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Possession and Spatial Motion in the Acquisition of Ditransitives

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Joshua Viau

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ABSTRACT

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Joshua Viau

What is the nature of the relation between a verb and its arguments? In this dissertation, I look to evidence from language acquisition for answers.

Any theory of ditransitives must explain certain structural asymmetries noted for both double-object (DO) datives (e.g. *Alfonso gave Derek the bat*) and prepositional datives (*Alfonso gave the bat to Derek*) (e.g. Barss & Lasnik 1986) as well as subtle but persistent meaning differences distinguishing the two dative constructions in many languages. A particular approach to argument realization, Harley (2002), does both. On Harley's approach, structural asymmetries arise from the hierarchical nature of the dative verb phrase, in which the first dative object asymmetrically c-commands the second in both constructions. In addition, the semantic facts fall out from the presence of primitives encoding possession in DO-datives (HAVE) and location in prepositional datives (LOC) that are embedded in these syntactic representations. I show that the structural asymmetries and meaning differences that have been observed for adults obtain for children as well, confirming Harley's general approach.

Concerning the structural asymmetries, a series of experiments using the Truth Value Judgment task reveal that four-year-olds already have hierarchical representations within the dative verb phrase, much as adults do. This finding is based on converging evidence from Principle C and quantifier-variable binding in English and quantifier-variable binding in

Kannada. The Kannada data in particular suggest that c-command (not linear order) guides children's interpretive preferences. Moreover, concerning meaning differences, a large-scale corpus study reveals that two-year-old English-speaking children demonstrate awareness of distinct possessional and spatial meaning in DO-datives and prepositional datives, respectively, in their earliest productions.

These results add to the considerable body of work illustrating the abstractness of children's early linguistic knowledge. I argue that the dative representations that children evidently have are not learnable if learning is construed inductively as the building up of rules and structures based solely on cues present in the input. Rather, the available evidence appears to favor deductive learning, whereby children are led to discover innately specified syntactico-semantic structures as a result of careful observation of what datives mean.

ACKNOWLEDGMENTS

Up until now I have been what you might call a career graduate student. My father in particular has enjoyed teasing me about this over the years by cleverly choosing the most inopportune moments to ask whether I was done writing my dissertation yet. It is with great relief and gratitude that I can now answer his question in the affirmative.

Many thanks are due first and foremost to the members of my dissertation committee—Jeffrey Lidz, Sandra Waxman, and Stefan Kaufmann—for their tireless work on my behalf. My advisor, Jeff, has been a tremendous resource, never failing to offer insight and enthusiasm when they were needed (often at the last minute). In addition, his astonishing generosity directly enabled the Kannada experiment in Chapter 2. Sandy is a force of nature who I am fortunate to have been shaped by throughout my graduate career. She and Jeff both serve as shining examples of how best to collaborate across disciplines in the study of language development. Stefan made key contributions to various aspects of my research as well, especially concerning issues of semantic representation. His perspective has proved to be invaluable.

While the seeds of this project were planted during the winter of 2002 in Jeff's syntax course and Jeff and Sandy's seminar on the acquisition of grammatical and conceptual categories, germination could not have occurred without many other serendipitous influences. I am grateful to have had fruitful conversations with past and present members of the Northwestern University (NU) Linguistics-Psychology Acquisition Lab Group and the NU Syntax and Semantics Group—especially Ann Bunger, Brady Clark, Chris Kennedy, Erin

open their doors to researchers like me; and without the brave scheduling and puppeting efforts of Cara Brown and Jane Solomon, who as a result will never forget the name of Woody's horse.

Chicago has been good to me. Before leaving I can't neglect to thank Cheetah Gym and the Chicago Park District for providing me with enjoyable, traffic-free settings for long runs, which kept me sane, and the Chicago Cubs, whose progress somehow always compared unfavorably to mine.

I'm blessed to have been raised in a family where the word, spoken or written, was always held in high regard. Dad, I'm proud to be your son. Rob, now there are two of us! Herb, your reign as Scrabble King is probably still not in jeopardy. Words, however, could never fully express how grateful I am to friends and family (a special shout-out to brother Nate here) and, above all, to my wife, Kathy-Ann, for their love, understanding, and full-on embrace of my chosen career. That won't stop me from trying.

Finally, I acknowledge a great debt to all of the parents who allowed their children to be recorded for the CHILDES database or to humor me personally in one study or another. It's humbling to reflect on the degree to which science—and so much else in life—depends on the kindness of strangers. All one can do is pay it forward.

DEDICATION

For Kathy-Ann, without whose love, constant support, and unending patience this thesis might never have been written.

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CHAPTER 1: BACKGROUND

What passed for on-camera drama Wednesday came during a prickly yes-no exchange over whether Chairman Arlen Specter, R-Pa., had received a letter from Sen. Ted Kennedy, D-Mass., asking that the committee seek certain papers related to Concerned Alumni of Princeton.

Kennedy said he sent it. Specter said he didn't receive it. Kennedy said he must have received it.

"I take umbrage at your telling me what I received," Specter said. "I don't mind your telling me what you mailed. But there's a big difference between what's mailed and what's received. And you know that."

http://www.breitbart.com/news/2006/01/11/D8F2N4HOC.html

Few linguistic phenomena have been the focus of as much scholarly attention over the past 30 years as the dative alternation, particularly in English. A casual search using Google Scholar today[1] turned up 69500 distinct hits for "dative" and 843 hits for "dative alternation." Despite the indisputable abundance of theoretical and empirical research available on this topic, however, no real consensus has yet emerged as to which of the many accounts of dative verbs like *give* and *send* is actually correct. The literature is rife with disagreements about the structure, meaning, and usage of datives, a state of affairs apparently mirrored in the non-academic world as well if the exchange between Senators Kennedy and Specter cited above teaches us anything. I see all of this debate as encouraging, an indicator that the questions raised by the dative alternation—concerning, for instance, the nature of the relation between a verb and its arguments—are still considered vital. Such questions will never be answered to the satisfaction

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[1] 26 April 2007

of all interested parties without more data. Thus, I would like to offer this dissertation as a collection of (a) new hard facts about what young children know about datives and (b) informed speculation about how they could have acquired this knowledge that might well be useful in deciding among competing answers.

Before we go any further, a quick note on terminology is in order. The dative alternation involves verbs that appear with their objects in two alternate realizations, as illustrated with *give* and *send* in (1) and (2), respectively. Here and throughout the dissertation I refer to these argument realization patterns as the prepositional (or *prep*) dative (e.g. the (a) sentences) and the double-object (or *DO*) dative (e.g. the (b) sentences).

(1)   a.   Alfonso gave the bat to Derek   *prep*

      b.   Alfonso gave Derek the bat   *DO*

(2)   a.   Kathy sent the new Beyoncé single to Devon   *prep*

      b.   Kathy sent Devon the new Beyoncé single   *DO*

By the term *dative* no special claims about case assignment to either internal argument are intended; rather, I lean on the conventional use of *dative*[2] as having to do with literal or metaphorical transfer, typically of some thing to some person or location. The term *ditransitive* will be used as an umbrella term to refer to both dative constructions.

At an intuitive level, and because one has to start somewhere, we might think of verbs as describing events in the world and verbal arguments in turn as naming individuals that stand in some principled relation to that event. Volumes of previous research have shown that, rather than varying arbitrarily in how they describe events, verbs with common semantic characteristics often have common syntactic characteristics. For example, *hit*-type verbs (e.g. *bash, hit, kick,*

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[2] *Dative* derives from the Latin *dativus*, meaning "appropriate to giving."

pound) appear in the conative construction and the body-part possessor ascension construction but not in the middle construction, while *break*-type verbs (e.g. *break*, *crack*, *rip*, *shatter*) show the exact opposite pattern (Levin 1993: 6-7).[3]

(3)   a.   Carla {hit/*broke} at the vase   *conative*

               cf. Carla {hit/broke} the vase

        b.   Carla {hit/*broke} Bill on the back   *body-part possessor ascension*

               cf. Carla {hit/broke} Bill's back

        c.   The vase {*hit/broke} easily   *middle*

               cf. Carla {hit/broke} the vase easily

Virtually all modern theories of lexical semantics have tried to account for this systematic aspect of verbal behavior in some way, with results varying widely in terms of representational detail. The fundamental question that anyone in this research area must grapple with is this, as Pylkkännen (2002) puts it: What is the nature of lexical complexity? One influential position has been that argument relations project from the verb. This position, which I will refer to as lexicalist (e.g. Chomsky 1981, Bresnan 1982, Dowty 1989, Jackendoff 1990, Steedman 1997, Rappaport Hovav & Levin 1998, Joshi 2004) because it places the burden of explanation on the lexicon, requires—in addition to a precise theory of lexical representation—a theory of how the predicates and arguments in lexical semantic representations determine syntactic behavior and map onto syntactic positions. Another equally important position, which I will call constructionalist following Folli & Harley (2002), has favored a significant role for verbal context in argument realization (e.g. Marantz 1984, 1997, Hale & Keyser 1993, Goldberg 1995, Harley 1995, Michaelis & Ruppenhofer 2001, Borer 2003, Pietroski 2005, Williams 2005). In a

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[3] The asterisks are intended to indicate ungrammaticality.

constructionalist account, the mapping (or *linking*) problem disappears more or less, and the explanatory burden often falls on the computational system, which accordingly requires more complex machinery than it might otherwise. In particular, the issue of how to integrate core verbal meaning (i.e. "root" meaning) with constructional meaning arises on this approach, whereas a verb's compatibility with multiple constructions is typically seen as a function of its own polysemy (and not the constructions') by lexicalists. The strongest version of the constructionalist approach holds that argument structure is purely syntactic, i.e. verbs have no arguments as part of their lexical representations (Pietroski 2005, Williams 2005).

An example of how proponents of the lexicalist and constructionalist positions would represent the denotation of the verb *give* with respect to its arguments should clarify the general picture. From a lexicalist perspective, *give* projects an Agent, Goal, and Theme (4a), all of which are associated with their syntactic positions via the application of a linking rule or lexical event structure (not shown). In contrast, from a strong constructionalist perspective, *give* doesn't project any arguments (4c); rather, basic thematic relations are introduced by the structure in which *give* occurs. There is also a weaker, intermediate constructionalist position (associated in particular with Marantz (1997)) according to which the Goal and Theme arguments are part of *give*'s lexical representation but the Agent argument is supplied by the syntax (4b).[4]

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[4] Kratzer (1996) first argued that agents are not arguments of the verb based in part on the observation, attributed to Marantz 1984, that there are no idioms involving just the verb and its agent. The argument goes through if we assume along with Krazter that idiomatic meanings must be stated over lexical representations.

(4) a. Lexicalist lexical entry for *give*

[[give]]: λe.λx.λy.λz. give(e) ∧ Goal(e,x) ∧ Theme (e,y) ∧ Agent (e,z)

b. Weak constructionalist lexical entry for *give*

[[give]]: λe.λx.λy. give(e) ∧ Goal(e,x) ∧ Theme (e,y)

c. Strong constructionalist lexical entry for *give*

[[give]]: λe. give(e)

This dissertation will explore how well a particular type of constructionalist account—in which the locus of constructional meaning differences for datives is the presence of syntactic primitives encoding either location (LOC) or possession (HAVE)[5] (Harley 2002)—explains the facts as we know them in English and other languages, most notably Kannada. More nuanced discussion of the difference between this account and other constructionalist accounts can be found in section 1.2, and the syntactic analysis to be argued for is presented at the end of section 1.3. Since this analysis involves null structure, an important goal throughout the dissertation will be to bring data from language acquisition to bear on the issues. Such psycholinguistic grounding is helpful, perhaps even essential for any theory that purports to describe a linguistic system that, by and large, children learn by the age of 5 but that adult linguists struggle to characterize precisely. Along the way, I will investigate promising connections between language and other cognitive systems more generally through a combination of literature review, experimental research, and crosslinguistic comparison. The results will bear on deep, interdisciplinary

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[5] Throughout this dissertation I rely on the following typographical conventions for clarity. When describing an argument with emphasis on the thematic role assigned to it, I capitalize the argument (the Goal). Thematic roles, themselves, are shown in ALL CAPS (THEME > GOAL). Syntactic/semantic primitives are displayed in SMALL CAPS (CAUSE, HAVE, BECOME).

questions, including the mapping between linguistic and conceptual representations of events and the role of innate knowledge in constructional learning.

Section 1.1 provides an overview of several important empirical observations pertaining to dative verbs in English and ends with a consensus view on what dative representations must encode. Section 1.2 compares various constructionalist accounts of the dative alternation. In Section 1.3, a number of syntactic approaches to the dative alternation are surveyed, and more details are given about the specific analysis to be adopted. I give a targeted review of the literature on the acquisition of dative verbs in Section 1.4. This section ends with a brief summary of what is known about children's dative representations and what remains to be discovered. Section 1.5 previews how the research described in Chapters 2 and 3 will shed light on the nature of these representations by testing claims implicit in the syntactic analysis adopted (claims pertaining to asymmetric c-command and semantic decomposition) and how the discussion in Chapter 4 will address issues of learnability raised by this analysis.

1.1 Some facts to explain

Right at the outset, I would like to describe three sets of facts pertaining to dative verbs in English in a relatively theory-neutral way with the intention of highlighting exactly what it is that any account of dative verbs must explain.

1.1.1 Structural asymmetries

The first set of facts consists of well-known structural asymmetries exhibited by prepositional datives and DO-datives alike. These asymmetries suggest that in both argument orders the first

internal argument in terms of linear order hierarchically dominates (or c-commands) the second, but not vice versa.[6] C-command is unidirectional, hence asymmetrical, with respect to these constituents. Barss & Lasnik (1986) present six types of evidence, which I will briefly review in large part using data from Larson (1988).

To begin with, we see a contrast in grammaticality in (5) and (6) when the reflexive *each other* is bound by its antecedent. The contrast follows if Principle A, a condition on the binding of reflexives, requires c-command and if *each other* is c-commanded by its antecedent in (5a) and (6a) but not in (5b) or (6b).

(5)　　a.　　I showed [the students]$_x$ to each other$_x$'s professors

　　　　b.　　* I showed each other$_x$'s professors to [the students]$_x$

(6)　　a.　　I showed [the professors]$_x$ each other$_x$'s students　　(B&L's (4))

　　　　b.　　* I showed each other$_x$'s students [the professors]$_x$　(B&L's (5))

Similarly, the contrast between the (a) and (b) examples in (7) and (8) follows if the quantified noun phrases (QNPs) in these examples must c-command the corresponding pronouns in order to bind them, and if they fail to c-command them in the (b) examples.

(7)　　a.　　I gave [every check]$_x$ to its$_x$ owner　　　　　　　(Larson's (5b))

　　　　b.　　* I gave his$_x$ paycheck to [every worker]$_x$　　　　(Larson's (5b))

(8)　　a.　　I gave [every worker]$_x$ his$_x$ paycheck　　　　　　(Larson's (3b))

　　　　b.　　* I gave its$_x$ owner [every paycheck]$_x$　　　　　　(Larson's (3b))

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[6] C-command is defined as follows: *a* c-commands *b* if and only if the lowest branching node that dominates *a* dominates *b* and *a* does not dominate *b*.

Note that the pronouns in these examples (both (a) and (b)) could perfectly well refer to extrasentential antecedents. There will be much more to say about quantifier-variable binding and extrasentential reference in Chapter 2.

In addition, dative verbs show weak crossover asymmetries, which arise when a *wh*-phrase c-commanded by a noun phrase (NP) containing a pronoun with which it is coreferential is moved over that NP:

(9)   a.   [Which check]$_x$ did you send __ to its$_x$ owner?   (Larson's (5c))

        b.   * [Which worker]$_x$ did you send his$_x$ check to __ ?   (Larson's (5c))

(10)   a.   [Which man]$_x$ did you send __ his$_x$ paycheck?   (Larson's (3c))

        b.   * [Whose pay]$_x$ did you send his$_x$ mother __ ?   (Larson's (3c))

We also observe superiority effects in dative verbs when wh-phrases are moved over other wh-phrases which c-command (and thus are "superior" to) them:

(11)   a.   Which check did you send __ to who?   (Larson's (5d))

        b.   * To whom did you send which check __ ?   (Larson's (5d))

(12)   a.   Who did you give __ which paycheck?   (Larson's (3d))

        b.   * Which paycheck did you give who __ ?   (Larson's (3d))

Constructions like *Each man saw the other* may have a reciprocal reading if and only if the *each*-phrase c-commands the *other*-phrase. Dative verbs show asymmetries with respect to this construction:

(13) a. I sent each boy to the other's parents (Larson's (5e))

  b. * I sent the other's check to each boy (Larson's (5e))

(14) a. I showed each man the other's socks (Larson's (3e))

  b. * I showed the other's friend each man (Larson's (3e))

Finally, we see asymmetries with the negative polarity item *any*, which is only licensed within the scope (i.e. c-command domain) of negation or other such downward-entailing operators:

(15) a. I sent no presents to any of the children (Larson's (5f))

  b. * I sent any of the packages to none of the children (Larson's (5f))

(16) a. I showed no one anything (Larson's (3f))

  b. * I showed anyone nothing (Larson's (3f))

Let us assume that the c-command relation (without reference to linear order) governs all of these phenomena—the binding of anaphors, the binding of pronominal variables by quantifiers, weak crossover, superiority effects, and negative polarity licensing—as is standard in the generative tradition. In Chapter 2, I will present evidence showing the correctness of this common but not universally embraced assumption.[7] Taken together, then, the asymmetries illustrated above provide strong evidence that for both prepositional datives and DO-datives the first internal argument asymmetrically c-commands the second. Of course, every linguist (generative or not) needs a theory of the phrase structure of datives. In my view, Barss-&-Lasnik-style data are simply relevant to determining what that phrase structure is, and only accounts positing hierarchical (as opposed to flat or indeterminate) structures for dative verb

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[7] See, for example, van Hoek (1995) or Harris & Bates (2002) for non-structural accounts of pronominal reference. Less formalist work in this vein typically fails to account for or even address the wide range of other phenomena, some of which are described above, that c-command helps to explain.

phrases will adequately capture them. A major focus of Chapter 2 will be to motivate the claim that such hierarchical structures are evident in language comprehension as early as age four in both English and Kannada.

Another apparently structural asymmetry about which I will have little to say involves scope freezing effects (e.g. Aoun & Li 1989, Larson 1990, Bruening 2001). Whereas the interpretation of one quantified internal argument relative to another is free in prepositional datives, it is frozen in DO-datives, with the only possible interpretation being one in which the scope of the quantifiers matches their surface order. Consider the prepositional dative example in (17), which has two possible readings. The sentence can mean that there was a single book that every child received, say "Goodnight Moon." Alternatively, it can mean that every child received a potentially different book, e.g. "Curious George" for Sam, "Goodnight Moon" for Geneva, and "Babar" for Olivia.

(17)   I gave a book to every child

   a.   a > every   surface scope, i.e. the same book to every child

   b.   every > a   inverse scope, i.e. every child gets a (potentially different) book

The equivalent DO-dative in (17) is effectively unambiguous.[8] It can only mean that one particular lucky child receives every book, not that every book went to a potentially different child.

(18)   I gave a child every book

   a.   a > every   surface scope, i.e. one particular child gets every book

   b.   * every > a   *inverse scope, i.e. every book to a (potentially different) child

---

[8] Indefinites such as *a book* or *a child* are well-known for their ability to take wide scope where other QNPs can not, e.g. from within the second object position of DO-datives. To avoid obscuring the scope-freezing effect, about which judgments are subtle, the indefinites in (17) and (18) are kept out of this position.

Most accounts of scope freezing that I am aware of are syntactic, though they vary as to whether the second object in DO-datives can move or not (*yes*: Bruening 2001; *no*: Larson 1988, 1990, Aoun & Li 1989, Marantz 1993) and also as to how prepositional datives and DO-datives are related to each other syntactically (*by transformation*: Larson 1988, 1990, Aoun & Li 1989; *by alternate syntactic projections*: Marantz 1993, Bruening 2001). In case-marking languages with comparatively free word order, scope freezing is often used as a test for DO-dative structure, for instance in Japanese (Miyagawa & Tsujioka 2004).

1.1.2 Semantic distinctions

The second set of facts concerning dative verbs has to do with subtle but persistent meaning differences between the syntactic frames in which they appear. DO-datives show semantic restrictions on the Goal argument that prepositional datives do not (e.g. Green 1974, Oehrle 1976, Pinker 1989). The object of *to* in prepositional datives is thematically a location (inanimate or animate), and accordingly a wider range of arguments may appear in that position than in the corresponding position with DO-datives, which is reserved for prospective possessors. For example, it is grammatical to *send a book to Chicago* (19a), but not to *send Chicago a book* (19b), since Chicago cannot easily be interpreted as a possessor of the book.[9]

(19) a. I sent a book to Chicago

      b. *I sent Chicago a book

This generalization extends equally to dative verbs involving metaphorical possession transfer. The prepositional dative in (20a) is perfectly compatible with a reading in which students fail to

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[9] It is possible, of course, to interpret Chicago as an animate entity if one interprets Chicago metonymically as the Chicago office (full of people), in which case (18b) would be fine.

come into possession of knowledge of Spanish as a result of Pablo's teaching, but the DO-dative

is less so (20b) (e.g. Green 1974).[10]

(20)   a.   Pablo taught Spanish to the students, but they didn't learn a thing

       b.   # Pablo taught the students Spanish, but they didn't learn a thing

       A similar phenomenon shows up in benefactive sentences. If I *bake a cake for my sister*

(21a), only the intention to transfer the cake to my sister is required. However, if I *bake my sister*

a cake (21b), there is an additional implication that the intended possession transfer is successful.

(21)   a.   I baked a cake for my sister, but I gave it to my mother

       b.   # I baked my sister a cake, but I gave it to my mother

This effect does not appear to derive from the intensionality surrounding *for* because it appears

with *for*-less benefactives in other languages argued to show the dative alternation, e.g. Kannada

(Lidz & Williams 2005: ex. 5).

(22)   a.   nannu Rashmi-ge keek-annu suTT-u-**koTT**-e

               I Rashmi-DAT cake-ACC prepare-PP-**BEN.PST**-1S

               'I made Rashmi a cake…'

       b.   # adare ad-annu nann-a taayi-ge koTT-e

               but it-ACC I-GEN mother-DAT give.PST-1S

               '…but I gave it to my mother'[11]

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[10] Here and elsewhere I use # to indicate pragmatic infelicity as opposed to ungrammaticality (*).
[11] This data point is from Lidz & Williams (2005), ex. 5. Note that in the equivalent of (22) without the benefactive affix (in bold above), there is no implication of successful transfer. Lidz and Williams (2005) argue that the benefactive affix marks the equivalent of the English DO-dative structure, following Lidz (2002). See Chapter 2 for more discussion.

Another type of restriction on the Goal argument in DO-datives is shown in (23). The DO-dative in (23b) implies that the referent of its Goal argument exists, and accordingly it sounds worse with a hypothetical goal than the prepositional dative in (23a) does.

(23)   a.   Pablo bought some toys for his grandchildren (in case he ever has any)

        b.   # Pablo bought his grandchildren some toys (in case he ever has any)

Semantic effects like these show up in a wide range of languages, from Chicheŵa (Marantz 1993) to Kannada (Lidz 2003), Tamil (Sundaresan 2006), Turkish (Gürcanli 2007, citing Öztürk 2004), Spanish (Bleam 2003, Cuervo 2003), Japanese (Miyagawa & Tsujioka 2004) and Korean (Jung & Miyagawa 2004) and are considered diagnostic of the DO-dative structure. They are also an important motivation for what I will refer to as polysemous accounts of the dative alternation in Section 1.2.

However, it has been noted that the source and strength of meaning differences associated with English datives are somewhat controversial. First, the prospective possessor restriction is not limited to DO-datives, strictly speaking. For instance, *give* shows this restriction in both dative frames:

(24)   a.   *I gave a book to Chicago   *cf. I sent a book to Chicago (19a)*

        b.   *I gave Chicago a book   *cf. *I sent Chicago a book (19b)*

Based on data like (24) and other exceptions to the broad generalization sometimes made in the constructionalist literature that prepositional datives always express caused motion and DO-datives always express caused possession, Rappaport Hovav & Levin (2006) conclude that "the meaning inherent in dative verbs plays the critical role in determining the availability of the inference, independent of the variant (p. 16)." Certainly verb-specific meaning can not be

ignored in any account of the dative alternation regardless of whether its role is more significant than construction-specific meaning. I do not believe that it is. Second, the possession-related inferences associated with the DO-dative are often defeasible, as we have already seen. In other words, these inferences are typically implicatures and do not rise to the level of entailments. Rappaport Hovav and Levin (2006) and others have argued on the basis of this observation that any verb-independent dative inferences must, therefore, not be directly attributable to elements of meaning that are encoded in dative constructions. Importantly, however, constructions could be interpreted in such a way as to avoid this objection, particularly in the case of constructions involving predicate decomposition. For instance, the DO-dative construction is often glossed as meaning "CAUSE to HAVE," but there is good reason to believe that the possession relation that HAVE contributes is relativized somehow in comparison to that contributed by the lexical verb *have*. In particular, a DO-dative description of an event could simply assert that the event will end in a state of having without entailing the achievement of the having prior to speech time, much as a killing event can be said to have taken place before death results, i.e. by indirect means like poisoning.[12] For somewhat related discussion on this point with respect to syntax, see Section 1.3. Krifka (2003) points to another way out of the dilemma when he suggests that "every transfer of possession can be conceptualized as an abstract movement event in the dimension of possession spaces (p. 11)."[13] The idea is that the representations of the two dative constructions may still differ despite the lack of truth-conditional difference between pairs like *Ann gave the car to Beth* and *Ann gave Beth the car*. As Krifka argues, (non-)distinctions like

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[12] I thank Jeffrey Lidz and Alexander Williams (p.c.) for suggesting this possibility originally in the spirit of Davidson (1967). Footnote 58 also addresses this general issue.

[13] cf. Jackendoff's Thematic Relations Hypothesis (1983) and other instantiations of the localist approach in which all verbs are construable as describing motion or location in a more abstract semantic field.

these may easily be captured in frameworks distinguishing two levels of semantics (e.g. Logical

Form and its model-theoretic interpretation). For now, though, I would like to abstract away

from this debate since it is larger than the scope of this dissertation and not likely to be settled by

any evidence from the acquisition of datives that I might present. Most skeptics will concede that

there is something special about the first internal object position in DO-datives even if they

would prefer not to encode that special something in a verb-independent way. That in itself,

coupled with the observation that English is one of many languages in which DO-datives are

semantically different from prepositional datives (or their equivalents), is enough to justify close

attention.

1.1.3 Dative idiosyncracies

The third set of facts concerning dative verbs has to do with their irregular distribution across

constructions. While the regularities observed with alternating verbs are impressive and call out

for explanation, there are idiosyncrasies that deserve comment as well. These are related to

Pinker's (1989) broad-range and narrow-range dative rules.

What I'll call broad-range idiosyncrasies are those in which dative verbs appear in one

argument structure but not the other, due seemingly to an incompatibility with the basic

semantics of that structure—informally, 'X causes Y to go to Z' for the prepositional dative and

'X causes Z to have Y' for the DO-dative. For example, "verbs of continuous causation of

accompanied motion in some manner"[14] like *carry*, *drag*, *haul*, *pull*, and *tug* have meanings more

compatible with spatial motion than possession transfer. These verbs express a homomorphic

mapping between a causing event (application of continuous force) and a full-fledged movement

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[14] The names for this and other verb classes in quotes are borrowed from Gropen et al. (1989).

event,[15] but DO-dative structures have been argued to be incompatible with this meaning. Accordingly, *carry*-type verbs may only appear in the prepositional dative[16]:

(25) a. I [carried/drove/dragged/hauled/pulled/tugged] the box to Matilde

b. I *[carried/drove/dragged/hauled/pulled/tugged] Matilde the box

Likewise, verbs of "future not having" like *bet*, *charge*, *cost*, *envy*, and *spare* have meanings involving possession in which nothing actually moves toward or away from the possessor, and these may only appear in DO-datives:

(26) (adapted from Gropen et al.'s (8))

a. Alex bet Leon $600 that the Red Sox would lose

b. * Alex bet $600 to Leon that the Red Sox would lose

c. The bank charged me $25

d. * The bank charged $25 to me

e. That remark might cost you your job

f. * That remark might cost your job to you

g. Carolyn envied Lisa her good looks

h. * Carolyn envied her good looks to Lisa

i. Please spare me your sarcasm

j. * Please spare your sarcasm to me

In contrast, narrow-range idiosyncrasies are less predictable based on the semantics of the prepositional dative and DO-dative constructions. For example, why should it be that the "verbs of type of communicated message" in (27) participate in the dative alternation while the "verbs

---

[15] See Krifka (2003), p. 11, *inter alia*, for the claim that DO-datives involve underspecified or defective paths consisting of two points only (source and goal).
[16] See Krifka (2003), p. 8, for discussion of *carry*-type verbs along these lines.

of manner of speaking" in (28) and the "verbs of communication of propositions and propositional attitudes" in (29) fail to appear in the DO-dative frame?

(27)   a.   I [read/showed/taught/told/wrote] something to Bill.

         b.   I [read/showed/taught/told/wrote] Bill something.

(28)   a.   I [murmured/shouted/screamed/whispered/yelled] something to Bill

         b.   * I [murmured/shouted/screamed/whispered/yelled] Bill something

(29)   a.   I [asserted/claimed/questioned/said] something to Bill

         b.   * I [asserted/claimed/questioned/said] Bill something

This puzzle and others like it will be left unresolved, though there are accounts in the literature (e.g. Pesetsky 1995, Harley 2007).

Finally, it has often been claimed that morphophonological constraints on the dative alternation are discernable, in English at least (Grimshaw & Prince 1986, Gropen et al. 1989, Pesetsky 1995, Harley 2007). "Native" Anglo-Saxon verbs participate in the alternation, but many that do not, disallowing the DO-dative, are Latinate and/or more transparently multimorphemic, as shown in (30):

(30)   (adapted from Harley 2005 lecture notes, attributed to Pesetsky 1995)

         a.   Susie gave/donated some canned food to Oxfam

         b.   Susie gave/*donated Oxfam some canned food

         c.   Bill sent/conveyed his regards to Sophie

         d.   Bill sent/*conveyed Sophie his regards

         e.   Mary showed/displayed her findings to the committee

         f.   Mary showed/*displayed the committee her findings

g. Tom told/recounted the story to Ben

h. Tom told/*recounted Ben the story

Complicating matters somewhat is the reality that different languages cut the semantic pie differently, so to speak, in their distributions of verbs across dative constructions. For instance, it is not necessarily true that the "verbs of type of communicated message" in (27) alternate in all languages with DO-datives. In Korean, they do not. In fact, the only verbs that allow what Jung & Miyagawa (2004) identify as a DO-dative construction in Korean are *give*, *teach*, and *pay*. Another example: in Mandarin Chinese, verbs of consuming like *eat* and *spend* occur as DO-datives but *throw*, *bring*, and *send* do not (Chung & Gordon 1998).

Idiosyncratic data such as these have traditionally been a focus of lexicalist work on dative verbs, which is only natural given the commonly (but not, of course, universally) held belief that the lexicon should be a repository for unpredictable word-related phenomena. Still, the constructionalist analysis that I will adopt is perfectly capable of accommodating these irregularities, and must, in my opinion, take them to heart, though this will not be my focus here. I return briefly to this topic in Section 4.4.

1.1.4 Summary

Of the three sets of facts pertaining to dative verbs in English that I have just described, the first two, structural asymmetries and semantic distinctions, are addressed directly in this dissertation. I take it to be the consensus view that adult dative representations must encode these asymmetries and distinctions in some way, shape, or form, despite the fact that there is

disagreement about how precisely they should be encoded. In Chapters 2 and 3, I show that children's dative representations encode them as well.

1.2 Approaches to argument realization

As discussed in the previous section, there is general agreement that meaning differences exist between DO-datives, which typically require Goal arguments that can be construed as prospective possessors, and prepositional datives, which do not. In broad strokes, two main approaches can be distinguished in the linguistics literature concerning the source of these meaning differences. The first approach, *Monosemy* (31a), treats such differences as semantically trivial—i.e. not relevant to underlying representations—and may minimize their importance or derive them by appealing to discourse factors such as information structure and argument heaviness (e.g. Snyder 2003, Rappaport Hovav and Levin 2006, Bresnan et al. 2007). As important as such factors may be in helping to determine which dative construction is used in a given context, their relevance to the issue of how dative constructions are represented, i.e. how they mean what they mean, is incidental in my view.[17] The second approach, *Polysemy* (31b-c), takes these meaning differences to be more fundamental and builds elements instantiating them into syntactic and/or semantic representations. Monosemous accounts are typically lexicalist, and polysemous accounts are typically constructional.

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[17] Certainly we would expect discourse factors to play a role in privileging one variant or the other in cases where the meanings of the variants overlap despite their distinctness. See, for example, Harley (2002), pp. 38-39 (and references), for explicit discussion of the apparent fact that DO-dative Goals form a subset of prepositional dative Goals. Bresnan et al (2007) argue that one can not always predict the choice of dative variant from meaning alone, but even if we accept the evidence offered to support this argument it does not necessarily follow that the meanings of dative variants (and by extension the representations underlying them) are thus identical.

(31)   Approaches to representing the dative alternation[18]

      a.   *Monosemy*: Dative verbs have a single meaning but two (often transformationally-related[19]) syntactic structures (e.g. Emonds 1972, Bresnan 1982, Aoun & Li 1989, Larson 1988, 1990, den Dikken 1995).

      b.   *Polysemy of verb*: Dative verbs have two distinct meanings, each with its own independent realization of arguments (e.g. Green 1974, Oehrle 1976, Pinker 1989, Hale & Keyser 1993, 2002, Krifka 1999, 2003).

      c.   *Polysemy of construction*: Dative verbs' meanings are invariant, but the meanings of the constructions they appear in are distinct (e.g. Goldberg 1995, Harley 2002, Bleam 2003, Lidz 2003, Beck & Johnson 2004).

Much recent work on the dative alternation has taken place within the polysemy approach. This dissertation, itself, will explore a particular syntactic instantiation of the polysemy approach with respect to others, to which I will turn shortly.

Before going any further, it may be instructive to recall that the pervasiveness of multiple argument realization in natural language (e.g. the dative and locative alternations, event structure augmentation, etc.) is itself an argument favoring constructional accounts over their lexicalist counterparts. As Levin and Rappaport Hovav (2005) point out, the lexicalist notion that the complement structure of a verb is determined by its semantics—as opposed to the reverse—is challenged by verbal promiscuity with respect to syntax. "Polysemous" verbs appearing in many

---

[18] Here I make use of the distinction between these approaches as drawn most recently by Rappaport Hovav & Levin (2006). Their own analysis is a hybrid of the two, whereby *give*-type verbs (e.g. *give, offer, read, show*) are monosemous, having only a caused possession meaning, and *send*-type verbs (e.g. *send, throw, kick, bring*) are polysemous, having both caused motion and caused possession meanings.

