SELECTIVE LEARNING IN THE ACQUISITION OF KANNADA DITRANSITIVES

JOSHUA VIAU
Johns Hopkins University

JEFFREY LIDZ
University of Maryland

In this article we offer up a particular linguistic phenomenon, quantifier-variable binding in Kannada ditransitives, as a proving ground upon which competing claims about learnability can be evaluated with respect to the relative abstractness of children's grammatical knowledge. We first identify one aspect of syntactic representation that exhibits a range of syntactic, morphological, and semantic consequences both within and across languages, namely the hierarchical structure of ditransitive verb phrases (Barss & Lasnik 1986, Larson 1988, Harley 2002). Next we show that while the semantic consequences of this structure are parallel in English, Kannada, and Spanish, the word order and morphological reflexes of this structure diverge. Thus, although it is clear that the same structures are exhibited crosslinguistically, the evidence available to learners that would allow them to identify these structures is variable. We then turn to an examination of children learning Kannada, demonstrating that they have command of the relation between morphological form and semantic interpretation in ditransitives with respect to quantifier-variable binding. Finally, we offer a proposal on how a selective learning mechanism might succeed in identifying the appropriate structures in this domain despite the variability in surface expression.*

Keywords: quantification, binding, acquisition, syntax

1. INTRODUCTION. A key feature of syntactic explanation is its abstract character. This abstractness manifests itself in two ways. First, the syntactic representation of a sentence is not directly reflected in its surface form. To the extent that sentences have an internal hierarchical structure, this structure is only partially recoverable from its phonological form (Chomsky & Halle 1968, Selkirk 1984, Nespor & Vogel 1986). Second, the components of a syntactic representation have consequences for a broad range of phenomena. Aspects of the phrase structure determine word order, interpretive relations between words and phrases (e.g. binding, anaphora, scope, thematic roles), and the morphological expression of syntactic dependencies (e.g. case, agreement, binding). Indeed, syntacticians generally view a proposal as most explanatory when a single aspect of syntactic representation can be shown to control a broad spectrum of phenomena at once (Chomsky 1981, Baker 1996, Perlmutter & Moore 2002, Moore & Polinsky 2003, Snyder 2007).

The abstractness of syntactic representation comes at a cost, however. The less informative the signal is about the structural representation giving rise to that signal, the more difficult it is for learners to draw inferences about structural representations on the basis of surface forms. Indeed, it is mainly for this reason that Chomsky and others have proposed that a good deal of what people come to know about syntactic structure derives from the nature of the learner and not from the nature of the environment (Chomsky 1959, 1975, 1980, 1981, Fodor 1966, Baker 1979, Pinker 1984, Crain 1991, inter alia). However, it is equally important to recognize that positing innate abstract structure does not solve the learning problem. Rather, it shapes the learning mechanism to be

* We are grateful to Tonia Bleam, Stacey Conroy, Heidi Harley, Kristen Syrett, and Alexander Williams for helpful discussion and to the Central Institute of Indian Languages (Mysore), Odaya Narayana Singh, A. S. Mahadeva, and P. P. Giridhar for logistical and experimental support. Thanks also to audiences at the National Science Foundation, BUCLD 2007, DGFS 2008, Maryland Mayfest 2010, GALANA 2010, Scuola Internazionale di Studi Avanzati, Johns Hopkins University, the University of Delaware, the University of Massachusetts, and the University of Pennsylvania for their input. This work was supported in part by National Science Foundation Grant BCS-0604526.

a selective one, rather than a strictly inductive one (Fodor 1966, Pinker 1979, Lightfoot 1982). Even if learners come fully loaded with innate knowledge about the range of abstract structures that are possibly utilized in language, they must still use evidence from the surface form of language to identify which particular abstract structures underlie any given sentence in the language to which they are exposed (Fodor 1966, Pinker 1979, Tomasello 2000). This problem is made even more severe when we recognize that the very same aspect of syntactic representation may manifest itself differently in the surface form of different languages (Rizzi 1982, Dresher & Kaye 1990, Clark 1992, Baker 1997, Sakas & Fodor 2001). Thus, a selective learning mechanism cannot be a simple triggering mechanism in which certain cues are built into the learner as the evidence that the learner must seek in order to identify a particular syntactic structure in the exposure language (Lightfoot 1991, 1999, Gibson & Wexler 1994, Fodor 1998, Tomasello 2000).

Of course, the conclusion that the acquisition of syntax is achieved in large measure by a selective learning mechanism is valid only to the extent that the arguments for abstract representation are themselves valid. Alternatives to the 'early abstraction' view come in two related varieties. One approach recognizes that syntactic representations in adult grammars are abstract, but posits that this abstractness is the result of a learning mechanism that drives the learner from concrete representations of particular experiences to increasingly abstract generalizations over those experiences (Elman et al. 1996, Bybee 1998, Tomasello 2000, inter alia). A second approach denies that syntactic representations are so abstract, moving the explanatory burden of seemingly abstract phenomena to other areas of linguistic knowledge (Culicover & Jackendoff 2005). A growing body of research reflects a convergence of these alternatives, attributing less abstractness to syntactic representations and deriving what abstractness there is from domain-general processes of induction and categorization (e.g. Tomasello 1992, 2003, Goldberg et al. 2004, 2005, Goldberg 2006).

The study of the acquisition of argument structure has been a central battleground for debates about learning and abstractness. To date, experimental evidence bearing on this subject has been mixed. Some researchers have emphasized children's reluctance to extend novel verbs to familiar syntactic frames and the occasionally item-specific nature of their verb-related knowledge (Tomasello & Brooks 1998, Brooks & Tomasello 1999, Tomasello 2000, Savage et al. 2003, Tomasello & Akhtar 2003). In contrast, others have highlighted evidence for verb-general knowledge in children's usage and comprehension of these frames (Pinker 1989, Fisher 2002, Lidz et al. 2003, Fernandes et al. 2006, Gertner et al. 2006, Shimpi et al. 2007, Viau 2007, Yuan et al. 2007). While we are entirely sympathetic to the latter interpretation of the available data, one shortcoming of work done previously in this domain has been its vagueness with respect to the finer points of the abstract representations attributed to learners. For example, consider the English dative constructions in 1.[1]

(1) a. Sara kicked Kai the ball. (double-object (DO) dative, V NP_1 NP_2)
b. Sara kicked the ball to Kai. (prepositional dative, V NP PP)

Recent studies using syntactic priming in comprehension (Thothathiri & Snedeker 2008) and elicited production of novel verbs (Conwell & Demuth 2007) have shown

[1] By the term DATIVE no special claims about case assignment to either internal argument are intended; rather, we lean on the conventional use of dative as having to do with literal or metaphorical transfer, typically of something to some person or location. *Dative* derives from the Latin *dativus*, meaning 'appropriate to giving'. The term DITRANSITIVE is used as an umbrella term to refer both to dative constructions in English and to their equivalents in Kannada and Spanish.

that three- and four-year-old English-speaking children possess somewhat abstract, verb-independent knowledge about dative constructions, for example, along the lines of the general dative schemas in 2b rather than the list of verb-specific schemas in 2a.

(2) a. *give* NP_1 NP_2, *give* NP PP, *show* NP_1 NP_2, *show* NP PP
b. V NP_1 NP_2, V NP PP

However, these studies were not designed to reveal anything about the internal structure of the schemas in 2b. Thus, while their findings are highly suggestive of verb-independent representations by age three, such representations are fully compatible with learning mechanisms in which abstractness is a driving feature of acquisition as well as those in which abstractness is a consequence of acquisition.

In what follows, we dig deeper, starting where Conwell and Demuth (2007) and Thothathiri and Snedeker (2008) left off. We offer up one particular linguistic phenomenon, quantifier-variable binding in Kannada ditransitives, as a probe into both the abstractness of the representations involved and the learning mechanisms responsible for those representations. The point here is not to provide a definitive argument in favor of one analysis over another. Instead, we aim to highlight the particular learning problems associated with adopting a highly abstract analysis and to offer a sketch of a learning mechanism that is compatible with this analysis. As noted above, adopting abstract analyses comes with a cost for the learner.

This article has two primary aims. Empirically, we show that children as young as age four command the structures responsible for the distribution of quantifier-variable relations in ditransitives. This sets an upper bound on when the relevant constructions must be acquired, placing severe constraints on the learning theory for the phenomenon. Theoretically, we sketch a distributional learning analysis that is compatible with the proposed structures, illustrating how the challenge of abstractness can be met. More specifically, we show how a learner armed with the space of possible ditransitive structures can use surface distributional evidence to determine which surface forms map onto which underlying structures.

An example of the binding phenomenon to be investigated is shown in English in 3, where the quantifier *every* binds the pronoun *his* (indicated by subscripts), yielding an interpretation according to which each individual worker receives his own paycheck, as opposed to someone else's.

(3) I gave every$_x$ worker his$_x$ paycheck.

Looking ahead, we argue that even the best possible combination of rich, informative input and potent cognitive resources alone would likely underdetermine the grammar for this phenomenon in Kannada. This analysis naturally invites a learning mechanism in which abstract syntactic structure serves as a causal factor in successful acquisition, rather than merely being the outcome of learning. If children did not bring these representational resources to bear in acquisition, how four-year-old Kannada speakers might have acquired the linguistic competence that they are shown to have would remain mysterious. We wish to emphasize, however, that claims about the causal role of syntactic structure in learning are valid only to the extent that we can identify how surface forms are mapped onto the relevant representations. We therefore include a proposal for how this might be achieved, illustrating how the environment interacts with the innate structure of the learner to allow for successful acquisition.

We first identify one aspect of syntactic representation that exhibits a range of syntactic, morphological, and semantic consequences both within and across languages, namely the hierarchical structure of ditransitive verb phrases (Barss & Lasnik 1986, Larson 1988, Harley 2002).

Next we show that while the semantic consequences of this structure are parallel in English, Kannada, and Spanish, the word order and morphological reflexes of this structure diverge. The crosslinguistic data present an interesting challenge to the theory of grammar. The interpretive parallels suggest a unified analysis across the three languages. The surface expression of this analysis varies, however, suggesting important differences. An explanatory theory in this domain, then, would be one in which the three languages are alike at one level of representation, with independent properties of the surface syntax conspiring to hide this similarity. Unifying the three languages in this manner is explanatory because it captures their fundamental structural and semantic similarities.

From the perspective of language acquisition, it is often proposed that crosslinguistic symmetries of this sort are explained by the same mechanisms that explain how children arrive at uniform structural analyses for a given surface form (Chomsky 1965, Pinker 1979, Baker 2005). Thus, these kinds of crosslinguistic symmetries in abstract structural analysis are the ideal place to look for constraints on the language learner's hypothesis space.

However, although it is clear that the same structures are exhibited crosslinguistically, the evidence available to learners that would allow them to identify these structures is crosslinguistically variable. Thus, to the extent that the crosslinguistic similarities are explained by limits on the space of possible grammars, we must face the additional challenge of determining how children are able to map surface forms onto these structures.

Having identified the learning problem, we then turn to an examination of children acquiring Kannada, demonstrating that they have command of the relation between morphological form and semantic interpretation in ditransitives with respect to quantifier-variable binding. We examine four-year-olds in particular for two reasons. First, given the complexity of the sentences required to determine the structure of ditransitives, children of this age are likely close to the youngest age at which they could understand the contexts in which these sentences are used. Second, because we target children, we are able to set an upper bound on when the acquisition process must be complete and hence place constraints on the kind and amount of information that learners must use in acquiring these structures. Our data show that four-year-old native speakers of Kannada have adult-like representations of ditransitive constructions. Their knowledge is independent of the specific verbs participating in these structures, and only partially dependent on the surface word order. Finally, we offer a concrete, though somewhat speculative, proposal on how a selective learning mechanism might succeed in identifying the appropriate structures in this domain despite the variability in surface expression that exists across languages.

2. BACKGROUND.

2.1. DATIVE ASYMMETRIES. Since the focus of this article is the hierarchical structure of ditransitive verb phrases, we first review some background on certain asymmetries in grammaticality judgments that have been used as evidence for hierarchical structure in the past. Barss and Lasnik (1986) were the first to discuss the general phenomenon as it is manifested in English with respect to the dative alternation. They present six types of evidence, which we briefly review in large part using data from Larson 1988.[2] In each

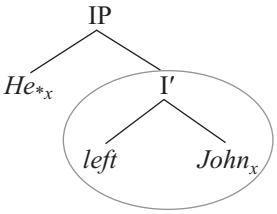
[2] Note that Barss and Lasnik (1986) originally restricted their discussion to DO-datives; Larson (1988) extended their observations to include prepositional datives in motivating his syntactic analysis.

case the argument proceeds as follows: given a grammaticality contrast, the facts fall out as they should if we assume (i) that the principle underlying the contrast crucially depends on the notion of c-command and (ii) that this c-command requirement is met in the grammatical structure but not in its ungrammatical counterpart. For our purposes, the following working definition of c-command will suffice (see Reinhart 1976, 1983, Chomsky 1981, 1986).

(4) C-COMMAND: *a* c-commands *b* if and only if the lowest branching node that dominates *a* dominates *b* and *a* does not dominate *b*.

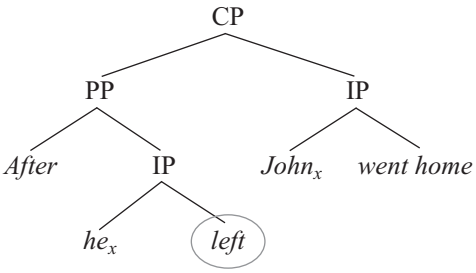
In 5, for example—but not 6—*He* c-commands *John* by this definition, which arguably explains why *He* and *John* can grammatically corefer only in 6.[3]

(5)



= *c-command domain of pronoun*

(6)



Returning to the data, the asymmetries shown in 7–12 are exhibited by prepositional datives and DO-datives alike.

