pr. go-Sg.Msc.Imprf. be-3.Sg.Pres.’ ‘he the dog is beaten’

Imperatives: Imperatives often omit the subject argument, but unlike in passives, the subject is not *obligatorily* omitted and can, on occasion, be realized: tum idhar aao ‘you-Nom here come-Imper’ ‘you come here’

Participial constructions:

Participial constructions are generally intransitive and can modify the subject (siitaa saaRii pehene hue hae ‘Siitaa-Nom sari-Nom wear-Pl.Msc.Pr. be-Pl.Msc.Pr. be-3.Sg.Pres.’ ‘Sita is clothed in a sari’ where the main verb is ho ‘be’ and the pehene hue ‘wear-Pl.Msc.Pr. be-Pl.Msc.Pr.’ ‘clothed in a sari’ is an adverbial complement modifying ‘siitaa’, (something like, she is sari-outfitted), or they can modify the object of a transitive verb kapRe almaarii-men rakhe (hue) haen ‘clothes-Nom cupboard-Loc place-Pl.Msc.Pr. be-Pl.Msc.Pr. be-3.Pl.Pres.’ ‘the clothes are placed in the cupboard’ (the hue is often dropped).

However, sometimes, what appear to be subject-modifying intransitive participial constructions are actually not, and they are actually transitive constructions: (maen-ne saaRii pehenii (huii) hae ‘I-Erg sari-Nom wear-Sg.Fem.Pr. be-Sg.Fem.Pr. be-3.Sg.Pres.’ ‘I have (at some point) worn a sari’); the diagnostic is the possibility of use of the ergative case -ne on the subject and the agreement of the verb with the object (if the construction were passive, ergative case would be replaced by instrumental case).

13. Adjunct -kar clauses were excluded as in the following example: us-ne (kaam karke) khaanaa khaayaa ‘he-Erg (work do-Conj.Prt.) food eat-Sg.Msc.Pr.’ ‘he (worked and then) ate food’

14. Coordinate clauses were treated as two independent clauses: us-ne kaam kiya aur fir voh ghar gayaa ‘he-Erg work do-Sg.Msc.Pr. and then he-Nom home-Dat go-Sg.Msc.Pr.’ ‘he worked and then he went home’; jab mohan ghar aayaa tab us-ne mujhe dekhaa ‘when Mohan-Nom home-Dat come-Sg.Msc.Pr. then he-Erg I-Dat see-Sg.Msc.Pr.’ ‘when Mohan came home, he saw me’

15. Additional information in the sentence such as adverbs and discourse markers of various types were ignored: (aur fir) raajuu-ne kahaanii sunaai ‘and then Raajuu-Erg story-Nom recite-Sg.Fem.Pr.’ ‘and then Raajuu told the story’; mujhe (bhii) dikhaao ‘I-Dat also show-Imper’ ‘Show me too’; (aese) karo ‘Like this do-Imper’ ‘Do (it) like this’.

16. While the relative-correlative construction is used to connect two separate events (jab siitaa aaegee, vo khaanaa khaaegee ‘when Siitaa-Nom come-3.Sg.Fem.Pl., he-Nom food-Nom eat-3.Sg.Msc.Fut.’ “when Siitaa comes, he will eat”; jahaan tum baiThoge, maen bhii wahiin baiThuungaa ‘where you-Nom sit-2.Sg.Msc.Fut., I-Nom also there only sit-1.Sg.Msc.Fut.’ “where you will sit, I will sit there too”), it is sometimes used to elaborate an argument of the verb, in which case it was coded as one clause (jo laal kamiiz pehenaa huaa hae, hamaare ghar-men rahtaa hae ‘who red shirt-Nom wear-Sg.Msc.Prf. be-3.Sg.Pres., we-Gen house-Loc stay-Sg.Msc.Imprf. be-3.Sg.Pres.’ “(the person) who is wearing a red shirt lives in our house”); here, the main clause is hamaare ghar-men X rahtaa hae (‘we-Gen house-Loc X stay-Sg.Msc.Imprf. be-3.Sg.Pres.’ “X lives in our house”), and jo laal kamiiz pehenaa huaa hae hae (‘who red shirt-Nom wear-Sg.Msc.Prf. be-3.Sg.Pres.’ “(the person) who is wearing a red shirt”) stands for X; it is hence treated as an argument of rah ‘stay, live’.