[19] Two examples of monosemous accounts of the dative alternation where the dative variants are not argued to be transformationally related: Wechsler (1995) and Butt, Dalrymple & Frank (1997).

different syntactic contexts do not form a well-defined, discrete set that can easily be explained away. Rather, such verbs are the norm. Consider the examples in (32) and the ease with which the novel verbs *siren* and *beer* in (33) and (34) are interpreted in a range of complement structures.[20]

(32)   (adapted from Rappaport Hovav and Levin 1998: 98, (3))

      a.   Elisa ran

      b.   Elisa ran to the beach

      c.   Elisa ran herself ragged

      d.   Elisa ran her shoes to shreds

      e.   Elisa ran clear of the falling rocks

      f.   The coach ran Elisa and the other athletes around the track

(33)   (from Borer 2003: 40 (13), citing Clark & Clark 1979)

      a.   The factory horns sirened throughout the raid

      b.   The factory horns sirened midday and everyone broke for lunch

      c.   The police car sirened the Porsche to a stop

      d.   The police car sirened up to the accident site

      e.   The police car sirened the daylight [sic] out of me

---

[20] A related finding is reported in the language acquisition literature: Young children (age five and under) tend to be frame-compliant, or reliant on syntactic structure, in positing meanings for new verbs and interpreting old verbs used in new syntactic contexts. For instance, 3-year-olds consistently interpret *The zebra goes the lion* as 'The zebra makes the lion go.' See, e.g., Naigles et al (1992, 1993) and Lidz, Gleitman, & Gleitman (2003) for relevant discussion.

(34)   (from an episode of the NBC comedy *The Office*, 4/26/07)

    a.   *Andy*: Beer me *(first use, meaning 'pass me that water, which I wish was beer')*[21]

    b.   *Andy*: Beer me that disk *(second use)*

    c.   *Jim*: Lord, beer me strength *(third use)*

Focusing on (32), it would be odd to posit multiple lexical entries for *run*, each of which subcategorizes for a distinct frame, as the lexicalist approach would have us do, particularly since all of the running events listed here involve the very same repetitive motion of arms and legs. Instead, we might think of syntactic contexts as determining their share of meaning, thereby eliminating the need for multiple lexical entries for verbs and capturing similarities and differences in running events. Constructionalist theories do exactly this by attributing a core meaning to *run* and allowing the constructions into which *run* is integrated to license some or all of *run*'s complement structure and enrich its meaning.

The various instantiations of the constructionalist approach differ mainly in terms of how constructional meaning is encoded. Traditional constructionalists (e.g. Goldberg 1995, 2006, Jackendoff 1997, Kay 2000, Michaelis & Ruppenhofer 2000, 2001) argue that constructions are conventionalized pairings of form and meaning, like words. These constructions—which can range in grain size from morphemes like *–ing* to idioms—show a range of related meanings that must be stored rather than derived compositionally. The original definition of construction given in Goldberg (1995) makes this plain: "Phrasal patterns are considered constructions if something about their form or meaning is not strictly predictable from the properties of their component

---

[21] This intended meaning was not initially understood by Jim. Andy's clarification: "Hand me that water. I always say 'beer me.' It gets a laugh like ¼ of the time."

parts (p. 4)." The DO-dative is understood as an instance of the Ditransitive construction (35b),

and the prepositional dative as an instance of a generalized Caused Motion construction (35a).

(35)   *Examples of correlations between form and meaning (from Goldberg 2006: 73)*

	Form	*Meaning*	*Construction label*
a.	Subj V Obj Obl$_{path/loc}$	X causes Y to move Z$_{path/loc}$	Caused Motion[22]
b.	Subj V Obj Obj$_2$	X causes Y to receive Z	Ditransitive

Typically, argument slots like those above (e.g. Obj, Obl) are the only details given concerning

the form of a particular construction; for more discussion of this aspect of traditional

constructionalist accounts, see Chapter 2. In contrast, neoconstructionalists[23] (e.g. Harley 2002,

Borer 2003, Bleam 2003, Lidz 2003) favor more elaborate, overtly hierarchical syntactic

representations. They see constructions not as arbitrary form-meaning pairs stored in the lexicon,

but rather as structurally encoded meanings—themselves built up compositionally—that then

combine with the meanings of verbs in predictable ways.[24]

1.3 Structural analyses

Before getting into the details of the specific neoconstructionalist analysis to be adopted toward

the end of this section, I would like to situate the discussion more generally by (a) giving a

concise history of syntactic treatments of the dative alternation in English; and (b) exploring the

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[22] Obl = Oblique argument.
[23] The term is attributed to Levin & Rappaport Hovav (2005).
[24] Some traditional constructionalists claim that their accounts preserve compositionality. What is typically meant with respect to argument structure is that the integration of verbal and constructional meaning is principled somehow, not that constructional meaning itself is a function of the meanings of a given construction's constituent parts and their combination. See, for example, Goldberg (1995), pp. 13-16, and Michaelis & Ruppenhofer (2001), pp. 9, 50. In contrast, neoconstructionalists assume that compositionality obtains at all levels, both broadly and more narrowly within constructions, which are thought of as being derived from combinations of more primitive constituents.

range of possible syntactic treatments under the polysemy approach, broadly construed, with

particular attention to how each derives the relevant semantic facts.

Where the modern syntax of the dative alternation is concerned, all roads lead back to

Larson (1988). Larson captures the Barss-&-Lasnik-style structural asymmetries discussed in

Section 1.1 by positing a hierarchical structure for the verb phrase containing two VP-shells. In

his analysis, the DO-dative (36b) is derived from the prepositional dative (36a) by a purely

syntactic, passive-like operation on the lower VP in which the Goal (minus its prepositional

case-marking) is raised to the lower specifier position and the Theme is generated in an adjunct

position.

(36)   Larson (1988): *Monosemy* with transformation

　　　　a.　　　prepositional dative (adapted from Larson's (13))
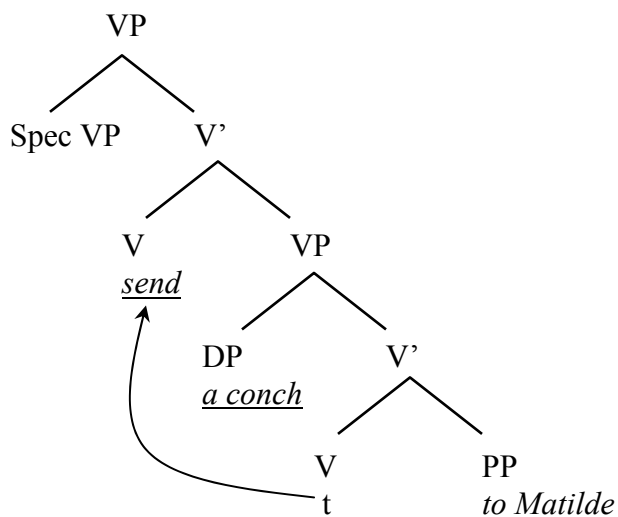
b.   DO-dative (adapted from Larson's (26))
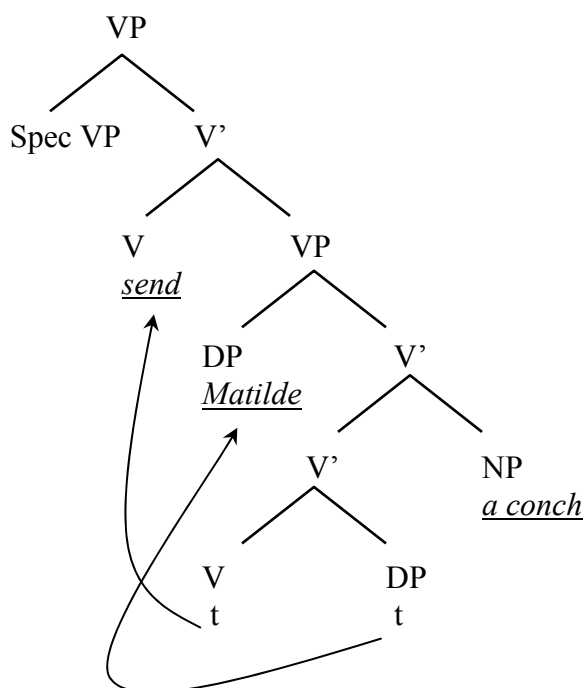
Larson assumes that the Goal is assigned the same thematic role by the verb in both structures, hence the classification of his analysis as monosemous. He appeals to a hierarchy of thematic relations (37) and a general principle of argument realization (38) to accomplish the mapping of thematic roles to arguments.

(37)   Thematic Hierarchy

AGENT > THEME > GOAL > OBLIQUES

(38)   Principle (Larson's (P2))

If a verb α determines θ-roles θ_1, θ_2, ..., θ_n, then the lowest role on the Thematic Hierarchy is assigned to the lowest argument in constituent structure, the next lowest role to the next lowest argument, and so on.

Note that in order for the mapping to work out as planned in (37b), the GOAL thematic role must be assigned to the Goal, *Matilde*, in (35b) before the Goal raises over the Theme, *a conch*, to receive Case. Larson attributes special restrictions on the Goal argument in DO-datives to there being a canonical position for affected arguments such as Goals, namely the surface direct object position. In later work, he suggests that what appear to be semantic constraints on the dative alternation are actually constraints on lexical rules making simple transitive verbs into ditransitives.[25]

Before continuing, it is worthwhile to note that reliance on some form of the principle of argument realization in (38)—which is a relativized version of Baker's (1988) Uniformity of Theta Assignment Hypothesis (UTAH), p. 46—has certain consequences. Faced with different arrangements of arguments that might appear to have the same thematic relations, as is the case for the DO-dative and prepositional dative, one has two choices. First, one can decide along with Larson that the thematic relations are the same in the two constructions. In this case, a syntactic transformation is required in order to explain why there are two different surface structures. Second, one can decide that the thematic relations are different in the two constructions, which makes the availability of two different surface structures unsurprising. Proponents of the neoconstructional accounts explained below have made the second choice but have also rejected the idea that thematic relations are determined by the verb. On these accounts, thematic relations are introduced instead by abstract predicates, e.g. APPL, G, or P_{HAVE}.

Marantz (1993) proposes an alternative analysis with crosslinguistic data from the Bantu languages of West Africa in mind. A particular type of double-object construction (DOC) referred to as the benefactive applicative is common in such languages. The Chicheŵa example

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[25] See Larson (1990), pp. 615-618.

in (39) illustrates the defining feature of applicatives, an "applied" affix, *-ir* in this case,

introducing the structurally highest internal argument, which must always be the affected object:

(39)   Chicheŵa (Marantz's (2), attributed to Alsina & Mchombo 1990)

Chitsiru chi-na-gul-ir-a atsikana mphatso

fool SUBJ-PAST-buy-APPL-fv[26] girls gift

'The fool bought a gift for the girls'

Given the ubiquity and regularity of the applicative within the Bantu family (not

demonstrated here), Marantz assumes that DOCs in all languages involve an applicative affix,

whether phonologically realized or not. This affix, unpronounced in languages like English but

morphophonologically contentful in Bantu languages, is analyzed as a verb because it must

combine with the verb during the course of the derivation[27]. The proposed universal structure for

the DOC is shown in (40b) along with an interpretive schematic. This structure does share the

"stacked VP" characteristics of Larson's analysis, but Marantz's proposed prepositional dative

structure does not (40a). The claim is that each internal object in a DO-dative construction

requires its own VP, while the oblique Goal argument in a prepositional dative does not require

its own VP:

---

[26] fv = final vowel
[27] The relevant movement depicted in (40b) is not all that is required, of course. The verb-affix complex must subsequently raise higher, presumably to INFL, in order to be inflected and precede the benefactive affected object on the surface.

(40)   Marantz (1993): *Polysemy of construction* with null applicative affix

a. prepositional dative (adapted from Marantz's (10))

```
                    IP
                   /  \
                 DP    I'
               Pablo   / \
                     /    \
                  INFL    (VP)
                  past    /  \
                        DP    V'
                      a conch / \
                             /   \
                            V     PP
                          send  to Matilde
```

b. DO-dative (adapted from Marantz's (8))

```
            (VP)                              (VP)
            /  \                              /  \
          DP    V'                          DP    V'
        Matilde / \                   affected object / \
               /   \                                /    \
            APPL  (VP)                            APPL   (VP)
            affix  / \                                    /\
                 DP    V'                                /  \
               a conch / \                     predicate describing event
                      /   \                    affecting affected object
                     V     ...
                   send
```
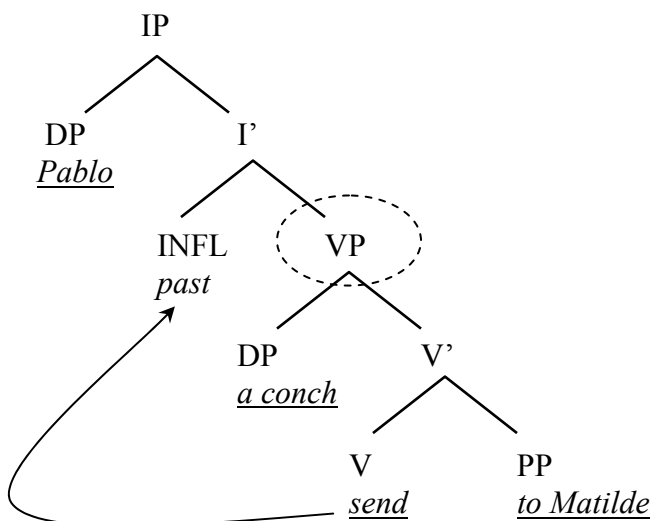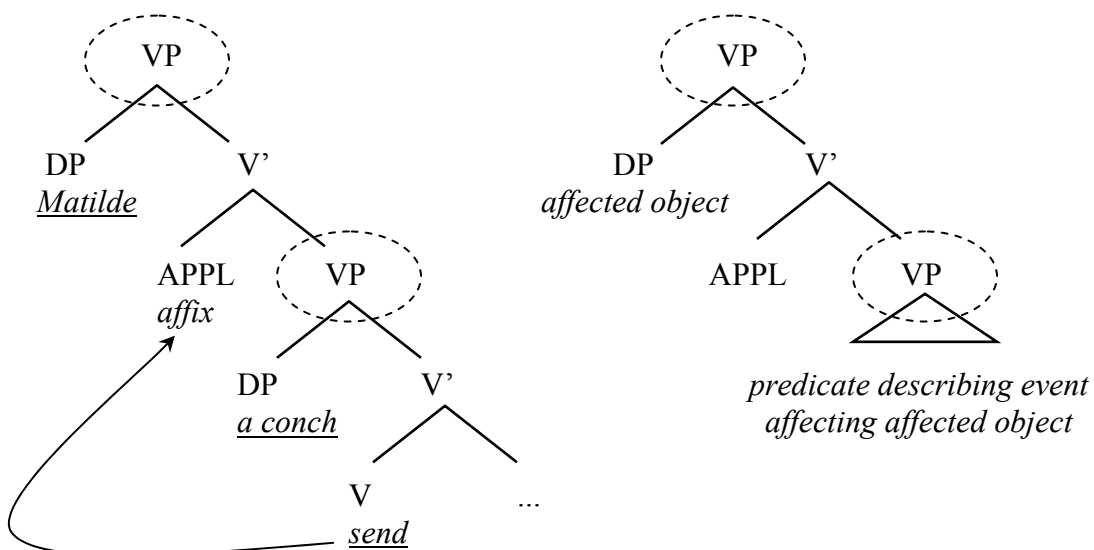
The APPL affix in (40b) takes an event argument semantically and a VP complement syntactically. The benefactive affected object in (40b), *Matilde*, is the semantic argument of the

combination of APPL and the lower VP. Rather than appealing to a Thematic Hierarchy to map

thematic roles to arguments, Marantz assumes that the structures shown above represent (and

ideally fall out from) the compositional semantics of thematic roles, referred to as event

structure. He invokes the mapping principle in (41) to establish a landing site for affected

arguments and the mapping principle in (42) to determine the relative embedding of various

types of affected arguments.

(41)   Affected objects are projected into specifier position of a VP (Marantz's (18)).

(42)   Affected object benefactives are compositionally outside the event constructed by the

        verb and theme/patient; affected object instruments and affected place locatives are

        affected inside this event and may be compositionally inside or outside the combination

        of verb and theme/patient (Marantz's (19)).

The details of the mapping are not immediately relevant, but the fact that argument

structure is represented syntactically is quite important—a point to be expanded upon below.

Notice also that this is a polysemous account of the dative alternation in which the locus of

meaning differences between alternative argument structures is the APPL affix, present only in

the DOC. Pylkkännen (2002), Anagnostopoulou (2003), Cuervo (2003), and Jeong (2006), *inter*

alia, update and refine Marantz's work involving applicative heads in ways that are not directly

related to this dissertation.

Pesetsky (1995) charts a somewhat similar path but trades the APPL affix for a null

preposition. In his analysis, verbs take a prepositional phrase complement in both prepositional

dative and DO-dative structures: in prepositional datives, this PP is headed by *to* with the Theme

in its specifier and the Goal in its complement (43a), while in DO-datives the PP is headed by an

independently motivated null preposition, G, with the Theme in its complement and the Goal in

its specifier (43b). During the course of the derivation, G must raise by head-movement and

incorporate into the verb.

(43)   Pesetsky (1995): *Polysemy of construction* with null prepositional affix

    a.   prepositional dative (adapted from Pesetsky's (456))

```
                    VP
                  /    \
            Spec VP     V'
                      /    \
                    V       PP
                  send    /    \
                        DP      P'
                     a conch   /  \
                             P      DP
                             to    Matilde
```

    b.   DO-dative (adapted from Pesetsky's (511))

```
                    VP
                  /    \
            Spec VP     V'
                      /    \
                    V       PP
                  send    /    \
                    ↑   DP      P'
                    |  Matilde /  \
                    |        P      DP
                    └────────G    a conch
```
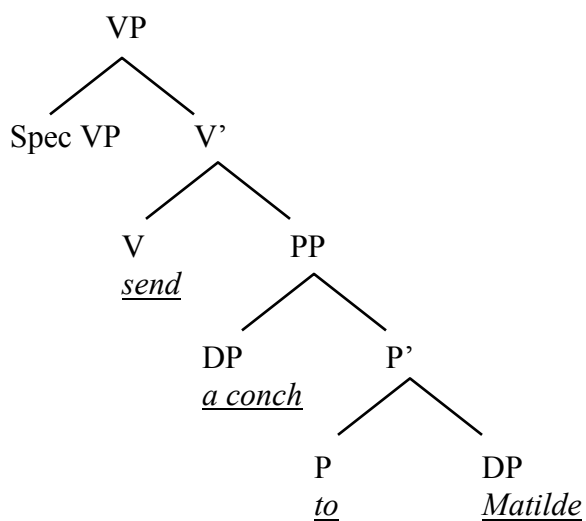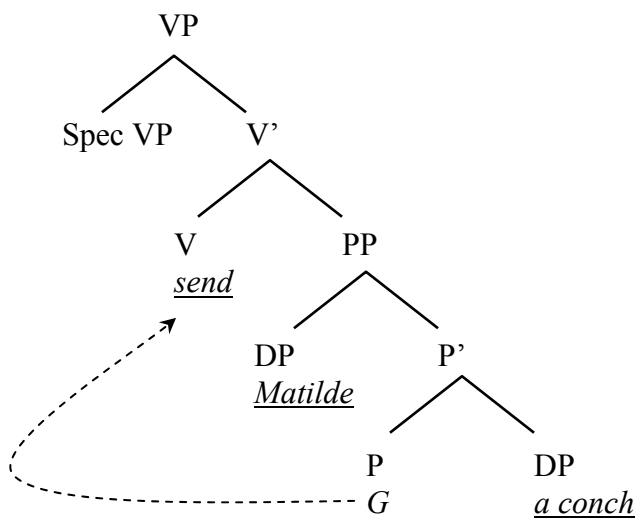
In this account of the dative alternation, another instantiation of the polysemy approach, meaning differences between alternative argument structures come from different selectional requirements for *to*, which selects a Goal, as compared to G, which selects a Theme.

Much interesting evidence in support of Pesetsky's analysis must necessarily be glossed over here. The basic data supporting a prepositional account are attributed to Kayne (1984): nominalizations of prepositional datives are possible (44b) while nominalizations of DO-datives are not (45b).

(44)   a.   Pablo gave a conch to Matilde

       b.   √ Pablo's gift of a conch to Matilde

(45)   a.   Pablo gave Matilde a conch

       b.   * Pablo's gift of Matilde a conch

Combined with the observation that affixation of a null morpheme more generally blocks further derivational affixation,[28] these data suggest that Pesetsky is on the right track. If DO-datives, but not prepositional datives, necessarily involve an affixal preposition G, then further derivation (e.g. the nominalization of *give*) should be blocked for DO-datives, and (45b) shows that it is.

Harley (2002) argues for a version of Pesetsky's approach with some important modifications. First, following a tradition of work on the possessive verb *have* (from Benveniste 1966 to Freeze 1992, Kayne 1993, den Dikken 1995, and Guéron 1995), she identifies Pesetsky's null preposition G—unique to DO-datives—with a null preposition encoding possession, which she calls P_{HAVE}. The idea is that the verb *have* consists of the verb *be* combined with this abstract preposition as well. Importantly, support for this hypothesis comes from the observation that the availability of the verb *have* in a given language correlates with the availability of the DOC in

---

[28] See Myers (1984) and most notably Pesetsky (1995) for detailed discussion.

that language. If Harley is right, then languages without P$_{HAVE}$ should not allow possessors to *c-command* possessees and should not show evidence of having DO-datives, in which Goals c-command Themes. This much seems to be true. For example, Irish possessives have the form "BE the pen at Mary," as shown in (46). We can tell that *Mary* does not c-command *the pen* in (46) because a pronoun in the same position as *the pen* can not be grammatically bound by a QNP in the same position as *Mary* (47).[29]

(46)   Tá an peann ag Máire

      BE   the pen   at Mary

      'Mary has the pen'

(47)   *Tá a$_x$ pheann-fhéin ag chuile$_x$ bhuachaill

      BE   his pen-self   at every boy

      'Every boy has his pen'

Furthermore, as predicted, Irish also lacks DO-datives, in which Goals c-command Themes. The Goal argument in the example below, *every boy*, cannot grammatically bind the Theme, *his pen*.

(48)   *Thug Míleó a$_x$ pheann-fhéin do chuile$_x$ bhuachaill

      gave   Mileo   his pen-self   to every boy

      'Milo gave every boy his pen'

Readers are referred to Harley (2002) for more details. For prepositional datives, Harley posits an abstract locative preposition, P$_{LOC}$, heading the PP complement to V.

---

[29] Examples (46-48) are taken from Harley (2002), pp. 50-51.

(49)   Harley (2002): *Polysemy* with null prepositional affix encoding possession

    a.   prepositional dative (adapted from Harley's (3a))

```
                vP
              /    \
        Spec VP     v'
                  /    \
              vCAUSE    PP
                      /    \
                    DP      P'
                  a conch  /  \
                          P    PP
                        PLOC  to Matilde
```

    b.   DO-dative (adapted from Harley's (3b))

```
                vP
              /    \
        Spec VP     v'
                  /    \
              vCAUSE    PP
                      /    \
                    DP      P'
                  Matilde  /  \
                          P    DP
                        PHAVE a conch
```
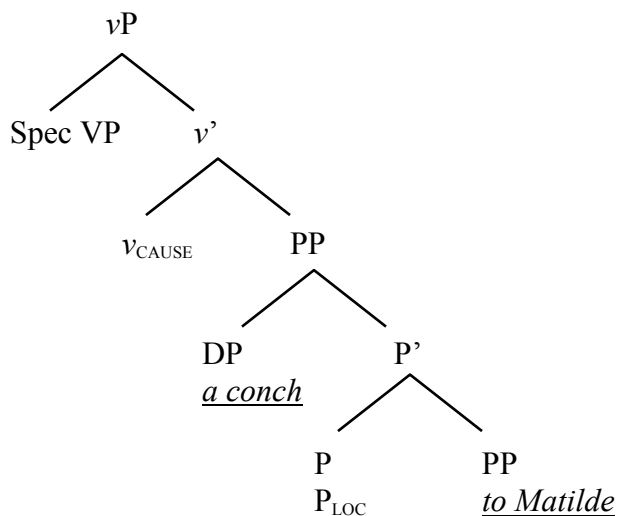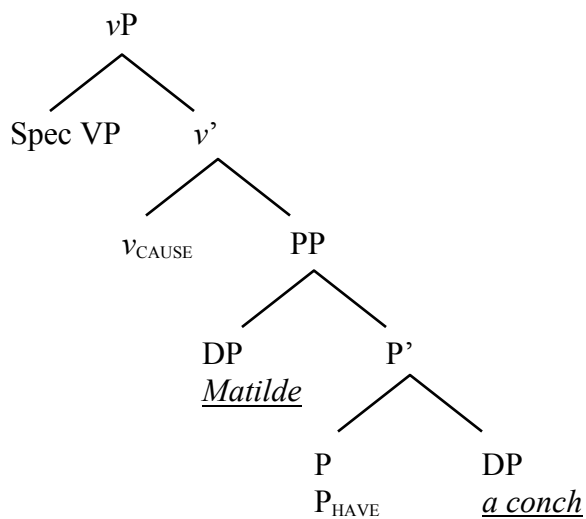
As in the polysemy-friendly work of Marantz (1993) discussed above, and to some extent that of

Pesetsky (1995), Harley's analysis breaks down the lexical semantics of DO-datives in the

syntax and thereby captures the c-command asymmetries and Green/Oehrle-style semantic

distinctions outlined in Section 1.1.2. The two abstract prepositions, P_{HAVE} and P_{LOC}, project

different structures containing two arguments in the appropriate hierarchical relations. These

structures are interpreted differently. By establishing a more or less 1:1 mapping between

syntactic position and semantic interpretation, Harley eliminates the need for rules linking

arguments to lexical semantic structures that are common in work such as Larson's (1988) done

within the Monosemy approach. As alluded to earlier, Harley's account must then be reconciled

with exceptions to the transparent mapping from syntax to semantics that she posits, but all

potential problems appear to be surmountable. In Chapter 4 I return to this issue.

Note that both prepositional datives and DO-datives are causatives on Harley's analysis.

Though it is not crucial to the discussion, this is as good a place as any to point out that Harley

differs slightly from others in her use of the functional projection vP. In her analysis, v (read as

"little v") is present for both causative and non-causative verbs. For causatives like those being

discussed in this proposal, in which a causing event brings about a resulting state, Harley's v_{CAUSE}

is identical to the light verb that licenses an external argument in its specifier as the agent or

causer of the event in other accounts (Hale & Keyser 1993, Chomsky 1995, Kratzer 1996, Lidz

1998). For noncausatives, Harley posits two other flavors of v, v_{BE} and v_{BECOME}, that do not license

agents, whereas elsewhere it is sometimes argued that vP is simply absent for noncausatives.

In addition to identifying G with P_{HAVE}, Harley's analysis also expands on Pesetsky's in

its adoption of a decompositional approach. Briefly, her two null prepositions must raise and

adjoin to the v head that selects them, in this case v_{CAUSE}.[30] There, the complex head is spelled out

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[30] For the moment, I will abstract away from any possible differences between these and the semantic primitives CAUSE, BE, and BECOME discussed in other work. Harley, herself, occasionally conflates the two (e.g. p. 62). I will also ignore differences between Harley's analysis and others in which the inventory of v-types is different, e.g. Folli

as a particular verb form. Harley's way of solving the problem of how to pronounce such combinations of primitive morphosyntactic predicates relies on a non-Lexicalist view of syntactic atoms (e.g. McCawley 1968), whereby morphemes are built into words in the syntax rather than in an autonomous and pre-syntactic lexicon. In addition, Harley adopts a particular theory of late lexical insertion, Distributed Morphology (Halle & Marantz 1993, 1994, Harley & Noyer 1999, Marantz 1997). In this theory, the input to syntax consists of items in the "narrow lexicon"—essentially morphosyntactic features and other primitive building blocks such as P_{HAVE}, P_{LOC}, v_{CAUSE}, etc.—that are merged and moved according to standard Minimalist principles. The output of syntax is a map of hierarchically represented terminal nodes that are ultimately pronounced based on correspondences between grammatical and phonological features listed in the "Vocabulary" and special meanings for particular roots relative to their syntactic context listed in the "Encyclopedia." For example, alternating dative verbs will form a class based on their having two sets of possible environments for insertion listed in their Vocabulary entries: either at P_{LOC} immediately c-commanded by v_{CAUSE} or at P_{HAVE} immediately c-commanded by v_{CAUSE}. Anything inserted at P_{HAVE} must involve what Harley calls the "change-of-possession" property. Alternating dative verbs must also be associated with Encyclopedic knowledge entailing that their meaning is compatible with the semantic contributions of primitive combinations like CAUSE+HAVE and CAUSE+LOC.

The particular decomposition for dative verbs that Harley argues for—CAUSE+HAVE in DO-datives and CAUSE+LOC in prepositional datives—is adopted in other research. For instance, Beck & Johnson (2004) follow von Stechow (1995) in using the different readings that *again*

& Harley (2002)'s v_{DO}, v_{CAUS}, and v_{BECOME} and Cuervo (2003)'s v_{DO}, v_{GO}, and v_{BE}. Invariably, these approaches all make the same crucial distinctions between dynamic/agentive and stative/non-agentive events.

gives rise to as a probe into the composition of complex predicates. They conclude that DO-datives contain HAVE in their syntactic decomposition, while prepositional datives do not and are not transformationally related. Based on data from idiomatic constituency, Richards (2001) confirms Harley's decomposition.[31] Furthermore, Jung & Miyagawa (2004) assume it in arguing that CAUSE is present in dative verbs based on Korean data.

For these reasons, among others, and based on supporting evidence from language acquisition to be presented in Chapters 2 and 3, I will assume Harley's analysis. Implicit in this analysis are two main representational claims: (a) that the first internal argument asymmetrically c-commands the second in both dative constructions; and (b) that the locus of constructional meaning differences for datives can be traced to the influence of a null preposition encoding possession for DO-datives, P_{HAVE}, and a different null preposition encoding location for prepositional datives, P_{LOC}. Chapter 2 tests the first claim, and Chapter 3 tests the second. Broadly speaking, however, I am more committed to the family of similar accounts under which the representation of argument structure is syntactic in nature than to any particular previous account. The possibility space for representing dative verbs that I lay out should thus be understood as limited by three generalizations: (i) Decomposition of verbs and their arguments is represented in syntax; (ii) Semantic relations between verbs and their arguments are derived from their structural relations to each other; and (iii) DO-datives involve a possessive structural relation, HAVE.

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[31] But cf. Rappaport Hovav and Levin (2006) for a reexamination of the argument from idioms.

1.4 The acquisition of dative verbs

In the vast literature on the acquisition of dative verbs, nearly all work has focused on solving a learnability problem referred to as Baker's Paradox (Baker 1979). The problem is this: Children hear many verbs like *give* and *tell* that alternate between prepositional dative and DO-dative argument structures. Children probably also hear verbs like *whisper* and *wash* that only appear in one of those structures, in this case the prepositional dative. Children like generalizations, and it is only natural for them to assume that *whisper* and *wash* alternate like *give* and *tell* do, leading to ungrammatical utterances like *whisper Sophie the secret* and *wash Kathy the car*. Given that children are not taught the dative alternation explicitly, and further that they are not systematically corrected or miscomprehended when they speak ungrammatically, how is it that they manage to avoid or unlearn such mistakes? I will not attempt to improve on existing solutions to this problem, e.g. Pinker's (1989) criteria-governed productivity hypothesis (see Section 1.4.2), which I believe can be made compatible with a neoconstructional account.

Curiously, however, very little attention has been devoted to another major problem, that of establishing what representations children actually have for dative verbs and how and when they learn them. The research described in Chapters 2 and 3 is designed to help fill this specific gap. Nevertheless, it will be productive to survey what literature exists on this topic with the twin goals of learning what we can say with confidence about children's early use and knowledge of dative verbs and of better framing any learnability issues. The Harley-style theory of dative argument structure that I have adopted seems to require extensive knowledge on the part of the child learner about hierarchical syntactic representations and unpronounced structure encoding

location and possession. Thus, particular attention will be paid to studies addressing children's

knowledge (or lack thereof) in these domains.

1.4.1 Early work

Some of the earliest work on the acquisition of datives in English was done in the 1970s and

early 1980s and showed, for instance, that preschool children had more difficulty comprehending

and imitating DO-datives than prepositional datives. As Gropen et al. (1989) and Snyder &

Stromswold (1997) point out, such findings led to the widespread (and erroneous, as now seems

clear) belief that the prepositional dative is acquired before the DO-dative. In these

comprehension and imitation studies, children were typically asked to act out and imitate DO-

datives and prepositional datives with full NPs for direct and indirect objects, resulting in datives

which may have been difficult to process for reasons independent of grammar. Osgood & Zehler

(1981) is a typical example (see also Cook 1976, Fischer 1971, Roeper et al. 1981, Wilson et al.

1981).

Osgood & Zehler tested three-to-five-year-olds on their comprehension and production of

dative verbs expressing four different prototypicality levels with four different levels of

complexity. They treated one human transferring an inanimate object to another human as the

most prototypical transfer event (*brother gives block to sister/gives sister block*), and one non-

human transferring an animate object to another non-human as the least prototypical transfer

event (*tiger gives puppy to cat/gives cat puppy*). At test, children were given a comprehension

task followed by a production task. The comprehension task involved asking children to act out

with dolls and toys the sentences that researchers read. The production task involved the

researchers acting out sentences written on cards and asking the children to guess what the cards must have said.

Results from their study indicated that children preferred prepositional datives in their productions in general. Interestingly, children produced prepositional datives with more accuracy than they understood them, while they understood DO-datives with more accuracy than they produced them. The highest scores for production of DO-datives came in the most prototypical transfer situation. Osgood & Zehler claimed to show that use of prepositional datives preceded use of DO-datives based on these results, but it is unclear what measure of acquisition they relied on. They report that children would frequently interpret a DO-dative incorrectly as a prepositional dative. For instance, on hearing *the mother gave the boy the baby*, a given child would act out the mother giving the boy to the baby. Likewise, they reported several instances of the same thing happening on the production task. Osgood & Zehler attributed the pattern to a cognitive link between the commonly observed act of giving and the object being given, a linkage which finds its linguistic expression earliest and most naturally in the prepositional dative. They hypothesized that children try out more sophisticated forms like DO-datives only after initial success with the prepositional dative.

1.4.2 Resolving Baker's paradox

In contrast, later work strongly suggests that DO-datives are not more difficult than prepositional datives. Gropen et al. (1989) is a landmark study and builds on much of this previous research (by Mazurkewich 1984, Pinker 1984, Mazurkewich & White 1984, and White 1987). Gropen et al. (1989) aimed to resolve Baker's learnability paradox for datives by providing evidence on

three critical issues, phrased here as questions. First, to what extent do children generalize verbs to DO-dative structure? Second, are the constraints (semantic and morphophonological) proposed to exist on the dativizability of verbs in the adult lexicon psychologically real? Third, do children come to respect constraints on dativizability and, if so, which ones and when? Gropen et al. used two converging sources of data to answer these questions: a corpus study using the Child Language Data Exchange System (CHILDES) database (MacWhinney 2000), and three experiments testing whether children and adults would generalize novel verbs presented in one dative construction to the other dative construction, where the semantics and morphophonology of dative verbs were varied as needed.