(7) Binding principle A
  a. I showed [the students]$_x$ to each other$_x$'s professors.
  b. *I showed each other$_x$'s professors to [the students]$_x$.
  c. I showed [the professors]$_x$ each other$_x$'s students.
  d. *I showed each other$_x$'s students [the professors]$_x$.

(8) Weak crossover
  a. [Which check]$_x$ did you send __ to its$_x$ owner?
  b. *[Which worker]$_x$ did you send his$_x$ check to __ ?
  c. [Which man]$_x$ did you send __ his$_x$ paycheck?
  d. *[Whose pay]$_x$ did you send his$_x$ mother __ ?

(9) Superiority
  a. Which check did you send __ to who?
  b. *To whom did you send which check __ ?
  c. Who did you give __ which paycheck?
  d. *Which paycheck did you give who __ ?

[3] We assume the following general formulation of binding principle C: R-expressions (referring expressions, e.g. *John*) must be free, where free is defined as not being bound by a c-commanding antecedent (e.g. Chomsky 1986). For example, in the sentence *He$_x$ left John$_x$*, *He* and *John* cannot corefer without incurring a principle C violation since *He* c-commands *John*.

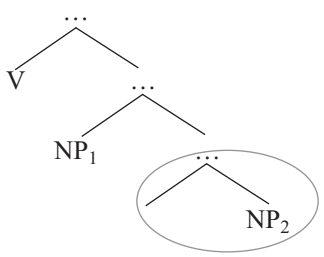
(10) Reciprocals
  a. I sent each boy to the other's parents.
  b. *I sent the other's check to each boy.
  c. I showed each man the other's socks.
  d. *I showed the other's friend each man.

(11) Negative polarity items (e.g. *any*)
  a. I sent no presents to any of the children.
  b. *I sent any of the packages to none of the children.
  c. I showed no one anything.
  d. *I showed anyone nothing.

(12) Quantifier-variable binding
  a. I gave [every check]$_x$ to its$_x$ owner.
  b. *I gave his$_x$ paycheck to [every worker]$_x$.
  c. I gave [every worker]$_x$ his$_x$ paycheck.
  d. *I gave its$_x$ owner [every paycheck]$_x$.

Let us assume that the c-command relation (without reference to linear order) is relevant in explaining the ungrammaticality of the (b) and (d) examples in all of these phenomena—the binding of anaphors, weak crossover, superiority effects, reciprocals, negative polarity licensing, and the binding of pronominal variables by quantifiers—as is standard in the generative tradition.[4] Taken together, then, the asymmetries illustrated above provide strong evidence that for both prepositional datives and DO-datives the first internal argument c-commands the second, but not vice versa. C-command is unidirectional, hence asymmetrical, with respect to these constituents. Concerning quantifier-variable binding in particular (12), the relative depth of embedding of the internal objects determines binding possibilities. Thus, any dative configuration must have the following hierarchical property (ignoring aspects of the representation that are irrelevant for our purposes, such as the category labels of the relevant nodes).

(13) ⬭ = *c-command domain of NP$_1$*



Of course, every linguist (generative or otherwise) needs a theory of the phrase structure of datives. In our view, Barss-and-Lasnik-style data are criterial in determining what that phrase structure is, and only accounts positing hierarchical (as opposed to flat or indeterminate) structures for dative verb phrases will adequately capture them.[5] In

[4] This is a common but not universally embraced assumption. See, for example, van Hoek 1997 or Harris & Bates 2002 for nonstructural accounts of pronominal reference. Less formalist work along these lines typically fails to account for or even address the wide range of other phenomena, only some of which are described above, that c-command helps to explain. But it is not the purpose of this article to decide whether c-command is the relevant structural relation here. Rather, it is to examine the consequences of assuming that it is.

[5] Another important issue about which we have little to say here is whether the two dative constructions in English are transformationally related, as Larson (1988) originally proposed (see also Aoun & Li 1989, den Dikken 1995, inter alia) or rather base-generated (e.g. Goldberg 1995, Bleam 2001, Harley 2002, Lidz 2003, Beck & Johnson 2004; see Rappaport Hovav & Levin 2008 for a review). The analysis proposed for Kannada ditransitives in this article is a hybrid of these approaches, with transformations operating on two distinct base-generated structures to yield four possible surface forms.

§§2.2 and 2.3, we motivate the claim that Kannada and Spanish, respectively, have the same underlying structures for ditransitives as English—in which the goal asymmetrically c-commands the theme in the 'DO-dative' variant and the theme asymmetrically c-commands the goal in the 'prepositional dative' variant—with the caveat that these structures are subject to derivational deformation as a function of freer word order in these languages.

2.2. QUANTIFIER-VARIABLE BINDING IN KANNADA. It is standardly held that quantifiers must c-command pronouns in order to bind them. This c-command requirement follows from the semantics of quantification and from general syntactic requirements on the bound interpretation of pronouns (Reinhart 1983, Heim & Kratzer 1998). We assume its basic correctness here. If quantifiers must c-command pronouns in order to bind them, then the quantifier-variable asymmetry we saw in 12 must arise due to syntactic configurations in which the first dative internal object c-commands the second, but not vice versa, for both dative constructions. In English, however, c-command and linear order are confounded. Thus, theoretical considerations aside, despite empirical findings suggesting that English-speaking children pattern with adults in their knowledge of asymmetries pertaining to principle C and quantifier-variable binding in datives (Viau 2007), it is impossible to demonstrate conclusively that the root cause of these asymmetries is asymmetric c-command of the second dative object by the first, as we have argued elsewhere.[6] A simple preference for forward binding, with the binder preceding the bound in the linear string—however unappealing theoretically—could largely explain the observed findings in English. For this reason, we now turn to a discussion of quantifier-variable binding in Kannada, a language whose structure allows us to disentangle c-command and linear order.

Kannada is a Dravidian language spoken by approximately forty million speakers primarily in the southern Indian state of Karnataka, where it is the official language. Kannada has unmarked subject-object-verb (SOV) constituent order, and its word order is relatively free, with noun phrases marked for case and verbs typically agreeing with the subject in person, number, and gender (Sridhar 1990).

In Kannada, the quantifier-variable binding asymmetry is more complex than in English, involving an interaction between word order and the presence or absence of a benefactive verbal affix (BEN).[7] The basic pattern of adult grammaticality judgments with a quantified dative argument is shown in 14, where DAT indicates the indirect object, marked with dative case, ACC indicates the direct object, marked with accusative case, and Q- indicates which of these noun phrases contains a quantifier.[8]

(14) a. Q-DAT$_x$ ACC$_x$ BEN
Rashmi pratiyobba hudugan-ige avan-a kudure-yannu
Rashmi every boy-DAT 3SG.M-GEN horse-ACC
tan-du-koTT-aLu.
return-PP-BEN.PST-3SG.F
'Rashmi returned every boy his horse.'

[6] Indeed, Barss and Lasnik's original use of their asymmetries was to argue for the relevance of linear order in explaining them.

[7] Our Kannada adult judgment data were collected by Jeffrey Lidz in Mysore, India, in 2001 based on interviews with K. Kushalappa Gowda, B. K. Suvarna Devi, B. Mallikarjun, and P. P. Giridhar. They were first published and discussed in Lidz & Williams 2005.

[8] We follow Sridhar 1990 and Lidz & Williams 2005 in adopting the convention of capitalizing retroflex consonants in Kannada.

b. Q-DAT$_x$ ACC$_x$ unaffixed
Rashmi pratiyobba hudugan-ige avan-a kudure-yannu
Rashmi every boy-DAT 3SG.M-GEN horse-ACC
tan-d-aLu.
return-PST-3SG.F
'Rashmi returned every boy his horse.'

c. ACC$_x$ Q-DAT$_x$ BEN
Rashmi avan-a kudure-yannu pratiyobba hudugan-ige
Rashmi 3SG.M-GEN horse-ACC every boy-DAT
tan-du-koTT-aLu.
return-PP-BEN.PST-3SG.F
'Rashmi returned his horse to every boy.'

d. *ACC$_x$ Q-DAT$_x$ unaffixed
*Rashmi avan-a kudure-yannu pratiyobba hudugan-ige
Rashmi 3SG.M-GEN horse-ACC every boy-DAT
tan-d-aLu.
return-PST-3SG.F
'Rashmi returned his horse to every boy.'

Descriptively speaking, when the dative-marked object comes first (14a,b), it can bind into the accusative-marked object, whether or not the benefactive affix is present. In contrast, when the accusative-marked object comes first (14c,d), the dative can bind into it only in the presence of the benefactive affix. That is, forward binding is always possible in these cases, but backward binding is possible only in the presence of the benefactive affix.

A different pattern emerges, however, if the quantificational phrase is the accusative argument and the pronominal is contained in the dative argument.

(15) a. *DAT$_x$ Q-ACC$_x$ BEN
*sampaadaka adar-a lekhan-ige pratiyondu lekhana-vannu
editor it-GEN author-DAT every article-ACC
kaLis-i-koTT-a.
send-PP-BEN.PST-3SG.M
'The editor sent its author every article.'

b. DAT$_x$ Q-ACC$_x$ unaffixed
sampaadaka adar-a lekhan-ige pratiyondu lekhana-vannu
editor it-GEN author-DAT every article-ACC
kaLis-id-a.
send-PST-3SG.M
'The editor sent its author every article.'

c. Q-ACC$_x$ DAT$_x$ BEN
sampaadaka pratiyondu lekhana-vannu adar-a lekhan-ige
editor every article-ACC it-GEN author-DAT
kaLis-i-koTT-a.
send-PP-BEN.PST-3SG.M
'The editor sent every article to its author.'

d. Q-ACC$_x$ DAT$_x$ unaffixed
sampaadaka pratiyondu lekhana-vannu adar-a lekhan-ige
editor every article-ACC it-GEN author-DAT
kaLis-id-a.
send-PST-3SG.M
'The editor sent every article to its author.'

Here we see that when the accusative-marked object comes first (15c,d), it can bind into the dative-marked object, regardless of whether the benefactive affix is present on the verb. When the dative-marked object comes first (15a,b), however, the accusative-marked object can bind into it only when the benefactive affix is absent. That is, forward binding is again always possible in these cases, but backward binding is possible only in the absence of the benefactive affix. The relevant binding possibilities for quantified dative and accusative arguments are summarized in 16.

(16) a. ✓Q-DAT_x ACC_x V-**BEN**
b. ✓Q-DAT_x ACC_x V
c. ✓ACC_x Q-DAT_x V-**BEN**
d. *ACC_x Q-DAT_x V
e. *DAT_x Q-ACC_x V-**BEN**
f. ✓DAT_x Q-ACC_x V
g. ✓Q-ACC_x DAT_x V-**BEN**
h. ✓Q-ACC_x DAT_x V

These data illustrate a complex interaction between the relative order of the two arguments and the presence/absence of the benefactive affix. Forward binding is always licensed (independent of which argument is the quantifier and independent of the presence/absence of the benefactive affix). In the cases where the dative argument is the quantifier, backward binding is licensed only in the PRESENCE of the benefactive affix. In the cases where the accusative is the quantifier, backward binding is licensed only in the ABSENCE of the benefactive affix. Thus, there is an interaction between which argument is the quantifier and what the morphological form of the verb is. Backward binding is licensed differentially depending on whether the quantifier is the dative or the accusative argument and whether the benefactive is present or absent.

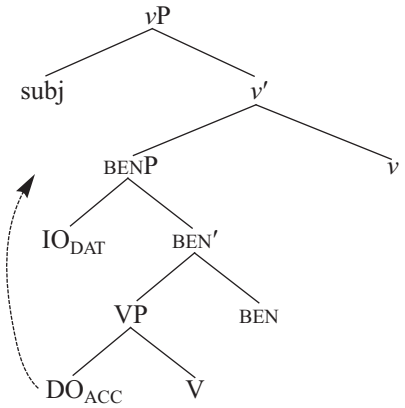
Lidz and Williams (2005) argue that the above asymmetries arise from there being two distinct underlying structures for ditransitives in Kannada. When the benefactive affix is present, the DAT-ACC order is the underlying order, with the ACC-DAT order derived by A-movement. Thus, according to Lidz and Williams (2005), 16c is derived from 16a by movement of the accusative argument past the dative. The appearance of backward binding in 16c is due to the fact that A-movement of the accusative over the dative does not destroy the binding relation established in the underlying order (16a), in which the quantified dative NP c-commands and thereby grammatically binds into the accusative.[9] Similarly, since the DAT-ACC order is underlying, a quantificational accusative-marked object cannot bind into the dative (16e) unless A-movement has occurred, introducing a new configuration to license binding (16g).

When there is no benefactive affix, the ACC-DAT order reflects the underlying structure, and the DAT-ACC order is derived by A-movement. Thus, 16b is derived from 16d. The quantified dative NP in 16d cannot bind into the accusative because it does not c-command the accusative; only after moving above the accusative, as in 16b, can it grammatically bind into the accusative. By the same logic, since the accusative is underlyingly higher than the dative, the binding of the dative by the accusative can be established over this representation (16h) and subsequent A-movement will not destroy it (16f).

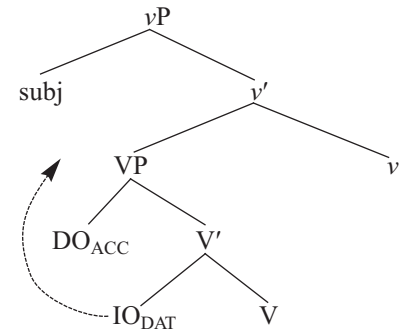
We assume this analysis as well as the syntactic representations that it entails, shown in 17 with the benefactive affix and in 18 without. Optional A-movement is marked with a dashed arrow.

[9] See Mahajan 1990 for the distinction between A and A-bar movement with respect to binding possibilities.