References

- Allen, Shanley, 2000. A discourse-pragmatic explanation for argument representation in child Inuktitut. *Linguistics* 38 (3), 483–521.
- Allen, Shanley, Schroeder, Heike, 2003. Preferred argument structure in early Inuktitut spontaneous speech data. In: Du Bois, J.W., Kumpf, L.E., Ashby, W.J. (Eds.), *Preferred Argument Structure: Grammar as Architecture for Function*. Benjamins, Amsterdam, pp. 301–338.
- Bhatia, Tej, 1981. The treatment of transitivity in the Indian grammatical tradition. *Studies in the Linguistic Sciences* 11 (2), 125–208.
- Bickel, Balthasar, 2002. Referential density in discourse and syntactic typology. Unpublished manuscript.
- Brown, Penelope, to appear. Verb specificity and argument realization in Tzeltal child language. In: Bowerman, M., Brown, P. (Eds.), *Crosslinguistic Perspectives on Argument Structure: Implications for Learnability*. Lawrence Erlbaum, Mahwah, NJ.
- Brown, Penelope, 1998. Early Tzeltal verbs: argument structure and argument representation. *Proceedings of the Annual Child Language Research Forum* 29, 129–140.
- Budwig, Nancy, 1995. *A Developmental Functionalist Approach to Child Language*. Lawrence Erlbaum, Mahwah, NJ.
- Budwig, Nancy, 2001. Perspective, deixis, and voice: developmental reflections. In: Cienki, A., Luka, B., Smith, M. (Eds.), *Conceptual and Discourse Factors in Linguistic Structure*. CSLI Publications, Stanford, CA, pp. 63–76.
- Budwig, Nancy, Chaudhary, Nandita, 1996. Hindi-speaking caregivers’ input: towards an integration of typological and language socialization approaches. In: *Proceedings of the 20th Annual Boston University Conference on Language Development*, vol. 1, pp. 135–145.
- Budwig, Nancy, Narasimhan, Bhuvana, 2000. Transitive and intransitive constructions in Hindi caregiver–child discourse. Talk presented at the Fifth Conceptual Structure, Discourse, and Language Conference. University of California, Santa Barbara, May.
- Budwig, Nancy, Narasimhan, Bhuvana, 2002. Hindi-speaking children’s early use of transitive and intransitive frames: a constructional approach. Unpublished manuscript.
- Butt, Miriam, 1995. The structure of complex predicates in Urdu. CSLI Publications, Stanford, CA.
- Chaudhary, Nandita, 1995. Family interaction patterns and language development in infancy. Unpublished Ph.D. Dissertation, University of Delhi.
- Chaudhary, Nandita, 1999. Language socialisation: patterns of caregiver speech to young children. In: Saraswati, T.S. (Ed.), *Culture, socialisation and human development: Theory, research, and applications in India*. Sage, New Delhi, pp. 145–166.
- Clancy, Patricia, 1993. Preferred argument structure in Korean acquisition. In: Clark, E.V. (Ed.), *Proceedings of the 25th Annual Child Language Research Forum*, pp. 307–314.