To begin with, the authors analyzed the CHILDES transcripts of five children and their caregivers. Searches were performed using 'grep' commands in a Unix program, and context was used for disambiguation when necessary, i.e. to distinguish DO-datives from possessive forms in which the possessive marker may have been omitted, as in *Get Daddy shoe*. An utterance was counted as a DO-dative if it contained a verb followed by two noun phrases, and as a prepositional dative if it included a verb, followed by a noun phrase, followed by a prepositional phrase headed by *to* or *for*. That said, a number of prepositional datives that fit this schema but belonged to different grammatical constructions were excluded. Results indicated that, contrary to findings like those in Osgood & Zehler (1981), neither version of the dative consistently emerged first.

Concerning productivity and overgeneralization, four of the five children uttered DO-datives containing verbs that they most likely could not have heard in that frame in the input. A few examples are repeated below:

(50)   a.   So don't please...keep me a favor (asking brother not to throw up) (Mark 3;8)

        b.   Jay said me no (Ross 2;8)

        c.   You finished me lots of rings (Adam 4;11)

        d.   You ate me my cracker (Ross 3;3)

(50a) could be a lexical substitution of *keep* for *do* in the idiom *do me a favor*. The verb *say* in (50b) is similar to other verbs of communication that do appear as DO-datives. (50c) is a benefactive that would normally take *for* in the prepositional dative. (50d) shows a malefactive relation in which the indirect object loses rather than gains possession of the direct object as a result of the action. Recall that such verbs appear as DO-datives in Mandarin. Though it is impossible to say with certainty whether the children used a dative rule to derive these sentences from prepositional forms, Gropen et al. pointed out that their errors with DO-datives were strongly constrained. There could have been many more types of errors and overgeneralizations. In fact, Gropen et al. observed that the vast majority of children's DO-datives were conservative, grammatical usages with a few common verbs also used in DO-datives by their parents. The onset of errors like in (50) invariably followed grammatical usages of one or both kinds of dative forms. No child used any verbs with Latinate prosodic properties, which Gropen et al. attributed to the rarity of Latinate forms, typically less basic and lower in frequency, in parents' speech. The researchers interpreted the results of Study 1 as evidence against the strictest form of a conservative, lexicalist hypothesis on the acquisition of dative verbs.

      Gropen et al.'s Experiment 1 tested whether the hypothesized semantic (prospective possession) and morphophonological (monosyllabicity) constraints are psychologically real for adults. Native speakers of English were given a questionnaire containing short paragraphs with

novel verbs used in prepositional dative sentences, i.e. *John pelled the disc to Brian*. Three

factors were varied across the novel verbs: whether they were mono- or polysyllabic, whether

they specified a change of possession or transportation or benefaction, and whether they used the

preposition *to* or *for*. Following each paragraph, subjects were asked to rate the acceptability of

different sentences, including DO-datives, using the novel verbs. The results indicated that

subjects judged DO-datives as being more acceptable if they involved possession, and, for one

verb, that subjects judged DO-datives with monosyllabic verbs as being more acceptable than

with polysyllabic verbs. Gropen et al. concluded that the semantic and morphophonological

constraints on dativization are thus psychologically real for adults. In their view, this established

a necessary precondition for the hypothesis that adults use these criteria to make decisions about

whether to use novel verbs in DOCs, thereby avoiding overgeneration to the extent that the

criteria reflect the real distribution of dativizable verbs in English.

Their Experiments 2 and 3 tested the status of these constraints for children. In

Experiment 2, Gropen et al. attempted to elicit DO-dative tokens of four novel verbs from

children (mean age 7;4). The novel verb stems were varied for syllabicity, (*moop*, *keat*, *orgulate*,

and *calimode)*. Testing consisted of a teaching phase in which each child was introduced to the

toys and a novel verb, followed by an elicited production task involving that verb. Teaching

consisted of the experimenter uttering the appropriate DO-dative or prepositional dative (*'I'm

mooping the mouse a ball'*) while performing the corresponding action. To elicit DO-datives, the

experimenter first performed an action while asking about the recipient and then repeated this

kind of action and question with a different transferred object (*'Can you tell me what I'm doing

with the mouse?'*). To elicit prepositional datives, the experimenter did the same procedure while

asking about the transferred object and then repeated this kind of question with a different action and transferred object (*'Here's a ball...can you tell me what I'm doing with the ball?'*). After the production phase, the experimenter administered a comprehension task in which the child was asked to act out both DO-datives and prepositional datives. Throughout the teaching and production phases, the experimenter attempted to prime DO-datives by modeling the construction with *pass* and giving feedback using DO-datives. Children were even asked questions like 'Do you remember the other way of saying that?' Responses to these follow-up questions were not counted as data, but rather were intended to encourage the production of DO-datives in subsequent questions.

Results indicated success in eliciting DO-datives. Children produced novel verbs in the DO-dative frame 50% of the time when the novel verbs had been taught in that construction, and 44% of the time when the novel verbs had been taught in the prepositional dative. Children also showed sensitivity to the morphophonological constraint by producing novel verbs in the DO-dative frame 54.7 % of the time for monosyllabic verbs and 39.1% of the time for polysyllabic verbs in response to goal-topic questions. Overall, Gropen et al. interpreted Experiment 2 as evidence for children's productivity in their use of DO-datives by virtue of respecting, to some extent, constraints on the permissible bounds of productive extension in English—all this against a background of relative conservatism, whereby children preferred to use argument structures that they had heard a verb used in.

In Experiment 3, Gropen et al. tried to observe children using DO-datives in more natural circumstances. They did, however, call attention to the DO-dative construction in several ways: by avoiding the prepositional dative altogether in the teaching phase, by focusing the

recipient/goal in a more salient way using a single toy or using the child as the recipient, and by having the child imitate DO-datives with existing verbs repeatedly before the production phase. Children were also primed with a distractor form to ensure that any success they showed on tasks was not due to some kind of metalinguistic game-playing strategy. The prediction was that, given equal access to both primed forms, children should be influenced by the DO-dative primes but not by the distractor primes in describing events about transfer of possession. The same four novel verbs from Experiment 2 were used for two groups of children (mean ages 6;11 and 8;3). Each child was taught and asked to produce each of the four novel verbs. The novel verbs themselves were modeled using a syntactically neutral gerund form (*'This is norping'*). Production was elicited with sentences like '*Can you tell me, using the word "norp," what I'm doing with you?*' Results again indicated success in eliciting DO-datives in general. Children produced unmodeled DO-datives with novel verbs in response to 41% of questions, with 75% of children producing at least one DO-dative. In contrast, only 12% of children produced the distractor form with novel verbs, and they did so in response to only 4% of questions. Children were significantly more likely to produce DO-datives if the recipient was a prospective possessor than if it was an inanimate location, with the highest rate of DO-dative responses occurring when the child was the recipient, followed by when toy animals were recipients.

Summing up, Gropen et al. concluded on the basis of their results that strict, lexical conservatism is false, but a weaker version of conservatism is true. Criteria-governed productivity was argued to be consistent with the data in a general way. Gropen et al. proposed that children infer (partly based on regularities in the input) a broad-range dative rule converting the semantic structure for the prepositional dative, 'X causes Y to go to Z,' to the semantic

structure for the DO-dative, 'X causes Z to have Y.' Syntax for the two constructions is assumed to fall out from the application of universal linking rules. Thus, Gropen et al. posited different thematic relations for DO- and prepositional datives. The broad-range rule is thought of as establishing the necessary condition on verbs to which it applies, namely that they be cognitively compatible with causation of change of possession. However, this is not a sufficient condition, as verbs exist which could be compatible with causation of possession change but do not in fact appear in DO-datives, i.e. *say* vs. *tell*. Accordingly, Gropen et al. proposed that children also must learn narrow-range rules, each of which incorporates some version of the semantic operation in the broad-range rule but applies only to narrow sets of verbs with similar kinds of meanings. These narrow-range rules are said to be conventionalized structures varying from language to language and dialect to dialect which tell a speaker what kinds of events, among those events potentially cognitively compatible with possession change, are licensed to be construed in that way for application of the broad-range rule. Gropen et al. presented cursory evidence that these narrow-range rules are not completely arbitrary on cognitive grounds. Children are hypothesized to construct narrow-range rules applying to verbs that are semantically and morphophonologically similar to those which have been heard to alternate.

Interestingly, Chung & Gordon (1998) provide some support for this account—specifically for the broad-range/narrow-range rule distinction—based on the results of a forced-choice grammaticality judgment test administered to Mandarin-speaking Taiwanese children (from four to eight years old). Children's acquisition of dative constructions in Mandarin was argued to be guided by a set of narrow-range rules highly similar to those described by Gropen et al. for English that define semantic subclasses of verbs permitted to alternate.

Other notable work in acquisition related to Baker's Paradox can be found in the work of Melissa Bowerman (Bowerman 1988, 1990), who makes extensive use of diary data. In addition, Kim, Landau & Phillips (1999) studied children's acquisition of locative verbs in English and Korean. They used an elicited production task (describing videotaped events) to test children's knowledge of non-alternating verbs like *pour* and *fill* and found that across both languages children's errors were systematic and extremely restricted.

1.4.3 Representational issues

Turning now to data from acquisition that directly or indirectly address the nature of children's syntactic representations for dative verbs, a good starting point is the corpus study in Snyder & Stromswold 1997. Snyder & Stromswold argue that English datives, verb-particle constructions, *put*-locatives, and causative/perceptual constructions belong to a single syntactic class whose acquisition depends on two parametric properties. The first property allows the grammar to generate DO-datives, causative/perceptual constructions, *put*-locatives, and V-NP-Particle constructions, while the second (when combined with the first) allows the grammar to generate V-Particle-NP constructions and prepositional datives. Examples of these are given below in (51) and (52):[32]

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[32] See Snyder (2001), p. 325.

(51) a.   Alice sent Sue the letter   (DOC)   Parametric property A

      b.   Fred made Jeff leave   (make-causative)

      c.   Fred saw Jeff leave   (perceptual report)

      d.   Bob put the book on the table   (*put*-locative)

      e.   Mary picked the book up   (V-NP-Particle)

(52) a.   Mary picked up the book   (V-Particle-NP)   Parametric property B

      b.   Alice sent the letter to Sue   (*to*-dative)

The evidence for Snyder and Stromswold's parametric account comes from an analysis of

transcripts for 12 children and their caregivers in the CHILDES database.[33] Like Gropen et al.,

their measure of acquisition for a given construction was first clear use. Results indicated a

statistically significant correlation between the ages of acquisition for DO- and prepositional

datives, and also a statistically strong ordering effect whereby the acquisition of DO-datives

preceded the acquisition of prepositional datives by a few months. The ordering effect is

consistent with the proposal that the language-specific grammatical knowledge required to

produce DO-datives is a proper subset of that required to produce prepositional datives.[34]

Similarly, ages of acquisition for the other relevant constructions were found to cluster as shown

in (51-52). Snyder and Stromswold ruled out relative frequency as being somehow responsible

for the ordering effect due to the lack of correlation between the frequency of prepositional

datives in adult speech and the ages of acquisition for either dative construction by the children.

One might ask what the nature of properties A and B is exactly. What do the

constructions they link have in common? Snyder and Stromswold make a case that property A is

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[33] cf. Gropen et al., who examined transcripts for five children.
[34] See Campbell & Tomasello's (2001) corpus study for more or less the same finding but a very different interpretation privileging verb-specific frequency and salience over syntax.

a parametric property somehow responsible for complex predicate or small clause constructions in English, and that property B may pertain to the ability of a verb to head-govern the head of its complement.[35] The researchers are not married to any one specific characterization of either property.

Snyder (2001), another corpus study, is an attempt to flesh out the nature of what Snyder and Stromswold (97) called property A, that which all the constructions in (47-48) have in common. Snyder groups resultative constructions such as *hammer the metal flat* together with the others and proposes that all of these complex predicates depend on productive endocentric root compounding at some abstract level of grammatical representation (in the syntax), whether or not their surface forms exhibit the morphological characteristics of a compound in a given language.[36] An example of root compounding is the process by which *frog* and *man* can come together to form *frogman* in English, which may designate a man who likes frogs, who resembles a frog, who collects frogs, etc. In French, hypothesized not to have productive root compounding, *un homme grenouille* (*man frog*) is restricted to its original, lexical sense of 'underwater diver.' *Homme grenouille* is deliberately coined rather than derived syntactically. Two empirical predictions follow from Snyder's proposal. First, across languages, the availability of complex predicates should pattern closely with the availability of productive root compounding (i.e. N-N compounding as in *frog man*). Second, in children acquiring English, the

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[35] A related finding of theirs that acquisition of triadic *to*-datives was best predicted by acquisition of dyadic *to*-datives led Snyder & Stromswold to suspect that something to do with the Case- and/or theta-assigning properties of the preposition *to* is at issue here (and possibly responsible for the late acquisition of the construction relative to DOCs). See pp. 299-300.

[36] In Beck and Snyder (2001), the class of complex predicates is expanded to include accomplishment predicates constructed out of an activity verb and a goal PP headed by *to*. Acquisitional evidence suggests that the English type of goal-PP construction appears to depend on productive compounding plus the availability of a principle of semantic composition for elements of a complex word. This is taken as evidence for a semantic parameter.

age at which complex predicates are first used productively should correspond to the age at which novel root compounds are first used.

The first prediction was confirmed by a crosslinguistic survey which included representatives from a substantial range of language groups, including ASL, Khmer, Thai, Basque, Lingala, Spanish, and Russian.[37] Native-speaking informants were used rather than reference grammars, and the existence of resultatives in a given language was taken as evidence for the availability of complex predicates in general in that language. Results showed that resultatives were found only in languages with productive N-N compounding, but that the availability of such compounding was not always a sufficient condition for the availability of resultatives. Basque is the lone example in this survey of a language with productive N-N compounding but no resultatives. The second prediction was confirmed by an analysis of 10 children's transcripts from the CHILDES database. The 10 children were a subset of the 12 children whose transcripts were examined in Snyder & Stromswold (1997). As his diagnostic for productive root compounding, Snyder used first clear use of a novel N-N compound, meaning the compound could not be lexicalized (e.g. *toothbrush*, *apple juice*), and there had to be contextual evidence that the compound was invented on the spot. Control measures were also obtained for the age at which children's MLU first reached or exceeded 2.5 words, the age of first clear use of a lexical N-N compound, and the age of first clear use of an adjective-noun combination like *big dog*. Snyder found that ages of acquisition of novel N-N compounding and most complex predicates were extremely similar. However, when the contribution of the control measures was subtracted out by partial regression, the correlation between DO-datives and

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[37] Of note: Spanish is a possible exception to this first prediction, having a DO-dative construction (as argued by Bleam 2003, Cuervo 2003) but lacking productive root compounding.

compounding lost its statistical significance. Snyder concluded that DO-datives are thus a possible exception to his parametric proposal. Either DO-datives do not depend on the availability of productive root compounding or they may depend on compounding in addition to some other property. Snyder favored the latter explanation.

Apparently the sole behavioral study testing the hierarchical nature of children's representations of dative verbs is Su (2001)'s unpublished dissertation on scope freezing. The bulk of the dissertation was devoted to explaining the finding that English-speaking four-year-olds demonstrate non-adult-like interpretations of DO-dative sentences like (49a) and prepositional dative sentences like (49b) in a Truth Value Judgment task (Crain & McKee 1985, Crain & Thornton 1998). Recall from Section 2 that DO-datives such as (53a) have been argued to be restricted to the surface scope interpretation for adults, while prepositional datives such as (53b) have been argued to be ambiguous between surface scope and inverse scope interpretations.

(53)   a.   Snow White gave a lady every flower

       b.   The teacher gave every ball to a girl

While interesting, the non-adult-like behavior that Su observed for these sentences may be at least in part an artifact of experimental design, and in any case the exact structural implications of scope freezing are still not agreed upon. More relevant to the present research is Su's related finding that English-speaking children showed evidence of having hierarchical representations for dative verbs. Their interpretation of sentences like those in (54) was adult-like in the sense that *his* was judged to co-refer with the Goal (in brackets) more often in (54a) where *his* is preceded by the Goal.

(54) a. The witch threw [the Pooh]$_x$ his$_x$ chair

  b. ? The smurf brought his$_x$ brother [Tigger]$_x$

Su's argument here is tantalizing but ultimately unconvincing for several reasons, the most important being that (54b) is not actually ungrammatical on the interpretation where *his* and *Tigger* corefer.[38] In addition, Su failed to test prepositional datives at all. My experiments in Chapter 2 correct these deficiencies.

The abstract nature of children's representations of dative verbs in general (apart from the specific issue of whether or not dative verbs phrases are hierarchically structured) is somewhat more established. For instance, in a series of studies examining children's online interpretation of dative sentences with temporary argument structure ambiguities, Thothathiri & Snedeker (2007) found evidence of syntactic priming in three- and four-year-olds. The priming effect was observed when the same dative verb was used in different sentences, and also when different verbs were used. The across-verb priming results in particular demonstrate that children as young as 3 years have and use abstract representations during the comprehension of sentences with familiar dative verbs. In addition, Conwell & Demuth (2007) found that three-year-old children show evidence of having abstract and productive knowledge of the dative alternation in their elicited production of novel dative verbs.

1.4.4 Possession, spatial motion, and conceptual abilities

Finally, moving away somewhat from the psycholinguistic literature, the neoconstructional account that I have adopted depends on children having certain conceptual abilities related to the

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[38] Su appears to argue that sentences like (54b) are Principle C violations and thus ungrammatical. However, Principle C—which requires referring expressions such as *Tigger* to be free—is not violated in (54b). *His* does not c-command *Tigger*.

domains of possession and spatial motion in particular and to argument structure in general. What do we know in these areas?

Concerning overlap in the possessional and spatial fields, several researchers have argued that children first analyze possession as a localized possession relation like "proximity" (Howe 1976, Slobin 1985, Barker 1995). Such arguments are based on (a) reported child errors in which locative prepositions are used inappropriately to express possession (e.g. lit. "the grandma *to* the monkey" with the intended meaning 'the monkey's grandma' in German) and (b) observations of simultaneous emergence of a preposition used to communicate possession and location in languages which provide a single marker for both (e.g. lit. "Nini *to* mouth" meaning 'in Nini's mouth' alongside "chair *to* Pierre" meaning 'Pierre's chair' in French).

As far as anyone can tell, children's early knowledge of spatial motion is extensive. Studies have shown that infants recognize connections between beginnings and endings of events in the sense that they can interpret events as goal-directed (e.g. Woodward 1998) or composed of causally-related subevents (e.g. Leslie 1984). Wagner & Carey (2005) provide evidence that 12-month-olds do not represent all motion events similarly; rather, 12-month-olds are surprised to see a chasing event involving animated balls end without one ball being caught by the other, whereas they register no surprise at such an ending following a non-chasing event.

Given these conceptual foundations, it is perhaps not surprising that linguistic expressions of paths involving spatial Goals emerge early, as has been widely reported (e.g. Choi & Bowerman 1991). Why then should the same sorts of paths in transfer events described by dative verbs—for instance, Goal phrases like *to Derek* in prepositional datives—emerge relatively late? Recall that DO-datives are acquired significantly earlier than prepositional

datives. This apparent paradox seems even more urgent in light of prominent accounts (e.g. Mandler 1992, Jackendoff 1992) positing that spatial relationships may serve as the conceptual template for more abstract possessional relationships. If anything, since DO-datives are acquired significantly earlier than prepositional datives in English, it seems that the connection between possession and datives is easier for children to make than that between location and datives—a mystery that overarches this dissertation and awaits clarification. One possible explanation is that the delayed acquisition of prepositional datives should be attributed to difficulties in the mapping between conceptual knowledge about bounded paths for transfer events and the linguistic expression of this knowledge—something which may plausibly fall out from crosslinguistic variation in this mapping combined with the ambiguity of *to*, which is both directional and dative in many languages, including English. Another possibility is that children preferentially attend to animate Goals that can be construed as possessors (e.g. the Goals in DO-datives) in their encoding of possession transfer events, and that this preference drives their acquisition of possessive and locative linguistic expressions. An important line of research bears directly on this second possibility, as described below.

There is widespread agreement in the literature that children and adults are predisposed in terms of event representation to attend preferentially to spatial Goals over Sources across a wide range of events, tasks, languages, and populations (see Lakusta 2005 for a review). With respect to language, data illustrating this "Goal bias" has been discussed by, for example, Ihara & Fujita (2000) and Nam (2004). Empirically, Regier's computational work (1996, 1997) is notable for, among other reasons, its support of the idea that a Goal bias exists and is useful for learning the meanings of spatial terms. Furthermore, Lakusta & Landau (2005) demonstrate that normal

adults, children aged three to six, and children with Williams syndrome all tend to encode Goals over Sources as measured by their descriptions of several different videotaped events, including possession transfer events (see also Zheng & Goldin-Meadow 2002). For example, subjects tended to describe an event in which a man gave flowers to a woman by saying *The man gave flowers to the woman* with a Goal-biased verb and a Goal path, as opposed to saying *The woman received flowers* with a Source-biased verb or *The woman received flowers from the man* with both a Source-biased verb and a Source Path. Turning to non-linguistic tasks, Lakusta (2005) argues that 12-month-olds show the same sort of Goal bias in their encoding of motion events (as measured by looking time), as do four-year-olds and adults (as measured by their ability to detect Goal- and Source-related changes in videotaped events). Concerning the latter finding, it is intriguing that intentionality seems to play a role in the Goal bias, which disappears when animate figures look toward a Source while moving from Source to Goal and also when inanimate figure objects move from Source to Goal (Lakusta 2005) in the absence of an intentional, animate actor.

If children are indeed biased from the start to attend preferentially to Goals, then they are attending to exactly the right thing with respect to figuring out the dative alternation, namely how Goals differ in DO datives as compared to in prepositional datives. DO-dative Goals are generally animate, forming a subset of possible Goals available to prepositional datives in just the same way that possessors form a subset of possible endpoints or locations in transfer events. A Goal bias would seemingly be of immense help to the child learning dative structures in English, if only because it could facilitate the child's decision as to which dative construction encodes possession.

Finally, and more generally, Gordon (2003) presents some suggestive findings bearing on the conceptual underpinnings of verb-argument structure. Using a looking-time habituation paradigm, Gordon showed that 10-month-olds distinguish between elements in an event that are relevant to event structure (the transferred object in a giving event) from those that are irrelevant (the same object in a hugging event). He suggests that this prelinguistic ability puts infants in the driver's seat, so to speak, in terms of acquiring verb-argument structure as soon as language learning begins in earnest. A number of potential confounds are tested and ruled out. Interestingly, six-month-olds do not make the same distinctions on this task, indicating that for them the idea of possession transfer is not conceptually salient. Even 10-month-olds fail to dishabituate where they had before if the transfer event is more abstract, as in a showing event. These results hint at the complexity of the mapping between word to world and suggest caution is necessary in attributing to children fully adult-like abilities vis-à-vis making sense of argument structure early on. Nevertheless, it is encouraging to note that children make fine distinctions in interpreting transfer events a full year before they utter their first dative verbs.

1.4.5 Summary

Two points stand out after having completed a review of the literature concerning the acquisition of datives. First, it is clear that children have abstract knowledge about datives and are willing to use it, occasionally overgeneralizing and showing that strict lexical conservatism cannot be true. However, we know very little about how exactly children's abstract knowledge is represented despite a great deal of careful work. Second, children are conceptually well prepared to learn about datives. Nevertheless, it is unclear how children would use their considerable abilities to

come into possession of whatever dative representations they have. For the rest of the dissertation, I will concentrate on chipping away at the uncertainty implicit in these two points. Chapters 2 and 3 add new dimensions to our understanding of children's syntactic and semantic representations for datives, and Chapter 4 addresses issues of learnability, weighing the roles of innate knowledge and the input in children's acquisition of datives.

1.5 The road ahead

With the foundations properly lain for a deeper understanding of dative verbs, I turn now to a short preview of what follows. As mentioned previously, the Harley-style syntactic account that I have adopted depends on children having hierarchical syntactic representations containing unpronounced structure encoding location and possession. In Chapter 2, I present evidence that the youngest children tested, four-year-olds, do indeed have such hierarchical representations within the dative verb phrase. The data come from comprehension studies focusing on Principle C and quantifier-variable binding in English and quantifier-variable binding in Kannada. The Kannada data in particular strongly suggest that children could not have learned the argument structures that they appear to have based on generalizations over surface forms present in the input. Instead, a good deal of children's knowledge of these structures must be innately specified. In Chapter 3, I present evidence from a large-scale corpus study showing that English-speaking two-year-olds are aware of the types of possessional and spatial primitives featured in Harley's semantic decompositions for DO-datives and prepositional datives, respectively, in their earliest productions. The argument is based on correlations with children's acquisition of other linguistic expressions that have been independently shown to decompose into primitives like

CAUSE, HAVE, and GO that are shared by datives. How children might come to know what they know about dative verbs is an important issue that I will be preoccupied with mainly in Chapter 4. There I dwell on issues of learnability raised by the findings in Chapters 2 and 3. I also outline what a coherent theory of learning that explains these findings—according to which children choose from among hypotheses about dative constructional configurations and meanings as early as can be observed—would look like. Specifically, I defend a deductive learning proposal according to which dative syntactic configurations follow directly from the child's correct identification of the DO-dative as encoding the possession relation. I then contrast this proposal with inductive, usage-based alternatives and find the deductive learning proposal to be superior. Chapter 5 concludes.

CHAPTER 2: THE SYNTAX OF DITRANSITIVES

Other concepts in generative grammar as well, for example vp-shells and light verbs, represent mere speculation about linguistic competence: their existence, let alone their suitability for grammatical description, is a matter of belief rather than of linguistic evidence and descriptive plausibility.

Joybrato Mukherjee, 2005, *English Ditransitive Verbs: Aspects of Theory, Description and a Usage-based Model*, p. 25

The grammar of a language is an institution, not unlike a river. It is fed by numerous tributaries not all of which are identified by the beneficiaries downstream.

S. N. Sridhar, 1990, *Kannada*, p. xix

What do children's syntactic representations for dative verbs look like? As described in Section 1.4, this question has a simple but unsatisfying answer: We don't know. Recent studies using syntactic priming (Thothathiri & Snedeker 2007) and elicited production of novel verbs (Conwell & Demuth 2007) have shown that three- and four-year-old English-speaking children possess somewhat abstract, verb-independent knowledge about datives, e.g. along the lines of the general DO-dative schema in (51b) rather than the list of verb-specific schemas in (51a):

(55)   a.   *give* NP$_1$ NP$_2$, *show* NP$_1$ NP$_2$, *read* NP$_1$ NP$_2$ …

       b.   V NP$_1$ NP$_2$

Beyond that is more or less terra incognita. In this chapter, I hope to push back the frontier of our knowledge in this domain, establishing the configurational nature of the dative verb phrase at age four and thereby alleviating some of the healthy skepticism that exists in the literature about whether the linguistic representations that have been posited for adults and children correspond

to reality. Concerning these representations, the syntactic account of dative verb argument structure that I have adopted makes two main claims, the first of which is directly relevant: that the first object asymmetrically c-commands the second in both DO-datives and prepositional datives. Using a comprehension-based methodology, the Truth Value Judgment task, I show that the youngest children tested, four-year-old native speakers of either English or Kannada, do indeed have such hierarchical representations within the dative verb phrase based on converging evidence from Principle C (English) and Quantifier-variable binding (English and Kannada).

Who might object to our interpretation of such experimental results? I address this hypothetical question toward the end of the chapter in Section 2.5. In the meantime, I begin by discussing the method used in Experiments 1-3 and then step through the experiments one at a time. Experiment 1 probes four-year-olds' knowledge of Principle C in English. Experiment 2 addresses their knowledge of quantifier-variable binding in English, and Experiment 3 examines what Kannada-speaking four-year-olds know about quantifier-variable binding.

2.1 Methodology: The Truth Value Judgment task

The procedure used in all three experiments was the Truth Value Judgment task (TVJT) (Crain & McKee 1985, Crain & Thornton 1998). In the child version of 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.[39]

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[39] In Experiments 1 and 2, the author was the storyteller without exception, and four different experimenters were puppeteers (Cara Brown, Elisa Sneed German, Jane Solomon, and Kristen Syrett). In Experiment 3, A.S. Mahadeva played the twin roles of storyteller and puppeteer, and Jeffrey Lidz noted children's responses.

Figure 2.1: Our puppet, Suzie the Banana Slug

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 here's what I think happened*) and then described what 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 only one at a time), and they were encouraged to justify their answers. The second experimenter recorded children's responses and justifications. Children were always tested individually. In the adult version of this task, no puppet was used, and adults were occasionally tested two or three at a time. The experimenter read what the puppet would have said after each story, and adult subjects indicated their individual responses on a written response sheet.

The TVJT is particularly appropriate for assessing children's syntax. Perhaps most importantly, task demands are kept to a minimum using this method. The child must simply make a bipolar judgment about whether a statement accurately describes a particular situation—

something not too far removed from everyday experience.[40] Toys and props used to tell stories

are entertaining and reduce memory load and other performance factors by serving as reminders

of major plot elements. As long as care is taken to set up contexts after which test sentences are

natural, comprehensible, and felicitous, one can test children's understanding of rather complex

constructions and feel confident that their responses tap into grammatical knowledge. That said,

no task is perfect. In particular, response bias is a risk that one must guard against when using the

TVJT. As Peter Gordon notes in McDaniel et al. (1998), adults have been shown to respond

more quickly and accurately to true statements than to false statements (Wason 1961), and

children might be disposed to favor encoding and/or agreeing with true statements as well

despite our best efforts. In order to identify and prevent "*yes* bias," as well as the less likely but

not unattested "*no* bias," among child participants, two measures were taken. First, subjects

received brief task-related training, during which they helped the puppet learn her colors, before

the study began (Experiments 1 and 2 only). The puppet was always wrong once about color and

right once about color. Explicit correction was given whenever the child gave the wrong reward

during training or showed signs of response bias. I excluded data from subjects who could not

provide at least one *yes* and one *no* during training. Second, control stories were used to maintain

a balance of *yes* and *no* responses throughout each experimental session (Experiments 1, 2, and

3). For example, if a subject answered *yes* to a given test sentence, the puppeteer would read a

false control sentence after the following control story in an attempt to elicit a *no*, and vice versa.

I excluded data from children who missed more than one control story and/or who could not give

reliable justifications for their answers.

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[40] For example, outside the lab a parent might ask a child whether it's a good day to go to the park.

2.2 Experiment 1: Principle C in English

The purpose of this first experiment was to determine whether four-year-old children

demonstrate knowledge of a structural asymmetry observed for adults (Barss & Lasnik 1986)

involving Principle C of the Binding Theory (Chomsky 1981, 1986) in their understanding of

dative verb phrases. Binding Theory constrains the interpretation of noun phrases (e.g. anaphors

like *himself*, pronouns like *him*, and referring expressions like *John*). While there have been

various reformulations of this Binding Theory over the years, the details are not crucial; none of

the dative structures considered here are controversial with respect to the finer points of these

reformulations. Therefore, I assume the following general version of Binding Theory:

(56)　*Binding Theory*[41]

  a. Principle A: Reflexives must be locally bound.

  b. Principle B: Pronouns must be locally free.

  c. Principle C: R-expressions (referring expressions) must be free.

Crucially, on this theory, binding is defined with respect to the c-command relation:

(57)　*Binding*: *a* binds *b* if and only if *a* c-commands *b* and *a* and *b* are coindexed.

C-command, in turn, is defined as follows (repeated from footnote 6):

(58)　*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*.

A brief illustration of how Binding Theory is used to explain Principle C should suffice to drive

home the point. Consider the following contrast in coreference possibilities, where $_x$ marks

expressions that corefer:

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[41] Various formulations of the Binding Theory differ in terms of how "local" is defined. Let us assume that the local domain is the clause for the sake of concreteness, and because locality-related details are irrelevant to the analysis presented in this chapter.

(59)   a.   *He$_x$ left John$_x$.

        b.   After he$_x$ left, John$_x$ went home.

In (59a), *He* and *John* can not corefer without incurring a Principle C violation since *He* c-commands *John*:

(60)   ◯⋯ = *c-command domain of pronoun*

```
            ⟨  IP  ⟩
           /      \
       He*x        I'
                  /   \
               left    Johnx
```

In contrast, in (59b) *He* and *John* can co-refer grammatically, despite the fact that *He* precedes *John* in the linear string, because *He* does not c-command *John*. The first branching node dominating *He*, IP, does not dominate *John*, and therefore no Principle C violation is observed.

(61)   CP   ◯⋯ = *c-command domain of pronoun*

```
                        CP
                      /    \
                   PP        IP
                  /  \      /   \
             After   ⟨IP⟩ Johnx  went home
                     /  \
                  hex    left
```
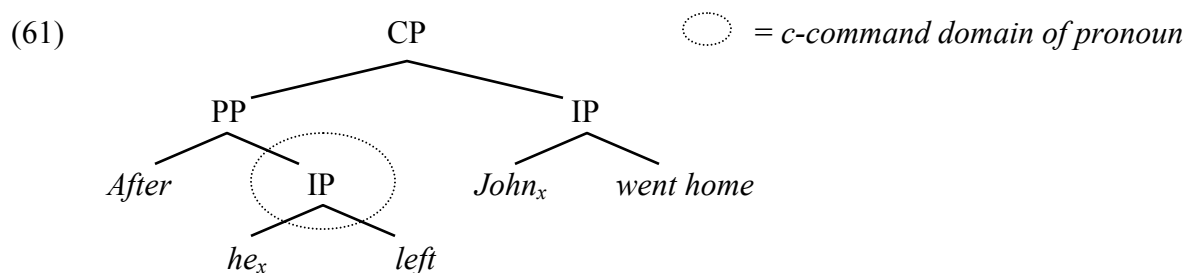
        The relevant Principle C-based asymmetry for DO-datives (62) and prepositional datives (63) is shown below:

(62)   a.   Ann gave Woody$_x$ his$_x$ horse

        b.   *Ann gave him$_x$ Woody$_x$'s horse

(63)   a.   Jeff gave the horse$_x$ to her$_x$ rider

        b.   *Jeff gave her$_x$ to the horse$_x$'s rider

Recall that the most natural and independently motivated explanation for this and other such asymmetries depends on the notion of c-command.[42] Thus, if we assume the basic correctness of Binding Theory—which is defined in terms of c-command—then we can conclude that the Principle C-based asymmetry must arise due to syntactic configurations in which the first dative object c-commands the second, but not vice versa, for both dative constructions. In other words, the relative depth of embedding of the objects determines binding possibilities. Any such configuration must have the following hierarchical property (ignoring irrelevant bits like the identity of the branching nodes):

(64)

$\bigcirc$ = *c-command domain of NP$_1$*
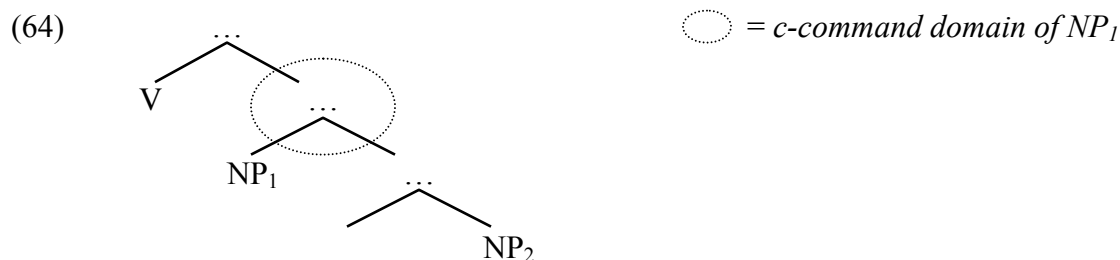
In Experiment 1, which I describe below—and in Experiments 2 and 3 as well—I test whether four-year-old children show evidence of having the adult patterns of grammaticality judgments that we hypothesize to be the result of such configurations in both DO-datives and prepositional datives. Evidence that they do is considered evidence for the configurational nature of the dative verb phrase at that age.