(17) Subject DAT ACC V-BEN



(18) Subject ACC DAT V



The conclusion that there are two distinct underlying structures in Kannada, each of which can be transformed by A-movement of the lower NP past the higher one, straightforwardly captures the binding asymmetries discussed above. At this juncture it is important to note that neither a theory of quantifier-variable binding that makes reference only to the surface configurations nor a theory of quantifier-variable binding that makes reference only to the underlying configuration (or to some semantic representation that is isomorphic to what we are treating as the underlying representation, as in Culicover & Jackendoff 2005) can capture the full pattern of facts here.

If binding were established only on the basis of the surface configuration, we would be unable to explain why the dative in 16c, which occurs lower than the accusative in the surface syntax, can bind into the accusative. Neither would we be able to explain why the accusative in 16f, which occurs lower than the dative in surface syntax, can bind into the dative.

By the same token, if binding were established only in some nonsurface representation (either the analogue of D-structure or some kind of conceptual semantic representation), it would be mysterious that the dative can bind into the accusative in 16b but not 16d, since these would presumably be alike at that level of representation. Similarly, it would be mysterious that the accusative can bind into the dative in 16g but not 16e, which should be alike at the relevant level of representation.

In essence, the pattern reported in Lidz & Williams 2005 argues decisively for (i) a theory of ditransitives with two alternative initial arrangements of the arguments and (ii) a derivational theory of syntax, since a monostratal theory seems incapable of capturing the relevant generalizations.

A referee raises an alternative analysis of these facts that does not rely on derivational history. In this alternative, binding is sensitive to a generalized notion of prominence across several representations. On this view, linear order (or surface c-command) provides one metric of prominence, explaining why forward binding is always possible. In addition, thematic structure provides an additional metric of prominence. If an NP_1 is more prominent than NP_2 along either of these dimensions, then NP_1 can bind into NP_2. On this view the dative NP is thematically prominent in the benefactive, but the accusative NP is thematically prominent in the accusative. Thus word order is irrelevant for the dative binding into the accusative in the benefactive structure, but not the nonbenefactive structure. Similarly, word order is irrelevant for the accusative binding into the dative only in the nonbenefactive structure.

This view differs from the derivational theory only insofar as thematic prominence is represented outside of the phrase structure. It captures the facts presented so far as well as the derivational theory, but at the expense of having a unified configural theory of binding. That is, this analysis has two domains of representation over which prominence for binding can be defined (thematic and syntactic), whereas the derivational theory defines prominence for binding only once. Similarly, in languages like English that lack the word-order flexibility that Kannada has, the thematic prominence lines up perfectly with phrase structural prominence, suggesting that there is a tight relation between these. Hence, it strikes us as more theoretically parsimonious to assume that thematic prominence is reflected in the underlying syntax and that deformations of word order are also reflected in the syntax, allowing for a unified theory of prominence for binding.[10]

An additional piece of evidence supporting the claim that we are dealing with dual underlying structures here is that benefactive and nonbenefactive ditransitives in Kannada have different meanings (Lidz & Williams 2005).[11] For example, benefactive ditransitives imply possession transfer just as DO-datives do in English (e.g. Green 1974, Oehrle 1976). Thus, in 19, Rashmi is understood as receiving the cake, and 19a cannot felicitously be followed by 19b.

(19) a. nannu Rashmi-ge keek-annu suTT-u-**koTT**-e
I Rashmi-DAT cake-ACC prepare-PP-**BEN.PST**-1SG
'I made Rashmi a cake … '

b. #adare ad-annu nann-a taayi-ge koTT-e.
but it-ACC I-GEN mother-DAT give.PST-1SG
' … but I gave it to my mother.'

In contrast, nonbenefactive ditransitives do not imply possession transfer. Accordingly, 20b is a perfectly acceptable and felicitous follow-up to 20a.

(20) a. nannu Rashmi-ge keek-annu suTT-e
I Rashmi-DAT cake-ACC prepare.PST-1SG
'I made a cake for Rashmi … '

b. adare ad-annu nann-a taayi-ge koTT-e.
but it-ACC I-GEN mother-DAT give.PST-1SG
' … but I gave it to my mother.'

[10] Others might have different metrics of theoretical parsimony, concluding, for example, that positing derivations while maintaining a unified theory of binding is a worse theory than one with no derivations but a disjunctive theory of binding. Nonetheless, the learning problem is essentially the same for this view as the derivational view, since the surface correlate of thematic prominence varies from language to language and interacts with word-order prominence in the same way.

[11] For a similar argument concerning ditransitives in a related language, Tamil, see Sundaresan 2006.

The data are consistent with the Kannada benefactive ditransitive representing the same possession relation argued to be encoded by the DO-dative in English, a point to which we return in §4. Before turning to our data on children's interpretation of Kannada ditransitives, we pause to consider what can be learned from a comparison with ditransitives in Spanish.

2.3. QUANTIFIER-VARIABLE BINDING IN SPANISH. Spanish is similar to Kannada—and accordingly different from English—in that what is argued to be the DO-dative is marked morphologically rather than by a distinctive word order. However, the kind of morphological marking used in Spanish is different from that used in Kannada. In Spanish the DO-dative is signaled by clitic (CL) doubling (Uriagereka 1988, Masullo 1992, Demonte 1995, Bleam 1999, 2001, Ormazabal & Romero 1999, Cuervo 2003). The basic pattern of adult grammaticality judgments for Spanish quantifier-variable binding is shown in 21–22, where IO indicates the indirect object, DO indicates the direct object, Q- indicates the quantified noun phrase, and CL indicates the clitic *le*, which refers to or 'doubles' the IO.

(21) a. Q-DO_x IO_x
El editor envió cada libro a su autor.
the editor send.PST.3SG each book to its author
'The editor sent each book to its author.'

b. *DO_x Q-IO_x
*El editor envió su libro a cada autor.
the editor send.PST.3SG his book to each author
'The editor sent each book to its author.'

(22) a. CL Q-IO_x DO_x
El editor le envió a cada autor su libro.
the editor CL send.PST.3SG to each author his book
'The editor sent each author his book.'

b. CL DO_x Q-IO_x
El editor le envió su libro a cada autor.
the editor CL send.PST.3SG his book to each author
'The editor sent each author his book.'

c. CL Q-DO_x IO_x
El editor le envió cada libro a su autor.
the editor CL send.PST.3SG each book to its author
'The editor sent its author each book.'

d. *CL IO_x Q-DO_x
*El editor le envió a su autor cada libro.
the editor CL send.PST.3SG to its author each book
'The editor sent its author each book.'

Descriptively speaking, without the clitic the DO can bind into the IO but not vice versa in the attested DO-IO word order (21a,b).[12] With the clitic, the IO can bind into the DO regardless of word order (22a,b), but the DO can bind into the IO only if the DO precedes the IO (22c,d). The relevant binding possibilities for quantified IOs and quantified DOs are summarized in 23.

[12] The reverse IO-DO word order is reported to be impossible in Spanish in the absence of the clitic, without special focus structure (Demonte 1995, Bleam 2001).

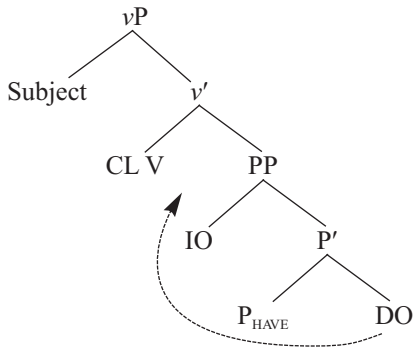
(23) a. ✓CL V Q-IO_x DO_x
b. —
c. ✓CL V DO_x Q-IO_x
d. *V DO_x Q-IO_x
e. *CL V IO_x Q-DO_x
f. —
g. ✓CL V Q-DO_x IO_x
h. ✓V Q-DO_x IO_x

The Kannada and Spanish facts are thus exactly parallel (cf. 16). Indeed, Bleam (2001) reaches the same conclusion for Spanish as Lidz and Williams (2005) do for Kannada, arguing that the above asymmetries arise from there being two distinct underlying structures for ditransitives in Spanish. When the clitic is present, the IO-DO order is the underlying order, with the DO-IO order derived by A-movement. Thus, according to Bleam (2001), 23c is derived from 23a. The appearance of backward binding in 23c is due to the fact that A-movement of the DO over the IO does not destroy the binding relation established in the underlying order 23a, in which the quantified IO c-commands and thereby grammatically binds into the DO. Similarly, since the IO-DO order is underlying, the quantified DO cannot bind into the IO (23e) unless A-movement has occurred, introducing a new configuration to license binding (23g).

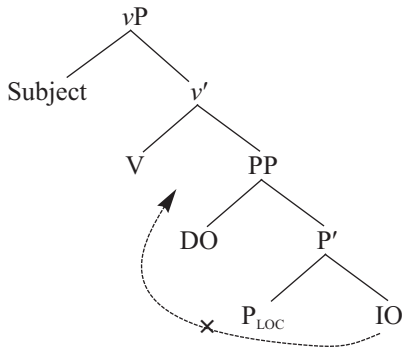
When there is no clitic, the DO-IO order is the basic word order (23d). The IO-DO order would have to be derived by A-movement in the absence of a clitic, but, as it turns out, this option is ruled out for independent reasons. The quantified IO in 23d cannot bind into the DO because it does not c-command the DO. Since, however, the DO is underlyingly higher than the IO, the binding of the IO by the DO can be established over this representation (23h).

We assume this analysis as well as the syntactic representations that it entails, shown schematically in 24 with the clitic and in 25 without (see Bleam 2001 and Harley 2002 for extensive discussion). Optional A-movement is marked with a dashed arrow.

(24) Subject CL V IO DO



(25) Subject V DO IO



As in English and Kannada, the two underlying structures have different meanings. Clitic-doubled ditransitives imply possession transfer. Thus, in 26, the sister is understood as receiving the cake, and 26a cannot felicitously be followed by 26b.

(26) a. Originalmente, le compré el helado a mi hermana
originally CL bought.PST.1SG the ice.cream for my sister
'Originally, I bought the ice cream for my sister … '
b. #pero decidí comerlo.
but decide.PST.1SG eat.it
' … but I decided to eat it.'

In contrast, ditransitives lacking clitic doubling do not imply possession transfer. Accordingly, 27b is a perfectly acceptable and felicitous follow-up to 27a.

(27) a. Originalmente, compré el helado a mi hermana
originally bought.PST.1SG the ice.cream for my sister
'Originally, I bought the ice cream for my sister … '
b. pero decidí comerlo.
but decide.PST.1SG eat.it
' … but I decided to eat it.'

For other similar meaning differences in the spirit of Green 1974 and Oehrle 1976 that hinge on the presence of the clitic in Spanish, see Bleam 2001. It seems that the Spanish clitic-doubled ditransitive represents the same possession relation argued to be encoded by the DO-dative in English and the benefactive ditransitive in Kannada.[13]

2.4. FRAMING THE LEARNING PROBLEM. In the preceding sections we have seen good evidence that English, Kannada, and Spanish all utilize essentially the same two structures in ditransitives.[14] In the 'prepositional dative', the accusative argument c-commands the dative underlyingly. This structure is expressed in English as the prepositional dative, in Spanish as the non-clitic-doubled ditransitive, and in Kannada as the nonbenefactive ditransitive. In the 'DO-dative', the dative argument c-commands the accusative underlyingly. This structure is expressed in English as the DO-dative, in Spanish through dative clitic doubling, and in Kannada through the benefactive verbal affix.

A theory of syntax that did not capture these fundamental parallels would be missing an important generalization about the way argument structures are realized crosslinguistically. Thus, the parallels point toward a theory of grammar in which the variant of a ditransitive that encodes a possession relation always projects the goal higher than the theme (and vice versa for the locative ditransitive), with the consequences for binding following from the theory of phrase structure in concert with the theory of binding. In other words, these crosslinguistic parallels suggest that there is a fundamental link in the theory of grammar between the interpretive properties of ditransitives and their structural realization.

[13] It is important to note as well that when we say that one structure is the 'underlying' or 'basic' structure, this has no bearing on what is the preferred or unmarked word order in actual usage. In Spanish, the ACC-DAT order is the informationally neutral word order, with the DAT-ACC order bearing a marked information-structure status (see Demonte 1995 and Bleam 2001, inter alia, for discussion). This is true independent of the presence of clitic doubling. In Kannada, the dative-accusative order is the informationally neutral word order, with the accusative-dative order conveying marked information structure. Again, this is true independent of the presence or absence of the benefactive morpheme (see e.g. Tirumalesh 2000).

[14] Similar claims have also been made for Greek (Anagnostopoulou 2003), Hiaki (Jelinek 2000, Harley 2002), Japanese (Miyagawa & Tsujioka 2004), Korean (Jung & Miyagawa 2004), and Romanian (Diaconescu & Rivero 2005), among others.

Given the widely held perspective that constraints on possible grammars constrain both crosslinguistic generalizations and the shape of language acquisition (Chomsky 1965, Langacker 1987, Pinker 1989, Baker 2005, Goldberg 2006, Snyder 2007), this crosslinguistic symmetry suggests that the factors that cause it should also constrain early language learners' grammars.

Despite this fundamental structural symmetry across the three languages, however, the surface manifestation of these structures is distinct in each language. DO-datives show a distinct surface word order in English but not in Kannada and Spanish. Both Kannada and Spanish, unlike English, have a morphological distinction that correlates with the choice of DO-dative or prepositional dative. In Kannada, the DO-dative variant is marked by a benefactive verbal affix, while in Spanish this variant is marked via clitic doubling of the dative argument. Thus, learners cannot rely on either the word order or the morphological form as evidence in determining which of the two abstract structures underlies a ditransitive sentence in the language they are learning. Even assuming that the learner is constrained to believe that the goal in a 'possession' dative is higher than the theme, but that the theme is higher than the goal in a 'location' dative, the learner is still faced with the puzzle of determining which sentences go with which structure. There simply is no crosslinguistically reliable surface cue in the word order or in the morphology (Haspelmath 2005). Consequently, having an innately constrained hypothesis space does not solve the learning problem entirely.