- Clancy, Patricia, 1997. Discourse motivations of referential choice in Korean acquisition. In: Sohn, H., Haig, J. (Eds.), *Japanese/Korean Linguistics 6*. CSLI Publications, Stanford, pp. 639–659.
- Clancy, Patricia, 2003. The lexicon in interaction: developmental origins of preferred argument structure in Korean. In: Du Bois, J.W., Kumpf, L.E., Ashby, W.J. (Eds.), *Preferred Argument Structure: Grammar as Architecture for Function*. Benjamins, Amsterdam, pp. 81–108.
- Dixon, Robert (Ed.), 1987. *Studies in Ergativity*. North Holland, Amsterdam (Reissue of *Lingua* 71).
- Dodson, Kelly, Tomasello, Michael, 1998. Acquiring the transitive construction in English: the role of animacy and pronouns. *Journal of Child Language* 25, 555–574.
- Du Bois, John, 1985. Competing Motivations. In: Haiman, J. (Ed.), *Iconicity in Syntax*. Benjamins, Amsterdam, pp. 343–365.
- Du Bois, John, 1987. The discourse basis of ergativity. *Language* 63, 805–855.
- Fillmore, Charles, 1996. Pragmatically controlled zero anaphora. *Berkeley Linguistics Society* 12, 95–107.
- Fisher, Cynthia, 1995. Who's the subject? Structural guides for verb learning. In: Clark, E.V. (Ed.), *Proceedings of the 26th Annual Child Language Research Forum*, pp. 42–52.
- Fisher, Cynthia, 2003. What's in a verb? Acquiring verb knowledge from ordinary discourse. Talk presented at the Workshop on the Linguistic Encoding of Three-Participant Events: Crosslinguistic and Developmental Perspectives, May 2003. Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands.
- Fisher, Cynthia, Hall, D.Geoffrey, Rakowitz, Susan, Gleitman, Lila, 1994. When it is better to receive than to give: syntactic and conceptual constraints on vocabulary growth. *Lingua* 92, 333–375.
- Gleitman, Lila, 1990. The structural sources of verb meanings. *Language Acquisition* 1, 3–55.
- Goldberg, Adele, 1995. *Constructions: A construction grammar approach to argument structure*. University of Chicago Press, Chicago.
- Grimshaw, Jane, 1994. Lexical reconciliation. In: Gleitman, L., Landau, B. (Eds.), *The Acquisition of the Lexicon*. MIT Press, Cambridge, MA, pp. 411–432.
- Hirsh-Pasek, Kathy, Golinkoff, Roberta, 1996. *The Origins of Grammar: Evidence from Early Language Comprehension*. MIT Press, Cambridge, MA.
- Hock, Hans Heinrich, 1985. Transitivity as a gradient feature? Evidence from Indo-Aryan, especially Sanskrit and Hindi. In: *Proceedings of the Conference on Participant Roles: South Asian and Adjacent Areas. An Ancillary Meeting to the CLS Regional Meeting, University of Chicago*. Reproduced by the Indiana University Linguistics Club.
- Hook, Peter Edwin, 1991. The emergence of perfective aspect in Indo-Aryan languages. In: Traugott, E., Heine, B. (Eds.), *Approaches to Grammaticalization*. Benjamins, Amsterdam, pp. 59–89.
- Jespersen, O. 1954. *A Modern English Grammar on Historical Principles*. Allen and Unwin, London.
- Kachru, Yamuna, 1981. Transitivity and volitionality in Hindi. *Studies in the Linguistic Sciences* 11 (2), 181–193.
- Küntay, Aylin, Slobin, Dan, 1996. Listening to a Turkish mother: some puzzles for acquisition. In: Slobin, D.I., Gerhardt, J., Kyratzis, A., Guo, J. (Eds.), *Social Interaction, Social Context, and Language*. Lawrence Erlbaum, Mahwah, NJ, pp. 265–286.
- Levin, Beth, 1993. *English Verb Classes and Alternations: A Preliminary Investigation*. University of Chicago Press, Chicago.
- MacNamara, John, 1982. *Names for Things: A Study of Human Learning*. MIT Press, Cambridge, MA.
- MacWhinney, Brian, Snow, Catherine, 1985. The child language data exchange system. *Journal of Child Language* 12, 271–296.
- Mohanan, Tara, 1994. *Argument Structure in Hindi*. CSLI Publications, Stanford University, Stanford, CA.
- Naigles, Letitia, 1990. Children use syntax to learn verb meanings. *Journal of Child Language* 17, 357–374.
- Naigles, Letitia, Kako, Edward, 1993. First contact in verb acquisition: defining a role for syntax. *Child Development* 64, 1665–1687.
- Naigles, Letitia, Gleitman, Lila, Gleitman, Henry, 1993. Children acquire word meaning components from syntactic evidence. In: Dromi, E. (Ed.), *Language and Cognition: A Developmental Perspective*. Ablex, Norwood, NJ, pp. 104–140.
- Pandharipande, Rajeswari, 1981. Transitivity in Hindi. *Studies in the Linguistic Sciences* 11 (2), 161–179.
- Pinker, Steven, 1984. *Language Learnability and Language Development*. Harvard University Press, Cambridge, MA.

- Pinker, Steven, 1989. *Learnability and Cognition: The Acquisition of Argument Structure*. MIT Press, Cambridge, MA.
- Rispoli, Matthew, 1991. Discourse-pragmatics and the acquisition of an argument structure alternation. *Papers and Reports on Child Language Development* 30, 112–119.
- Rispoli, Matthew, 1995. Missing arguments and the acquisition of predicate meaning. In: Tomasello, M., Merriman, W. (Eds.), *Beyond Names for Things*. Lawrence Erlbaum, Hillsdale, NJ, pp. 331–354.
- Skarabela, Barbora, Allen, Shanley, 2003. Joint attention in argument expression in child Inuktitut. Talk presented at the Georgetown University Roundtable on Languages and Linguistics, Washington, DC, February.
- Slobin, Dan (Ed.), 1985. *A Crosslinguistic Study of Language Acquisition*, vols. 1 and 2. Lawrence Erlbaum, Mahwah, NJ.
- Tomasello, Michael, 2003. *Constructing a language: A usage-based theory of language acquisition*. Harvard University Press, Harvard, MA.
- Tomasello, Michael (Ed.), 1998. *A New Psychology of Language*. Lawrence Erlbaum, Mahwah, NJ.
- Tomasello, Michael, Brooks, Patricia, 1998. Young children's earliest transitive and intransitive constructions. *Cognitive Linguistics* 9 (4), 379–395.

Bhuvana Narasimhan is a scientific staff member at the Max Planck Institute for Psycholinguistics, Nijmegen, The Netherlands. Her research interests include lexical semantics and argument structure from a crosslinguistic and developmental perspective, with a specific focus on Hindi and Tamil.

Nancy Budwig is a professor of psychology at Clark University. Her primary area of research lies in a usage-based approach to children's early grammatical development with specific focus on verb-argument structure. She also examines language socialization and more generally the contributions of the study of language to an understanding of early socio-cognitive development. Her research currently investigates children's development of English, German, Hindi, and Hebrew.

Lalita Murty is a lecturer at the Norwegian Study Center at the University of York. Her research interests are in the area of the bilingual mental lexicon, and she has worked on languages such as Dutch, Japanese, Telugu, and English. She is currently interested in examining the sociolinguistic aspects of Indian English.