Bolstering this argument for Experiment 1 in particular are countless studies demonstrating that four-year-old children know about both Principle C and c-command irrespective of their knowledge of dative syntax. Principle C has been observed as early as researchers have gone looking for it, specifically from age three onward (e.g. Crain & McKee

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[42] See Section 1.1.1 for more discussion.

1985 for English, Guasti & Chierchia 1999, 2000 for Italian; see also Thornton 1990, Crain & Thornton 1998, Kazanina 2005, *inter alia*). For instance, Crain & McKee (1985) report that children as young as age three typically reject (65a) but accept (65b) just like adults:

(65) a.   *He$_x$ ate the hamburger when the smurf$_x$ was inside the fence

      b.   When he$_x$ stole the chickens, the lion$_x$ was inside the box

In fact, the evidence for children's proficiency with respect to Principle C is extremely robust, perhaps more so than that for Principle B at first glance (see, e.g., Conroy et al. 2006 and Leddon 2006 for relevant discussion). Concerning c-command, to give just one example, a strong case has been made that this fundamental relation constrains children's interpretations of scopally ambiguous sentences at age four. Lidz & Musolino (2002) show that English-speaking children strongly prefer the isomorphic interpretation of sentences like (66) in which quantifier raising has not applied and the numeral quantifier *two* is interpreted in its base position within the scope of negation (defined in terms of-command):

(66) The detective didn't find two guys

      Isomorphic interpretation: not > two, i.e. he found one

      Non-isomorphic interpretation: two > not, i.e. two specific guys he didn't find

In principle this could be due to children's knowledge of c-command or simply to their reliance on an interpretive principle emphasizing linear precedence whereby children prefer to interpret whatever scopally relevant term comes second within the scope of whatever comes first. Lidz & Musolino (2002) definitively rule out the latter, extra-grammatical possibility by demonstrating that four-year-old speakers of Kannada also prefer the isomorphic interpretation of such sentences, despite the fact that in Kannada *two* actually precedes *not* in the surface string, e.g.

literally *The detective two guys found not*. In Kannada, a verb-final language, c-command and linear precedence can be disentangled (a fact that will be very much relevant in Experiment 3). The objects of transitive verbs (e.g. *two guys*) precede but are nevertheless c-commanded by negation, and four-year-old Kannada speakers demonstrated that they are aware of this through their isomorphic interpretive preferences. But this is a story for another paper. For my purposes, it is sufficient to conclude on the basis of the available evidence that four-year-old children can plausibly be assumed to know about Principle C and c-command. I turn now to the details of Experiment 1.

2.2.1 Design

This experiment had a modified Latin Square design. Two factors varied within subjects—dative construction (DO or prep) and grammaticality of coreference (yes or no)—but were permuted with respect to the four test verbs between subjects. Simply put, each subject was presented with grammatical and ungrammatical test sentences in both DO-dative and prepositional dative frames, but no subject heard a given dative verb more than once. An additional factor was age, with children compared to adults. Subjects were randomly assigned to one of four experimental conditions; each judged four test sentences and three control sentences in pseudorandom order. Sentence order was counterbalanced across subjects. The above aspects of the experimental design are summarized in Table 2.1 below.

Table 2.1: Conditions for Experiment 1

Condition A	Condition A2	Condition B	Condition B2
Control 1	Control 1	Control 1	Control 1
give—DO—yes	*kick*—DO—yes	*give*—DO—no	*kick*—DO—no
read—prep—no	*bring*—prep—no	*read*—prep—yes	*bring*—prep—yes
Control 2	Control 2	Control 2	Control 2
bring—DO—no	*read*—DO—no	*bring*—DO—yes	*read*—DO—yes
Control 3	Control 3	Control 3	Control 3
kick—prep—yes	*give*—prep—yes	*kick*—prep—no	*give*—prep—no

For clarity, an experimental subject assigned to Condition A would first be presented with Control 1 and then with the *give*-DO-yes test item, the test sentence for which is *Ann gave Woody$_x$ his$_x$ horse*, and so on. The *give*-DO-yes test sentence features the verb *give* in the DO-dative frame with grammatical coreference between the pronoun *his* and the referring expression *Woody*. In contrast, a different subject in Condition B would judge the *give*-DO-no test item, the test sentence for which is **Ann gave him$_x$ Woody$_x$'s horse*. This sentence again features the verb *give* in the DO-dative frame, but this time coreference between the pronoun *him* and the referring expression *Woody* is ungrammatical in that it violates Principle C.

2.2.2 Participants

20 four-year-olds (7M 13 F, *M* 4;7, range 3;11-5;3) and 40 adult Northwestern University undergraduates participated. Child subjects were run in an area preschool (Northbrook Community Nursery School) or in the laboratory at Northwestern's Project on Child Development (*director*: Sandra Waxman). Children received a book or toy for participating. Adult subjects were run in Northwestern's Language Acquisition laboratory (*director*: Jeffrey

Lidz). Adults earned credit toward fulfilling an experimental requirement for a 200-level
Linguistics course by participating in the experiment.

2.2.3 Stimuli

As mentioned above, subjects each judged four test sentences and three control sentences in
pseudorandom order. The four test verbs were *give*, *read*, *bring*, and *kick*. For the complete list
of stimuli—including story summaries and test and control sentences with lead-ins—please refer
to Appendix A.

Test stories

All test sentences in Experiment 1 were true on the bound reading only, i.e. the reading in which
the pronoun and referring expression in the test sentence corefer. Consider the following test
sentences for *give*:

(67)   a.   Ann gave Woody$_x$ his$_x$ horse   *give*-DO-yes

       b.   *Ann gave him$_x$ Woody$_x$'s horse   *give*-DO-no

       c.   Jeff gave the horse$_x$ to her$_x$ rider   *give*-prep-yes

       d.   *Jeff gave her$_x$ to the horse$_x$'s rider   *give*-prep-no

The bound reading is disallowed in (67b) and (67d) due to Principle C. The pronouns in these
examples c-command the NPs with which coreference is intended, violating Principle C. A
description of one of the *give* items should help to highlight other important aspects of the test
stories (with italicized portions indicating what is read by the puppet following the test story).

(68)   Ann has just fed one male horse that belongs to Eric and one male horse that belongs to

Woody. The boys decide that they want their horses back so they can go riding. Ann

suggests that they trade horses, but the boys reject that idea. So Ann returns Eric's horse

to Eric and Woody's horse to Woody.

> Puppet*: Hmm, that was a story about Eric and his friend, Woody. And here's*
>
> *what I think happened…*

Ann gave Woody his horse	*give*-DO-yes
Ann gave him Woody's horse	*give*-DO-no

Given the context in (68), the bound reading of both possible test sentences (*give*-DO-yes

and *give*-DO-no) is true, but I predicted that subjects would agree with Suzie (the puppet)—

thereby indicating reliance on and acceptance of the bound reading—significantly more often

where the bound reading does not violate Principle C (namely for the *give*-DO-yes test sentence).

Several aspects of the stimulus design are worthy of comment. First, subjects rejecting a 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

Ann gave him Woody's horse, she could do so with confidence, pointing to the fact that Ann

gave Eric (not mentioned in the test sentence) his own horse rather than Woody's horse. This

aspect of the stimulus design satisfies what is known as the falsification condition in the TVJT

literature; in short, it makes subjects' responses more reliable. Second, the characters in each

story always considered an alternate course of action that would have made the bound reading

false and the free reading true before settling on the course of action that made the bound reading

true. The terms bound and free should be understood as describing the status of the referring

expression with respect to the pronoun in the test sentence (e.g. Woody in this case with respect to *his/him*). Thus, in the story above, Ann suggests that the boys trade horses, but the boys reject that idea. This aspect of the stimulus design satisfies what is known as the plausible dissent condition in the TVJT literature, a condition that was first proposed in order to maximize grammatical as opposed to pragmatic reasoning by child subjects. Third, I made sure that the Agent in all test sentences (Ann in this case) was of a different gender than the other characters so as to avoid confusion and avoid processing difficulties. As an illustration, imagine how much more difficult it would be to interpret *John gave him Woody's horse* than it is to interpret *Ann gave him Woody's horse*. Finally, all lead-ins to the test stories mentioned the extrasentential referent for the pronoun last so as to make him or her as salient as possible. For example, the lead-in to the above story was "*Hmm, I think I know one thing that happened. That was a story about Eric and his friend, Woody,*" making Woody salient. Doing so risked inflating the acceptance rates for ungrammatical datives (e.g. *Ann gave him Woody's horse*), which were easier to process as a result, but ensured that any rejections of ungrammatical datives that were observed would be that much more likely to have been due to subjects' grammaticality judgments rather than to felicity judgments or interpretive difficulties.

Figure 2.2: The end of a give-DO test story

The prepositional dative versions of test items with *give* and *bring* were slightly different because *give* and *bring* had animate Themes whose genders I kept constant across dative constructions (as opposed to *read* and *kick*, which had inanimate Themes). Consequently, the gender of the Agents was switched in the prepositional dative versions of these items in order to ensure that that the Agent in all test sentences was of a different gender than the other characters, as shown in (69).

(69)　Jeff has just fed a female elephant that belongs to Eric and a female horse that belongs to Woody. The boys decide that they want their pets back so they can go riding. Jeff suggests that they trade pets, but the boys reject that idea. So Jeff returns Eric's elephant to Eric and Woody's horse to Woody. The animals are very excited to be back with their riders.

Puppet*: Hmm, I think I know one thing that happened. That was a story about two animals with pink ribbons, a girl elephant and a cute girl horse. And I think…*

Jeff gave the horse to her rider　　　give-prep-yes

Jeff gave her to the horse's rider　　　give-prep-no

If a subject rejected the test sentence *Jeff gave her to the horse's rider,* she could do so with confidence, pointing to the fact that Jeff gave the elephant to the elephant's rider, Eric, as opposed to the horse's rider, Woody. Note that both the horse and the elephant were female. Subjects were told the genders of all human and animal participants in each story before the story began. In addition, gender was reinforced during each story through repeated use of gendered pronouns like *he/she* and *him/her*. Furthermore, all female animals in the stories wore pink ribbons—a visual reminder of relevant gender assignments.

Figure 2.3: The end of a give-prep test story

Control stories

Each of the three control stories could be described by two 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 mentioned in Section 2.1, control stories were used primarily to maintain a balance of *yes* and *no* responses throughout each experimental session (Experiments 1, 2, and 3). For example, if a subject answered *yes* to a given test sentence, the puppeteer would read a false sentence after the following control story in an attempt to elicit a *no,* and vice versa. The three control stories were also designed to determine

subjects' knowledge of Principle C independent of datives (Control 1), their ability to interpret

the phrase *its owner* (used in the prepositional dative test sentences for *read* and *kick*) (Control

2), and their relative preference for extrasentential antecedents in interpreting pronouns (Control

3), should any of these three measures be needed. The complete list of control stories can be

found in Appendix A.

2.2.4 Results

Participants' responses were analyzed in terms of the percentage of bound readings. This

dependent measure was functionally equivalent to percentage acceptance since all test stories

were true on the bound reading. To be clear, the two possible readings for a sample test sentence

are shown below. The bound reading contrasts with the free reading, where the terms bound and

free should be understood as describing the status of the referring expression with respect to the

pronoun within the test sentence (e.g. Woody in this case with respect to *his*):

(70)   *Ann gave Woody his horse* (*give*-DO-yes)

  a. *Bound reading*: Ann gave Woody his own horse (*his = Woody*, true)

  b. *Free reading*: Ann gave Woody Eric's horse (*his = Eric*, false)

Unless otherwise indicated, all *p* values reported below are two-tailed.

  Recall that I predicted significantly higher acceptance rates for the bound reading for test

sentences with grammatical binding (gram) than for test sentences in which the bound reading

violated Principle C (ungram). Such a difference in response patterns would be considered

evidence for the configurational nature of the dative verb phrase, while the absence of a

difference in response patterns would be more indicative of a flat or indeterminate structure in which the first dative object failed to asymmetrically c-command the second.

The results of Experiment 1 indicated that, as expected, adults accepted the bound reading more often for grammatical test sentences (98%) than for ungrammatical test sentences (34%). This difference was significant by paired t test ($t(39) = 11.27$, $p < .0001$). Children patterned with adults in accepting the bound reading significantly more often for grammatical test sentences (80%) than for ungrammatical test sentences (48%) ($t(19) = 3.58$, $p = .002$). A 2 x 2 analysis of variance (ANOVA) comparing adults' and children's response rates for grammatical and ungrammatical test sentences revealed no significant effect of age ($F(1, 59) = 0.11$, $p = .7413$), a significant effect of grammaticality ($F(1,59) = 121.74$, $p < .0001$), and a significant interaction between age and grammaticality ($F(1,59) = 9.29$, $p = .0035$). The interaction is driven by the fact that adults' responses are more categorical than children's responses for both grammatical and ungrammatical test sentences. However, it seems clear that children's responses are qualitatively like adults' responses.

Figure 2.4: Mean percentage bound readings, averaging across dative constructions, for child (n=20) and adult (n=40) subjects in Experiment 1
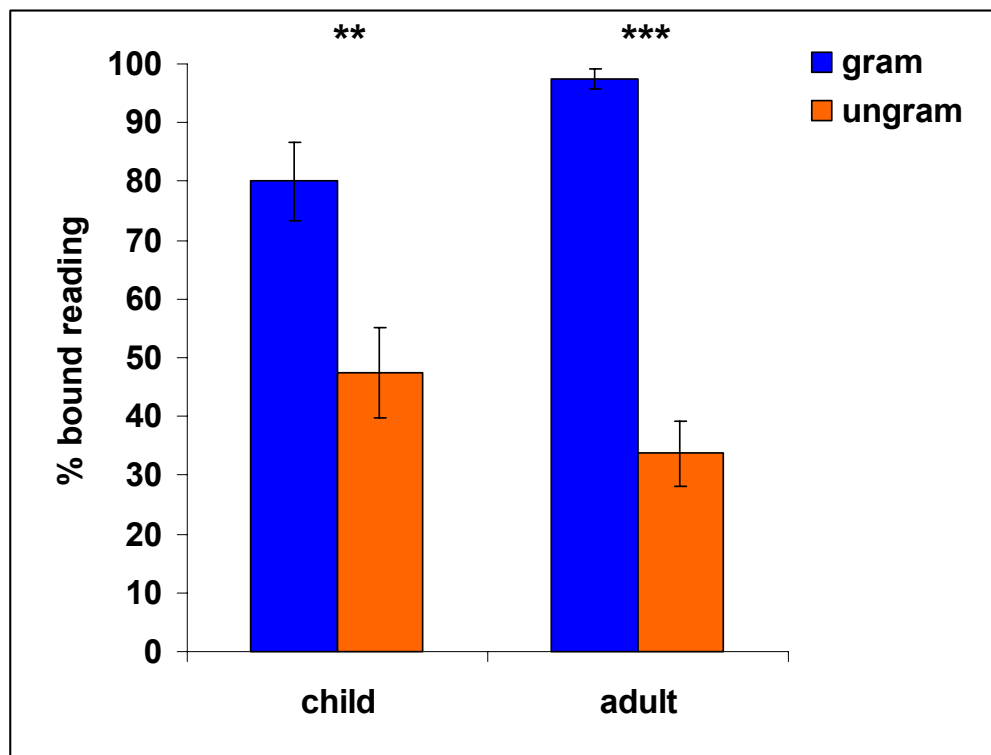
(** < .01 *** < .001, paired *t* tests)

A closer look at the data isolating each dative construction again shows similar trends in children's and adults' response patterns. Concerning DO-datives, the difference in adults' acceptance rates for the bound reading between grammatical test sentences (98%) and ungrammatical test sentences (20%) was significant ($t(39) = 11.59$, $p < .0001$). The difference in children's acceptance rates for the bound reading between grammatical test sentences (75%) and ungrammatical test sentences (30%) was also significant ($t(19) = 3.33$, $p < .0035$). Concerning prepositional datives, the difference in adults' acceptance rates for the bound reading between grammatical test sentences (98%) and ungrammatical test sentences (48%) was significant ($t(39)$

= 5.7, $p < .0001$), but the difference in children's acceptance rates for the bound reading between grammatical test sentences (85%) and ungrammatical test sentences (65%) was not significant ($t(19) = 1.29, p = .2125$). However, if we exclude the data from four child subjects who missed the Principle C control item—i.e. who accepted the sentence *He$_x$ drove Mr. Blue$_x$'s car* in a context in which Mr. Blue drove his own car—then the difference in children's acceptance rates for grammatical prepositional datives (88%) and ungrammatical prepositional datives (56%) becomes marginally significant ($t(15) = 1.78, p = .0953$).

Figure 2.5: Mean percentage bound readings by construction for child (n=20) and adult (n=40) subjects in Experiment 1

(** < .01 *** < .001, paired *t* tests)
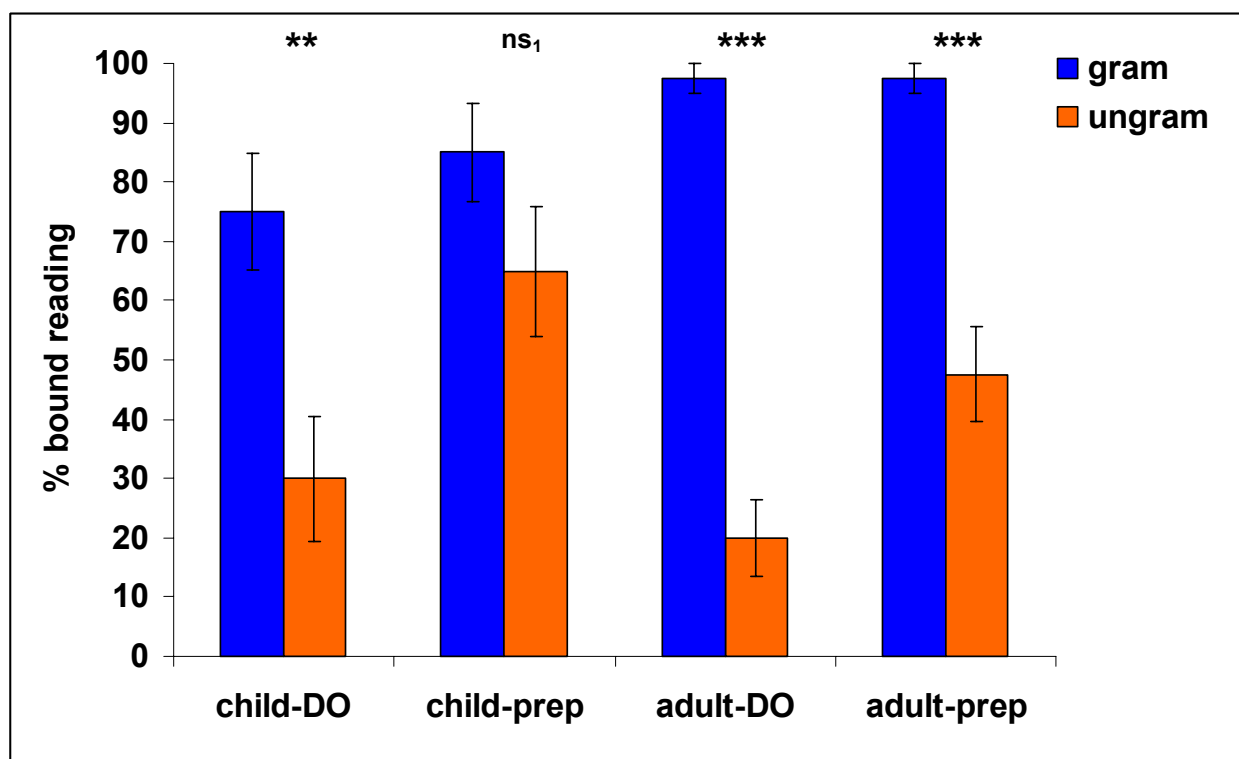ns$_1$ = marginally significant when data from four subjects who missed Principle C control excluded

Importantly, both children and adults showed significantly higher acceptance rates of the bound reading for ungrammatical prepositional datives (prep) than for ungrammatical DO-datives (DO) (for children, $t(19) = 2.33$, $p = .031$; for adults, $t(39) = 2.91$, $p = .0059$). This tendency, discussed in the next section, coupled with a typical level of noise in the child data, is the most likely cause of the weakened grammaticality effect within prepositional datives for children.

2.2.5 Discussion

The main finding of Experiment 1—that English-speaking four-year-olds show the adult pattern of grammaticality judgments for a Principle C-based asymmetry in datives—provides strong confirmation that the dative verb phrase is configurational at age four in general just as it is for adults, and that the specific configuration involves the first dative object asymmetrically c-commanding the second in both dative constructions.

One might object that the weaker effect of grammaticality within prepositional datives for children undermines the above conclusion. I don't feel that this aspect of the data is especially problematic. Importantly, children's high acceptance rates for the bound reading of ungrammatical prepositional datives relative to that for grammatical prepositional datives mirrors an identical and statistically significant tendency in the adult data. Thus the trend is not age-specific and calls out for an explanation that would apply to adults and children alike. Let us consider two possible explanations before continuing on to Experiment 2.

First, suppose that the prepositional phrase in prepositional datives may be optionally attached high enough to escape the c-command domain of the preceding pronoun and thereby circumvent any possible Principle C violation in a sentence like *Jeff gave her to the horse's*

rider. Such attachment height ambiguities are well-documented in the syntax and sentence processing literature (see Schütze and Gibson 1999 for a review). For instance, in (71a) the prepositional phrase can be understood as describing the instrument the spy used to see the child (VP-level attachment), and perhaps less plausibly as describing the child that he saw (NP-level attachment). In contrast, in (71b) real-world knowledge dictates that the prepositional phrase can only describe the child.

(71)　a.　　The spy saw a child with night-vision goggles

　　　b.　　The spy saw a child with a chocolate sundae

Prepositional phrases that are ambiguous in terms of their attachment height are always optional to my knowledge, i.e. non-arguments. Accordingly, if an attachment height ambiguity among dative prepositional phrases were to blame for the higher rate of acceptance for Principle C violations in ungrammatical prepositional datives that we observed in Experiment 1, then we would expect this to be disproportionately true for the test verbs that do not require a prepositional phrase: *read* and *kick*. Both of these verbs sound perfectly fine as simple transitives, e.g. *Serena read a magazine* or *Davin kicked the soccer ball*. However, the test verb with the highest rate of acceptance for its ungrammatical prepositional dative variant among children was *bring* (though *kick* came in second).[43] *Bring* takes an obligatory prepositional phrase argument according to standard diagnostics. In comparison, for adults the two test verbs with the highest rates of acceptance for their ungrammatical prepositional dative variants were *kick* and *give*, with the latter taking an obligatory prepositional phrase argument just as *bring* does. It appears that the PP attachment hypothesis does not make correct predictions for these data.

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[43] Acceptance rates for individual test items can be found in Appendix A.

A second possible explanation for the elevated rate of acceptance of the bound reading in ungrammatical prepositional datives would have to do with pragmatic loopholes in Principle C that have long been observed (e.g. Evans 1980, Reinhart 1983). In brief, it is difficult to avoid accidental coreference—even when it is ungrammatical—if there is a discourse reason to license it. Consider the following exchange:

(72) Q: Is that John?

      A: Well, he's wearing John's coat, so yes.

The answer contains a Principle C violation, but it does not strike most people as ungrammatical. There are two possible interpretations of what this answer means, outlined in (73):

(73) a.   x is wearing x's coat   *bound variable interpretation*

      b.   x is wearing John's coat   *coreferential interpretation*

Only the coreferential interpretation in (73b) is actually relevant to the question asked, and since it can be distinguished from the bound variable interpretation (which addresses the more general issue of whether coats are worn by their owners) Principle C can be circumvented. The idea is that binding and coreference are handled separately, with the former firmly planted in the domain of syntax/semantics and the latter at the semantics/pragmatics interface. If this general type of explanation for Principle C violations were to shed light on the data from Experiment 1, it would have to be true that the coreferential interpretation of ungrammatical prepositional datives is somehow more easily distinguishable from the bound variable interpretation in contexts described by ungrammatical prepositional datives than in contexts described by grammatical DO-datives. However, in Experiment 1 ungrammatical prepositional datives and DO-datives described the very same contexts, ignoring irrelevant changes to the Agent in the

give and *bring* stories and a change to one of the Themes in the *give* story (both of which were described in Section 2.2.3). Furthermore, children and adults did not entirely agree on the particular stories for which the bound reading of ungrammatical prepositional dative test sentences was most acceptable. For these reasons it is not likely that a pragmatic loophole in Principle C of the type described could explain the response patterns in question by itself, though the possible influence of some other type of pragmatic reasoning on the interpretation of ungrammatical datives can not be ruled out without further testing. I will leave this issue for future work to resolve.

2.3 Experiment 2: Quantifier-variable Binding in English

In this experiment I sought converging evidence for the configurational nature of the dative verb phrase in four-year-olds in order to confirm the findings from Experiment 1. Specifically, my goal was to determine whether four-year-old children are aware of a different structural asymmetry observed for adults (Barss & Lasnik 1986) involving quantifier-variable binding, e.g. *Every father$_x$ loves his$_x$ children*. It is standardly argued that quantifiers like *every* in this example must c-command pronouns (e.g. *his*) in order to bind them. This c-command requirement—which has been shown, for instance, to motivate covert displacement operations such as Quantifier Raising (May 1985, Hornstein 1995)—follows from the semantics of quantification and from general syntactic requirements on the bound interpretation of pronouns (for extensive discussion see Heim & Kratzer 1998). I will assume its basic correctness here.

The relevant asymmetry concerning quantifier-variable binding in DO-datives (74) and prepositional datives (75) is the following:

(74) a. Ann gave every boy$_x$ his$_x$ horse

      b. *Jeff gave her$_x$ rider every horse$_x$

(75) a. Jeff gave every horse$_x$ to her$_x$ rider

      b. *Ann gave his$_x$ horse to every boy$_x$

Assuming that quantifiers must c-command pronouns in order to bind them, the above asymmetry must arise due to syntactic configurations in which the first dative object c-commands the second, but not vice versa, for both dative constructions, much like the Principle C-related asymmetry for datives investigated in Experiment 1. To reiterate, the relative depth of embedding of the objects determines binding possibilities. In Experiment 2, described below, I test whether four-year-old children show evidence of having the adult patterns of grammaticality judgments that we hypothesize to be the result of such configurations in both DO-datives and prepositional datives. Evidence that they do is again considered evidence for the configurational nature of the dative verb phrase at that age.

It should be noted before moving on that four-year-old children are demonstrably adult-like with respect to their knowledge of and proficiency with quantifier-variable binding in general. Lidz et al. (2004) show that children are willing and able to access the bound interpretation of sentences like (76) as measured by their responses and justifications in an experiment using our TVJT method:

(76) a. Every dancer$_x$ kissed Kermit before she$_x$ went on stage

      b. Kermit kissed every dancer$_x$ before she$_x$ went on stage

That said, I turn now to the details of Experiment 2.

2.3.1 Design

This experiment had the same modified Latin Square design as in Experiment 1. Once again subjects were randomly assigned to one of four experimental conditions; each judged four test sentences and three control sentences in pseudorandom order. Sentence order was counterbalanced across subjects. The above aspects of the experimental design are summarized in Table 2.2 below.

Table 2.2: Conditions for Experiment 2

Condition A	Condition A2	Condition B	Condition B2
Control 1	Control 1	Control 1	Control 1
give—DO—yes	*kick*—DO—yes	*give*—DO—no	*kick*—DO—no
read—prep—no	*bring*—prep—no	*read*—prep—yes	*bring*—prep—yes
Control 2	Control 2	Control 2	Control 2
bring—DO—no	*read*—DO—no	*bring*—DO—yes	*read*—DO—yes
Control 3	Control 3	Control 3	Control 3
kick—prep—yes	*give*—prep—yes	*kick*—prep—no	*give*—prep—no

An experimental subject assigned to Condition A would first be presented with Control 1 and then with the *give*-DO-yes test item, the test sentence for which is *Ann gave every boy$_x$ his$_x$ horse*, and so on. The *give*-DO-yes test sentence features the verb *give* in the DO-dative frame with the quantified noun phrase (QNP) *every boy* c-commanding and grammatically binding the pronoun *his*. In contrast, a different subject in Condition B would judge the *give*-DO-no test item, the test sentence for which is **Jeff gave her$_x$ rider every horse$_x$*. This sentence again features the verb *give* in the DO-dative frame, but this time *every horse* does not c-command and thus can not grammatically bind *her*.

2.3.2 Participants

15 four-year-olds (5M 10 F, *M* 4;6, range 3;11-4;10) and 20 adult Northwestern University undergraduates participated in Experiment 2. 20 additional adult subjects participated in a follow-up experiment, Experiment 2A, described in Section 2.3.5. Child subjects were run in an area preschool (Northbrook Community Nursery School) or in the laboratory at Northwestern's Project on Child Development (*director*: Sandra Waxman). Children received a book or toy for participating. Adult subjects were run in Northwestern's Language Acquisition laboratory (*director*: Jeffrey Lidz). Adults earned credit toward fulfilling an experimental requirement for a 200-level Linguistics course by participating in the experiment.

2.3.3 Stimuli

As in Experiment 1, subjects each judged four test sentences and three control sentences in pseudorandom order. The four test verbs were once again *give*, *read*, *bring*, and *kick*. For the complete list of stimuli—including story summaries and test and control sentences with lead-ins—please refer to Appendix A.

Test stories

As before, all test sentences were true on the bound reading only, i.e. the reading in which the pronoun is bound by the QNP in the test sentence. Consider the following test sentences for *give*:

(77) a.   Ann gave every boy$_x$ his$_x$ horse

      b.   *Jeff gave her$_x$ rider every horse$_x$

(78) a.   Jeff gave every horse$_x$ to her$_x$ rider

      b.   *Ann gave his$_x$ horse to every boy$_x$

The bound reading is ungrammatical in (77b) and (78b) because the QNPs in these examples fail to c-command the pronouns that they are supposed to bind. Let us walk through one of the test stories in order to better understand the context that it establishes:

(79)   Ann has just fed Eric's horse, Woody's horse, Steve's horse, and the alien's horse. The boys decide that they want their horses back so they can go riding. Ann gives Eric the alien's horse by mistake. Eric points out her mistake, so Ann takes the alien's horse back and gives Eric his own horse. Ann goes through the same process with Woody, mistakenly giving him the alien's horse and then, after being corrected by Woody, giving him his own horse. By the time it's Steve's turn Ann has figured things out and gives Steve his own horse right away. Then the Alien appears, and Ann gives him his cool-looking alien horse.

       Puppet*: Hmm, that was a story about a blue alien and three boys. And here's what I think happened…*

              Ann gave every boy his horse   *give*-DO-yes

              Ann gave his horse to every boy   *give*-prep-no

Given the context in (79), the bound reading of both possible test sentences (*give*-DO-yes and *give*-prep-no) is true, but I predicted that subjects would agree with Suzie—thereby indicating reliance on and acceptance of the bound reading—significantly more often when the

QNP c-commands and thus grammatically binds the pronoun. Concerning stimulus design, as in Experiment 1 subjects rejecting a 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 *Ann gave his horse to every boy,* she could do so with confidence, pointing to the fact that Ann only mistakenly gave the alien's horse (referred to by *his*) to two boys, Eric and Woody, but not Steve. As before, I made sure that the Agent in all test sentences (Ann in this case) was of a different gender than the other characters so as to avoid confusion and avoid processing difficulties. In addition, all lead-ins to the test stories mentioned the three characters denoted by the QNP last so as to make them as salient as possible. For example, the lead-in to the above story was "*Hmm, that was a story about a blue alien and three boys*, making the boys salient. Doing so risked inflating the acceptance rates for datives with ungrammatical quantifier-variable binding (e.g. *Ann gave his horse to every boy*), which were easier to process as a result, but ensured that any rejections of ungrammatical datives that were observed would be that much more likely to have been based on subjects' grammaticality judgments rather than on felicity judgments or interpretive difficulties. In an attempt to balance out the salience of potential pronominal antecedents somewhat, I was careful to have characters refer to the extrasentential antecedent (e.g. the Alien in the above story) often throughout the story. Continuing with our example, though the Alien doesn't interact with Ann until the end of the story when he asks for his horse, the boys refer to him several times, saying things like "No, that's the Alien's horse. Look, it's got a funny blue hat with a horn," and Ann refers to this particular horse as "the Alien's horse" each time she is corrected by one of the boys.

Figure 2.6: A give-DO test story in Experiment 2: Bound-true

Bound-True
story type

Ann gave every boy$_x$ his$_x$ horse = True

Ann gave every boy$_x$ his$_y$ horse = False
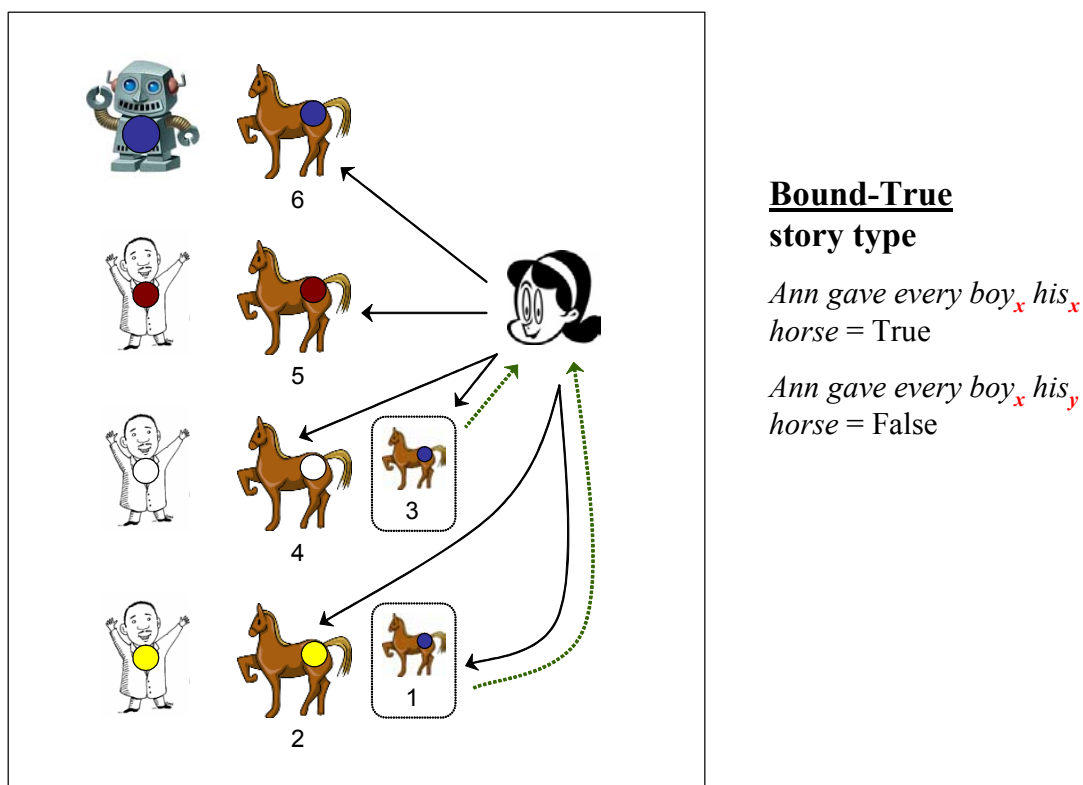
In Figure 2.6 above, other important aspects of the test stories in Experiment 2 are highlighted. The colored dots indicate ownership. In all test stories, ownership was discussed explicitly (e.g. whose horse was whose), and color coding reinforced it to an even greater extent than is shown. For instance, in the *give* story, Woody's horse is Bullseye (his horse from the movie Toy Story), who has a lot of brown tones like Woody. Eric's horse is white, just like his shirt. Steve is wearing yellow, and his horse has a yellow mane. Finally, the alien is blue, and his horse is wearing a blue hat with a horn. 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 moving on the extrasentential antecedent. This order of major plot elements is represented in Figure 2.6 by the subscript numbers. Dashed green lines indicate returns of transferred items that were given by mistake. In the *give* test story, Ann keeps forgetting which horses go with which owners and gives the Alien's horse first to one boy and then to another. Each time she mistakenly gives a boy the Alien's horse, the boy corrects her and she takes the horse back. In other test stories involving physical transfer (*bring* and *kick*), the same thing happens. 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 can not literally take the story back from the character who listened to it.