To the extent that learners can be shown to identify the appropriate structure, we are faced with an interesting puzzle. On the one hand, the fact that the very same structures are exhibited in languages with such divergent surface syntax points toward just the sort of crosslinguistic commonality that a selective learning theory is intended to explain. On the other hand, the fact that the surface realizations of these structures diverge across languages would appear to make it difficult to use the surface form as a cue for the underlying structure.

It is important to note further that learners almost certainly cannot learn which binding configurations are possible simply by observing them. Ditransitive sentences with one quantificational argument and one argument containing a pronoun that could potentially be bound by that quantifier are exceedingly rare. We searched a 385-million-word parsed corpus of *New York Times* data for ditransitives meeting the relevant structural description.[15] Out of the fifteen million sentences in that corpus we found 216 ditransitives in which the first internal argument was a quantifier and the second internal argument contained a pronoun.[16] Of these 216, there were no cases in which the pronoun and the quantifier matched in person, number, and gender features. We also searched a 7.25-million-word corpus of child-directed speech for the same type of ditransitives.[17] This time we found a proportionately slightly larger number of ditransitives in which the first internal argument was a quantifier and the second internal argument contained a pro-

[15] Stories from the *New York Times* were selected by their trigram coverage in the Penn Treebank, with custom sentence segmentation and tokenization. These were parsed using a self-training parser (Huang & Harper 2009), which was given WSJ 0-21 and 300,000 sentences from the BLLIP WSF corpus for self-training. Thanks to Denis Filimonov for parsing the corpus and Philip Resnik for making it available to us for searching.

[16] The particular quantifiers examined in both corpora were *all*, *each*, *every*, *most*, and *some*.

[17] Here we made use of the entire American English corpus in CHILDES (MacWhinney 2000), downloaded on August 24, 2010, which we searched using CLAN.

noun: 251. Of these, however, there were only four in which the pronoun and the quantifier matched in person, number, and gender features, given in 28.

(28) a. *MOT: put (th)em all in their trucks. (file: \Post\lew10.cha, line 519)
b. *MOT: but let's put them all in their …
(file: \Providence\Naima\nai26.cha, line 677)
c. *MOT: Ruby put all the guests in their chairs one two three four five six seven stuffed guests Max said Ruby.
(file: \Providence\Naima\nai37.cha, line 1613)
d. *MOT: let's put them all in their little beds. (file: \Valian\13b.cha, line 3878)

Note that in the ditransitives shown in 28, only one verb occurs, *put*. Furthermore, *put* appears in only one syntactic frame, V NP PP, and always with a PP headed by *in*. Finally, it is not entirely clear that in the three ditransitives containing the phrase *them all* we have bona fide examples of quantifier-variable binding as opposed to pronouns binding other pronouns. As a result, the likelihood that any young learner of English would be able to extract from input as impoverished as this the full range of binding possibilities within ditransitive verb phrases is, in our view, negligible. Assuming that the sorts of potentially informative configurations that we failed to turn up in our searches are not more common in Kannada than in English, we think it is fair to say that the data from which one could directly learn about binding in ditransitives are sparse.

Moreover, even if these data were more frequent, in order to learn from them, the learner would also have to correctly represent the intended interpretation of the sentence, without knowing its structure, in a substantial subset of cases. Absent knowledge of the intended interpretation of a given sentence, the learner would not be able to learn anything about possible binding relations for that sentence. Suppose, for example, that learners had a bias for forward binding that they had to learn to overcome in certain cases (e.g. with a dative quantifier and the benefactive morpheme or with an accusative quantifier and no benefactive morpheme). Hearing sentences in which a backward-binding interpretation was intended might lead children to change their grammar to fit the intended interpretation. Alternatively, it might lead them to conclude that the speaker understood the situation differently from the way they did. Thus, even if 'positive' data existed in sufficient quantity, it is not straightforward to define how children should learn from such data. Finally, even if only a subset of all imaginable interpretations were observed for a given sentence type, the learner would still somehow need to determine that unobserved interpretations did not represent accidental gaps, a problem that becomes severe when the data are sparse. Given these considerations, it seems reasonable to conclude that whatever children know about binding in ditransitives, it is likely derived by a projection beyond the input and not simply by tracking the distribution of interpretations in the input.

In what follows, we first demonstrate that children learning Kannada have the relevant abstract syntactic knowledge, as shown by their interpretive preferences with respect to quantifier-variable binding in ditransitives. We then turn to a discussion of how a selective learning mechanism might make the acquisition of these constructions possible.

It is important to examine four-year-olds in this context for two reasons. First, demonstrating these effects in four-year-olds attests to their robustness; you do not need to have a highly developed metalinguistic capacity to display these phenomena. Second, by examining young learners, we are able to set some constraints on a theory of learning that would explain the response patterns we observe. Such a theory would need to be quite different if these patterns were first evident in fifteen-year-olds rather than in four-year-olds. For example, if they depend on learners having experience with the relevant kinds of sentences (which, to some degree they must), then early acquisition places an upper bound on the quantity of input that is required for successful acquisition.

It should be noted before moving on that four-year-old children are demonstrably adult-like with respect to their proficiency with quantifier-variable binding and their knowledge of c-command irrespective of dative syntax. Concerning quantifier-variable binding, Lidz and colleagues (2004) show that English-speaking children are willing and able to access the bound interpretation of sentences like 29, as measured by their responses and justifications in a study using the same experimental method as ours.

(29) a. Every dancer$_x$ kissed Kermit before she$_x$ went on stage.
b. Kermit kissed every dancer$_x$ before she$_x$ went on stage.

Concerning c-command, a strong case has been made, for instance, that this fundamental relation constrains children's interpretations of pronouns in English and Russian (Crain & McKee 1985, Chien & Wexler 1990, Kazanina & Phillips 2001), as well as their interpretations of scopally ambiguous sentences in English and Kannada (Lidz & Musolino 2002). For current purposes, it is sufficient to conclude on the basis of the available evidence that four-year-old children, whether they are native speakers of English or Kannada, can plausibly be assumed to be proficient in their interpretation of bound variables and reliant on c-command (see Lidz 2007 for an overview of relevant findings). Now that all of the necessary pieces are in place, we turn to the details of our experiment.

3. EXPERIMENT: QUANTIFIER-VARIABLE BINDING IN KANNADA. As discussed above, our goal here is to test whether Kannada-speaking children have knowledge of abstract structure within the ditransitive verb phrase. Specifically, we ask whether they show evidence of having adult-like patterns of grammaticality judgments with respect to quantifier-variable binding in ditransitives. To the extent that they do, it supports the view that children's representations encode both the underlying hierarchical structure and the syntactic operations that rearrange it.

3.1. PARTICIPANTS. Ninety-eight four-year-olds (forty-seven male, fifty-one female; mean age 4;6, range 4;2–5;2) participated, with data included from ninety-six (two children (one male and one female) were excluded because of difficulty with the task). Child subjects were tested at Swami Vivekinanda and Pushkarini Preschools in Mysore, India. Several adult subjects were also tested in order to confirm the patterns of grammaticality judgments discussed above. These patterns were confirmed without exception, but the results are not reported.

3.2. MATERIALS. Each subject judged four test sentences and three control sentences in pseudorandom order. The four test verbs were 'return', 'read', 'bring', and 'kick'. For the complete list of stimuli—including story summaries and test and control sentences—see the appendices. Each test story had two variants: one that made the bound reading of the test sentence true and the free reading false (bound-true), and another that made the bound reading of the test sentence false and the free reading true (bound-false). Here the terms bound and free should be understood as describing the status of the pronoun in the test sentence with respect to the quantified noun phrase (QNP). For instance, in the sentence *Teacher kicked every girl her ball*, the bound interpretation of the pronoun *her* is one in which each girl receives her own ball, while the free interpretation involves the girls each getting some other female referent's ball, for example, the mermaid's ball. Subjects received either all bound-true test stories or all bound-false test stories depending on the condition to which they were randomly assigned, as detailed in §3.4.

BOUND-TRUE TEST STORIES. These test stories all made the bound reading true and the free reading false. Let us walk through an example for the test verb 'return' in the DAT-ACC BEN condition.

(30) Three boys bring their horses to Rashmi. R2-D2 brings his own special horse to Rashmi also. After leaving for a while, they all return to retrieve their horses. Rashmi gives R2's horse to the first boy by mistake. He objects and points out that it's not his horse, so Rashmi gets him the correct horse. Rashmi then gives R2's horse to the second boy. He objects also, correcting Rashmi and asking why she can't remember which horse belongs to R2. Rashmi then gives the second boy the correct horse. Finally, Rashmi gives the third boy his horse and then gives R2 his special horse.[18]

Puppet: That was a story about Rashmi, who was taking care of some horses. She couldn't remember whose horse was whose. So here's what happened ...

Rashmi pratiyobba hudugan-ige avan-a kudure-yannu
Rashmi every boy-DAT 3SG.M-GEN horse-ACC
tan-du-**koTT**-aLu.
return-PPL-BEN.PST-3SG.F
'Rashmi returned every boy his horse.' (DAT-ACC BEN)

Given the context in 30, the bound reading of this test sentence is true since every boy eventually received his own horse. However, the free reading is false since it is not the case that every boy received R2's horse (only two boys did). We predicted that child subjects would accept the bound reading of test sentences like these following bound-true contexts in all conditions except the one in which the bound reading is ruled out by the grammar due to the failure of the QNP to c-command the pronoun in the test sentence at any point in the derivation, namely ACC-DAT unaffixed.

Concerning stimulus design, subjects rejecting a bound-true test sentence always had an alternate extrasentential referent for the ambiguous pronoun to which they could refer in justifying their answer. For example, if a subject rejected the test sentence 'Rashmi returned every boy his horse', she could do so with confidence, pointing to the fact that Rashmi only mistakenly gave the horse belonging to R2 (the extrasentential antecedent referred to by 'his') to two of the three boys. Furthermore, in an attempt to balance out the salience of potential pronominal antecedents somewhat, we were careful to have characters refer to the extrasentential antecedent often throughout the story. Continuing with our example, though R2 does not interact with Rashmi until the end of the story when he asks for his horse, the boys refer to him several times, making comments like 'No, that's R2's horse. Look, it's different than the others', and Rashmi refers to this particular horse as 'R2's horse' each time she is corrected by one of the boys. Finally, we made sure that the agent in all test sentences (Rashmi in this case) was of a different gender from the other characters so as to avoid confusion and potential processing difficulties in pronominal reference resolution.

In Figure 1, other important aspects of bound-true stories are highlighted schematically. The dots indicate ownership. In all test stories, ownership was discussed explicitly (e.g. whose horse was whose), and color coding reinforced it. The extrasentential antecedent (e.g. the robot here) was always of the same gender as the other three characters denoted by the QNP, enabling all four characters to be potential antecedents for the pronoun in the test sentence. Concerning the plot of the test stories, in all cases the agent initiated transfer events with the three characters denoted by the QNP first, before

[18] Of course, all interactions with the children, including the presentation of experimental materials, were conducted in Kannada by a native speaker of Kannada (A. S. Mahadeva).

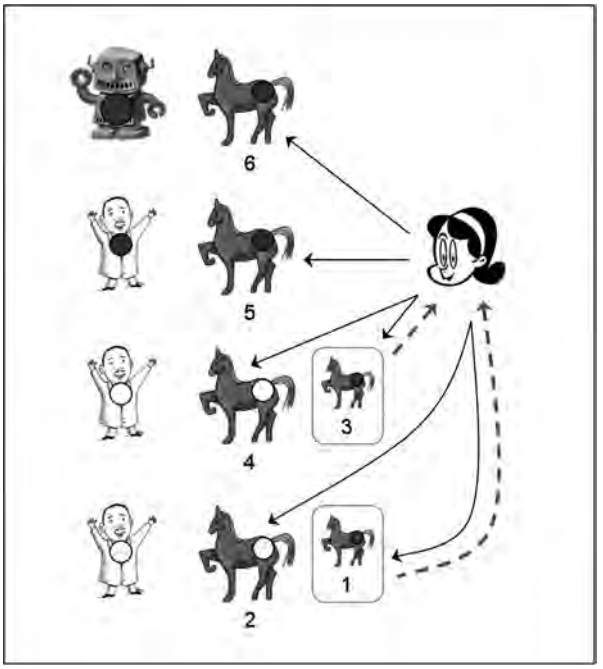


FIGURE 1. Plot outline for a bound-true test story.

moving on to the extrasentential antecedent. This order of major plot elements is represented in Fig. 1 by the sequential subscript numbers. Dashed lines indicate returns of transferred items that were given by mistake. In the 'return' test story, Rashmi keeps forgetting which horses go with which owners and gives R2's horse first to one boy and then to another. Each time she mistakenly gives a boy R2's horse, the boy corrects her and she takes the horse back. In other test stories involving physical transfer ('bring' and 'kick'), the same sequence obtains. In the test story involving metaphorical transfer ('read'), each time the agent mistakenly reads the wrong book to a character she takes the book back to where she got it, but for obvious reasons she cannot literally take the story back from the character who listened to it.

BOUND-FALSE TEST STORIES. These test stories reversed the truth conditions for our test sentences, making the bound reading false and the free reading true. Let us walk through an example parallel to 30 for the test verb 'return' in the DAT-ACC BEN condition, with the relevant differences underlined.

(31) Three boys bring their horses to Rashmi. R2-D2 brings his own special horse to Rashmi also. After leaving for a while, they all return to retrieve their horses. Rashmi gives R2's horse to the first boy by mistake. He objects and points out that it's not his horse, so Rashmi gets him the correct horse. Rashmi then gives R2's horse to the second boy. He objects also, correcting Rashmi and asking why she can't remember which horse belongs to R2. Rashmi then gives the second boy the correct horse. Afterward, Rashmi gives the third boy R2's horse and is corrected. At this point, Rashmi gives R2 his special horse and tells the third boy that she is too frustrated to get his horse for him.

Puppet: That was a story about Rashmi, who was taking care of some horses. She couldn't remember whose horse was whose. So here's what happened …

Rashmi pratiyobba hudugan-ige avan-a kudure-yannu
Rashmi every boy-DAT 3SG.M-GEN horse-ACC
tan-du-**koTT**-aLu.
return-PPL-BEN.PST-3SG.F
'Rashmi returned every boy his horse.' (DAT-ACC BEN)

Given the context in 31, the bound reading of this test sentence is false since it is not the case that every boy eventually received his own horse. One boy is horseless at the end of the story. However, the free reading is true, since every boy received R2's horse. The predictions here were not so straightforward. Children could conceivably have accepted the free reading of the pronoun in all four test sentences since the bound-false stories made this reading true and the free reading is always available. Alternatively, there could have been a general bias toward the bound reading in our test stories even though these stories made it false. If this were the case, we predicted that kids would reject all of the test sentences in which the bound reading was grammatically possible (thereby indicating that they had a bound interpretation of the pronoun) and accept the one test sentence in which the bound reading is not grammatically possible, ACC-DAT unaffixed (thereby indicating that they had a free interpretation of the pronoun).

Apart from the different truth conditions that they established with respect to our test sentences, illustrated in Figure 2, the bound-false test stories were identical in all relevant respects to the bound-true test stories.

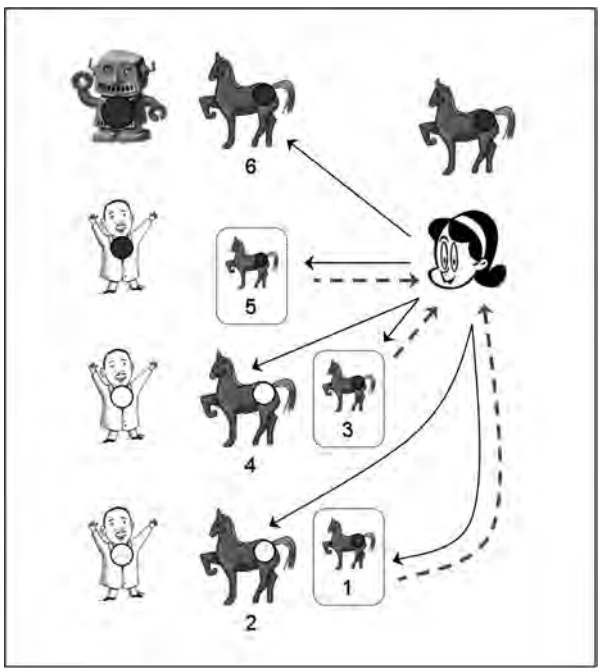


FIGURE 2. Plot outline for a bound-false test story.

CONTROL STORIES. The three control items were designed to test three independent aspects of language that could potentially confound our results if subjects were not proficient with them. Control 1 tested whether children correctly computed principle C, an alternative principle based on c-command; control 2 tested children's ability to interpret the phrase 'its owner';[19] and control 3 tested their relative preference for extrasentential antecedents in interpreting pronouns. The second of the three control items, control 2, could be described by two possible sentences, one designed to elicit a 'yes' response (and thus likely to be interpreted as true) and one designed to elicit a 'no' response (and thus likely to be interpreted as false). This is because, as discussed briefly in §3.3, control items were also used to maintain a balance of 'yes' and 'no' responses throughout each experimental session. In contrast to control 2, control 1 was always false in context, and the control 3 test sentence was always true in context.

3.3. PROCEDURE. We used the TRUTH-VALUE JUDGMENT TASK (Crain & McKee 1985, Crain & Thornton 1998). In this task, one experimenter told a series of stories using toys and props, and a second experimenter played the role of an easily confused puppet who watched carefully alongside the children.[20] After each story, the puppet said what she thought happened in the story. The puppet first summarized the story (e.g. 'That was a story about … ') and then described what she thought happened using the target sentence. The child's job was to help the puppet learn by telling the puppet whether she was right or wrong. Before any of the stories were told, the rules of the task were explained: if the puppet is right, she gets a cookie; if she is wrong, she gets a sip of milk. Children were told that the puppet likes both types of snacks (though is only allowed one at a time), and they were encouraged to justify their answers. One experimenter recorded children's responses and justifications. Children were always tested individually.

In order to guard against response bias, control items were used to maintain a balance of 'yes' and 'no' responses throughout each experimental session. For example, if a participant answered 'yes' to the test sentence immediately preceding control 2, the puppeteer would read a false control sentence after the control 2 story in an attempt to elicit a 'no', and vice versa. We excluded data from one child because she missed more than one control story and one child who could not give justifications for his answers. These children were replaced in the design so that we had an equal number of children in each condition.

3.4. DESIGN. This experiment had a 2 × 2 × 2 design with three factors manipulated between subjects. The three factors were word order (Subj DAT ACC V vs. Subj ACC DAT V), benefactive affix (present or absent), and context (bound-true vs. bound-false). Subjects were randomly assigned to one of eight experimental conditions (twelve subjects per condition) corresponding to the four possible permutations of word order and benefactive affix in each of the two contexts. Subjects each judged four test sentences and three control sentences in pseudorandom order. The above aspects of the experimental design are summarized in Table 1 below.

[19] The motivation for including this specific control sentence comes from the English-language version of this and a related experiment, with which we compare these results explicitly elsewhere. See Viau 2007 for details.

[20] In this experiment, A. S. Mahadeva played the twin roles of storyteller and puppeteer, and Jeffrey Lidz noted children's responses.

DAT-ACC BEN	DAT-ACC	ACC-DAT BEN	ACC-DAT
control 1	control 1	control 1	control 1
'return' test	'return' test	'return' test	'return' test
'read' test	'read' test	'read' test	'read' test
control 2	control 2	control 2	control 2
'bring' test	'bring' test	'bring' test	'bring' test
control 3	control 3	control 3	control 3
'kick' test	'kick' test	'kick' test	'kick' test

TABLE 1. Experimental conditions (bound-true/bound-false).

To be clear, subjects assigned to the bound-true DAT-ACC BEN condition received a total of four test items, all of which had bound-true stories followed by test sentences with the DAT-ACC order and the benefactive verbal affix. Likewise, subjects assigned to the bound-false DAT-ACC BEN condition received four test items with bound-false stories followed by the same test sentences, and so on. Please refer to Figs. 1 and 2 as necessary for the distinction between the bound-true and bound-false story types, respectively.

3.5. RESULTS. Participants' responses were analyzed in terms of the percentage of bound readings. Unless otherwise indicated, all *p*-values reported below are two-tailed.

Let us examine the results for the bound-true test stories first. Recall that we predicted significantly higher acceptance rates for the bound reading for test sentences with grammatical quantifier-variable binding (DAT-ACC BEN, DAT-ACC unaffixed, and ACC-DAT BEN) than for test sentences in which the QNP failed to c-command the pronoun it was supposed to bind (ACC-DAT unaffixed). The results of our experiment strongly confirmed this prediction, indicating that, as expected, children accepted the bound reading much more often when it was grammatical (90–98%) than when it was ungrammatical (15%) (see Figure 3). The data were so clear that statistical tests were essentially unnecessary. Still, we can confirm that the difference between percentage bound readings for all three sentence types with grammatical binding was significantly higher than that for the sentence type with ungrammatical binding as measured by independent samples *t*-test (DAT-ACC BEN vs. ACC-DAT unaffixed, $t(22) = 12.21$, $p < 0.0001$; DAT-ACC unaffixed vs. ACC-DAT unaffixed, $t(22) = 8.66$, $p < 0.0001$; ACC-DAT BEN vs. ACC-DAT unaffixed, $t(22) = 11.48$, $p < 0.0001$).

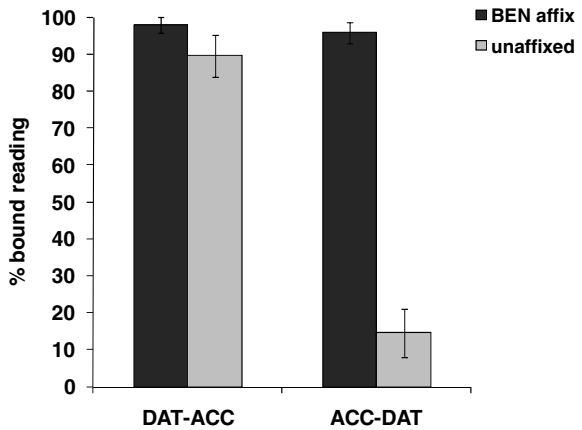


FIGURE 3. Mean percentage bound readings for child ($N = 48$) subjects (bound-true) (*** < 0.001, independent samples *t*-tests, all vs. ACC-DAT unaffixed).

Turning to the bound-false test stories, recall that there were two possible predictions. First, children could conceivably have accepted the free reading of the pronoun in all four test sentences since the bound-false stories made this reading true and the free reading is always available. In this case one would expect high acceptance rates across the board for all four test sentences. Alternatively, there could have been a bias toward the bound reading despite the fact that the bound-false stories made it false. If this were the case, we predicted that children would reject all of the test sentences in which the bound reading was false but grammatically possible and accept the test sentence in the one condition in which the bound reading was false and also ruled out by the grammar, ACC-DAT unaffixed. The latter prediction was borne out by the data (see Figure 4). Children chose the bound reading more often for test sentences with grammatical binding (65–73%) than for the test sentence with ungrammatical binding (4%). Again, the data were extremely easy to interpret. We can confirm that the difference between percentage bound readings for all three grammatical sentence types was significantly higher than those for the ungrammatical sentence type as measured by independent samples *t*-test (DAT-ACC BEN vs. ACC-DAT unaffixed, $t(22) = 6.37$, $p < 0.0001$; DAT-ACC unaffixed vs. ACC-DAT unaffixed, $t(22) = 5.39$, $p < 0.0001$; ACC-DAT BEN vs. ACC-DAT unaffixed, $t(22) = 6.63$, $p < 0.0001$).

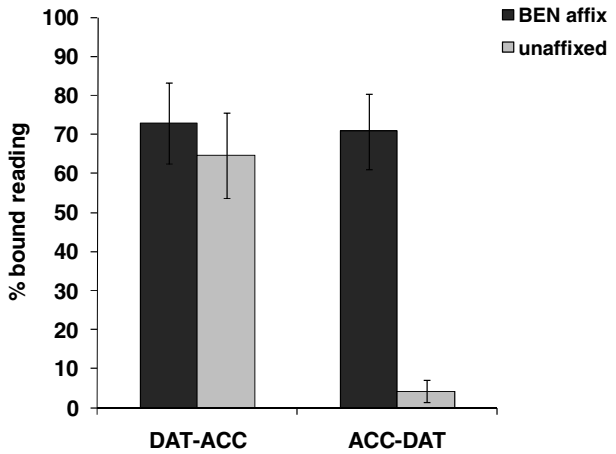


FIGURE 4. Mean percentage bound readings for child ($N = 48$) subjects (bound-false) (*** < 0.001, independent samples *t*-tests, all vs. ACC-DAT unaffixed).

Though Figs. 3 and 4 look more or less identical, keep in mind that subjects in the bound-true conditions indicated their choice of the bound reading by accepting test sentences, while subjects in the bound-false conditions indicated their choice of the bound reading by rejecting them. The fact that we observe identical response patterns regardless of whether children said 'yes' or 'no' to indicate their preference effectively rules out response bias as an explanatory factor for our results.

3.6. DISCUSSION. The results of this experiment demonstrate that Kannada-speaking four-year-olds show the adult pattern of grammaticality judgments for a complex quantifier-variable binding asymmetry in ditransitives. To the extent that this pattern argues for a configurational theory of ditransitives with two distinct underlying structures (as argued in Lidz & Williams 2005), children would also seem to be engaging these kinds of representations. Whereas a simple preference for forward binding, with the binder

preceding the bound in the linear string, could technically explain children's acquisition of the adult pattern in English (see Viau 2007), such a preference cannot explain the Kannada data. In Kannada, a dative-marked QNP does not need to precede the pronoun that it grammatically binds as long as the benefactive affix is present. Kannada-speaking children have been shown to be quite aware of the interaction between word order and morphological form in determining binding possibilities, an awareness that does not follow simply from the surface form.

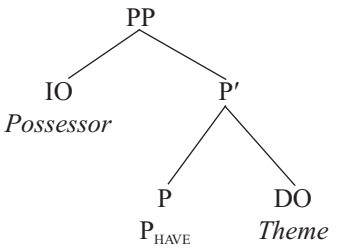
In the remaining discussion we turn our attention to how children might have come to acquire the complex interaction between word order and benefactive morphology in predicting quantifier-variable binding in Kannada ditransitives.

4. A SKETCH OF A SELECTIVE LEARNING MECHANISM FOR DITRANSITIVES. The empirical data just presented illustrate that Kannada-speaking children have acquired representations for ditransitives that are fully adult-like. It remains, however, to determine how they might have achieved this feat. If we assume (i) that the adult-like representations that these children control have the character argued for in §2.2 and (ii) that the crosslinguistic patterns argue for a theory in which the language faculty provides just two possible underlying configurations for ditransitives more generally, then we are faced with the question of determining how children learn to map the appropriate strings to the appropriate structures. Given the distance between the representations of underlying hierarchical structure and the surface form, this is a nontrivial challenge. In what follows, we outline how a selective theory of acquisition could work.