Control stories

The control stories were the same as those used in Experiment 1. As a reminder, the complete list of control stories can be found in Appendix A.

2.3.4 Results

Participants' responses were analyzed in terms of the percentage of bound readings, as in Experiment 1. This dependent measure was again functionally equivalent to percentage acceptance since all test stories were true on the bound reading. The two possible readings for a sample test sentence are shown below. The bound reading contrasts with the free reading, where the terms bound and free should be understood as describing the status of the pronoun in the test sentence (e.g. *his* in this case) with respect to the QNP:

(80)   *Ann gave every boy his horse* (*give*-DO-yes)

     a.   *Bound reading*: Ann gave every boy his own horse (*every boy* binds *his*, true)

     b.   *Free reading*: Ann gave every boy Mr. Alien's horse (*his* = *Mr. Alien*, false)

Unless otherwise indicated, all *p* values reported below are two-tailed.

Recall that I predicted significantly higher acceptance rates for the bound reading for test sentences with grammatical quantifier-variable binding (gram) than for test sentences in which the QNP failed to c-command the pronoun it was supposed to bind (ungram). Such a difference in response patterns would be considered evidence for the configurational nature of the dative verb phrase, while the absence of a difference in response patterns would be more indicative of a flat or indeterminate structure in which the first object failed to asymmetrically c-command the second.

The results of Experiment 2 indicated that, as expected, adults accepted the bound reading more often for grammatical test sentences (88%) than for ungrammatical test sentences (25%). This difference was significant by paired *t* test ($t(19) = 6.57$, $p < .0001$). Children patterned with adults in accepting the bound reading significantly more often for grammatical test sentences (90%) than for ungrammatical test sentences (63%) ($t(14) = 3.28$, $p = .0061$). A 2 x 2 analysis of variance (ANOVA) comparing adults' and children's response rates for grammatical and ungrammatical test sentences revealed a significant effect of age ($F(1, 33) = 5.772$, $p = .0221$), a significant effect of grammaticality ($F(1,33) = 46.171$, $p < .0001$), and a significant interaction between age and grammaticality ($F(1,33) = 7.457$, $p = .0101$). The effect of age and the interaction between age and grammaticality both stem from the fact that children's

acceptance rates for ungrammatical datives do not fall off as much as adults' do relative to those

for grammatical datives.

Figure 2.7: Mean percentage bound readings, averaging across dative constructions, for child (n=15) and adult (n=20) subjects in Experiment 2
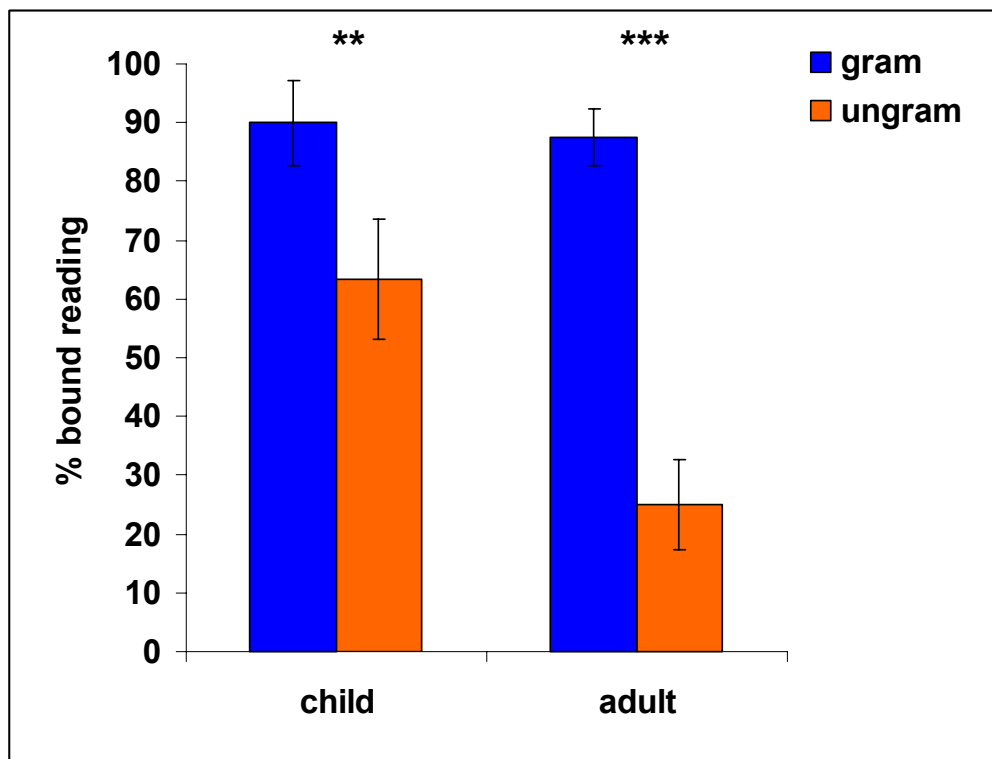
(** < .01   *** < .001, paired *t* tests)

A closer look at the data isolating each dative construction shows somewhat similar

trends in children's and adults' response patterns. Concerning DO-datives, the difference in

adults' acceptance rates for the bound reading between grammatical test sentences (95%) and

ungrammatical test sentences (30%) was significant ($t(19) = 5.94$, $p < .0001$). The difference in

children's acceptance rates for the bound reading between grammatical test sentences (87%) and

ungrammatical test sentences (60%) was also significant ($t(14) = 2.26$, $p = .0406$). Concerning

prepositional datives, the difference in adults' acceptance rates for the bound reading between grammatical test sentences (80%) and ungrammatical test sentences (20%) was significant (t(19) = 4.49, p = .0003). The difference in children's acceptance rates for the bound reading between grammatical test sentences (87%) and ungrammatical test sentences (67%) was marginally significant (t(14) = 1.87, p = .0824).

Figure 2.8: Mean percentage bound readings by construction for child (n=15) and adult (n=20) subjects in Experiment 2
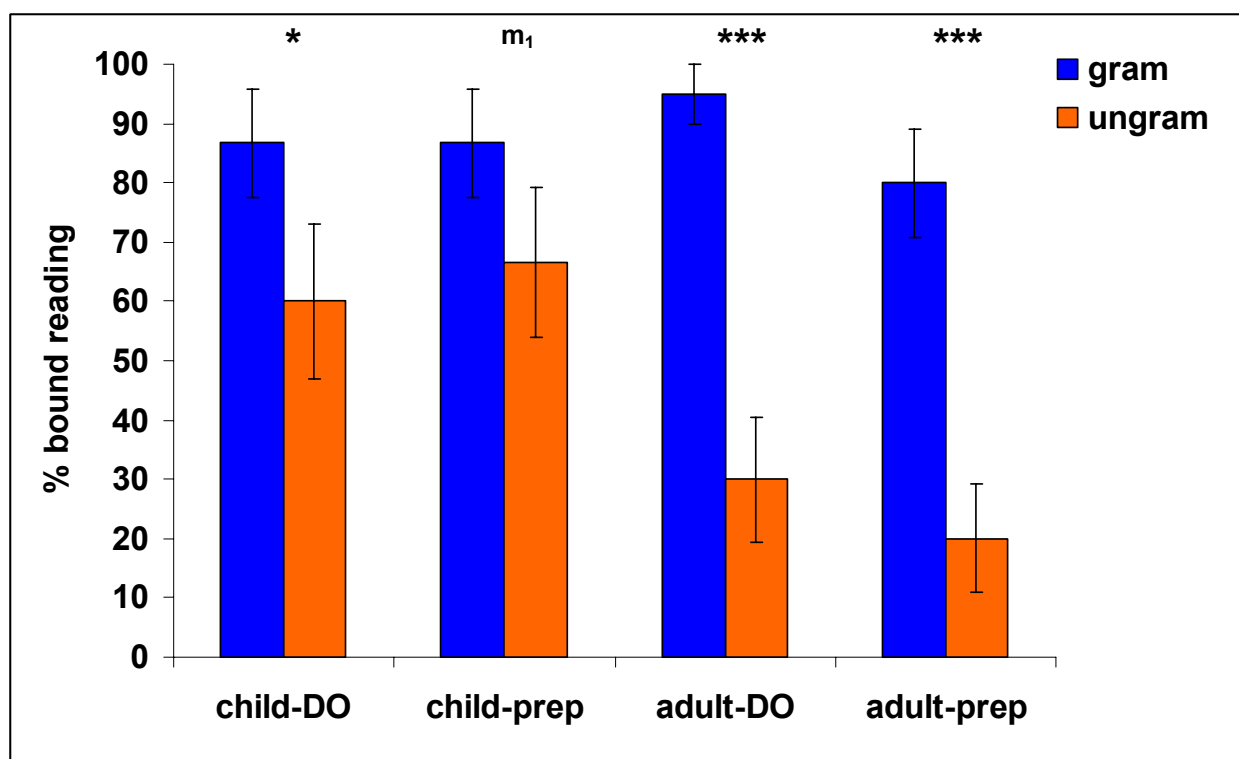
(* < .05 *** < .001, paired t tests)
m_1 = marginally significant

2.3.5 Discussion

The results of Experiment 2—that English-speaking four-year-olds show the adult pattern of grammaticality judgments for the quantifier-variable binding asymmetry in datives—complement the results of Experiment 1 nicely, confirming that the dative verb phrase is configurational at age four in general just as it is for adults, and that the specific configuration involves the first dative object asymmetrically c-commanding the second in both dative constructions.

Unlike in Experiment 1, child subjects in Experiment 2 did not accept significantly more bound readings for ungrammatical prepositional datives than they did for ungrammatical DO-datives. Instead, like adults, their ungrammatical acceptance rates were essentially equal for the two dative constructions, significantly lower than those for grammatical datives. The higher baseline acceptance rate for ungrammatical datives manifested in the child data in Experiment 2 is not entirely surprising given the complexity of the stories and test sentences. Pilot data from an earlier version of the experiment with even more complicated test sentences (e.g. *Ann gave him every boy's horse* (pilot) with the quantifier as a possessor vs. *Jeff gave her rider every horse* (current)) showed even higher acceptance rates. Another possible contributing factor is that the test stories, which all end similarly with the characters in possession of their own horses/books/babies/soccer balls, are biased toward the bound-variable interpretation to such an extent that children sometimes felt compelled to respond to what they believed the puppeteer would say rather than to what she actually said. Recall that the test items were designed explicitly to make the bound-variable reading both true and as easy to process in context as possible.

In order to probe for the presence of a bound-variable bias in the test stories used in Experiment 2, I ran 20 additional adult subjects in a follow-up experiment, which I will refer to

as Experiment 2A. In this follow-up, everything was identical to Experiment 2 except for the story type. Whereas in Experiment 2 the bound reading was always made true by our test stories (hence the designation bound-true in Figure 2.6), in Experiment 2A the bound reading was always false (bound-false). This manipulation entailed a few minor changes in the plot of the test stories, as illustrated in Figure 2.9. Going back to the *give* test item, Ann does everything the same way for the first two boys in the bound-false version. However, when she gets to the third boy, this time she mistakenly gives the alien's horse to him as well, is corrected by the boy, and then takes the horse back. At this point she is distracted by the arrival of the alien and neglects to give the third boy his own horse. She simply gives the alien's horse back to the alien and calls it a day. This story makes the bound reading false and the free reading true.

(81)   *Ann gave every boy his horse* (*give*-DO-yes)

      a.   *Bound reading*: Ann gave every boy his own horse (*every boy* binds *his*, false)

      b.   *Free reading*: Ann gave every boy Mr. Alien's horse (*his = Mr. Alien*, true)

I predicted that if the original test stories in Experiment 2 were, indeed, biased toward the bound-variable reading as I have argued, then subjects would reject the test sentences describing the bound-false versions of these stories in Experiment 2A. Importantly, the test sentences were all identical to those used in Experiment 2. By rejecting the test sentences in Experiment 2A that other adults had accepted in Experiment 2, subjects would demonstrate their preference for the bound reading, according to which everyone ends up with his or her own things, despite the availability of a true and presumably salient alternative interpretation, the free reading.

Figure 2.9: A give-DO test story in Experiment 2A: Bound-false
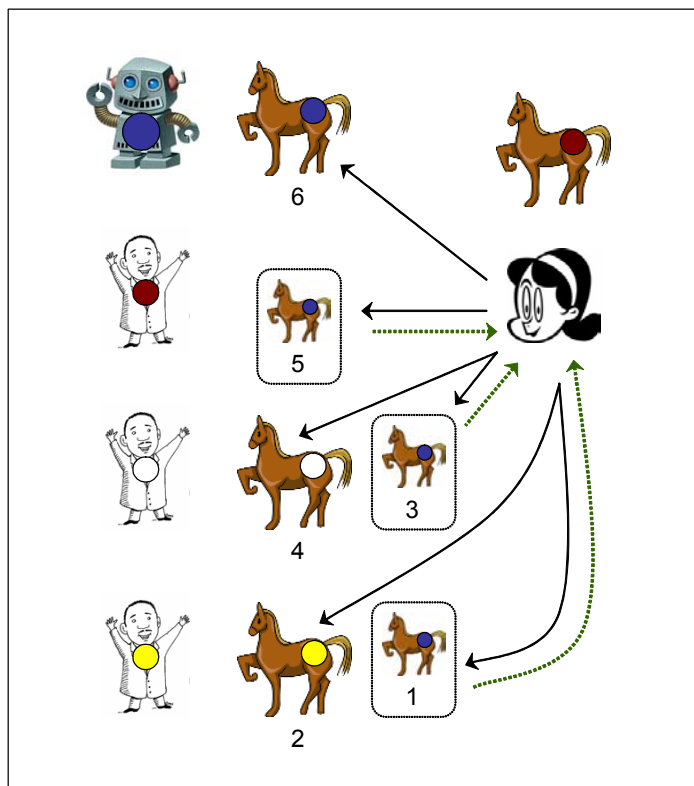
Bound-False
story type

Ann gave every boy$_x$ his$_x$ horse = False

Ann gave every boy$_x$ his$_y$ horse = True

The results of Experiment 2A indicated that adults in the bound-false condition chose the bound reading overwhelmingly, as indicated by their consistent rejection of the test sentences. There was, however, a small but significant difference between adults' acceptance rates of the alternative free reading, with more rejections for grammatical test sentences (98%) than for ungrammatical test sentences (85%) ($t(19) = 2.52$, $p < .021$). In other words, subjects were somewhat more likely to accept the free reading for a pronoun in a test sentence in which quantifier-variable binding is technically ungrammatical, e.g. *Ann gave his horse to every boy*, than in a test sentence with grammatical quantifier-variable binding, e.g. *Ann gave every boy his horse*, just as they were in Experiment 2.

Figure 2.10: Mean percentage bound readings, averaging across dative constructions, for adult subjects in Experiments 2 (n=20) (bound-true) and 2A (n=20) (bound-false)
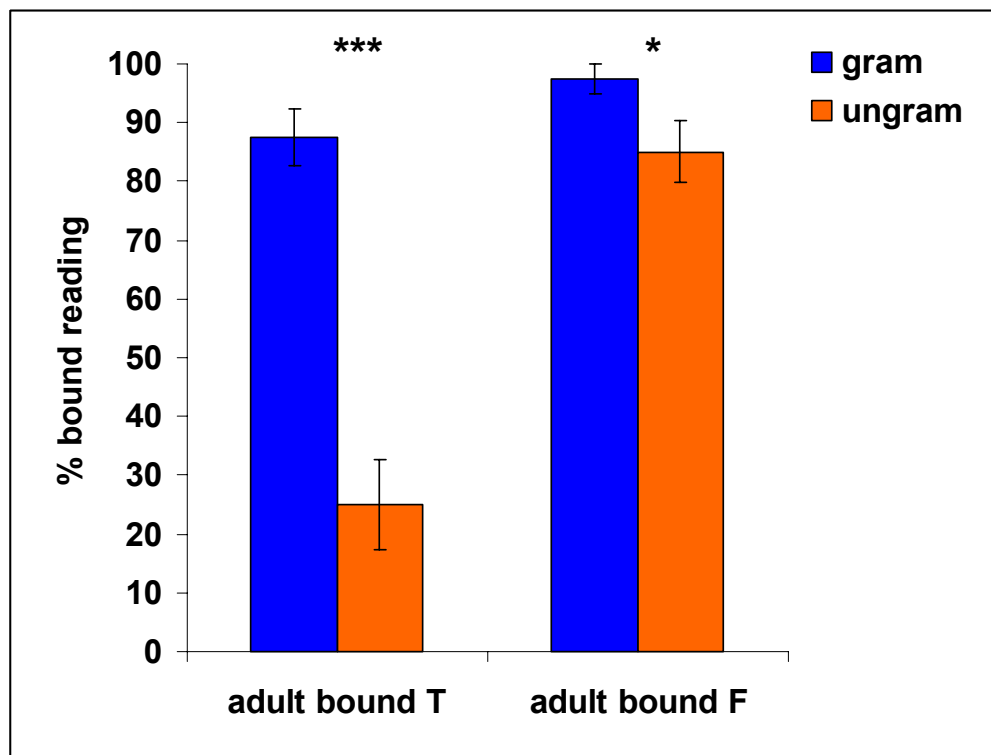
(* < .05 *** < .001, paired *t* tests)

Despite this significant difference, in general subjects apparently found the bound reading of our test sentences so captivating when it was not made true by the test stories that they chose it without much regard for whether the test sentence was grammatical or not. Assuming that children might perceive the bound-true test stories similarly, these results lend support to the notion that the elevated acceptance rates shown by children for ungrammatical datives in Experiment 2 were due to a bias toward the bound-variable interpretation in the test items. This bias, combined with difficulties in interpreting the complex test sentences, may have partially masked children's grammatical knowledge in bound-true contexts much as it seems to have

masked adults' grammatical knowledge in bound-false contexts. Further investigation along these lines must regrettably be left for future work.

2.4 Experiment 3: Quantifier-variable Binding in Kannada

In Experiments 1 and 2, c-command and linear order were confounded. Thus, while all of the evidence pointed to the fact that children patterned with adults in their knowledge of asymmetries pertaining to Principle C and quantifier-variable binding in datives, I could not demonstrate conclusively that the root cause of these asymmetries was asymmetric c-command of the second dative object by the first, as is standardly argued. 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. Thus in Experiment 3 I tested four-year-olds' knowledge of dative asymmetries involving quantifier-variable binding in Kannada, a language whose structure allows us to disentangle c-command and linear order.

First, I should note some basic facts. Kannada is a Dravidian language spoken by approximately 40 million speakers primarily in the southern Indian state of Karnataka, where it is the official language. Some of its closest relatives, linguistically speaking, include Tamil, Telugu, and Malayalam. 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 complex, involving an interaction between word order and the presence or absence of a benefactive affix (BEN) attached to the verb. The basic pattern of adult grammaticality judgments in shown in (82),

where DAT indicates the indirect object (IO), marked with dative case, and ACC indicates the

direct object (DO), marked with accusative case.[44]

(82) a. DAT$_x$ ACC$_x$ BEN

Rashmi pratiyobba hudugan-ige avan-a kudure-yannu tan-du-**koTT**-aLu

Rashmi every boy-dat 3sm-gen horse-acc return-ppl-ben.pst-3sf

'Rashmi returned every boy his horse'

b. DAT$_x$ ACC$_x$ unaffixed

Rashmi pratiyobba hudugan-ige avan-a kudure-yannu tan-d-aLu

Rashmi every boy-dat 3sm-gen horse-acc return-pst-3sf

'Rashmi returned every boy his horse'

c. ACC$_x$ DAT$_x$ BEN

Rashmi avan-a kudure-yannu pratiyobba hudugan-ige tan-du-**koTT**-aLu

Rashmi 3sm-gen horse-acc every boy-dat return-ppl-ben.pst-3sf

'Rashmi returned his horse to every boy.'

d. *ACC$_x$ DAT$_x$ unaffixed

Rashmi avan-a kudure-yannu pratiyobba hudugan-ige tan-d-aLu

Rashmi 3sm-gen horse-acc every boy-dat return-pst-3sf

'Rashmi returned his horse to every boy.'

Descriptively speaking, when the dative-marked object comes first (82a-b), it can bind the

accusative-marked object whether or not the benefactive affix is present. In contrast, when the

accusative-marked object comes first (82c-d), the dative can bind it only in the presence of the

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[44] I follow Sridhar (1995) and Lidz & Williams (2005) in adopting the convention of capitalizing retroflex consonants in Kannada.

benefactive affix. The relevant binding possibilities for quantifier datives (Q-DAT) like *every boy* with respect to ACC-marked pronominals within the test sentences are summarized below:

(83)   a.   √ Subject Q-DAT$_x$ ACC$_x$ V-**BEN**

        b.   √ Subject Q-DAT$_x$ ACC$_x$ V

        c.   √ Subject ACC$_x$ Q-DAT$_x$ V-**BEN**

        d.   * Subject ACC$_x$ Q-DAT$_x$ V

Lidz & Williams (2005) argue that this asymmetry arises from there being two distinct underlying structures for ditransitives in Kannada. When the benefactive affix is present, the DAT-ACC order is unmarked, with the ACC-DAT order derived by A-movement. Thus, according to Lidz & Williams (2005), (83c) is derived from (83a). The appearance of backward binding in (83c) 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 (83a), in which the quantifier dative c-commands and thereby grammatically binds into the accusative. When there is no benefactive affix, the ACC-DAT order is unmarked, and the DAT-ACC order is derived by A-movement. Thus, (83b) is derived from (83d). The quantifier dative in (83d) can not bind into the accusative because it does not c-command the accusative; only after moving above the accusative, as in (83b), can it grammatically bind into the accusative.[45] I will assume this analysis as well as the syntactic representations that it entails, shown in (84) with the benefactive affix and in (85) without.

---

[45] The reverse asymmetry also holds with a quantifier accusative, but this is not shown or tested in children here. See Lidz & Williams (2005) for details.

(84)   a.   Subject Q-DAT$_x$ ACC$_x$ V-**BEN**   (Lidz & Williams 2005, ex. 13)

```
                        vP
                   ╱          ╲
               subj            v'
                          ╱          ╲
                      BENP            v
                     ╱    ╲
                IO_DAT     BEN'
                        ╱       ╲
                      VP         BEN
                    ╱    ╲
               DO_ACC     V
```
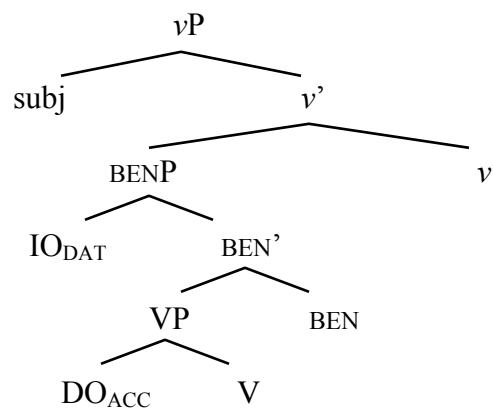
   b.   Subject ACC$_x$ Q-DAT$_x$ V-**BEN**   (Lidz & Williams 2005, ex. 14)

```
                        vP
                   ╱          ╲
               subj            v'
                          ╱          ╲
                      BENP            v
                     ╱    ╲
               DO_ACC      BENP
                          ╱    ╲
                      IO_DAT    BEN'
                             ╱       ╲
                           VP         BEN
                         ╱    ╲
                    t_ACC      V
```

(85) a. Subject ACC$_x$ Q-DAT$_x$ V (Lidz & Williams 2005, ex. 9)

vP
subj   v'
    VP   v
DO$_{ACC}$ V'
    IO$_{DAT}$ V
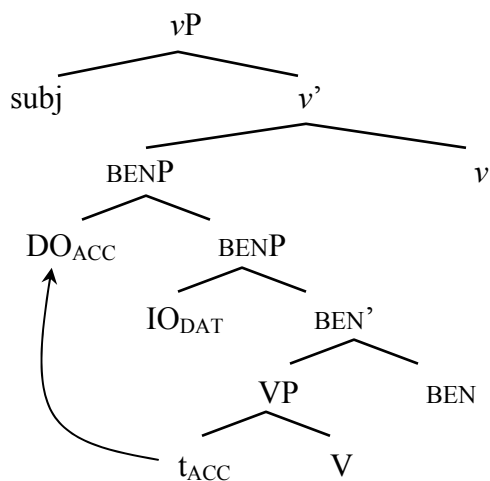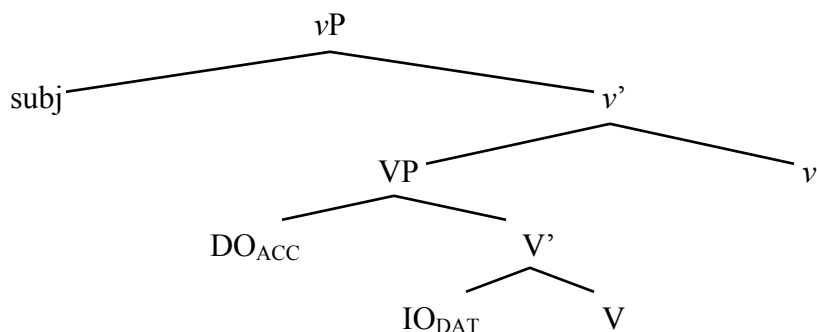
b. Subject Q-DAT$_x$ ACC$_x$ V (Lidz & Williams 2005, ex. 10)

vP
subj   v'
    VP   v
IO$_{DAT}$ VP
    DO$_{ACC}$ V'
        t$_{DAT}$ V
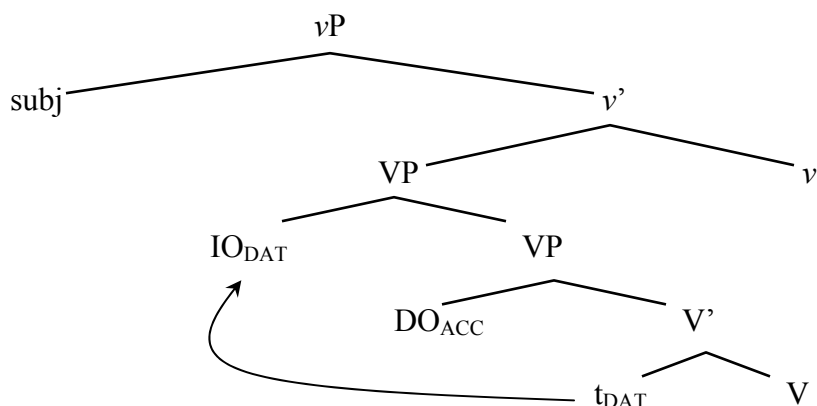
Importantly, in addition to being syntactically distinct, benefactive and nonbenefactive ditransitives in Kannada have different meanings.[46] As mentioned in Section 1.2, benefactive ditransitives imply possession transfer just like DO-datives in English. Thus, in (86), Rashmi is understood as receiving the cake, and (86a) cannot felicitously be followed by (86b).

---

[46] For a similar argument re: ditransitives in a related language, Tamil, see Sundaresan (2006).

(86) a.   nannu Rashmi-ge keek-annu suTT-u-**koTT**-e

I Rashmi-DAT cake-ACC prepare-PP-**BEN.PST**-1S

'I made Rashmi a cake…'

b.   # adare ad-annu nann-a taayi-ge koTT-e

but it-ACC I-GEN mother-DAT give.PST-1S

'…but I gave it to my mother'[47]

In contrast, nonbenefactive ditransitives do not imply possession transfer. Accordingly (87b) is a perfectly acceptable and felicitous follow-up to (87a).

(87) a.   nannu Rashmi-ge keek-annu suTT-e

I Rashmi-DAT cake-ACC prepare.PST-1S

'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-1S

'…but I gave it to my mother'[48]

The data are consistent with the Kannada benefactive ditransitive representing the same possession relation argued to underlie the DO-dative in English.

Now that all of the necessary pieces are in place, I turn to the details of Experiment 3.

2.4.1 Design

This experiment had a 2 x 2 x 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

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[47] Example taken from Lidz & Williams (2005), ex. 5.
[48] Example taken from Lidz & Williams (2005), ex. 6.

(present or absent), and context (bound-true vs. bound-false). Subjects were randomly assigned to one of eight experimental conditions corresponding to the four possible permutations of word order and benefactive affix in each of two contexts. As in Experiments 1 and 2, subjects each judged four test sentences and three control sentences in pseudorandom order. The above aspects of the experimental design are summarized in Table 2.3 below.

Table 2.3: Conditions for Experiment 3

Bound-true

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

Bound-false

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

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 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 Figures 2.6 and 2.9 as necessary for the distinction between the bound-true and bound-false story types, respectively.

2.4.2 Participants

96 four-year-olds (46M 50F, *M* 4;6, range 4;2-5;2) participated. Child subjects were run at Swami Vivekinanda and Pushkarini Preschools in Mysore, India. Several adult subjects were also run in order to confirm the patterns of grammaticality judgments discussed above. These patterns were confirmed without exception, but the results are not reported.

2.4.3 Stimuli

The four test verbs were *return*, *read*, *bring*, and *kick*. For the complete list of stimuli—including story summaries and test and control sentences with lead-ins—see Appendix A.

Bound-true test stories

These test stories naturally made the bound reading true and the free reading false, where the terms bound and free should be understood as describing the status of the pronoun in the test sentence with respect to the QNP. The Kannada bound-true quantifier-variable stories were essentially identical in plot to the English bound-true stories discussed in Experiment 2 but used different toys and props. Let us walk through an example for the test verb *return* in the DAT-ACC BEN condition.

(88)   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.

> *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 tan-du-**koTT**-aLu*
>
> *Rashmi   every boy-dat   3sm-gen horse-acc   return-ppl-ben.pst-3sf*
>
> *'Rashmi returned every boy his horse'*
>
> DAT-ACC BEN

Given the context in (88), 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). I predicted that child subjects would accept the bound reading in all test sentences except the one in which it is ruled out by the grammar, namely ACC-DAT unaffixed. All aspects of the stimulus design (e.g. gender differentiation, color coding to indicate possession, etc.) were identical to Experiment 2 with the exception that the lead-ins to the test stories did not mention any of the non-Agent characters.

Bound-false test stories

As one might expect, these test stories made the bound reading false and the free reading true, where the terms bound and free should be understood as describing the status of the pronoun in the test sentence with respect to the QNP. The Kannada bound-false quantifier-variable stories were minimally different from the Kannada bound-true stories in exactly the same ways that the English bound-false stories used in Experiment 2A differed from the English bound-true stories in Experiment 2. Let us walk through an example again for the test verb *return* in the DAT-ACC BEN condition.

(89)   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.

   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 tan-du-**koTT**-aLu*

   Rashmi   every boy-dat   3sm-gen horse-acc   return-ppl-ben.pst-3sf

   'Rashmi returned every boy his horse'

   DAT-ACC BEN

Given the context in (89), the bound reading of this test sentence is false since it is not the case that every boy eventually received his own horse. 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 bias toward the bound reading as we observed in Experiment 2 even though these stories made it false. If this were the case I 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). Otherwise, as was true for the bound-true test stories, all aspects of the stimulus design (e.g. gender differentiation, color coding to indicate possession, etc.) were identical to Experiment 2 with the exception that the lead-ins to the test stories did not mention any of the non-Agent characters.

Control stories

The control stories were essentially the same as those used in Experiment 1 and 2, though these had different toys and props and were in Kannada. The control 3 story was always followed by a true control sentence (as opposed to either true or false control sentences following the control 3 story in Experiments 1, 2, and 2A). The complete list of control stories can be found in Appendix A.

2.4.4 Results

Participants' responses were analyzed in terms of the percentage of bound readings, as in

Experiments 1 and 2. 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 I 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 Experiment 3 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%). The data were so categorical that statistical tests

were essentially unnecessary. Still, I 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, $t(22) = 12.21$, $p < .0001$; DAT-ACC unaffixed vs.

ACC-DAT unaffixed, $t(22) = 8.66$, $p < .0001$; ACC-DAT BEN vs. ACC-DAT unaffixed, $t(22) =$

11.48, $p < .0001$).

Figure 2.11: Mean percentage bound readings for child (n=48) subjects in Experiment 3 (bound-true)
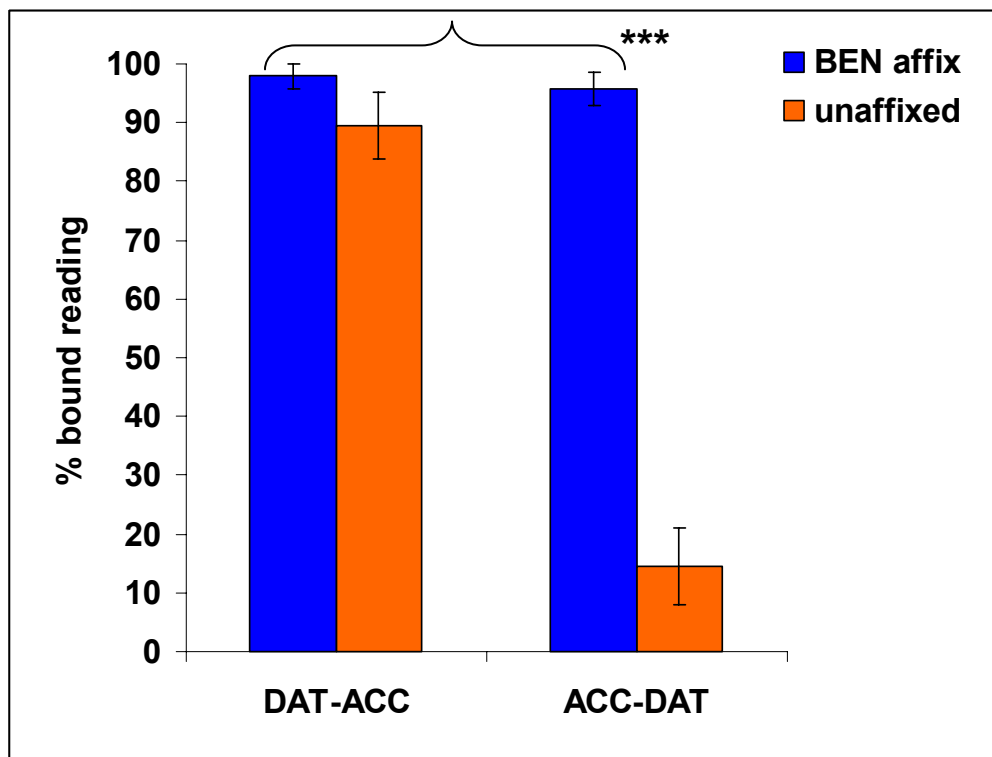
(*** < .001, independent samples *t* tests, all vs. ACC-DAT unaffixed)

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 acceptances across the board for all four test sentences. Alternatively, there could have been a bias toward the bound reading as we observed in Experiment 2 even though the bound-false stories made it false. If this were the case I predicted that children would reject all of the test sentences in which the bound reading was false but grammatically possible and accept the one test sentence in which the bound reading was true but

not grammatically possible, ACC-DAT unaffixed. The latter prediction was borne out by the
data. 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. I 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, $t(22) = 6.37$, $p < .0001$; DAT-ACC unaffixed vs. ACC-DAT unaffixed,
$t(22) = 5.39$, $p < .0001$; ACC-DAT BEN vs. ACC-DAT unaffixed, $t(22) = 6.63$, $p < .0001$).