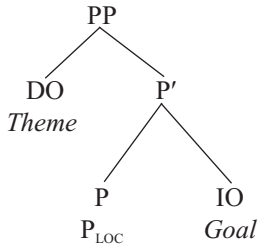
In order for a selective learning mechanism to function in the acquisition of Kannada ditransitives, three things must be true. First, the learner must know antecedently that ditransitives divide into two types with different structures: one in which the DO asymmetrically c-commands the IO in the underlying representation, and another in which the IO asymmetrically c-commands the DO in the underlying representation. Second, the learner must know that these two types are distinguished by the thematic relation borne by the IO argument (i.e. IO = possessor in the 'DO-dative' variant; IO = goal in the 'prepositional-dative' variant). Third, the learner must know that possessors are more likely than goals to be animate. A learner equipped with this knowledge should be able to use the distribution of animate and inanimate IO arguments to determine which ditransitive structure is intended for a given surface form, as we outline below.

Concerning the first two requirements, the analysis in Lidz & Williams 2005 builds on Harley's (2002) syntactic account of the dative alternation in unifying these requirements within a single representation. The semantic differences distinguishing dative constructions are made to follow from distinct heads that introduce the distinct thematic relations associated with direct and indirect objects, as illustrated in 32.

(32) a. DO-dative



b. prepositional dative



Specifically, P_{HAVE} requires a possessor in specifier position and a theme in complement position (32a), while P_{LOC} requires the opposite configuration, a theme in specifier position and a goal in complement position (32b).[21] This refinement of the configurational knowledge attributed to the learner profoundly simplifies the process of acquiring ditransitive constructions. In particular, it enables a deductive learning account, which can be summarized as in 33.

(33) DEDUCTIVE LEARNING FOR DATIVES: The configurational properties of dative constructions follow deductively from their semantics. Once learners identify which dative construction counts as possessional, it follows that the IO/dative argument is structurally superior to the DO/accusative argument in that construction (and vice versa for the nonpossessional variant).

In essence, the child who is able to determine which dative variant encodes possession gets both variants' syntax for free (subject to variability in word order within and across languages).

Our proposal for how the child would make this determination is simple. Recall the third requirement mentioned above, namely that the learner must know that possessors are more likely to be animate than goals. It is hard to imagine this not being the case, given that animacy is a defining feature of recipienthood and that possession-oriented concepts such as 'possessor' and 'recipient' are expressed extremely early in child language (Brown 1973, Tomasello 1998, 2003, inter alia). Thus, given that IOs bearing the possessor thematic relation are highly likely to be animate and that IOs bearing the goal thematic relation are completely free to be either animate or inanimate, the learner can simply track the distribution of IO arguments across constructions in order to determine which construction has an IO with the possessor relation and which has an IO with the goal relation. The construction in which inanimates occur more frequently as IOs is the construction with a locative (nonpossessional) structure.

Now, let us assume that a statistical pattern in the input holds whereby one dative construction is more likely to appear with an inanimate goal than the other (e.g. prepositional dative in English, ditransitive without BEN in Kannada, ditransitive without clitic doubling in Spanish[22]). This pattern remains to be documented empirically in Kannada and Spanish to our knowledge, but there is evidence that it is present in English both in adults' spontaneous speech (Bresnan et al. 2007) and in adults' and chil-

[21] These configurations abstract away from surface word order. In Kannada, the P_{HAVE} head would be realized by the benefactive affix.

[22] Interestingly, the correlation of animacy with clitic doubling in Spanish has led many to erroneously conclude that clitic doubling actually requires an animate dative NP. In fact, inanimates that can act as possessors can be clitic-doubled as well (cf. Suñer 1988, Bleam 1999).

dren's elicited production (Viau & Landau 2011).[23] Having observed this pattern, the learner should be able to easily conclude that the dative construction less frequently associated with inanimate goals involves possession and thus can proceed to map that construction to the underlying structure that assigns the possessor thematic relation to the IO. We note that there is suggestive corpus evidence showing that two-year-old English-speaking children behave as if they do discern meaning differences between the two dative constructions (Viau 2006, 2007), and the available behavioral data from three- and four-year-olds support this conclusion as well (see Tamura et al. 2007 for Japanese, Viau & Landau 2011 for English).

The selective learning account thus works as follows. The child comes to the learning task with the knowledge that natural languages use at least two ways to configure ditransitives: a possession-based structure in which the IO occurs higher than the DO, and a location-based structure in which the DO occurs higher than the IO. If the child is faced with two distinct types of ditransitive clauses (e.g. DO- vs. prepositional dative in English, benefactive vs. nonbenefactive in Kannada, clitic-doubled vs. non-clitic-doubled in Spanish), she must then identify which of these to associate with which underlying configuration. To do so, the child relies on the distribution of animate IOs. The construction in which IOs are more likely to be animate than inanimate has the possession configuration, and the construction in which IOs are more likely to be inanimate than animate has the location configuration.

Importantly, once the learner correctly identifies the underlying configuration, the variable-binding asymmetries that we have observed in our experimentation follow directly. Thus, the learner requires no experience with particular binding configurations in order to acquire the variable-binding asymmetries we have observed in our experimentation.

This is not to say, of course, that there is no learning involved in the acquisition of ditransitives. Our account is a learning-theoretic account in which the child, armed with a set of possible configurations for ditransitives and faced with the data, is able to use certain patterns of distribution to identify a mapping between surface forms and innate configurations. The innate guidance comes from the set of configurations and their semantic properties. Knowing these semantic properties enables the learner to track appropriate distributional information in the surface forms in order to learn which surface forms map onto which of the innate configurations. Again, the configurations, in concert with basic structural requirements on variable binding (which may themselves be either learned or innate) and knowledge of how word order can be manipulated in the target language (which surely is at least partially learned), directly determine the binding possibilities for the structures tested in our experimentation.

Crucially, for this selective learning account to succeed, children do not need to be able to discern all of the subtle meaning differences between DO-dative and prepositional-dative variants that are often discussed in the literature. As is often highlighted (see e.g. Rappaport Hovav & Levin 2008), these meaning differences do not generally rise to the level of entailments. Typically, the DO-dative variant merely implies possession transfer, as shown in 34b, which is infelicitous rather than ungrammatical.

[23] For example, Bresnan and colleagues (2007:87) observe that in the Switchboard corpus of recorded telephone conversations, inanimate recipients are at least five times more likely to be expressed in prepositional-dative structures than animate recipients. Animacy of the recipient is shown to be one of the strongest factors influencing speakers' choice of dative construction.

(34) a. I made a cake for Rashmi, but I gave it to my mother.
b. #I made Rashmi a cake, but I gave it to my mother.

In order for the child learner to make use of such subtle distinctions, the child would have to (i) be sufficiently exposed to instructive utterances like those in 34 in which possible possession-related inferences are denied; (ii) be sufficiently exposed to discourses in which the relative infelicity of one of the utterances, in this case 34b, is made plain; and (iii) be capable of noticing the infelicity of 34b. We have no data that shed light on the frequency with which conditions (i) and (ii) are met in English, Kannada, or Spanish. Condition (iii) could well be plausibly met, though children are hardly known for their pragmatic sophistication (Noveck 2001, Papafragou & Musolino 2003, Musolino & Lidz 2006). Given these considerations, it strikes us that many (likely the vast majority of) utterances with typical dative verbs would be uninstructive with respect to dative meaning differences. Thus, we think it is unlikely that attending solely to contrasts like that in 34 would draw children's attention to the relevant distinctions to the point that they could decide which dative construction is possessional. Indeed, we think it is a strength of the selective learning account that we have outlined that these kinds of subtle semantic facts do not have to be learned, and do not contribute to learning, but rather follow from an interaction between the structure of the learner and the regularities present in the environment.

Now, the learning account proposed herein makes heavy use of innate structure as a directive force for interpreting the exposure language. In short, the learner uses statistical distribution to make a selection from innate structures, acquiring a mapping between the surface form and the innate configurations. It is worth considering, as a point of contrast, whether the distributional facts about IO and DO arguments by themselves could somehow be enough to lead to the child's knowledge of the complex binding asymmetries observed here in the absence of innate configurational knowledge.

Suppose that it is true that the distribution of inanimate IOs is heavily skewed toward nonbenefactive ditransitives in Kannada. In our account, this observation enables the learner to determine that the nonbenefactive ditransitive is a locative (i.e. nonpossessional) structure and hence that the DO is underlyingly higher than the IO. From this, it follows that a quantificational IO in the nonbenefactive ditransitive can bind into the DO only if the IO precedes the DO in the string. What conclusions would be licensed about variable binding on the basis of this asymmetry without such knowledge? It seems to us that nothing would follow from this distributional observation except that it is a fact. This is not to say that no learning alternative based on distributional data is conceivable, just that the asymmetry in the distribution of inanimates would not lead to any conclusions about binding in such an alternative. Indeed, on a strictly distributional learning theory, it seems that the only way to learn the facts in 16 would be to hear each of these sentences under conditions in which the learner could clearly discern the intended meaning of the utterance. If the learner were exposed only to a subset of these sentences (or erroneously encoded the intended meaning), then she would run the risk of acquiring a generalization about binding based either on word order or on benefactive morphology rather than on the complex interaction of these two factors that we have observed. As noted above, sentences with the relevant configurational properties are exceedingly rare, thus casting doubt on a theory that depends on experience with the relevant sentences.

Finally, even if learners were exposed to the relevant sentences, there is no guarantee that they would use evidence about the intended interpretation as evidence about the grammar as opposed to evidence about the speaker's beliefs. Suppose, for example, that

learners began with a bias for forward binding but had to learn to overcome that bias in certain cases, as suggested by an anonymous referee. What evidence would lead them to change their grammars?

Specifically, suppose such a learner were exposed to a sentence like 14c, in which a dative quantifier follows an accusative NP containing a pronoun and the speaker intended backward binding. The learner might, under such conditions, parse the sentence using his preference for forward binding and arrive at an interpretation that differs from the speaker's. The child might, in this case, be unaware of the discrepancy in interpretation, and the sentence would therefore have no impact on the grammar. Alternatively, the child might recognize that his interpretation differs from the speaker's and change his grammar to allow this interpretation. But just as likely, the child might recognize the difference in interpretation and decide that the speaker misunderstood the situation. This would lead to no change in the grammar. It is therefore not immediately obvious that even experience with such sentences would suffice to guarantee that children acquire the appropriate set of interpretations.

While we cannot definitively provide an argument against a strictly distribution-driven proposal, it strikes us as a serious challenge to such an approach to explain how the kinds of asymmetries observed in our experimentation could follow from something other than the kind of selective learning account outlined here.

Of course, our selective learning account remains somewhat speculative, since we currently have no clear data on the distribution of animate and inanimate IOs in Kannada or Spanish (though the results for English are encouraging, as discussed earlier, and we are in the process of collecting the relevant data from existing corpora and building a computational model of learning given that data). Indeed, we could very well be wrong about the particular cue that drives the appropriate mapping between surface form and a particular ditransitive structure. Nonetheless, a strength of our account is that children need have no experience with binding in ditransitives to acquire the complex array of binding facts we have now seen that they command. It remains an important goal to identify precisely how the kinds of asymmetries observed in this article can be shown to follow from experience. In our view, experience plays a critical role, but only in concert with a set of specific syntactic hypotheses that this experience can be measured against.

Appendix A: Test sentences

ACC DAT unaffixed

1. KICK
   adhyaapaka avaL-a ceND-annu pratiyobba huDug-ige od-d-anu.
   teacher 3SG.F-GEN ball-ACC every girl-DAT kick-PST-3SG.M
   'Teacher kicked her ball to every girl.'
2. BRING
   kaavalugaara avaL-a magu-vannu pratiyobba taay-ige kaLis-id-anu.
   babysitter 3SG.F-GEN baby-ACC every mother-DAT bring-PST-3SG.M
   'The babysitter brought her baby to every mother.'
3. RETURN
   Rashmi avan-a kudure-yannu pratiyobba hudugan-ige tan-d-aLu.
   Rashmi 3SG.M-GEN horse-ACC every boy-DAT return-PST-3SG.F
   'Rashmi returned his horse to every boy.'
4. READ
   adhyaapaki avan-a pustaka-vannu pratiyondu aame-ge oodu-heeL-id-aLu.
   teacher 3SG.M-GEN book-ACC every turtle-DAT read-tell-PST-3SG.F
   'Teacher read his book to every turtle.'

DAT ACC unaffixed

1. KICK
   adhyaapaka pratiyobba huDug-ige avaL-a ceND-annu od-d-anu.
   teacher every girl-DAT 3SG.F-GEN ball-ACC kick-PST-3SG.M
   'Teacher kicked every girl her ball.'
2. BRING
   kaavalugaara pratiyobba taay-ige avaL-a magu-vannu kaLis-id-anu.
   babysitter every mother-DAT 3SG.F-GEN baby-ACC bring-PST-3SG.M
   'The babysitter brought every mother her baby.'
3. RETURN
   Rashmi pratiyobba hudugan-ige avan-a kudure-yannu tan-d-aLu.
   Rashmi every boy-DAT 3SG.M-GEN horse-ACC return-PST-3SG.F
   'Rashmi returned every boy his horse.'
4. READ
   adhyaapaki pratiyondu aame-ge avan-a pustaka-vannu oodu-heeL-id-aLu.
   teacher every turtle-DAT 3SG.M-GEN book-ACC read-tell-PST-3SG.F
   'Teacher read every turtle his book.'

ACC DAT BEN

1. KICK
   adhyaapaka avaL-a ceND-annu pratiyobba huDug-ige od-du-koTT-anu.
   teacher 3SG.F-GEN ball-ACC every girl-DAT kick-PPL-BEN.PST-3SG.M
   'Teacher kicked her ball to every girl.'
2. BRING
   kaavalugaara avaL-a magu-vannu pratiyobba taay-ige kaLis-i-koTT-anu.
   babysitter 3SG.F-GEN baby-ACC every mother-DAT bring-PPL-BEN.PST-3SG.M
   'The babysitter brought her baby to every mother.'
3. RETURN
   Rashmi avan-a kudure-yannu pratiyobba hudugan-ige tan-du-koTT-aLu.
   Rashmi 3SG.M-GEN horse-ACC every boy-DAT return-PPL-BEN.PST-3SG.F
   'Rashmi returned his horse to every boy.'
4. READ
   adhyaapaki avan-a pustaka-vannu pratiyondu aame-ge oodu-heeL-i-koTT-aLu.
   teacher 3SG.M-GEN book-ACC every turtle-DAT read-tell-PPL-BEN.PST-3SG.F
   'Teacher read his book to every turtle.'