*Figure 2.12: Mean percentage bound readings for child (n=48) subjects in Experiment 3
(bound-false)*
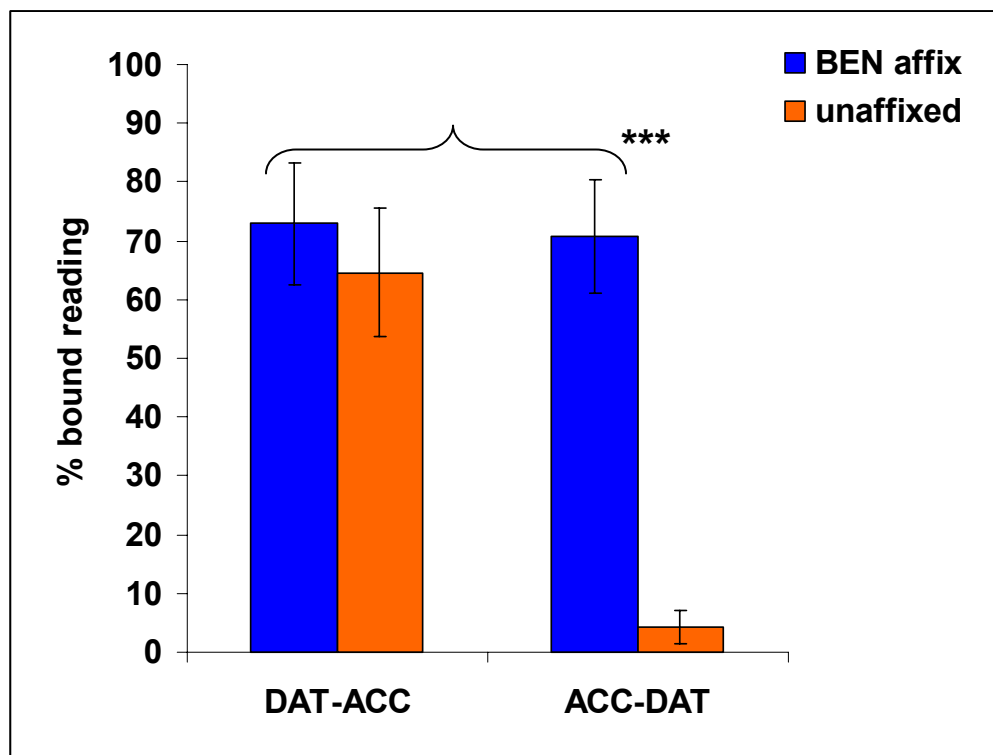
(*** < .001, independent samples t tests, all vs. ACC-DAT unaffixed)

Though Figures 2.11 and Figures 2.12 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.

2.4.5 Discussion

The results of Experiment 3—that Kannada-speaking four-year-olds show the adult pattern of grammaticality judgments for the quantifier-variable binding asymmetry in datives—drive home the point made in Experiments 1 and 2 that the dative verb phrase is configurational at age four in general just as it is for adults, and that the specific configuration involves the first dative object asymmetrically c-commanding the second in both dative constructions. Whereas a simple preference for forward binding, with the binder preceding the bound in the linear string, could technically explain the observed findings in Experiments 1 and 2, such a preference cannot explain the Kannada data. In Kannada, a QNP does not need to precede the pronoun that it grammatically binds as long as the benefactive affix is present. C-command, for which there are few surface cues in the input (if any), reliably determines binding possibilities as opposed to linear order, which is only a weak cue to the grammaticality of quantifier-variable binding in Kannada as we have seen. Kannada-speaking children have been shown to be quite aware of this fact, an awareness which seemingly can only flow from highly abstract knowledge of syntax on their part.

2.5 General discussion

Taken together, the evidence from Experiments 1-3 rather convincingly suggests that four-year-olds have sophisticated syntactic representations for datives. I have demonstrated that English-speaking four-year-olds show the adult pattern of grammaticality judgments for both a Principle C-based asymmetry in datives (Experiment 1) and an asymmetry involving quantifier-variable binding in datives (Experiment 2). Furthermore, I have shown that Kannada-speaking four-year-olds show the adult pattern of grammaticality judgments for an even more complex asymmetry involving quantifier-variable binding in benefactive and nonbenefactive ditransitives (Experiment 3). Assuming a standard configurational explanation of Principle C and quantifier-variable binding depending primarily on independently motivated grammatical notions like c-command, we can conclude that four-year-old native speakers of English and Kannada have hierarchical representations of the dative verb phrase in which the structurally higher dative object asymmetrically c-commands the lower dative object. In particular, Experiment 3 strongly confirms that c-command and not linear order is responsible for the observed asymmetries.

These results confirm the first representational claim associated with the syntactic account of dative verb argument structure that I adopted in Chapter 1, namely that the first object asymmetrically c-commands the second in both DO-datives and prepositional datives. I imagine that proponents of all similar neoconstructional approaches to dative argument structure would welcome such news. Additionally, monosemous accounts of the dative alternation positing a derivational relationship between dative constructions are more than compatible with the findings discussed above. In particular, Larson (1988) was the first to argue for dative syntactic representations that directly encoded asymmetric c-command, and this aspect of his account

receives strong support from the data. As for those readers committed to monostratal, non-derivational, or other types of theories who for whatever reason are not sympathetic to or convinced by the structural conclusions drawn from these experiments, I would urge that the data be taken seriously regardless. Surely we now know something more about datives than we did before from having considered them.

Should traditional constructionalists be counted as members of this last group? It is not always clear whether Construction Grammar (CG), for example, is actually incompatible with construction-internal syntactic structure or rather merely oriented more toward describing and explaining other aspects of the linguistic system. In the absence of evidence to the contrary, I assume that the former is closer to the truth. For example, recent work by Goldberg (2006) in the CG tradition emphasizes the relevance of information structure and language processing for several topics like island constraints and quantifier scope ambiguities that are more standardly given syntactic accounts in the generative literature. Goldberg (2006) is also careful to distinguish her version of CG both from "mainstream Generative Grammar" proposals which adopt derivational approaches to syntax (p. 205) and from Cognitive Grammar (e.g. Langacker 2003), which is described as explicitly reductionist with respect to syntactic features (p. 221). Regarding grammatical categories, Goldberg writes that "references to 'Subj,' 'Obj,' 'N,' and 'V' in CCxG [Cognitive Construction Grammar] (e.g. Goldberg 1995) are not an endorsement of strongly autonomous syntax, whereby these labels refer to irreducible grammatical primitives without corresponding meanings or functions. Rather, the labels simply capture a relevant level of description (p. 221)." I take such comments to indicate that construction-internal syntax for

datives of the type described in this chapter would be rather unexpected, unappealing, and

challenging to explain on the CG approach.

CHAPTER 3: THE SEMANTICS OF DITRANSITIVES

If, in some cataclysm, all of scientific knowledge were to be destroyed, and only one sentence passed on to the next generations of creatures, what statement would contain the most information in the fewest words? I believe it is the atomic hypothesis (or the atomic fact, or whatever you wish to call it) that all things are made of atoms…

Richard Feynman, 1995, *Six Easy Pieces: Essentials of Physics Explained by Its Most Brilliant Teacher*, p. 4

*If there is an indefinitely large stock of lexical concepts, and the basis for acquiring them must be encoded in a finite brain, we are forced to conclude that the innate basis must consist of a set of generative principles—a group of primitives and principles of combination that collectively determine the set of lexical concepts. This implies in turn that most if not all lexical concepts are composite, that is, that they can be decomposed in terms of the primitives and principles of composition of this innate **grammar of lexical concepts**.*

Ray Jackendoff, 1992, *Languages of the Mind*, pp. 25-26

Recall that the syntactic account of dative verb argument structure that I have adopted involves two main representational claims: (a) that the first internal argument asymmetrically c-commands the second; and (b) that the locus of constructional meaning differences for datives can be traced to the influence of a null preposition encoding possession for DO-datives, P_{HAVE}, and a different null preposition encoding location for prepositional datives, P_{LOC}. In the previous chapter, we saw abundant evidence for the first claim. The youngest children tested, four-year-olds, do indeed appear to have hierarchical, right-branching representations within the dative verb phrase. In this chapter, I turn our attention to the second representational claim, arguing based on data from a corpus study that English-speaking two-year-olds show awareness of

possessional and spatial primitives operative in DO-datives and prepositional datives, respectively, in their earliest productions.[49]

As described in Sections 1.2 and 1.3, many recent analyses of alternating dative verbs within the polysemy family posit that the frames in which their two internal arguments can appear are syntactically and semantically independent rather than transformationally related (Krifka 1999, 2003, Richards 2001, Harley 2002, 2004, Beck & Johnson 2004, *inter alia*). DO-datives are often semantically decomposed as "CAUSE to HAVE" (90a) and prepositional datives as "CAUSE to GO" (90b), roughly speaking.

(90) a. Pablo gave Matilde a conch   e.g. CAUSE *Matilde to* HAVE *a starfish*

   b. Pablo gave a conch to Matilde e.g. CAUSE *a starfish to* GO *to Matilde*

For example, Harley (2002) argues in favor of just this sort of decomposition in the syntax, which I endorse. Her dative representations are repeated below in slightly abridged form.

---

[49] This chapter expands upon but overlaps significantly with Viau (2006), in which the results of the corpus study to be discussed here were first published in condensed form.

(91)   *DO-dative*   *prepositional dative*

```
              v'                                                    v'
             /  \                                                  /  \
    v_CAUSE      PP                                      v_CAUSE       PP
               /   \                                                 /   \
             DP      P'                                            DP      P'
          Matilde   /  \                                        a conch   /  \
                   P     DP                                             P      PP
                P_HAVE  a conch                                       P_LOC  to Matilde
```
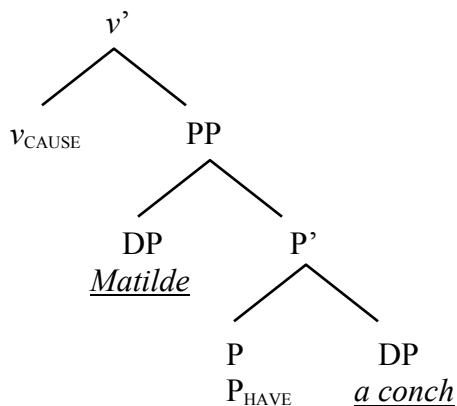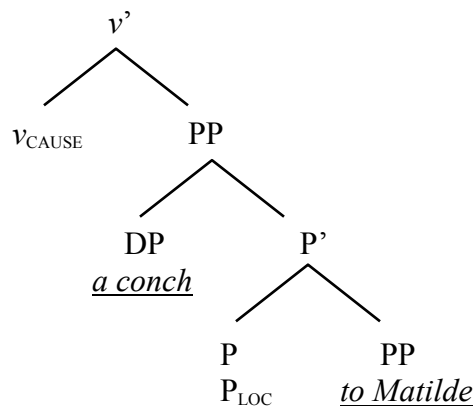
Beck & Johnson (2004) argue for similar syntactic decompositions, as shown in linearized form
in (92):[50]

(92)   a.   *DO-dative (p. 114, (54))*

       [vP Pablo [v' v [vP give [BECOME [HAVEP Matilde [HAVE a conch]]]]]]

       b.   *prepositional dative (p. 118, (79))*[51]

       [vP Pablo [v' v [vP [a conch]₁ give [BECOME [PP PRO₁ AT Matilde]]]]]]

"CAUSE to HAVE" and "CAUSE to GO" decompositions like these are also posited in other

polysemous approaches. For instance, Krifka (1999) argues for distinct dative semantic

representations that are more or less identical to the syntactic representations shown above:

---

[50] The diligent reader will notice that a CAUSE primitive is absent from the decompositional structures in (92). This is
because Beck & Johnson argue that CAUSE is contributed by the application of an interpretive rule, Principle R,
which allows *give* to combine with its small clause complement. The semantic subtleties are not germane to or
challenging for the argument here.
[51] The structure in ex. 79, from which my (92b) is adapted, is actually given for the verb *send* in the prepositional
dative by Beck & Johnson (2004). The authors argue toward the end of the paper that *give*-type and *send*-type
prepositional datives are represented similarly.

(93) a. *DO-dative (p. 265, (31b))*

∃e∃s [AGENT (e, Pablo) ∧ THEME (e, conch) ∧ CAUSE (e, s) ∧ s: HAVE (Matilde,

conch)]

i.e. There is an event e, with Pablo as Agent and a conch as Theme, that causes a

state s of Matilde having the conch.

 b. *prepositional dative (p. 265, (31a))*

∃e∃e' [AGENT (e, Pablo) ∧ THEME (e, conch) ∧ CAUSE (e, e') ∧ MOVE (e') ∧

THEME (e', conch) ∧ GOAL (e', Matilde)]

i.e. There is an event e, with Pablo as Agent and a conch as Theme, that causes

another event e' that is a movement event with the conch as Theme and Matilde

as Goal.

In addition, Goldberg (1995) takes the DO-dative construction to be a conventionalized pairing

of the causation of possession meaning with its grammatical form; likewise, the prepositional

dative construction pairs a causative change of location meaning with its own grammatical form,

as illustrated below (example repeated for clarity).

(94) *Examples of correlations between form and meaning (from Goldberg 2006: 73)*

	Form	*Meaning*	*Construction label*
a.	Subj V Obj Obl$_{path/loc}$	X causes Y to move Z$_{path/loc}$	Caused Motion[52]
b.	Subj V Obj Obj$_2$	X causes Y to receive Z	Ditransitive

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[52] Obl = Oblique argument.

Furthermore, Pinker (1989) encodes "CAUSE to HAVE" and "CAUSE to GO" meanings for dative verbs in distinct lexico-semantic event structures that strongly resemble those in (90).[53] Levin (2006)[54] argues for similar event structures, or event schemas, as well, as illustrated below:

(95) a. *DO-dative (p. 3, (8))*

$$[[x \text{ ACT}] \text{ CAUSE } [\text{BECOME } [y \text{ HAVE}_{<\text{POSS-TYPE}>} z]]]$$

b. *prepositional dative (p. 4, (9))*

$$[[x \text{ ACT}_{<\text{MANNER}>}] \text{ CAUSE } [y \text{ GO } [\text{PATH } z]]]$$

Whether the locus of dative polysemy is understood as syntactic (e.g. Harley 2002), constructional (e.g. Goldberg 1995), or lexico-semantic (e.g. Levin 2006), it is striking that the various representations of these meanings are so similar. In a sense, therefore, acquisitional data motivating such representations should be of some interest to everyone. The grain of the analysis offered in this chapter is coarse enough that the findings will not falsify any of the competing polysemous accounts of argument realization, strictly speaking, though they are arguably more compatible with some than with others. The findings do, however, pose a significant challenge for monosemous accounts of the dative alternation, as discussed in Section 3.4.1.

As we have seen, many polysemous accounts feature predicate decomposition, so it is worth our while to motivate the decompositional approach to some extent before going further. A detailed history of predicate decomposition, which dates back to McCawley (1968) and his analysis of kill as [CAUSE [BECOME [NOT [ALIVE]]]], is unnecessary and beyond the scope of this chapter; for now it will be enough to give the highlights. In broad strokes, decomposition is a

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[53] Pinker (1989) himself represents essentially this lexical information in tree form (p. 211).
[54] As mentioned in footnote 18, on Levin's (2006) and Rappaport Hovav & Levin's (2006) analysis *give*-type verbs (e.g. *give, offer, tell, show*) are monosemous, having only a caused possession meaning, and *send*-type verbs (e.g. *send, throw, kick, bring*) are polysemous, having both caused motion and caused possession meanings.

response to the fact that we perceive events to be hierarchically structured and internally

complex (e.g. Pietroski 2000). Linguistic evidence for the complexity of event structure comes

from many sources, e.g. the scope of adverbial modification (e.g. Pustejovsky 1991, von

Stechow 1991) and constraints on children's interpretations of novel causative verbs (e.g. Bunger

& Lidz 2004) to name a few. Decomposition allows us to chop this event-related complexity into

manageable bits, constraining theories of argument realization and thereby facilitating

generalization. Other approaches, e.g. Dowty (1991), rely on verbal entailments assigned to

event participants rather than structured event templates to achieve the same end, so

decomposition is not unique in this sense. Consider why Hale & Keyser (1991, 1993) propose to

decompose verbs into primitives like CAUSE and DO. On the view that verbs have lexical entries

listing which thematic roles they have to assign (THEME, GOAL, etc.), there seems to be no

explanation for the limited number of thematic roles available to verbs. What (beyond

hypothetical limits on storage space) is to stop there from being 1000 distinct thematic roles, as

opposed to the usual handful, if the roles are simply listed in the lexicon? Why not have roles

like KICKEE and ROMANTIC DESTINATION available to verbs alongside THEME and

GOAL? Hale & Keyser argue in effect that there appear to be few thematic roles because

thematic roles are an illusion, the product of arguments entering into structural relations with a

limited number of primitives, which combine to form and be pronounced as lexical verbs. I am

sympathetic to this argument[55] and simultaneously aware of the risk that comes with following it

to its most extreme logical conclusion. And yet, perhaps surprisingly to some, a reductionist,

decompositional approach according to which the diversity of possible dative verb meanings is

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[55] See Harley (1995) for much illuminating discussion of the general point.

stripped down to "CAUSE to HAVE" and "CAUSE to GO" is shown in this chapter to shed light on how children learn language.

Turning to verb learning, any decompositional approach poses several problems for the acquisition of dative verbs in English. First, syntactico-semantic primitives such as CAUSE, HAVE, and GO are not pronounced, so at best only indirect evidence about the decompositional nature of verbal representations in general is available to the child. Second, the specific primitives on which the representations of dative verbs arguably depend must be identified by the child. If these primitives could be shown to form part of children's early productive inventories, we would have evidence that they might plausibly be combined later into dative verbs and other complex predicates as many have proposed.

In what follows I address both issues using corpus data from 22 English-speaking children available through the Child Language Data Exchange System, or CHILDES (MacWhinney 2000). The argument is based on children's acquisition of verbs that have been independently shown to decompose into the primitives CAUSE, HAVE, GO, BE, and BECOME. To preview the principal findings, I confirm that prepositional datives are acquired late in language development relative to DO-datives (e.g. Snyder & Stromswold 1997, Campbell & Tomasello 2001). Explanations for the observed ordering effect based on input frequency or mean length of utterance are tested and ruled out. In addition, I find that the acquisition of CAUSE and HAVE is both necessary for and predictive of the acquisition of double-object datives, which contain both. Likewise, I find that the acquisition of CAUSE and GO is both necessary for and predictive of the acquisition of prepositional datives, which contain both. Importantly, these results suggest that children's dative representations do, indeed, involve semantic decomposition, and furthermore

that knowledge of semantic primitives helps to make the acquisition of datives possible. I return

to this last point in Chapter 4.

3.1 Logic of the argument from corpus data

In order to use dative verbs as a probe in evaluating the possible role of semantic decomposition

in early dative representations, I need to make certain assumptions about specific

decompositions. These are summarized in Table 3.1.

Table 3.1: Semantic decompositions assumed in corpus study

Primitive	*Instantiation*	*Example*
HAVE	DO-dative	[x CAUSE [z HAVE y]]
	get	[BECOME [x HAVE y]]
	have	[BE [x HAVE y]]
	want	*want* [x HAVE y]
GO	prepositional dative	[x CAUSE [y GO z]]
	directional *to,* e.g. *to the store*	[x GO XP$_{location}$]
CAUSE	DO-dative	[x CAUSE [z HAVE y]]
	prepositional dative	[x CAUSE [y GO z]]
	causative verbs,	[x CAUSE [y BECOME XP$_{state}$]]
	e.g. *open*, *close*, *break*, *grow*	

Concerning the primitive HAVE, I draw on the tradition going back to Benveniste (1966)

that possessive *have* is represented as BE+*preposition* crosslinguistically, and I assume that the

relevant preposition is HAVE in English (or, more precisely, P$_{HAVE}$), following Harley (2002).[56]

Recall from section 1.3 that Harley (2002) shows that the availability of the primitive HAVE in a

given language's morphosyntactic inventory is a necessary condition for the availability of the

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[56] I am ignoring any possible distinction between the primitive HAVE and Harley's abstract preposition P$_{HAVE}$. These two notational variants can and will be used interchangeably for our purposes.

DO-dative construction (which also depends on HAVE) in that language. In addition, the verb *get*

is analyzed as the unaccusative of *give*, containing BECOME and HAVE (e.g. Richards 2001).

Richards' argument is based on idiomatic constituency. The following examples gives a sense of

the argument's flavor:

(96)   The shit hits the fan ~ The shit has hit the fan

(97)   Mary gave Susan the boot ~ Susan got the boot

Just as the inflectional elements *–s* (in *hits*) and *has* are not part of the idiom in (96)—since there

is no perceived loss of idiomaticity despite the difference between the two variants—the lexical

verbs *give* and *get* are not argued to be part of the idiom in (97). Richards argues that the idiom

in (97) is actually "HAVE the boot." If *give* and *get* are decomposed into several parts, only one of

which, HAVE, is part of the idiom (and common to both verbs), then we have a natural account of

the behavior of this and related idioms.[57] Finally, I assume that the verb *want* means "want to

HAVE" when it takes a noun phrase complement (Harley 2004, see also den Dikken, Larson, &

Ludlow 1997 and Fodor & Lepore 1998). In brief, Harley argues against Fodor & Lepore's

(1998) proposal that *want* always introduces a lexical *have* relation into the VP it governs since

this proposal is unable to account for abstract event-denoting NP complements like *a kiss* (as in

John wants a kiss) that can be given or received but not precisely *had* because they cease to exist

once given or received. In other words, John doesn't want to *have* a kiss; he wants to *get* one. If

want introduces the abstract preposition P_{HAVE} instead, as Harley argues—thereby encoding a

state of affairs relevant to possession but neutral with respect to the duration of this state—then

the difference between *John wants a mango* and *John wants a kiss* that we see in paraphrases

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[57] Note that the prepositional dative *Mary gave birth to Nolan* does not have a paraphrase with *get*, e.g. **Nolan got birth*. This follows naturally if HAVE is part of the idiom for DO-datives but not for prepositional datives.

with *have* and *get* can be explained much more simply. Importantly, the primitive P$_{HAVE}$ / HAVE

(which is not synonymous with the word *have*) is argued here and elsewhere to be a subpart of

both the verbs *have* (BE + HAVE) and *get* (BECOME + HAVE) (e.g. Richards 2001, Beck & Johnson

2004). It is this piece of primitive meaning (HAVE) that *have* and *get* share that is assumed to be

present in the decomposition of *want*.

Concerning other primitives, I assume that directional *to* (as in *to the store*) includes a

locative primitive that I call GO in its representation. By GO I mean the bounded path of a motion

event as opposed to the eventive conceptual primitive GO in, for example, Jackendoff (1983) that

takes a path as its argument. I also assume (uncontroversially, it seems, judging from the

ubiquity of this particular decomposition) that causative verbs contain a primitive CAUSE that

embeds BECOME.

Combined with the widely adopted hypothesis that DO-datives decompose into "CAUSE

to HAVE" and prepositional datives into "CAUSE to GO," these assumptions lead to straightforward

predictions that were tested and confirmed using corpus data.[58] First, in terms of order of

acquisition, I expected to replicate the observation made by Snyder & Stromswold (1997) and

Campbell & Tomasello (2001) that DO-datives are acquired before prepositional datives in

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[58] Note, however, that there is some reason to suspect that the CAUSE primitive argued to be part of dative decompositions is not identical in meaning to the CAUSE primitive of lexical causatives like *open* and *break*. Not all dative verbs entail that the intended possession relation (in DO-datives) or location relation (in prepositional datives) be realized prior to speech time (see Section 1.1 for related discussion). *Give* does, but *send* doesn't (i-ii). In contrast, lexical causatives always entail realization of the caused result state prior to speech time (iii). The → symbol should be read as *entails* and the ×→ symbol as *does not entail*.

(i)   Kathy gave Lauren the Munny doll → Lauren received the Munny doll
(ii)   Kathy sent Lauren the Munny doll ×→ Lauren received the Munny doll
(iii)   Kathy broke the Munny doll → The Munny doll was broken

Causation in datives is often more indirect. Such CAUSE-related subtleties are not problematic for the more coarse-grained semantic analysis given in this chapter. I thank Jeffrey Lidz and Alexander Williams (p.c.) for bringing this to my attention.

English. Next, assuming that CAUSE is a component of DO-datives, I expected to find that our independent measure of the acquisition of CAUSE (causative verbs) is predictive of the acquisition of DO-datives. Thus, I predicted that the primitive CAUSE should be acquired earlier than or concurrent with DO-datives. By transitivity of inference, if DO-datives precede prepositional datives then it follows that CAUSE should be acquired earlier than prepositional datives. Similarly, assuming that HAVE is a component of DO-datives, I expected to find that our independent measure of the acquisition of HAVE (the verbs *get*, *have*, and *want*) is predictive of the acquisition of DO-datives. Thus, I predicted that the primitive HAVE should be acquired earlier than or concurrent with DO-datives, and as before if DO-datives precede prepositional datives in acquisition then it follows that structures containing the primitive HAVE should be acquired earlier than prepositional datives. Finally, assuming that GO is a component of prepositional datives, I expected to find that our independent measure of GO, directional *to*, is predictive of the acquisition of prepositional datives. Thus, I predicted that GO should be acquired after DO-datives but earlier than or concurrent with prepositional datives.

I also expected to observe correlations between the two dative constructions and the primitives into which they decompose. Specifically, I predicted that the acquisition of CAUSE would be correlated with that of both prepositional and DO-datives, since they both contain CAUSE. Likewise, I predicted a correlation between the acquisition of HAVE and that of DO-datives, which contain HAVE, and I predicted a correlation between the acquisition of GO and that of prepositional datives, which contain GO.

3.2 Analysis

In order to gain statistical power, I examined digitized transcripts of the spontaneous speech of 22 children, as shown in Table 3.2. This corpus included all of the American English-speaking children in CHILDES with more than two sessions around two years of age, i.e. ~ 2;0 (years;months), at the time the study was carried out.

The measure of acquisition for all structures examined was first clear use, which has been shown to be a robust and sensitive measure of grammatical competence for production data (e.g. Stromswold 1990). First uses were in all cases novel utterances (i.e. not unanalyzed routines or imitations) that were spoken clearly. I used *t* tests (correlated samples) and sign tests to verify predictions about the order in which structures were acquired and linear correlations to verify predictions about the relatedness of various structures. Unless otherwise noted, all reported *p* values are two-tailed.

Table 3.2: CHILDES corpus details

Child	Corpus	Ages	Sessions	Child lines
Abe	Kuczaj	2;4—5;0	210	22443
Adam	Brown	2;3—4;10	55	46716
Allison	Bloom 1973	1;4—2;10	6	2529
April	Higginson	1;10—2;11	6	2457
Emily	Nelson	1;9—3;0	6	274
Eric	Bloom 1970	1;8—1;10	3	2729
Eve	Brown	1;6—2;3	20	11624
Jimmy	Demetras Working	2;2—2;9	15	7159
June	Higginson	1;3—1;9	14	3262
Lew	Post	1;10—2;8	10	2527
Mark	MacWhinney	0;7—6;0	86	18956
Naomi	Sachs	1;1—5;1	93	17253
Nathaniel	Snow	2;5—3;9	30	13518
Nina	Suppes	1;11—3;3	52	33188
Peter	Bloom 1970	1;9—3;2	20	29497
Ross	MacWhinney	1;4—7;10	86	32713
Sarah	Brown	2;3—5;1	139	37634
She	Post	1;7—2;5	10	2762
Shem	Clark	2;2—3;2	40	18074
Steven	Feldman	0;5—2;9	16	2553
Tow	Post	1;7—2;5	10	3091
Trevor	Demetras Trevor	2;0—3;11	28	6975

My procedure for identifying dative verbs was virtually identical to the one used by Snyder & Stromswold (1997). Much of the coding was done manually to avoid unintentionally excluding non-adult-like utterances. First, the CLAN program was used to list all the words used by each child independent of grammatical form. These lists were then edited by hand, removing words that were impossible or extremely unlikely to be used as verbs, such as proper names or conjunctions. Next, I fed the edited lists back into CLAN, which returned all child lines with possible verbs in context, i.e. with the two utterances before and two utterances after each line. From that point I combed through the lines by hand to identify dative verbs.

The criteria for accepting dative verb tokens were as follows. Verbs followed by two noun phrases were coded as DO-datives. Verbs followed by a noun phrase and a prepositional phrase headed by *to* or *for* were coded as prepositional datives. *For*-datives were included because my own observations indicated that excluding them does not significantly change any experimental findings (as is demonstrated below in Section 3.3.1). Snyder & Stromswold (1997) excluded *for*-datives, while Campbell & Tomasello (2001) included them, and the results of these two studies with respect to the relative order of acquisition of the two dative constructions were identical. More importantly, as mentioned in Section 1.1.2, *for*-datives and *to*-datives exhibit similar types of semantic restrictions on the Goal argument in the double-object construction. Because this work is probing semantic regularities among datives and other verbs, it would have been inappropriate to exclude *for*-datives. However, I did require that prepositions be overt. In other words, I did not accept tokens like *read book Lia* as prepositional datives. Note, however, that Snyder & Stromswold (1997: p. 299) show for a substantial subset of the children whose transcripts were examined here that children generally do not go through a stage during which they produce preposition-less datives or prepositional datives with anomalous prepositions, meaning that my overt preposition requirement is not likely to affect the findings one way or the other. Obvious non-dative tokens were excluded, e.g. *she made soup for dinner*.

Concerning the criteria for first uses of other structures, I limited my search of causative verbs to four frequent verbs that participate in the causative/inchoative alternation: *open*, *close*, *break*, and *grow*. Post-verbal noun phrases were required for causative verbs in order to distinguish them from their inchoative variants, e.g. *the door opens*. For *have*, I was careful to exclude auxiliary verb uses, e.g. *where has car gone*. As with causative verbs, I required post-

verbal noun phrases for first uses of possessive *have* and for the verbs *get* and *want*. With respect to *get*, Bonnie Schwartz has noted that it may be important to separate standard *get* tokens from purely stative possessive tokens in which *get* is used to mean *have* (p.c.). It is unfortunately impossible to distinguish these two possible meanings for *get* in the absence of richer context than a corpus can provide and in the absence of disambiguating tense/agreement inflection, e.g. *I get another one* (more likely to be standard *get*) vs. *I gots another one* (more likely to be *have*-y *get*).[59] For directional *to*, I was careful to only include tokens where the entire prepositional phrase could be replaced with a locative pro-form (e.g. *there*) without significantly changing the meaning of the preceding verb.

3.3 Results

3.3.1 Order of acquisition

The corpus study revealed that the age of acquisition of DO-datives ranged from 1;7 (years;months) to 2;10, while the age of acquisition of prepositional datives ranged from 1;10 to 3;4. The average temporal gap between the two constructions was 3.3 months (median 3.7 months). Of the 22 children's transcripts examined, 17 children had examples of both dative constructions. For 15 of those children, the DO-dative was acquired first, whereas only one child acquired the prepositional dative first, and one other child acquired them within the same transcript (significant by sign test, $p < .001$). The mean ages of acquisition were 2;1.6 for DO-datives and 2;4.9 for prepositional datives. This difference was significant by *t* test, $t(16) = 3.93$,

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[59] For the curious, six of the 22 first uses of *get* took the form of *got,* e.g. *I got horn*, which is ambiguous between standard *get* and possessive *get*.

p = .0005. The ages of acquisition of DO- and prepositional datives were also strongly correlated with one another, r = .66, $t(15)$ = 3.43, p = .0043.

Excluding *for*-datives from the analysis, the results are substantially similar. The average temporal gap between dative constructions is somewhat larger at 3.7 months (median 3.9 months) due to the fact that for six children a *for*-dative is produced before a *to*-dative. The same 15 children for whom we have examples of both dative constructions acquired the DO-dative first, the same one child acquired the *to*-dative first, and the same other child acquired them within the same transcript (significant by sign test, $p < .001$). The mean ages of acquisition were 2;1.6 for DO-datives and 2;5.3 for *to*-datives. This difference remained significant by t test, $t(16)$ = 4.39, p = .0005. In addition, the ages of acquisition of DO- and *to*-datives were still strongly correlated with one another, r = .67, $t(15)$ = 3.43, p = .0030. As mentioned previously, since the inclusion or exclusion of *for*-datives does not matter statistically, I have chosen to include them among first uses of the prepositional dative. All future discussion of prepositional datives pertaining to the results of this corpus study will conflate *to*- and *for*-datives.

A closer look at the verbs used by the children in their first dative constructions shows that the type frequency is relatively high. Seven children used *give* in their first DO-dative, five used *get*, and there were several others (*read*, *feed*, *say*, *know*, and *eat*). A few of these tokens were non-adult-like over-generalizations, for instance *Jay said me no, know me my name,* and *I eat it my butter off.* As has been observed many times in past research, children are not strictly conservative in this respect; they do occasionally go beyond what they hear in terms of which

verbs are used in DO-datives (Bowerman 1982, Pinker 1989).[60] There is an even broader range

of verbs in the children's first prepositional datives. Four children used *get* in their first

prepositional dative, three used *read*, two used *give*, and there were many others (*make*, *bring*,

show, *take*, *buy, say, do,* and *find*). There is overlap between first uses of verbs in the two

constructions, with *get* being the most frequent alternator. For a complete list of dative first uses,

please see Appendix B.

Since a number of predictions follow from the relative order in which the DO- and

prepositional dative constructions are acquired, we need to evaluate the possibility that this order

is an effect of children's mean length of utterance (MLU) rather than their acquisition of

syntactic/semantic knowledge. If children's MLU delays their ability to utter prepositional

datives, which are on average one word longer than DO-datives due to the preposition, then we

would expect that the mean length of first uses of DO-datives would be significantly shorter than

that of prepositional datives. In order to test this prediction, the MLU (in words) for all dative

first uses was calculated. As it turns out, there is no statistical difference between the mean

length of children's first uses of DO-datives (mean MLU = 5 words) and prepositional datives

(mean MLU = 6 words), $t(16) = .79$, $p = .4429$, making it unlikely that MLU could account for

the early acquisition of DO-datives. However, MLU can not entirely be ruled out as a nuisance

variable. If we examine MLU averaged over children's first 100 utterances, then there is a

significant difference between the MLU of files containing children's first DO-datives (mean

MLU = 2.57 words) and that of files containing children's first prepositional datives (mean MLU

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[60] Interestingly, some overgeneralizations even seem to support the specific decompositions that I have argued for in this chapter. For example, Bowerman (1982) reports the following causative *have* example (used like *give*): *Will you have me a lesson?* (Christy, 4;0) (cited by Goldberg, Casenhiser, & Sethuraman 2004). And Pinker (1989: p. 24)) reports an apparent substitution of *be* for *have*: *I want be my eyes open* (unidentified child, 2;1) (cited by Becker 1997).

= 3.36 words), $t(17) = 3.94$, $p = .001$. What are we to make of this? If MLU were all that accounted for the order in which DO-datives and prepositional datives were acquired, then the fact that the MLU of first uses of datives does not fit this general picture would be unexpected. One would have to argue that the MLU filter responsible for the delayed acquisition of prepositional datives just happened to be absent for every child when they uttered their first datives. Another unexpected fact if MLU were solely responsible for the early acquisition of DO-datives is that the correlation between the ages of acquisition for DO-datives and prepositional datives remains marginally significant even after an MLU-based control measure, the age at which children's MLU first reaches 2.5, is partialed out (see Section 3.3.2). Simply put, while MLU differences at around 25 and 29 months do line up with the ages of acquisition for DO-datives and prepositional datives, respectively, it is extremely unlikely that MLU is the sole cause (or even a significant cause) of the observed ordering effect.

Another possible alternative explanation for the order of acquisition of dative constructions involves the frequency of the two dative constructions in the input. Perhaps parents use DO-datives more frequently than prepositional datives, causing children to acquire DO-datives earlier. If this is so, then we would expect that the relative frequency of DO-datives in caregiver speech would correlate with children's age of acquisition for DO-datives. We might also expect that the relative frequency of DO-datives in caregiver speech would correlate with the number of DO-datives used by children before they uttered their first prepositional dative. In order to test these predictions, all of the caregiver utterances in the transcripts covering the period from each child's first DO-dative token to that child's first prepositional dative token were examined by hand. Adult utterances with triadic dative verbs (i.e. those taking two internal

arguments) were coded as DO-datives or prepositional datives using the same criteria used for children's utterances. The number of DO-dative tokens used by children before their first prepositional dative tokens was determined as well. The results, summarized in Table 3.3 below, showed that DO-datives accounted for between 40% and 86% of the adult lines containing triadic dative verbs, the mean being 64%. There was no significant correlation between the relative frequency of DO-datives in adult speech and the ages of acquisition of either DO-datives or prepositional datives by the children (r values $< .20$, p values $> .10$). Moreover, there was no significant correlation between the relative frequency of DO-datives in adult speech and the number of DO-datives used by children before they uttered their first prepositional datives ($r = -.39$, $p = .12$). In fact, there was evidence of a trend toward an inverse correlation between these last two factors, with the highest numbers of child DO-dative tokens found in samples where adult speech contained among the lowest relative frequencies of DO-datives. Thus, I feel confident in rejecting the possibility that input frequency is responsible for DO-datives being acquired before prepositional datives, a possibility which Snyder & Stromswold (1997) reject as well.

Table 3.3: Age of acquisition and frequency of datives (years;months)

	Age of acquisition of DO-datives	Age of acquisition of prep datives	# DO-datives prior to first prep dative	% of adult datives that = DO-datives
Abe	2;5.10	2;5.14	2	.73
Adam	2;3.04	2;10.3	37	.44
Allison	1;10	2;10	3	.67
April	1;10.3	2;1	4	.71
Emily	---	1;10.18	---	---
Eric	---	---	---	---
Eve	1;8	1;11	23	.54
Jimmy	2;4.29	2;2.15	--- (-7)	.76
June	---	---	---	---
"Lew"	---	2;5.06	---	---
Mark	2;7.16	3;4.15	2	.63
Naomi	2;0.28	2;3.19	6	.53
Nathaniel	2;5.18	2;7.01	2	.59
Nina	1;11.29	2;1.15	3	.52
Peter	2;1	2;1	n/a	.63
Ross	2;7.18	2;8.05	1	.63
Sarah	2;10.2	3;1.1	3	.86
"She"	1;7.18	1;11.2	2	.79
Shem	2;2.16	2;3.02	2	.40
Steven	2;1.23	---	n/a	---
"Tow"	1;7.05	2;5.03	20	.59
Trevor	2;0.27	2;6.05	10	.79
mean	*25.61*	*28.94*	*8*	*.64*

--- Unattested

If MLU and input frequency do not explain the developmental delay in prepositional datives, what does? As mentioned in Section 1.4.4, one might plausibly attribute this delay to difficulties in the mapping between conceptual knowledge about bounded paths for transfer events and the linguistic expression of this knowledge due to (a) crosslinguistic variation in this mapping; and (b) the ambiguity of *to*, which is both directional and dative in many languages, including English. Another possibility is that children preferentially attend to animate Goals that

can be construed as possessors (e.g. the Goals in DO-datives) in their encoding of possession transfer events, and that this preference drives their acquisition of possessive and locative linguistic expressions. A third possibility is that prepositional datives depend on grammatical knowledge made available by two distinct parameter settings (one more than for DO-datives), as proposed by Snyder & Stromswold (1997) and Snyder (2001) and discussed in Section 1.4.3. The results described in this chapter do not seem incompatible with any of these possibilities and do not help us to choose among them, so I must leave the question open-ended for now.

Moving on, recall that if DO-datives mean "CAUSE to HAVE" and prepositional datives mean "CAUSE to GO," then both dative constructions depend on the prior acquisition of CAUSE. Since DO-datives are acquired first, one would expect CAUSE to be acquired earlier than or at around the same time as DO-datives (but crucially not after them) and before the prepositional dative is acquired. Let us consider DO-datives first. 18 children had examples of both causatives and DO-datives. For 10 of those children, causatives were acquired first, whereas four children acquired DO-datives first, and four children acquired causatives and DO-datives within the same transcript (not significant by sign test, $p = .18$). The mean ages of acquisition were 2;0.4 for causatives and 2;1.6 for DO-datives. As predicted, there was no statistical difference between the ages at which causative verbs (our instantiation of CAUSE) and DO-datives were acquired ($p > .10$). Concerning prepositional datives, 18 children had examples of both causatives and prepositional datives. For 15 of those children, causatives were acquired first, whereas no children acquired prepositional datives first, and three children acquired causatives and prepositional datives within the same transcript (significant by sign test, $p < .0001$). The mean ages of acquisition were 2;0.4 for causatives and 2;4.9 for prepositional datives. Again as

predicted, causative verbs are acquired significantly earlier than prepositional datives, $t(17) =$ 4.67, $p = .0003$.

What about the primitive HAVE? Recall that only DO-datives contain HAVE in their representations. Since DO-datives are acquired first, one would expect HAVE to be acquired at around the same time as DO-datives if not earlier (but crucially not after DO-datives), and certainly before the prepositional dative is acquired. Let us consider our three instantiations of HAVE (*want*, *have* and *get*) one by one, starting with *want*. With respect to DO-datives, 18 children had examples of both *want* and DO-datives. For nine of those children, *want* was acquired first, whereas four children acquired DO-datives first, and five children acquired *want* and DO-datives within the same transcript (not significant by sign test, $p = .126$). The mean ages of acquisition were 1;11.7 for *want* and 2;1.6 for DO-datives. As predicted, there was no statistical difference between the ages of acquisition of the verb *want*, which I have assumed contains HAVE, and double-object datives ($p > .10$). With respect to prepositional datives, 19 children had examples of both *want* and prepositional datives. For 15 of those children, *want* was acquired first, whereas only one child acquired prepositional datives first, and three children acquired *want* and prepositional datives within the same transcript (significant by sign test, $p <$ .001). The mean ages of acquisition were 1;11.7 for *want* and 2;4.9 for prepositional datives. Again as predicted, *want* is acquired significantly earlier than prepositional datives, $t(18) = 3.30$, $p = .0044$.

I now turn to possessive *have*. With respect to DO-datives, 18 children had examples of both *have* and DO-datives. For 10 of those children, *have* was acquired first, whereas six children acquired DO-datives first, and two children acquired *have* and DO-datives within the

same transcript (not significant by sign test, *p* = .454). The mean ages of acquisition were 2:0.7

for *have* and 2;1.6 for DO-datives. As predicted, possessive *have,* which I have assumed contains

the primitive HAVE, is acquired at the same time as DO-datives, statistically speaking (*p* > .10).

With respect to prepositional datives, 19 children had examples of both *have* and prepositional

datives. For 14 of those children, *have* was acquired first, whereas three children acquired

prepositional datives first, and two children acquired *have* and prepositional datives within the

same transcript (significant by sign test, *p* = .01). The mean ages of acquisition were 2;0.7 for

have and 2;4.9 for prepositional datives. Again as predicted, *have* is acquired significantly earlier

than prepositional datives, *t*(18) = 3.45, *p* = .0032.

Focusing now on *get, w*ith respect to DO-datives, 18 children had examples of both *get*

and DO-datives. For nine of those children, *get* was acquired first, whereas one child acquired

DO-datives first, and eight children acquired *get* and DO-datives within the same transcript

(significant by sign test, *p* < .05). The mean ages of acquisition were 1;11.1 for *get* and 2;1.6 for

DO-datives. As predicted, *get*, which I have assumed contains HAVE, is acquired significantly

before DO-datives (*p* = .0197). With respect to prepositional datives, 19 children had examples

of both *get* and prepositional datives. For 17 of those children, *get* was acquired first, whereas no

children acquired prepositional datives first, and two children acquired *get* and prepositional

datives within the same transcript (significant by sign test, *p* < .0001). The mean ages of

acquisition were 1;11.1 for *get* and 2;4.9 for prepositional datives. Again as predicted, *get* was

acquired significantly earlier than prepositional datives, *t*(18) = 5.12, *p* = .0001.

Concerning the primitive GO, recall that only the prepositional dative has GO in its

representation. Since DO-datives are acquired before prepositional datives, one would expect GO

(instantiated by directional *to*) to be acquired after DO-datives but at around the same time as prepositional datives. With respect to DO-datives, 18 children had examples of both *to* and DO-datives. For eight of those children, DO-datives were acquired first, whereas six children acquired *to* first, and four children acquired DO-datives and *to* within the same transcript (not significant by sign test, p = .581). The mean ages of acquisition were 2;1.6 for DO-datives and 2;4 for *to*. As predicted, directional *to*, our instantiation of GO, was acquired significantly after double-object datives, $t(17)$ = 2.47, p = .0249. With respect to prepositional datives, 17 children had examples of both *to* and prepositional datives. For nine of those children, *to* was acquired first, whereas five children acquired prepositional datives first, and three children acquired *to* and prepositional datives within the same transcript (not significant by sign test, p = .2297). The mean ages of acquisition were 2;4 for *to* and 2;4.9 for prepositional datives. Again as predicted, directional *to* was acquired at the same time as prepositional datives, statistically speaking ($p >$ .10).

Table 3.4 below lists all of the ages of acquisition upon which the ordering effects that I have just described in prose are based.

Table 3.4: First uses (years;months)

	prep. datives	directional *to*	DO-datives	causatives	poss. *have*	*want*	*get*
Abe	2;5.14	2;5.07	2;5.10	2;5	2;5	2;4.24[‡]	2;4.24[‡]
Adam	2;10.3	2;3.04[‡]	2;3.04[‡]	2;3.04[‡]	2;4.3	2;4.3	2;3.04[‡]
Allison	2;10	2;4	1;10	1;10	2;4.7	2;4.7	1;10
April	2;1	2;9	1;10.3[‡]	2;1	2;1	2;1	1;10.3[‡]
Emily	1;10.18	---	---	---	1;11.2	2;0.1	1;10.18
Eric	---	---	---	---	---	1;9.14	1;9.14
Eve	1;11	1;11	1;8	1;7	1;6[‡]	1;6[‡]	1;6[‡]
Jimmy	2;2.15[‡]	2;4.28	2;4.29	2;2.15[‡]	2;2.15[‡]	2;2.15[‡]	2;2.15[‡]
June	---	---	---	---	1;9	---	1;8
"Lew"	2;5.06	---	---	2;3.25	2;7.07	2;5.06	2;1.22
Mark	3;4.15	2;6.14	2;7.16	2;6.14	2;1.05	1;2.11	2;1.05
Naomi	2;3.19	1;11.06	2;0.28	1;9.07	1;11.3	1;9.26	1;6.16
Nathaniel	2;7.01	2;5.18[‡]	2;5.18[‡]	2;5.18[‡]	2;5.18[‡]	2;5.18[‡]	2;5.18[‡]
Nina	2;1.15	1;11.24	1;11.29	1;11.16[‡]	1;11.16[‡]	2;0.1	1;11.16[‡]
Peter	2;1	2;1	2;1	1;9.08[‡]	2;0.7	2;0.7	1;9.7[‡]
Ross	2;8.05	2;6.17	2;7.18	1;5.23	1;4.11[‡]	1;4.11[‡]	1;5.23
Sarah	3;1.1	3;1.24	2;10.2	2;4.26	2;5.30	2;3.26	2;3.19[‡]
"She"	1;11.2	2;4.01	1;7.18[‡]	1;9.2	1;9.2	1;7.18[‡]	1;7.18[‡]
Shem	2;3.02	2;4.05	2;2.16[‡]	2;2.16[‡]	2;3.16	2;2.16[‡]	2;2.23
Steven	---	2;2.2	2;1.23	1;11	1;11	1;11	2;1.23
"Tow"	2;5.03	2;5.03	1;7.05[‡]	1;11.21	1;9.09	1;7.05[‡]	1;7.05[‡]
Trevor	2;6.05	2;0.27[‡]	2;0.27[‡]	2;1.05	2;0.27[‡]	2;0.27[‡]	2;0.27[‡]
mean	*2;4.94*	*2;3.95*	*2;1.61*	*2;0.43*	*2;0.66*	*1:11.67*	*1;11.09*
median	*2;4.98*	*2;4.03*	*2;1.23*	*2;0.72*	*2;0.68*	*2;0.19*	*1;11.09*

[‡] *First use occurs in earliest transcript*
--- *Unattested*

In summary, every predicted ordering effect has been borne out by the data. I have replicated a principal finding reported in previous work, namely that DO-datives are acquired significantly earlier than prepositional datives in English, using the largest corpus assembled to date. I have confirmed that the primitive CAUSE (as instantiated by causative verbs) is acquired

earlier than or concurrent with DO-datives (but not significantly after them) and earlier than prepositional datives. Similarly, the primitive HAVE (as instantiated by *want*, *have*, and *get*) has been found to be acquired earlier than or concurrent with DO-datives (but not significantly after them) and earlier than prepositional datives. In addition, I have shown that the primitive GO (instantiated by directional *to*) is acquired after DO-datives but earlier than or concurrent with prepositional datives. These findings are compatible with a general picture of the acquisition of expressions like datives in which children must acquire knowledge of unobservable primitives needed to represent the meanings of words before they acquire and produce the words themselves. Specifically, children acquire CAUSE and HAVE, which are needed to produce DO-datives, relatively early. Once these components have both been acquired, they may be combined, and DO-datives appear soon afterward. Likewise, once the primitive GO has been acquired later on, it may subsequently be combined with CAUSE to produce prepositional datives.

Ambridge et al. (2007) have suggested that this type of analysis would receive stronger support if our instantiations of HAVE were acquired *before* DO-datives, and our instantiation of GO *before* prepositional datives, instead of the relevant constructions being simultaneously acquired. In other words, simultaneous acquisition of a primitive and a complex predicate depending on that primitive does not make the strongest possible case for decompositional learning. I grant the general point but am not concerned because the case for such learning is strong nevertheless. First, it should be pointed out that one of our three instantiations of HAVE, the verb *get, is* in fact acquired significantly earlier than DO-datives. Unless children need converging evidence from multiple sources that HAVE must be posited, *get* could suffice, so Ambridge et al.'s objection doesn't apply to my analysis of HAVE constructions. But what about

the apparently simultaneous acquisition of GO and prepositional datives? On my view, in order to use a primitive in a linguistic expression, a child must (a) know about its existence and (b) have a construction of the right type to instantiate it. Any number of factors pertaining to (b) could lead to what looks like simultaneous acquisition. In addition, it may be that the corpora have insufficiently frequent samples to show subtle ordering effects that might exist such as that between GO and prepositional datives. Plus, it is almost certainly true that the expression I chose as an instantiation of GO, directional *to*, is not the only expression that the child might plausibly consider to be evidence for GO, i.e. that the relevant ordering effect *was* there to be measured and could have been measured if only a more exhaustive list of candidate expressions instantiating GO had been examined. In light of these considerations, I feel confident that the observed order of acquisition strongly confirms my predictions about dative decompositions.

3.3.2 Correlations

The predicted relationships between structures containing primitives like CAUSE, HAVE, and GO also fared well in the analysis. Recall that both prepositional datives and DO-datives contain CAUSE. Thus, one expects that the acquisition of CAUSE will be correlated with the acquisition of both dative constructions. As predicted, the ages of children's first uses of causative verbs were significantly correlated with those of their first uses of both DO-datives ($r = .52$, $r^2 = .28$, $t(16) = 2.47$, $p = .0260$) and prepositional datives ($r = .50$, $r^2 = .25$, $t(16) = 2.29$, $p = .0367$). This suggests that the acquisition of CAUSE helps predict the acquisition of the two dative constructions that depend on it in their representations. A control measure was also obtained for each child: the age at which the child's MLU first reached or exceeded 2.5 words. This measure

can be used to check for the possibility that two given structures are acquired together simply due to general developmental factors rather than to decompositional relatedness. In particular, the MLU = 2.5 milestone signals the "grammar explosion" that occurs between Brown's (1973) Stages II and III. That said, our MLU control measure was not correlated with the acquisition of causatives, so any role it might have played in the correlations between causatives and datives can be thought of as insignificant and is not subtractable by partial regression.

In addition, I predicted that the acquisition of HAVE would be correlated with the acquisition of DO-datives. As predicted, the ages of children's first uses of *get* were significantly correlated with those of their first uses of DO-datives ($r = .57$, $r^2 = .33$, $t(16) = 2.81$, $p = .0134$). The ages of children's first uses of possessive *have* were only marginally correlated with those of their first uses of DO-datives ($r = .39$, $r^2 = .15$, $t(16) = 1.70$, $p = .1095$). There was no correlation between their first uses of *want* and those of DO-datives ($r = .16$, $p > .10$). However, the first uses of *get*, *have*, and *want* were all very strongly correlated with one another: *get* ~ *have* ($r = .83$, $r^2 = .68$, $t(19) = 6.397$, $p < .0001$); *want* ~ *have* ($r = .83$, $r^2 = .69$, $t(18) = 6.262$, $p < .0001$); and *get* ~ *want* ($r = .68$, $r^2 = .47$, $t(19) = 4.089$, $p = .0008$). When the contribution of the MLU control measure is partialed out, a marginally significant portion of the remaining variance in the ages of acquisition for DO-datives can still be accounted for by the ages of acquisition for *get* ($r = .40$, $r^2 = .16$, $t(15) = 1.74$, $p = .1011$), but not by the ages of acquisition for *have* ($r = .14$, $r^2 = .02$, $t(15) = .54$, $p = .5971$). Concerning the interrelatedness of our HAVE constructions, when the contribution of the MLU control measure is partialed out, *get* still accounts for a significant portion of the variance in the ages of acquisition for *have* ($r = .79$, $r^2 = .62$, $t(18) = 5.14$, $p =$

.0001) as does *want* for *have* (r = .80, r^2 = .63, t(17) = 5.08, p = .0001) and *get* for *want* (r = .61, r^2 = .37, t(18) = 3.09, p = .0070).

What should we make of the findings for HAVE? The ages of acquisition for the three instantiations of HAVE are all very strongly correlated with each other even when the contribution of the MLU control measure is partialed out. This is convincing evidence that their representations are interdependent, as I have argued. The ages of acquisition for two of the three instantiations of HAVE, *get* and *have*, are correlated with those of DO-datives, as predicted, but when the contribution of the MLU control measure is partialed out, the correlation between *get* and DO-datives becomes only marginally significant and the correlation between *have* and DO-datives becomes nonsignificant. There are at least two possible explanations for this finding. First, DO-datives may not in fact depend on the availability of HAVE. Second, DO-datives may depend on HAVE and some other factor or factors such that HAVE alone is not sufficient to predict when DO-datives will become available to the child in acquisition. Of course, I am already committed to the second possibility by virtue of having assumed that DO-datives depend on the primitives CAUSE and HAVE (as opposed to HAVE alone). Furthermore, surely the mere presence of these primitives is not all that the child needs in order to acquire DO-datives. These primitives must also be combined through root compounding, as Snyder (2001) suggests, or some other operation that the child has to master. The correlation between HAVE and DO-datives looks stronger when viewed from this perspective.

Nevertheless, we should consider the challenge from our partial regression result seriously. The first possibility—that DO-datives do not depend on HAVE—predicts that HAVE and DO-datives could be acquired in either order. The second possibility, in contrast—that DO-

datives depend on HAVE plus something else—predicts that no child should produce DO-datives without first having produced at least one instantiation of HAVE (*get*, *have*, or *want*). This second prediction was checked against the data from all 18 children for whom we have DO-dative examples, and it is 100% correct. Of these 18 children, 10 produced a HAVE construction earlier than their first DO-dative, and eight produced a HAVE construction in the same transcript as their first DO-dative. No child produced their first DO-dative before their first HAVE construction. Thus, despite some noise in the data—something that should not be too surprising considering the subtlety of the correlations involved between constructions sharing unpronounced bits of meaning—the data taken together suggest that the acquisition of HAVE partially predicts the acquisition of DO-datives.

Finally, I predicted that the ages of acquisition of GO would be correlated with those of prepositional datives. As predicted, the ages of children's first uses of our instantiation of GO, directional *to,* are significantly correlated with those of their first uses of prepositional datives ($r = .50$, $r^2 = .26$, $t(15) = 2.27$, $p = .0394$). However, when the contribution of the MLU control measure is partialed out, the correlation between GO and prepositional datives becomes nonsignificant ($r = .17$, $r^2 = .03$, $t(14) = .64$, $p = .5325$). As with HAVE above, there are at least two possible explanations for this finding. First, prepositional datives may not in fact depend on the availability of GO. Second, prepositional datives may depend on GO and some other factor or factors such that GO alone is not sufficient to predict when prepositional datives will become available to the child in acquisition. As before, I am already committed to the second possibility by virtue of having assumed that prepositional datives depend on the primitives CAUSE and GO (as opposed to GO alone). In addition, it is quite possible that other GO constructions that I failed

to measure are better, more salient, and/or more reliable instantiations of GO than directional *to*.

Finally, it is not unreasonable to suspect that the MLU control measure is too strong in this case

for the simple reason that directional *to* and prepositional datives overlap morphologically.

Nevertheless, we should once again consider the challenge from our partial regression

result seriously. Of the 17 children for whom we have examples of both directional *to* and

prepositional datives, nine produced directional *to* earlier than their first prepositional dative, and

three produced directional *to* in the same transcript as their first prepositional dative. Five

children produced their first prepositional dative before their first directional *to* token. But one of

these five children, April, has an inexplicable eight-month gap between the transcript in which

she produces her first prepositional dative (age 2;1) and the very next transcript, in which she

produces her first token of directional *to* (age 2;9), raising the possibility that sampling frequency

has skewed her data with respect to GO constructions. When April's results are excluded, the

predicted correlation between the ages of children's first uses of directional *to* and those of their

first uses of prepositional datives becomes much stronger ($r = .64$, $r^2 = .41$, $t(14) = 3.12$, $p =$

.0075). And now even when the contribution of the MLU control measure is partialed out, GO

accounts for a marginally significant portion of the variance in the ages of acquisition for

prepositional datives (r = .44, $r^2 = .19$, t(13) = 1.77, p = .1002). Thus, on the whole the data

suggest that the acquisition of GO at least partially predicts the acquisition of prepositional

datives.

In summary, it is clear that if we adopt an account of dative verbs according to which

these verbs are associated with two distinct meanings, and moreover if we take their semantic

decompositions seriously, then given the assumptions in Table 3.1 we make correct predictions

about the acquisition of structures that are only related in ways very difficult to observe. The observed statistical correlations indicate that the acquisition of DO-datives depends on the acquisition of CAUSE and HAVE. In addition, the acquisition of prepositional datives, acquired later in language development, depends on the acquisition of CAUSE and GO.

Before concluding this section, I would like to consider another potential objection to these findings raised originally by Ambridge et al. (2007). What if everything is simply correlated with everything at around age two due to general linguistic or cognitive development? The obvious response is that the MLU control measure discussed above addresses this possibility. When I subtracted its influence through partial regression, the relevant predicted correlations remained at least marginally significant. Moreover, I can report that the ages of acquisition for *get*, *have*, and *want* were not significantly correlated with those for prepositional datives. The ages of acquisition of DO-datives *were* correlated with those for both directional *to* (r = .53, r^2 = .28, t(16) = 2.482, p = .0253) and prepositional datives (r = .66, r^2 = .44, t(15) = 3.43, p = .0043). However, in my opinion this is not necessarily problematic. Recall that CAUSE is shared by both dative constructions, by hypothesis, and that directional *to* and the prepositional dative are acquired simultaneously, both significantly after DO-datives. When the possible influence of the MLU control measure is partialed out, the correlation between DO-datives and directional *to* becomes nonsignificant (r = .091, r^2 = .01, t(15) = .35, p = .7312), and the correlation between DO-datives and prepositional datives weakens, becoming only marginally significant (r = .44, r^2 = .19, t(14) = 1.82, p = .0902). When the possible influence of CAUSE is also partialed out, the correlation between DO-datives and prepositional datives becomes nonsignificant (r = .32, r^2 = .10, t(13) = 1.20, p = .2527). Thus, the two correlations that might

have seemed problematic on my analysis can be explained by general developmental factors in the case of DO-datives and directional *to* and by a combination of these factors and the influence of CAUSE in the case of DO-datives and prepositional datives.

3.4 Discussion

The evidence is clear that two-year-old children show awareness of distinctive possessional and spatial meaning in DO-datives and prepositional datives, respectively, in their earliest productions. I take this as confirmation that the syntactico-semantic primitives that are posited in the decompositions of dative verbs are really there. In particular, these findings provide empirical support for the second main representational claim following from the syntactic account of dative verb argument structure that I have adopted: namely that the locus of constructional meaning differences for datives can plausibly be traced to the influence of the null preposition P_{HAVE} in DO-datives and P_{LOC} for prepositional datives, assuming that these are interpreted in the relevant ways. More generally, however, these findings should be compatible with all polysemous approaches to dative argument structure positing a distinction along the lines of possession vs. location. Nothing about the order of acquisition or correlational findings presented in this chapter proves conclusively that the HAVE primitive in DO-datives is P_{HAVE} or that P_{HAVE} heads a prepositional phrase with a possessor Goal in its specifier position and a Theme c-commanded by the Goal as its complement (e.g. Harley 2002). In light of the results discussed in Chapter 2, I believe that we are led to this conclusion (as I argue in Chapter 4) but the results from this corpus study alone do not get us there by themselves. The primitives HAVE and GO could exert their influence at the constructional level, reflecting the meaning of "basic-

level scenes" or event types expressed by the DO-dative and prepositional dative constructions (e.g. Goldberg 1995). Alternatively, HAVE and GO could be conceived of as purely semantic predicates, themselves neutral with respect to the syntactic configuration of their arguments (e.g. Krifka 1999 or Levin 2006).

In these last few subsections I narrow the field, so to speak, by addressing two aspects of competing accounts that would appear problematic given the results of this corpus study.

3.4.1 Challenges for monosemous accounts

If DO-datives and prepositional datives had the same meaning, more or less, then how would we explain the fact that DO-datives pattern with HAVE constructions and prepositional datives pattern with GO constructions during the course of language acquisition? I can think of no obvious answer here. It seems clear that monosemous accounts of dative argument structure (e.g. Larson 1988, Baker 1988, Aoun & Li 1989) will have difficulty accommodating this result. Larson himself has suggested one avenue to explore: that children preferentially attend to events in which humans are salient, i.e. DO-datives in which the Goal is affected and must be interpreted as a prospective possessor (p.c.). This type of general cognitive strategy leaves unexplained how and why DO-datives (but not prepositional datives) privilege possessor Goals in the first place. Additionally, if children were relying on some kind of rule that DO-datives are for affected humans and prepositional datives are for affected objects, we would expect to find evidence of this in their productions. However, the Goals in children's first uses of both DO- *and* prepositional datives that I gathered in this corpus study are overwhelmingly human, with two exceptions for DO-datives and only one exception for prepositional datives (see Appendix B). At

any rate, on standard versions of monosemous accounts, the two dative variants are argued to be derivationally related (with case assignment typically driving the alternation) in part due to the Uniformity of Theta Assignment Hypothesis (or UTAH, Baker 1988), which requires alternating variants involving the same thematic roles to have the same underlying structure. This core presupposition—that DO-datives and prepositional datives are thematic paraphrases—is undermined by the data. In comparison, polysemous approaches to dative argument realization offer a natural explanation for the observed pattern of acquisition: "CAUSE to HAVE" and "CAUSE to GO" meanings are associated with two distinct patterns of dative argument realization.

A further challenge faces particular monosemous accounts arguing that the DO-dative is derived from the prepositional dative (e.g. Larson 1988) as opposed to the reverse (e.g. Aoun & Li 1989). Recall that on Larson's account the DO-dative is derived by a passive-like operation applied to the lower VP in which the Goal (minus its prepositional case-marking) is raised and the Theme is generated in an adjunct position. One might wonder what order of acquisition would follow from such an account. You could make a coherent case for predicting that the prepositional dative would be acquired first, being unmarked, while the DO-dative would be acquired later once the necessary transformational machinery had been identified and implemented. You could even explain simultaneous acquisition of the two dative constructions if the knowledge required to derive the DO-dative was in place prior to the acquisition of the prepositional dative. What you would not expect is for the prepositional dative to be acquired significantly after the DO-dative, since the DO-dative is supposedly derived from the prepositional dative, and yet this is exactly the pattern of acquisition that we have demonstrated, replicating previous work.

3.4.2 The internal structure of constructional meaning

As documented in Section 1.1.2, the alternation between double-object and prepositional dative constructions is not random for dative verbs. On the contrary, subtle but systematic meaning differences have long been observed. The data discussed in this chapter suggest that children as young as two years are aware of this as well. Such evidence has led many linguists within different theoretical frameworks to reject the idea that the two argument orders are monosemous and to adopt alternative polysemous accounts like those discussed previously.

Overarching this discussion, of course, is a debate on what constructions are in natural language and how syntactic patterns like the dative alternation are represented and learned. I would like to call attention to one particular account in this debate that has been increasingly influential within the polysemy family, Construction Grammar (CG). On this account, the meaning difference between, for example, *Pablo sent Matilde a conch* and *Pablo sent a conch to Matilde* is attributed not exclusively to individual verbs or parts of verbs, but also to the DO- and prepositional dative constructions that these verbs appear in. This much is compatible with the type of neoconstructionalist account I have defended. In addition, however, proponents of CG argue that the meanings of these constructions have no internal structure *per se*. To reiterate[61], Goldberg (1995) writes that "Phrasal patterns are considered constructions if something about their form or meaning is not strictly predictable from the properties of their component parts or from other constructions (p. 4)."

The evidence presented in this chapter shows quite the opposite, namely aspects of the meaning of dative verbs that *are* predictable from the properties of their component parts. I have

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[61] See Section 1.2 for the first mention of this issue.

shown that dative verbs share semantic primitives with other verbs and expressions, and that their acquisition is linked as a result, predictable based on when the primitives are acquired. Can CG accommodate these findings with respect to the interrelatedness of constructions, for example, of causatives and DO-datives? CG does in principle allow for ways of generalizing across constructions. One possibility would be to appeal to what are called inheritance links in the CG literature. Inheritance links specify in what ways non-conflicting information is shared between related constructions. These links are thought of as mental objects in their own right that can be related hierarchically.[62] In Figure 1 below, reproduced from Goldberg (1995: p. 109), some of the hypothesized inheritance links between constructions (represented by the shaded boxes) are illustrated:[63]

Figure 3.1: Some inheritance links in Construction Grammar

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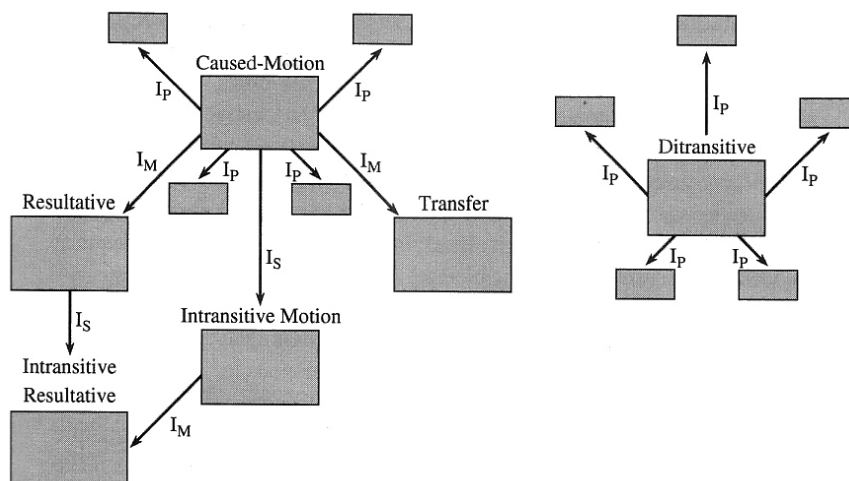
[62] Alternatively, Michaelis & Ruppenhofer (2001) describe inheritance links as "entrenched connections within an associative memory (p. 61)."

[63] I_P stands for *polysemy link* (capturing the relation between a particular sense of a construction and extensions of this sense that are not considered independent constructions), I_S indicates a *subpart link* (for when one construction is a proper subpart of another and exists independently), and I_M represents a *metaphorical extension link.* I_I is an instance link (not shown but used to indicate when a construction is a special case of another).

Among the various types of inheritance links, the one that would come closest to describing how causatives and DO-datives are shown to be related in our corpus results is I_S, a *subpart link*. Figure 2, reproduced from Goldberg (1995: p. 78), illustrates one such subpart link between the Caused-Motion and Intransitive Motion constructions. Shared information is represented in italics.