DAT ACC BEN

1. KICK
   adhyaapaka pratiyobba huDug-ige avaL-a ceND-annu od-du-koTT-anu.
   teacher every girl-DAT 3SG.F-GEN ball-ACC kick-PPL-BEN.PST-3SG.M
   'Teacher kicked every girl her ball.'
2. BRING
   kaavalugaara pratiyobba taay-ige avaL-a magu-vannu kaLis-i-koTT-anu.
   babysitter every mother-DAT 3SG.F-GEN baby-ACC bring-PPL-BEN.PST-3SG.M
   'The babysitter brought every mother her baby.'
3. RETURN
   Rashmi pratiyobba hudugan-ige avan-a kudure-yannu tan-du-koTT-aLu.
   Rashmi every boy-DAT 3SG.M-GEN horse-ACC return-PPL-BEN.PST-3SG.F
   'Rashmi returned every boy his horse.'
4. READ
   adhyaapaki pratiyondu aame-ge avan-a pustaka-vannu oodu-heeL-i-koTT-aLu.
   teacher every turtle-DAT 3SG.M-GEN book-ACC read-tell-PPL-BEN.PST-3SG.F
   'Teacher read every turtle his book.'

APPENDIX B: TEST STORIES (BOUND-TRUE)

1. KICK
   It's time for soccer practice, and the players on the team (three girls and a mermaid) each kick their balls to the teacher. Now the teacher is going to kick the balls back to the players. He kicks the mermaid's ball to the blue girl. She objects, saying 'That's not my ball, that's the mermaid's ball.' Then he kicks the blue ball to the blue girl. Next he kicks the mermaid's ball to the yellow girl. She objects, saying 'Pay atten-

tion! The black ball is the mermaid's. That's her ball.' Then he kicks the yellow ball to the yellow girl. Now it's the green girl's turn. The teacher says, 'Oh, I remember. The black ball is her ball (pointing to the mermaid). So I'll give you the green ball.' He does so. Then he gives the mermaid the black ball.

That was a story about soccer practice. The coach couldn't remember whose ball was whose. So here's what happened …

2. BRING

Three mother animals and the older sister mermaid are going to a party. They leave their charges (daughter animals and sister) with the babysitter. When they return from the party, they ask the babysitter for their kids back. The babysitter first gives the mermaid baby to the elephant mother. The elephant objects, saying 'The mermaid baby doesn't have a trunk. That's not my baby.' The babysitter realizes his mistake and gives the elephant baby to the elephant mom. Then he gives the mermaid baby to the dinosaur mother. 'What, are you blind?' she asks. 'The mermaid baby has a fish tail. I'm a stegosaurus.' The babysitter realizes his mistake and gives the dinosaur baby to the dinosaur mom. Then he turns to the cow. 'I know the mermaid baby does not belong to you either,' he says. So he gives her the cow baby. Then he gives the mermaid baby to the mermaid.

That was a story about a babysitter. He couldn't remember whose baby was whose. So here's what happened …

3. RETURN

Three boys bring their horses to Rashmi. R2-D2 brings his own special horse to Rashmi also. After a while, they all return to retrieve their horses. Rashmi gives R2's horse to the first boy by mistake. He objects and points out that it's not his horse, so Rashmi gets him the correct horse. Rashmi then gives R2's horse to the second boy. He objects also, correcting Rashmi and asking why she can't remember which horse belongs to R2. Rashmi then gives the second boy the correct horse. Finally, Rashmi gives the third boy his horse and then gives R2 his special horse.

That was a story about Rashmi, who was taking care of some horses. She couldn't remember whose horse was whose. So here's what happened …

4. READ

Four students (three turtles and one alligator) hand in their homework assignments (in book form) to the teacher. Now she is ready to give them back. She reads the alligator's book to the first turtle and says what a nice job he did. The first turtle says that that's not his book. She finds the correct book and reads it to him. Next the teacher reads the alligator's book to the second turtle and is corrected. So she reads the correct book to the second turtle. By now, the teacher has figured things out. She reads the third turtle the correct book, and then she reads the alligator the alligator's book.

That was a story about a school. The teacher couldn't remember whose book was whose. So here's what happened …

Appendix C: Test stories (bound-false)

1. KICK

It's time for soccer practice, and the players on the team (three girls and a mermaid) each kick their balls to the teacher. Now the teacher is going to kick the balls back to the players. He kicks the mermaid's ball to the blue girl. She objects, saying 'That's not my ball, that's the mermaid's ball.' Then he kicks the blue ball to the blue girl. Next he kicks the mermaid's ball to the yellow girl. She objects, saying 'Pay attention! The black ball is the mermaid's. That's her ball.' Then he kicks the yellow ball to the yellow girl. Now it's the green girl's turn. The teacher kicks the mermaid's ball to the green girl, who corrects him once again. Frustrated, the teacher gives the mermaid's ball to the mermaid and tells the green girl that he's too frustrated to help her out.

That was a story about soccer practice. The coach couldn't remember whose ball was whose. So here's what happened …

2. BRING

Three mother animals and the older sister mermaid are going to a party. They leave their charges (daughter animals and sister) with the babysitter. When they return from the party, they ask the babysitter for their kids back. The babysitter first gives the mermaid baby to the elephant mother. The elephant objects, saying 'The mermaid baby doesn't have a trunk. That's not my baby.' The babysitter realizes his mistake and gives the elephant baby to the elephant mom. Then he gives the mermaid baby to the dinosaur mother. 'What, are you blind?' she asks. 'The mermaid baby has a fish tail. I'm a stegosaurus.' The babysitter realizes his mistake and gives the dinosaur baby to the dinosaur mom. Then the babysitter gives the mermaid baby to the cow, who points out his mistake. At this point the babysitter gives the mermaid baby to the mermaid and gives up without helping the cow's mother any further.

That was a story about a babysitter. He couldn't remember whose baby was whose. So here's what happened …

3. RETURN
   Three boys bring their horses to Rashmi. R2-D2 brings his own special horse to Rashmi also. After a while, they all return to retrieve their horses. Rashmi gives R2's horse to the first boy by mistake. He objects and points out that it's not his horse, so Rashmi gets him the correct horse. Rashmi then gives R2's horse to the second boy. He objects also, correcting Rashmi and asking why she can't remember which horse belongs to R2. Rashmi then gives the second boy the correct horse. Afterward, Rashmi gives the third boy R2's horse and is corrected. At this point, Rashmi gives R2 his special horse and tells the third boy that she is too frustrated to get his horse for him.
   That was a story about Rashmi, who was taking care of some horses. She couldn't remember whose horse was whose. So here's what happened …
4. READ
   Four students (three turtles and one alligator) hand in their homework assignments (in book form) to the teacher. Now she is ready to give them back. She reads the alligator's book to the first turtle and says what a nice job he did. The first turtle says that that's not his book. She finds the correct book and reads it to him. Next the teacher reads the alligator's book to the second turtle and is corrected. So she reads the correct book to the second turtle. Then the teacher reads the alligator's book to the third turtle, who objects. Finally, the teacher reads the alligator's book to the alligator and then stops, too frustrated to help the third turtle with his correct book.
   That was a story about a school. The teacher couldn't remember whose book was whose. So here's what happened …

Appendix D: Control sentences

	EXPECTED RESPONSE
1. Principle C (control 1)	
idu niili ciTTey-a pogostiki-nalli kuppaLis-itu.	
3SG.N.PROX blue butterfly-GEN pogostick-LOC jump-PST.3SG.N	
'He jumped on the blue butterfly's pogostick.'	F
2. Its owner (control 2)	
Mickey adar-a oDeya-nannu kaaND-a.	
Mickey 3SG.N.REMOTE-GEN owner-ACC find.PST-3SG.M	
'Mickey found its owner.'	T
Mickey adar-a oDeya-nannu kaaN-al-illa.	
Mickey 3SG.N.REMOTE-GEN owner-ACC find-INF-NEG	
'Mickey didn't find its owner.'	F
3. Pronoun first (control 3)	
mari girafe avaL-ige huliy-a molada bagge heeL-itu.	
baby giraffe her-DAT tiger-GEN rabbit about tell-PST.3SG.N	
'Baby giraffe told her about tiger's rabbit.'	T

Appendix E: Control stories

1. Principle C (control 1)
   It's the day of the great pogostick jumping competition. The competitors are the red butterfly and the blue butterfly. Each butterfly has a pogostick that is matching in color. Before the competition begins, the blue butterfly says that he's tired of his blue pogostick and wants to try a red one. He asks the red butterfly to switch. The red butterfly considers the switch, but decides that he needs good luck because he's seen the blue butterfly jump and doesn't want to use a new pogostick for the competition. So the blue butterfly uses the blue pogostick and the red butterfly uses the red pogostick.
   That was a story about a jumping game. The butterflies thought about switching pogosticks. So here's what happened …
2. Its owner (control 2)
   Mickey was walking down the road one day when he came across a big box. He decided to look inside. There was a computer. He really wanted to play with it, but he thought he should ask permission first. So Mickey set off to find out who the computer belonged to. First he asked the smurf, who was painting a picture. The smurf said it wasn't his computer, but maybe he should ask the dwarf. So Mickey found the dwarf and asked if it was his computer. The dwarf said it was. Mickey asked if he could play with it. The dwarf said yes.
   That was a story about Mickey, who found a computer. Here's what happened …
3. Pronoun first (control 3)
   The tiger has an amazing rabbit that talks, and she's just dying to show it off. She lets the baby giraffe in on the secret. At first, he thinks it's a trick, but he finally believes it. After witnessing the talking rabbit,

the baby giraffe goes off to tell his mother all about it. The mother is also skeptical, but the baby giraffe insists that he's telling the truth!

That was a funny story about a tiger who had a talking rabbit, and some giraffes. The giraffes didn't believe that rabbits could talk. So here's what happened …

REFERENCES

ANAGNOSTOPOULOU, ELENA. 2003. *The syntax of ditransitives: Evidence from clitics*. Berlin: Mouton de Gruyter.

AOUN, JOSEPH, and YEN-HUI AUDREY LI. 1989. Scope and constituency. *Linguistic Inquiry* 20.141–72.

BAKER, C. L. 1979. Syntactic theory and the projection problem. *Linguistic Inquiry* 10.533–81.

BAKER, MARK. 1996. *The polysynthesis parameter*. Chicago: University of Chicago Press.

BAKER, MARK. 1997. Thematic roles and syntactic structure. *Elements of grammar*, ed. by Liliane Haegeman, 73–137. Dordrecht: Kluwer.

BAKER, MARK. 2005. On gerunds and the theory of categories. New Brunswick, NJ: Rutgers University, MS.

BARSS, ANDREW, and HOWARD LASNIK. 1986. A note on anaphora and double objects. *Linguistic Inquiry* 17.347–54.

BECK, SIGRID, and KYLE JOHNSON. 2004. Double objects again. *Linguistic Inquiry* 35.97–123.

BLEAM, TONIA. 1999. *Leista Spanish and the syntax of clitic doubling*. Newark: University of Delaware dissertation.

BLEAM, TONIA. 2001. Properties of the double object construction in Spanish. *A Romance perspective on language knowledge and use*, ed. by Rafael Núñez-Cedeño, Luis López, and Richard Cameron, 233–52. Amsterdam: John Benjamins.

BRESNAN, JOAN; ANNA CUENI; TATIANA NIKITINA; and R. HARALD BAAYEN. 2007. Predicting the dative alternation. *Cognitive foundations of interpretation,* ed. by Gerlof Bouma, Irene Krämer, and Joost Zwarts, 69–94. Amsterdam: Royal Netherlands Academy of Science.

BROOKS, PATRICIA J., and MICHAEL TOMASELLO. 1999. How children constrain their argument structure constructions. *Language* 75.720–38.

BROWN, ROGER. 1973. *A first language: The early stages*. Cambridge, MA: Harvard University Press.

BYBEE, JOAN. 1998. The emergent lexicon. *Chicago Linguistic Society* 34.421–35.

CHIEN, YU-CHIN, and KENNETH WEXLER. 1990. Children's knowledge of locality conditions in binding as evidence for the modularity of syntax and pragmatics. *Language Acquisition* 1.3.225–95.

CHOMSKY, NOAM. 1959. Review of *Verbal behavior*, by B. F. Skinner. *Language* 35.26–58.

CHOMSKY, NOAM. 1965. *Aspects of the theory of syntax*. Cambridge, MA: MIT Press.

CHOMSKY, NOAM. 1975. *Reflections on language*. New York: Pantheon.

CHOMSKY, NOAM. 1980. *Rules and representations*. Oxford: Blackwell.

CHOMSKY, NOAM. 1981. *Lectures on government and binding*. Dordrecht: Foris.

CHOMSKY, NOAM. 1986. *Knowledge of language: Its nature, origin and use*. New York: Praeger.

CHOMSKY, NOAM, and MORRIS HALLE. 1968. *The sound pattern of English*. Cambridge, MA: MIT Press.

CLARK, ROBIN. 1992. The selection of syntactic knowledge. *Language Acquisition* 2.83–149.

CONWELL, ERIN, and KATHERINE DEMUTH. 2007. Early syntactic productivity: Evidence from dative shift. *Cognition* 103.163–79.

CRAIN, STEPHEN. 1991. Language acquisition in the absence of experience. *Behavioral and Brain Sciences* 14.597–650.

CRAIN, STEPHEN, and CECILE MCKEE. 1985. The acquisition of the structural restrictions on anaphora. *North East Linguistic Society (NELS)* 15.94–110.

CRAIN, STEPHEN, and ROSALIND THORNTON. 1998. *Investigations into universal grammar: A guide to experiments on the acquisition of syntax and semantics*. Cambridge, MA: MIT Press.

CUERVO, MARIA CRISTINA. 2003. *Datives at large*. Cambridge, MA: MIT dissertation.
CULICOVER, PETER, and RAY JACKENDOFF. 2005. *Simpler syntax*. Oxford: Oxford University Press.
DEMONTE, VIOLETA. 1995. Dative alternation in Spanish. *Probus* 7.5–30.
DEN DIKKEN, MARCEL. 1995. *Particles*. Oxford: Oxford University Press.
DIACONESCU, CONSTANȚA RODICA, and MARÍA LUISA RIVERO. 2005. An applicative analysis of double object constructions in Romanian. *Proceedings of the 2005 annual conference of the Canadian Linguistics Association*. Online: http://westernlinguistics.ca/Publications/CLA-ACL/Diaconescu_Rivero.pdf.
DRESHER, B. ELAN, and JONATHAN D. KAYE. 1990. A computational learning model for metrical phonology. *Cognition* 34.137–95.
ELMAN, JEFFREY L.; ELIZABETH A. BATES; MARK H. JOHNSON; ANNETTE KARMILOFF-SMITH; DOMENICO PARISI; and KIM PLUNKETT. 1996. *Rethinking innateness: A connectionist perspective on development*. Cambridge, MA: MIT Press.
FERNANDES, KEITH J.; GARY F. MARCUS; JENNIFER A. DI NUBILA; and ATHENA VOULOUMANOS. 2006. From semantics to syntax and back again: Argument structure in the third year of life. *Cognition* 100.B10–B20.
FISHER, CYNTHIA L. 2002. Structural limits on verb mapping: The role of abstract structure in 2.5-year-olds' interpretations of novel verbs. *Developmental Science* 5.55–64.
FODOR, JERRY A. 1966. How to learn to talk: Some simple ways. *The genesis of language*, ed. by Frank Smith and George A. Miller, 105–22. Cambridge, MA: MIT Press.
FODOR, JANET DEAN. 1998. Parsing to learn. *Journal of Psycholinguistic Research* 27.339–74.
GERTNER, YAEL; CYNTHIA L. FISHER; and JULIE EISENGART. 2006. Learning words and rules: Abstract knowledge of word order in early sentence comprehension. *Psychological Science* 17.684–91.
GIBSON, EDWARD, and KENNETH WEXLER. 1994. Triggers. *Linguistic Inquiry* 25.407–54.
GOLDBERG, ADELE E. 1995. *Constructions*. Chicago: University of Chicago Press.
GOLDBERG, ADELE E. 2006. *Constructions at work: The nature of generalization in language*. Oxford: Oxford University Press.
GOLDBERG, ADELE E.; DEVIN M. CASENHISER; and NITYA SETHURAMAN. 2004. Learning argument structure generalizations. *Cognitive Linguistics* 14.289–316.
GOLDBERG, ADELE E.; DEVIN M. CASENHISER; and NITYA SETHURAMAN. 2005. The role of prediction in construction learning. *Journal of Child Language* 32.407–26.
GREEN, GEORGIA M. 1974. *Semantics and syntactic regularity*. Bloomington: Indiana University Press.
HARLEY, HEIDI. 2002. Possession and the double object construction. *Yearbook of Linguistic Variation* 2.29–68.
HARRIS, CATHERINE L., and ELIZABETH A. BATES. 2002. Clausal backgrounding and pronominal reference: A functionalist approach to c-command. *Language and Cognitive Processes* 17.237–70.
HASPELMATH, MARTIN. 2005. Argument marking in ditransitive alignment types. *Linguistic Discovery* 3.1.1–21.
HEIM, IRENE, and ANGELIKA KRATZER. 1998. *Semantics in generative grammar*. Malden, MA: Blackwell.
HUANG, ZHONGQIANG, and MARY HARPER. 2009. Self-training PCFG grammars with latent annotations across languages. *Proceedings of the 2009 Conference on Empirical Methods in Natural Language Processing*, vol. 2, 832–41.
JELINEK, ELOISE. 2000. Datives and argument hierarchies. *MIT Working Papers on Endangered and Less Familiar Languages (Papers in honor of Ken Hale)* 1.51–70.
JUNG, YEUN-JIN, and SHIGERU MIYAGAWA. 2004. Decomposing ditransitive verbs. *Proceedings of SICGG*, 101–20.
KAZANINA, NINA, and COLIN PHILLIPS. 2001. Coreference in child Russian: Distinguishing syntactic and discourse constraints. *Proceedings of the Boston University Conference on Language Development (BUCLD)* 25.413–24.
LANGACKER, RONALD. 1987. *Foundations of cognitive grammar, vol. 1*. Stanford, CA: Stanford University Press.
LARSON, RICHARD K. 1988. On the double object construction. *Linguistic Inquiry* 19.335–91.

LIDZ, JEFFREY. 2003. The syntax of ditransitive verbs of transfer. Paper presented at the Conference on Language and Space, Baltimore, MD.
LIDZ, JEFFREY. 2007. The abstract nature of syntactic representations: Consequences for a theory of learning. *Blackwell handbook of language development*, ed. by Erika Hoff and Marilyn Shatz, 277–303. Malden, MA: Blackwell.
LIDZ, JEFFREY; HENRY GLEITMAN; and LILA GLEITMAN. 2003. Understanding how input matters: Verb learning and the footprint of universal grammar. *Cognition* 87.151–78.
LIDZ, JEFFREY; ERIN MCMAHON; KRISTEN SYRETT; JOSHUA VIAU; FLORENCIA ANGGORO; JESSICA PETERSON-HICKS; ELISA SNEED; ANN BUNGER; TAKI FLEVARIS; ANNE GRAHAM; KRISTY GROHNE; YONGEUN LEE; and JOHN EVAR STRID. 2004. Quantifier raising in 4-year-olds. *Proceedings of the Boston University Conference on Language Development (BUCLD)* 28.340–49.
LIDZ, JEFFREY, and JULIEN MUSOLINO. 2002. Children's command of quantification. *Cognition* 84.113–54.
LIDZ, JEFFREY, and ALEXANDER WILLIAMS. 2005. C-locality and the interaction of reflexives and ditransitives. *North East Linguistic Society (NELS)* 34.389–404.
LIGHTFOOT, DAVID. 1982. *The language lottery: Toward a biology of grammars*. Cambridge, MA: MIT Press.
LIGHTFOOT, DAVID. 1991. *How to set parameters: Arguments from language change*. Cambridge, MA: MIT Press.
LIGHTFOOT, DAVID. 1999. *The development of language: Acquisition, change, and evolution*. Oxford: Blackwell.
MACWHINNEY, BRIAN. 2000. *The CHILDES project: Tools for analyzing talk*. 3rd edn. Mahwah, NJ: Lawrence Erlbaum.
MAHAJAN, A. K. 1990. *The A/A-bar distinction and movement theory*. Cambridge, MA: MIT dissertation.
MASULLO, PASCUAL. 1992. *Incorporation and case theory in Spanish: A crosslinguistic perspective*. Seattle: University of Washington dissertation.
MIYAGAWA, SHIGERU, and TAKAE TSUJIOKA. 2004. Argument structure and ditransitive verbs in Japanese. *Journal of East Asian Linguistics* 13.1–38.
MOORE, JOHN, and MARIA POLINSKY. 2003. *Explanation in linguistics*. Stanford, CA: CSLI Publications.
MUSOLINO, JULIEN, and JEFFREY LIDZ. 2006. Why children aren't universally successful with quantification. *Linguistics* 44.4.817–52.
NESPOR, MARINA, and IRENE VOGEL. 1986. *Prosodic phonology*. Dordrecht: Foris.
NOVECK, IRA A. 2001. When children are more logical than adults: Experimental investigations of scalar implicature. *Cognition* 78.165–88.
OEHRLE, RICHARD T. 1976. *The grammatical status of the English dative alternation*. Cambridge, MA: MIT dissertation.
ORMAZABAL, JAVIER, and JUAN ROMERO. 1999. On the syntactic nature of the *me-lui* and the person-case constraint. *Anuario del Seminario Julio de Urquijo* 32.2.415–33.
PAPAFRAGOU, ANNA, and JULIEN MUSOLINO. 2003. Scalar implicatures: Experiments at the semantics-pragmatics interface. *Cognition* 86.253–82.
PERLMUTTER, DAVID M., and JOHN MOORE. 2002. Language-internal explanation: The distribution of Russian impersonals. *Language* 78.619–50.
PINKER, STEVEN. 1979. Formal models of language learning. *Cognition* 7.217–83.
PINKER, STEVEN. 1984. *Language learnability and language development*. Cambridge, MA: Harvard University Press.
PINKER, STEVEN. 1989. *Learnability and cognition: The acquisition of argument structure*. Cambridge, MA: MIT Press.
RAPPAPORT HOVAV, MALKA, and BETH LEVIN. 2008. The English dative alternation: The case for verb sensitivity. *Journal of Linguistics* 44.129–67.
REINHART, TANYA. 1976. *The syntactic domain of anaphora*. Cambridge, MA: MIT dissertation.
REINHART, TANYA. 1983. Coreference and bound anaphora: A restatement of the anaphora questions. *Linguistics and Philosophy* 6.47–88.
RIZZI, LUIGI. 1982. *Issues in Italian syntax*. Dordrecht: Kluwer.
SAKAS, WILLIAM G., and JANET DEAN FODOR. 2001. The structural triggers learner. *Language acquisition and learnability*, ed. by Stefano Bertolo, 172–233. Cambridge: Cambridge University Press.

SAVAGE, CERI; ELENA LIEVEN; ANNA THEAKSTON; and MICHAEL TOMASELLO. 2003. Testing the abstractness of children's linguistic representations: Lexical and structural priming of syntactic constructions in young children. *Developmental Science* 6.557–67.
SELKIRK, ELISABETH O. 1984. *Phonology and syntax: The relation between sound and structure*. Cambridge, MA: MIT Press.
SHIMPI, PRIYA M.; PERLA B. GÁMEZ; JANELLEN HUTTENLOCHER; and MARINA VASILYEVA. 2007. Syntactic priming in 3- and 4-year-old children: Evidence for abstract representations of transitive and dative forms. *Developmental Psychology* 43.6.1334–46.
SNYDER, WILLIAM. 2007. *Child language: The parametric approach*. Oxford: Oxford University Press.
SRIDHAR, S. N. 1990. *Kannada*. London: Routledge.
SUNDARESAN, SANDHYA. 2006. The argument structure of verbal alternations in Tamil. *West Coast Conference on Formal Linguistics (WCCFL)* 25.390–98.
SUÑER, MARGARITA. 1988. The role of agreement in clitic-doubled constructions. *Natural Language and Linguistic Theory* 6.391–434.
TAMURA, SHIN-ICHI; NATSUKO KATSURA; YOSHIAKI KANEKO; and MASATOSHI KOIZUMI. 2007. Word-order preferences in Japanese children's ditransitives: The effect of verb meanings. Paper presented at the Boston University Conference on Language Development, Boston.
THOTHATHIRI, MALATHI, and JESSE SNEDEKER. 2008. Syntactic priming during language comprehension in three- and four-year-old children. *Journal of Memory and Language* 58.188–213.
TIRUMALESH, K. V. 2000. *The landscape of language: Issues in Kannada linguistics*. New Delhi: Allied.
TOMASELLO, MICHAEL. 1992. *First verbs: A case study of early grammatical development*. Cambridge: Cambridge University Press.
TOMASELLO, MICHAEL. 1998. One child's early talk about possession. *The linguistics of giving*, ed. by John Newman, 349–74. Amsterdam: John Benjamins.
TOMASELLO, MICHAEL. 2000. Do young children have adult syntactic competence? *Cognition* 74.209–53.
TOMASELLO, MICHAEL. 2003. *Constructing a language: A usage-based theory of language acquisition*. Cambridge, MA: Harvard University Press.
TOMASELLO, MICHAEL, and NAMEERA AKHTAR. 2003. What paradox? A response to Naigles (2002). *Cognition* 88.317–23.
TOMASELLO, MICHAEL, and PATRICIA J. BROOKS. 1998. Young children's earliest transitive and intransitive constructions. *Cognitive Linguistics* 9.4.379–95.
URIAGEREKA, JUAN. 1988. *On government*. Storrs: University of Connecticut dissertation.
VAN HOEK, KAREN. 1997. *Anaphora and conceptual structure*. Chicago: University of Chicago Press.
VIAU, JOSHUA. 2006. Give = CAUSE + HAVE / GO: Evidence for early semantic decomposition of dative verbs in English child corpora. *Proceedings of the Boston University Conference on Language Development (BUCLD)* 30.665–76.
VIAU, JOSHUA. 2007. *Possession and spatial motion in the acquisition of ditransitives*. Evanston, IL: Northwestern University dissertation.
VIAU, JOSHUA, and BARBARA LANDAU. 2011. The language of possession and space: Differential encoding of recipients and locations in transfer events. Baltimore, MD: Johns Hopkins University, MS.
YUAN, SYLVIA; CYNTHIA L. FISHER; YAEL GERTNER; and JESSE SNEDEKER. 2007. Participants are more than physical bodies: 21-month-olds assign relational meaning to novel transitive verbs. Paper presented at the biennial meeting of the Society for Research in Child Development, Boston.

Viau
Department of Cognitive Science
Johns Hopkins University
237 Krieger Hall
3400 North Charles Street
Baltimore, MD 21218
[viau@cogsci.jhu.edu]

[Received 19 August 2008;
revision invited 14 March 2009;
revision received 2 December 2010;
accepted 17 May 2011]

Lidz
Department of Linguistics
University of Maryland
1401 Marie Mount Hall
College Park, MD 20742
[jlidz@umd.edu]