Figure 3.2: Example of a subpart link in Construction Grammar
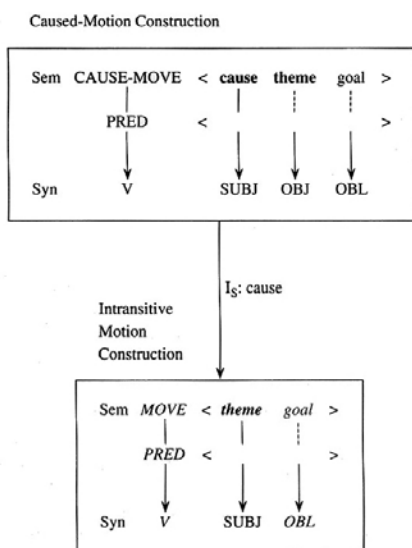
Subpart links specify that one construction is a proper subpart of another. However, the CAUSE primitive that I have assumed is part of the meaning of causatives is not a subpart of the meaning of DO-datives in this sense. Causatives are represented as CAUSE+BECOME, and BECOME has not been argued or shown to form part of the representations of DO-datives. In order to represent the link between causatives and DO-datives in a CG-friendly way, it seems to me that one would have to either argue that the primitive CAUSE is an independent construction in and of itself (thereby enabling the use of the subpart link) or posit a new type of link describing cases of partial overlap between constructions. Neither solution seems in keeping with the spirit of CG,

which places a premium on concrete, surface-oriented generalizations. This is as true for CG accounts of adult linguistic competence as it is for CG and other usage-based accounts of language acquisition, as will be discussed in Chapter 4.

What would a coherent theory of the acquisition of dative verbs look like that can accommodate both the asymmetric c-command facts described in Chapter 2 and the semantic decomposition facts described above? The next chapter is devoted to exactly this issue.

CHAPTER 4: LEARNING DITRANSITIVES

*The trouble is that an observer who notices **everything** can learn **nothing**, for there is no end of categories known and constructable to describe a situation. Indeed, not only learnability theorists but all syntacticians in the generative tradition appeal to the desireability of narrowing the hypothesis space lest the child be so overwhelmed with representational options and data-manipulative capacity as to be lost in thought forever.*

Lila Gleitman, 1990, *The Structural Sources of Verb Meanings*, p. 12

Thus far I have focused mainly on establishing what children know about dative constructions. We might think of the findings from Chapters 2 and 3 as newly erected landmarks—standing now at ages four and two, respectively—along a developmental path concerning dative-related knowledge. But where does this knowledge come from? How do children move from one landmark to the next? In this chapter, I take a broader view of the data and unpack their implications for language acquisition to the extent possible. Let us begin with a reminder of what we have learned ourselves.

4.1 Taking stock

In Chapter 2, we saw experimental evidence in support of the claim that dative constructions as they are represented by four-year-old English- and Kannada-speaking children have complex internal structure. In particular, both DO-dative and prepositional dative verb phrases were shown to be configured hierarchically, with the first dative object asymmetrically c-commanding the second. The crosslinguistic data from Experiment 3 allowed us to rule out an alternative

explanation for the findings, namely that a simple interpretive preference based on linear order could itself be responsible for the observed asymmetry instead of the structural notion invoked earlier, c-command.[64] In Chapter 3, the results of a corpus study indicated that two-year-old English-speaking children show awareness of distinctive possessional and spatial meaning in DO-datives and prepositional datives, respectively, in their earliest productions. This awareness on the part of the learner was argued to be largely independent of the possible contributions of MLU or input frequency.

In my opinion, these findings, when considered together, are useful in deciding among competing theories of argument realization. For simplicity's sake, and in view of where the discussion has led us, we can think of such theories as being of three main types:

(98)   Approaches to representing the dative alternation (adapted from (31))

a.   *Monosemy*: Dative verbs have a *single meaning* but two (often transformationally-related) syntactic structures (e.g. Larson 1988).

b.   *Polysemy—Constructionalist*: Dative verbs' meanings are invariant, but the meanings of the constructions they appear in are *distinct*, and *constructions are arbitrary pairings of form and meaning* (e.g. Goldberg 1995, CG).

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[64] The argument goes through on the assumption that learners of both English and Kannada (and all other languages) bring the same resources and abilities to the task of language acquisition. It would be contrary to volumes of previous research to suppose otherwise, i.e. to argue that c-command is only relevant to learners of a particular language, e.g. Kannada. To do so would also amount to abandoning any hopes of constructing a unified theory of how children learn the world's languages—a step no one should take lightly. Importantly, by aspiring to defend such a unified, or universalist, theory we need not deny the importance of language-specific differences in terms of the input children receive. Rather, we need only situate these language-specific differences within the general context of linguistic development.

c. *Polysemy—Neoconstructionalist*: Dative verbs' meanings are invariant, but the meanings of the constructions they appear in are *distinct*, and *constructions are structurally encoded meanings, themselves built up compositionally* (e.g. Harley 2002).

The asymmetric c-command facts from Chapter 2 are quite compatible with both monosemous accounts (98a) and with neoconstructionalist polysemous accounts (98c). Whether they are compatible with constructionalist accounts like CG (98b) depends on whether or not these accounts posit construction-internal syntax of sufficient complexity. As discussed earlier, this is difficult to determine. Logically, it is possible to envision a constructionalist theory that maintains both the arbitrary aspect of the pairing between form and meaning and hierarchical structure within that form, though the role of the syntax in such a theory would be little more than decorative, playing no role in determining constructional meaning.[65] However, I know of no concrete CG proposals that fit this description. In the absence of such proposals, and given the evidence discussed toward the end of Chapter 2 suggesting that this type of proposal is unlikely to emerge anyway for theory-internal reasons, I must conclude that traditional constructionalist accounts would have considerable difficulty explaining the experimental results detailed in Chapter 2.

Moving on, the results pertaining to semantic decomposition from Chapter 3 are compatible with most polysemous accounts that encode a dative-related distinction between

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[65] Incidentally, due to its arbitrary form-meaning pairings, a constructionalist theory would also have no way of predicting which dative construction has a possessional meaning and which has a non-possessional meaning in a given language. Essentially, from the point of view of CG, it is an accident that the DO-dative or the Kannada benefactive are possessional in ways that other variants are not. In contrast, the systematicity of these form-meaning pairings falls out naturally on a neoconstructional account in which dative constructions consist of specific combinations of meaning-bearing primitives.

possession and location (98b-c), though problems for constructionalist accounts like CG were noted toward the end of that chapter. In particular, the ability of CG to capture the interrelatedness of various constructions with respect to primitives such as CAUSE is in doubt. In any case, the findings are without question incompatible with monosemous accounts of dative argument realization (98a) because they challenge a core presupposition of such accounts, namely that DO-datives and prepositional datives are thematic paraphrases. It is hard to avoid the conclusion that monosemous accounts would face significant obstacles in explaining the results of Chapter 3.

The conclusion that one is led to is the following: of the three types of theories competing to explain dative argument realization, neoconstructionalist polysemous theories seem to most naturally account for the available developmental evidence. A neoconstructionalist account assumes the type of syntactic representations (involving asymmetric c-command of the second dative object by the first) that are necessary to explain the results of Chapter 2. In addition, the primitives arranged within these representations according to a neoconstructionalist theory express the semantic distinctions needed to distinguish the DO-dative from the prepositional dative in just the ways that two-year-olds were observed to distinguish them in Chapter 3.

Of course, all sorts of qualifications could be made here. I want to be careful to emphasize that I do not believe any account to be definitively ruled out by the evidence presented in preceding chapters. However, at the very least it is now clear that a neoconstructionalist theory of the type described and defended in this dissertation makes reliable predictions about what children's representations for dative verbs look like. At this point one's

thoughts turn to learnability. What constraints does a neoconstructionalist theory impose on language acquisition? The next section addresses this question directly.

4.2 A neoconstructional account

Recall that Harley (2002), our representative neoconstructionalist account, posits the following representations for the DO-dative and prepositional dative in English:
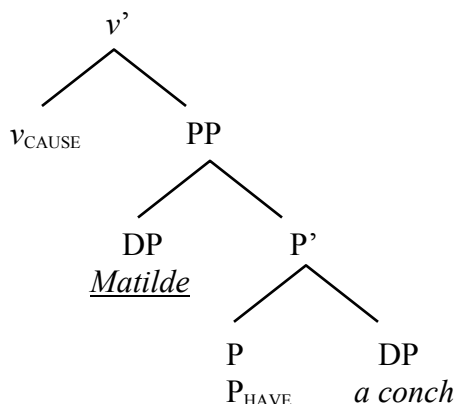
(99)   *DO-dative*   *prepositional dative*
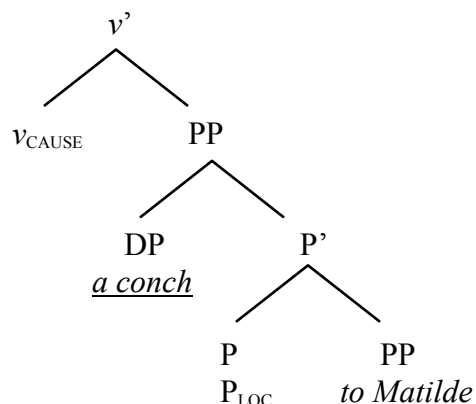
The equivalent representations for Kannada would differ in certain respects (right-headed vP, the presence of the maximal projection BENP where appropriate, etc.) but would share key features such as asymmetric c-command and the primitives instantiating HAVE and GO.

Before considering the details of a proposal for how children might come to possess such abstract representations, we should step through exactly what knowledge they presuppose on the part of the child. Starting with the primitives themselves, this knowledge would include at least the following elements by age two in no particular order:

(100)   Decompositional knowledge presupposed

      a.   The possibility of predicate decomposition

      b.   The identity of relevant primitives (e.g. CAUSE, HAVE, GO)

      c.   Constraints on how these primitives may combine (e.g. CAUSE+HAVE but not

                HAVE+CAUSE)

Is it plausible to believe two-year-olds would have access to this knowledge? I believe so. For instance, the primitives involved in predicate decomposition (100a) do have surface reflexes in some languages, e.g. CAUSE realized as *ase/sase* in Japanese:[66]

(101)   a.   Calvin-ga Hobbes-o ik-**ase**-ta

             Calvin-nom   Hobbes-acc   go-cause-past

             'Calvin made Hobbes go'

      b.   Calvin-ga Hobbes-ni piza-o tabe-**sase**-ta

             Calvin-nom   Hobbes-dat   pizza-acc   eat-cause-past

             'Calvin made Hobbes eat pizza'

Generally speaking, however, these primitives are not pronounced, so it would be difficult to argue that decomposition could be inferred by children crosslinguistically based on the input that they receive. Instead, we might think of it as a manifestation of the type of abstract structure that is commonly posited in the generative syntax tradition. Importantly, abstraction is just as much a feature of natural language as it is of any particular theory used to describe and explain it. To very coarsely paraphrase the poverty of the stimulus argument, what you hear is not always what you get. For instance, consider the relative opacity (from a learner's perspective) of utterances like "What a smart boy you are! You found one! Yes, you did!" that a parent might conceivably

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[66] The example is from Harley (1996), ex. 2.

make while playing with her child and some colored balls. The exclamative in this utterance involves fronting of a non-subject *wh*-phrase (leaving a trace in its base position),[67] *one* is anaphoric to either N° (e.g. *ball*) or N' (e.g. *red ball*) depending on context,[68] and *you did* is an example of VP ellipsis that must be resolved (*did what?*). Given the ubiquity of opacity and null structure both in such utterances and more broadly, I do not find it overly controversial to argue that a predisposition toward recognizing one type of null structure, predicate decomposition, is part of children's biological endowment as concerns the language faculty, i.e. Universal Grammar (UG). We might think of decomposition as a simple design feature of the machinery for representing language that we are born with, as Wierzbicka (e.g. 1972, 1995) and others have. The alternative—that decomposition might be the outcome of learning—is not inconceivable. However, to cite one relevant study, Bunger & Lidz (2004) have shown that two-year-old children use decomposition as a guide in learning novel causative verbs. Combined with the findings from Chapter 3, these results suggest that decomposition drives learning and is not merely the result of it.

What about the identity of the primitives themselves (100b) and constraints on how they may combine (100c)? Jackendoff (1992: ch. 3) explicitly argues that approximations of these are both innately specified as well. In answer to the rhetorical question *What is a word meaning?,* he proposes that such a meaning must be conceived of in terms of states in a combinatorial system governing conceptual structure. The job of this combinatorial system is to assemble conceptual structures from primitives. The range of humanly possible conceptual structures is argued to be determined by a set of conceptual well-formedness rules. Now in order for a child to learn a

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[67] See Pesetsky & Torrego (2001) for a somewhat tangential discussion of the subject/non-subject asymmetry in fronted exclamatives.

[68] See Lidz, Waxman, & Freedman (2003) for evidence that 18-month-olds have command of the syntax for *one*.

word on Jackendoff's view, the child must at a minimum select a conceptual structure for the

word and link it with its linguistic expression. The rules constraining the space of possible

concepts that the child selects from cannot be learned, Jackendoff argues (following Fodor

(1975)), because they are the foundation upon which learning is based. Similar reasoning obtains

for the primitives that are combined into conceptual structures governed by these rules. For

example, Jackendoff argues at length that possessional concepts could not be learned from

spatial concepts despite certain parallels that exist between them; possession must instead be

discovered among other germ concepts rather than built from scratch. This is not the time or

place for a full exposition of every issue raised by such arguments. However, it seems to me that

we can easily extend the essence of Jackendoff's reasoning about conceptual structures to

syntactico-semantic structures[69] and thereby find a measure of support for our

neoconstructionalist account involving innate specification of primitives like CAUSE and HAVE

and constraints on how they may be combined in the syntax. To be concrete, I suggest that

children do not have to learn CAUSE, HAVE, and GO; rather, they must simply discover how these

primitives connect up with linguistic expressions and how they are pronounced. I also suggest

that children never entertain the idea that there could be a HAVE+CAUSE verb (as opposed to

CAUSE+HAVE) or a CAUSE verb without an embedded result state. With the combinatorics

inherently restricted, other noticeable factors can more easily come into play in the acquisition of

datives, such as the number of arguments and their linear order, simplifying the problem of

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[69] I am not recommending a return to the days of Generative Semantics, when Deep Structure was thought of as identical to meaning (e.g. McCawley 1968, Postal 1970, Lakoff 1971). A neoconstructionalist account does posit relatively more isomorphism between syntax and semantics, broadly construed, than other types of accounts, but the isomorphism between these levels is far from absolute. To give just one example, constructional meaning, represented syntactically, must be augmented by verbal meaning in order to produce the observed differences between, for example, *throw* the ball to John and *kick/roll/bring* the ball to John. Precisely how syntactic decompositional structures should be interpreted is a promising topic for future research, as is the nature of the relationship between the syntactico-semantic primitive HAVE and the concept of possession.

which possible meanings go with which decompositional structures. I will have more to say about this in a moment.

In short, there is some precedence for the claim that two-year-old children possess roughly the knowledge of semantic decomposition that is presupposed by a neoconstructionalist account, and further that they are born with this knowledge. Let us move on to the syntactic configurations in which semantic primitives are embedded on a neoconstructionalist account, configurations that presuppose the following:

(102)   Configurational knowledge presupposed

      a.   Principles of X-bar theory (i.e. syntax assembly rules)

      b.   The c-command relation

      c.   An inventory of possible lexical (N, V, Adj) and functional (v, Det, Infl) categories

All three elements have been independently argued to form part of UG. Concerning (102a), these are basic architectural principles describing a schema for building well-formed syntactic trees such as the one below.

(103)

```
            XP
           /  \
     specifier  X'
              /  \
            X'    adjunct
           /  \
          X    complement
        head
```
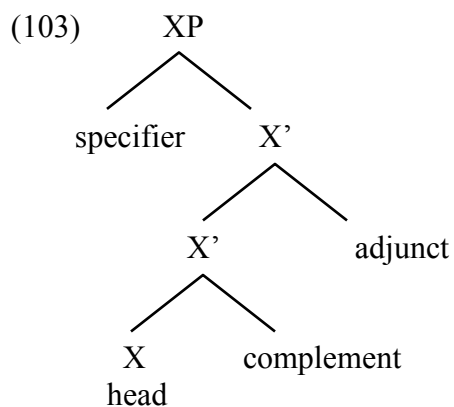
Pinker (1994) and Jackendoff (2002), among many others, have argued that X-bar principles are innate, and Becker (1997) has reported that bare tree structures are likely the minimum amount of syntax that must be in place innately in order for a computational model of the learner to discover that *have* is represented as BE+preposition. C-command (102b) is another prime candidate for a structural relation that should be innately specified (as argued by Crain & Lillo-Martin 1999, *inter alia*). Though there have been many attempts to derive c-command from more fundamental principles of grammatical organization (Hornstein 2005 is a good introduction), I am unaware of any serious attempts to model how a child might infer c-command from the input. Any such model would have to take into account a recent experimental result showing that English-speaking children as young as 30 months are aware of Principle C, which depends on the notion of c-command (Lukyanenko, Conroy, and Lidz in preparation). In brief, children in this study were familiarized to both a reflexive event (Katie patting Katie in the presence of Anna) and a non-reflexive event (Anna patting Katie). At test, children looked reliably longer at the reflexive event when they heard "Look, she's patting herself. Find the one where she's patting herself," and they looked reliably longer at the non-reflexive event when they heard a Principle C violation as in "Look, she's patting Katie. Find the one where she's patting Katie." Finally, concerning the inventory of possible lexical and functional categories (102c), some linguists who have argued that these do not need to be learned include O'Grady (1997) and Wunderlich (2004).

Of course, one should be conservative in attributing knowledge to UG, but as we have seen nothing is qualitatively new in the above lists of knowledge about semantic decomposition or syntactic configurations that our neoconstructionalist account presupposes. That said, I would like to propose an extension to item (100c) to the effect that primitives like HAVE and GO are

choosy not only about how they combine with other primitives but also about what types of arguments occur in the specifier and complement positions of the phrases that they head. Specifically, HAVE would require a Possessor in specifier position and a Theme in complement position (104a), while GO would require the opposite configuration, a Theme in specifier position and a Goal in complement position (104b).

(104)   *a. DO-dative*   b. *prepositional dative*

```
            PP                                                    PP
           /  \                                                  /  \
         DP    P'                                              DP    P'
     Possessor /  \                                          Theme  /  \
              P    DP                                              P    PP
            P_HAVE  Theme                                        P_LOC  Goal
```
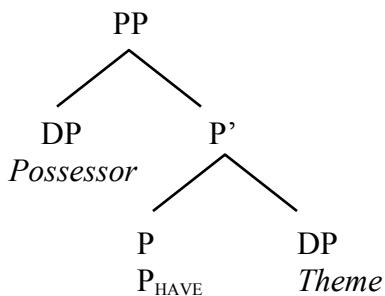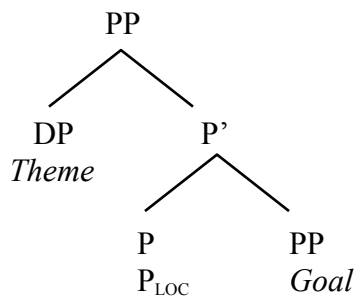
This simple extension to one bit of innately specified configurational knowledge profoundly simplifies the process of learning datives for children. In particular, it enables a deductive learning account, which can be summarized as follows:

(105)   *Deductive learning for datives*: The configurational properties of dative constructions follow deductively from their semantics. Once learners identify which dative construction counts as possessional (e.g. the English DO-dative, the Kannada benefactive), they can easily deduce the correct syntactic configuration for that construction.

In essence, the child who is able to determine which dative variant encodes possession gets that variant's syntax for free.

Crucially, for this deductive account to succeed it must be the case that children are able to discern meaning differences between DO-datives and prepositional datives. We know from

Chapter 3 that two-year-old children behave as if they do discern such meaning differences. However, it is important to consider *how* children might come to discern them. Recall from Section 1.1.2 that these meaning differences do not often rise to the level of entailments. Typically, the DO-dative merely implies possession transfer, as shown in the example repeated below. Recall that similar contrasts exist in Kannada as well.

(106) a.   Pablo taught Spanish to the students, but they didn't learn a thing

          b.   # Pablo taught the students Spanish, but they didn't learn a thing

In order for the child learner to make use of such subtle distinctions, the child would have to (a) be sufficiently exposed to instructive utterances like those in (106) in which possible possession-related inferences are denied; (b) be sufficiently exposed to discourses in which the relative infelicity of one of the utterances, in this case (106b), is made plain; and (c) be capable of noticing the infelicity of (106b). I have no data that shed light on the frequency with which conditions (a) and (b) are met in English or Kannada. Condition (c) could well be plausibly met. I certainly would not want to deny that children are capable of determining when datives are used felicitously at age two or younger. To quote Gleitman (1990), "If you think there's something that infants can't or won't notice, look in the next issue of *Developmental Psychology* and you will probably discover that someone proved they can (p. 11)." Nevertheless, given the uncertain status of conditions (a) and (b), I have to assume that many (perhaps even the majority of) utterances with typical dative verbs would be uninstructive with respect to dative meaning differences. Thus, I think it is unlikely that attending solely to contrasts like that in (106) would draw children's attention to the relevant distinctions to the point where they could decide which dative construction is possessional.

One alternative account of how children could make this decision would involve attending to an additional cue, namely the relative frequency with which optionally ditransitive verbs like *read*, *get*, *make*, and *bake* (as opposed to obligatorily ditransitive verbs like *give*, *show*, *send*, and *bring*) occur in dative constructions.[70] Assume that the child is aware that *read*, for instance, is typically used as a simple transitive, e.g. *Kathy read the book*. When the child encounters her first ditransitive use of *read*, e.g. *Kathy read me the book*, she hazards a guess as to its meaning. Further experience with ditransitive uses of *read* will either confirm the child's tentative hypothesis or falsify it, forcing her to revise her interpretation. If the child finds that, after a certain amount of exposure to the relevant input, an optionally transitive verb like *read* is skewed toward the DO-dative in its distribution, she could plausibly associate the notion of transfer that ditransitive *read* communicates with the DO-dative construction itself. At this point she would have enough evidence to decide that the DO-dative is possessional, and she could deduce the syntax of the DO-dative as described in (105).

Unfortunately, the corpus study in Chapter 3 cannot tell us whether the distribution of optionally ditransitive verbs is skewed in the right direction for this alternative account to work because verb-specific data from caregivers was not collected. However, Campbell & Tomasello (2001) did collect such data for a subset of the children whose transcripts were examined in Chapter 3 and their caregivers.[71] Ignoring differences between their criteria for accepting dative tokens and mine, we can use Campbell & Tomasello's findings as a starting point. The findings that they report exclude dative verbs that children produced in only one dative construction (as

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[70] I thank Jeffrey Lidz (p.c.) for suggesting this possibility.
[71] The transcripts examined in Campbell & Tomasello (2001) were those for Eve (ages 1;6 to 2;3), Adam (2;3.4 to 4;10.23), Sarah (2;3.5 to 5;1.6), Peter (1;9.7 to 3;1.21), Abe (2;4.24 to 5;0.11), Naomi (1;2.29 to 4;9.3), and Nina (1;11.16 to 3;3.21).

opposed to both), so they do not tell the whole story. Nevertheless, what they reveal is that each

of the seven children was exposed to and produced examples of at least one optionally

ditransitive verb used in a dative construction.[72] Five of these seven children heard an optionally

ditransitive verb used disproportionately often in the DO-dative frame by caregivers: Peter—

make 66% (2:1) DO-dative; Naomi—*read* 71% (5:2) DO-dative; Adam—*buy* 66% (2:1) DO-

dative; Abe—*get* 79% (78:21) DO-dative; and *Sarah*—read 92% (11:1) DO-dative, *get* 75%

(24:8) DO-dative, and *make* 100% (10:0) DO-dative. However, three of these five children also

heard additional optionally ditransitive verbs that were used disproportionately in the

prepositional dative frame by caregivers: Peter—*get* 66% (2:1) prepositional dative; Adam—

read 86% (12:2) prepositional dative, *make* 62% (5:3) prepositional dative, and *get* 71% (5:2)

prepositional dative; and Abe—*read* 80% (8:2) prepositional dative. An additional two children

received essentially uninformative input concerning optionally ditransitive verbs: Eve—*read*

50% (4:4) DO-dative; and Nina—*read* 52% (43:39) DO-dative. If children were basing their

decision on the distribution of all optionally ditransitive verbs as opposed to that of each one

individually, then the observed distributions would be problematic. Keep in mind though that

these distributional data are averaged across years worth of transcripts, most of which were

recorded after children's first uses of dative constructions, i.e. too late to be formative.

In the end, what we find in Campbell & Tomasello's data does not wholly confirm that

children could be using the distributions of optionally ditransitive verbs to determine which

dative construction is possessional; optionally ditransitive verbs are uninformative as a class for

five of the seven children whose transcripts were examined. At the same time, they do not

disprove that children could be using the distributions of optionally ditransitive verbs to

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[72] See Campbell & Tomasello 2001, Table 2, pp. 258-259.

determine which dative construction is possessional; it may be the case that the very first optionally ditransitive verbs heard by the children in dative constructions *are* skewed toward the DO-dative but were not reported by Campbell & Tomasello (2001) since the verbs did not alternate, or that these critical examples were simply too early in the children's development to be recorded or occurred after the tape recorder had been turned off. More work remains to be done before we can pass judgment, particularly with respect to the input that Kannada-speaking children receive.[73]

Leaving aside the question of how children come to decide which dative construction involves possession, I will now give an example of what would happen after this decision has been made according to our deductive learning account. In English, the answer could not be simpler. After deciding that the DO-dative has a possessive meaning, children would select the one dative syntactic configuration in their UG toolkit with the appropriate number of arguments that contains a possessional primitive, HAVE. The alternative configuration would go by default to the prepositional dative. In Kannada, where children must choose from among four surface word orders instead of two (DAT-ACC BEN, ACC-DAT BEN, DAT-ACC, and ACC-DAT) children would need additionally to determine which of the orders with BEN is the underlying order, and likewise for the orders without BEN. But here the syntax would provide children with answers. The child who has decided that the benefactive (marked with BEN) is possessional needs only to consult the syntactic configuration for the benefactive to see that the Possessor c-

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[73] Another potential cue to the possessional nature of one particular dative construction that is available in Kannada, but not English, is the presence of overt benefactive verbal morphology. Interestingly, Pesetsky (1995) has proposed that in English the DO-dative (unlike the prepositional dative) contains a null verbal affix (see Section 1.3). Even if this were true, it does not seem likely that English-speaking children could rely on a null affix as a cue to possessional meaning due to its being unpronounced (at least not to the extent that Kannada-speaking children might rely on BEN).

commands the Theme. This uniquely identifies the DAT-ACC BEN order as the underlying form for the benefactive and suggests that the ACC-DAT BEN order must be derived by movement. Likewise, the child who has decided that the non-benefactive ditransitive is not possessional can determine from the syntax that the Theme c-commands the Goal, which means that the ACC-DAT order must be underlying with the DAT-ACC order derived by movement.

Of course I am ignoring many other important aspects of verb learning in this broad sketch of a deductive learning proposal for datives, e.g. how children learn that a verb labels a basic-level category of actions instead of a specific action (e.g. Waxman 1990 for nouns) or what sources of information are most helpful for children in learning verbs in general (Piccin 2007, Piccin & Waxman 2007). Like any researcher, I stand on the shoulders of many others. My main goal has simply been to outline a learning proposal that is compatible with neoconstructionalist theories of argument realization, which have been shown to most naturally explain the findings from Chapters 2 and 3 concerning what children's representations for dative verbs look like. In the next section I contrast this deductive learning proposal with an imagined alternative, usage-based account.

4.3 A usage-based alternative

Suppose that everything about your grammar has to be learned by observation. This is the starting point for a usage-based account (e.g. Tomasello 1992, 2000, 2003, Goldberg, Casenhiser, & Sethuraman 2004, 2005, among many others). Since there is no Universal Grammar on this view of the world, linguistically speaking, other factors must be appealed to in order to explain how children learn what they have been observed to know. Typically,

proponents of usage-based accounts argue that the stimulus is not nearly as poor as has been argued by nativists. In addition, they often stress the power of general cognitive strategies like frequency tracking, categorization, analogy, associative learning, and intention-reading. In cases where even the combination of rich, informative input and potent cognitive resources might run the risk of underdetermining the grammar (e.g. predicate decomposition), one usage-based response would be to reduce the relative abstractness of the grammar. So, in anticipation of this response, let us temporarily abandon all theoretical assumptions that have been adopted so far—bidding a fond farewell to c-command and CAUSE+HAVE—and see how far we can go. I will confine myself to the findings presented in previous chapters, which must be treated separately in this section because on a usage-based account we no longer have much reason to think that the syntactic representations discussed in Chapter 2 have anything to do with the semantic representations discussed in Chapter 3, or indeed that these representations exist at all.

Starting with Chapter 2, recall that while four-year-old English-speaking children patterned with adults in their knowledge of dative asymmetries pertaining to Principle C and quantifier-variable binding in datives (Experiments 1 and 2), I could not demonstrate conclusively that the root cause of these asymmetries was asymmetric c-command of the second dative object by the first, as is standardly argued. A simple preference for forward binding, independent of datives, with the binder preceding the bound in the linear string could largely explain the observed findings. Presumably on a usage-based account one would be able to demonstrate that forward binding is more frequent in English overall and explain away the acceptable but infrequent "backward binding" examples. The Kannada data from Experiment 3 would not be so easily dispatched, however. As a reminder, Kannada-speaking four-year-olds

show the adult pattern of grammaticality judgments (repeated below) with respect to quantifier-variable binding in the dative verb phrase.

(107) a. √ Subject Q-DAT$_x$ ACC$_x$ V-**BEN**

    b. √ Subject Q-DAT$_x$ ACC$_x$ V

    c. √ Subject ACC$_x$ Q-DAT$_x$ V-**BEN**

    d. * Subject ACC$_x$ Q-DAT$_x$ V

How could they learn this pattern? The data are inconsistent with the hypothesis that binding of the accusative-marked object (ACC) by the dative-marked object (DAT) depends on the dative preceding the accusative on the surface (since it doesn't in 107c). The data are also inconsistent with the hypothesis that binding of the accusative-marked object (ACC) by the dative-marked object (DAT) depends on the presence of the benefactive affix (BEN) (since 107b lacks BEN). Binding possibilities in Kannada involve an interaction of word order and the presence or absence of the benefactive affix. Thus, it seems that the child would be forced to determine the binding possibilities for each of the four configurations in (107) individually. For sentences like (107a), the child would need to have a likely interpretation in mind before deciding whether the pronoun within the accusative-marked object is bound by the dative quantified noun phrase (QNP). If that interpretation happened to be one that required treating the pronoun as a bound variable, and the pronoun was indeed bound by the QNP in context, then she would have learned that the pronoun can be bound by the dative QNP in that particular configuration. On the other hand, if the child's interpretation required the free reading for a pronoun, and the pronoun was free in context, then she would have learned nothing because the free reading is available in any configuration. The same sequence of events would need to take

place for sentences like (107b) and (107c), with hypotheses about the likelihood of the bound

reading being continually confirmed in the (107a-c) cases. It would also have to be true that

children rarely encounter sentences like (107d) in contexts where they believe that the most

likely interpretation is one on which the pronoun is bound by the dative QNP. Otherwise they

might conclude erroneously that the configuration in (107d) allows the dative QNP to bind the

pronoun. It is not technically impossible that all of the 96 children in Experiment 3 could have

consistently come up with correct guesses about likely meanings for all of the configurations in

(107) prior to the experiment, and furthermore that they could have been exposed to the full

range of informative input for these configurations while avoiding uninformative or misleading

data. However, it seems unlikely that such a developmental perfect storm could organize itself

even once, much less repeatedly.

What about the results of Chapter 3, in which two-year-old English-speaking children

were argued to demonstrate awareness of distinctive possessional and spatial meaning in DO-

datives and prepositional datives, respectively, in their earliest productions? Consider the order

in which dative constructions were observed to appear. If MLU and constructional input

frequency are not behind the significant delay in the acquisition of prepositional datives relative

to DO-datives, as I argued, then proponents of a usage-based account might fall back on the

proposal discussed in Section 3.4.1: that children preferentially attend to—and thus acquire

linguistic expressions early for—events in which humans are salient, i.e. DO-datives in which

the Goal is affected and must be interpreted as a prospective possessor. However, as mentioned

earlier, this type of general cognitive strategy leaves unexplained how and why DO-datives (but

not prepositional datives) privilege possessor Goals in the first place, and it was shown to make

false predictions about the animacy of Goals in early dative utterances. Perhaps another proposal

could be shown to be more viable. We should also consider the observed correlations between

possessional expressions like *have*, *want*, *get*, and DO-datives on the one hand and more spatial

expressions like directional *to* and prepositional datives on the other hand. If not for the

primitives HAVE and GO, what could explain them? I did not explicitly address or rule out the

possible effect of frequency with respect to these correlations, so that (or related nuisance

variables) could be one avenue to explore. Note, however, that the early and near-simultaneous

acquisition of possessional expressions should strike someone committed to learning by

observation as odd since possession is conceptually abstract and not easily observed. Still, in my

opinion the most challenging aspect of the data from Chapter 3 when viewed from a usage-based

perspective is not the order effect with respect to the acquisition of dative constructions in

English or the correlations per se, but rather the verb-general nature of the order effect. It is often

claimed in the usage-based literature that children must accumulate a critical mass of verbs

(along with statistics about the syntactic frames in which they are used) in order to form

generalizations about these frames, or constructions. Tomasello (2003), in particular, has argued

that up until age 2;6 at the absolute earliest (and possibly well beyond age 3) syntactic

competence is "best characterized as simply an inventory of independent verb island

constructions that pair a scene of experience and an item-based construction, with no structural

relationships among these constructional islands (p. 121)." Figure 4.1, reproduced below from

Tomasello (2003: p. 120), illustrates what these hypothetical item-based schemas are supposed to

look like at age two.

Figure 4.1: Examples of verb islands on a usage-based account
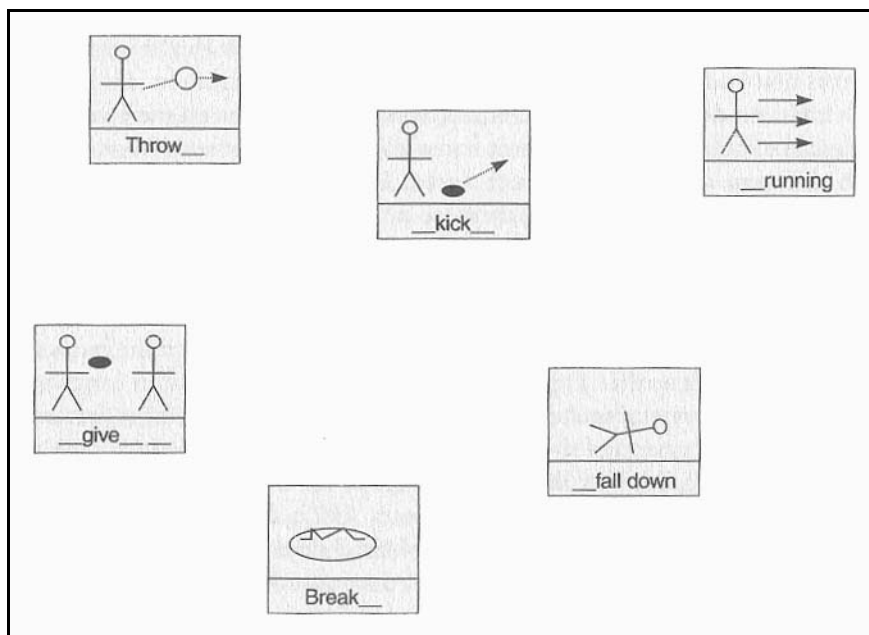
The problem is that the 17 children whose transcripts were examined in Chapter 3 (and who each produced both dative constructions) did not all produce the same verb in their first uses of DO-datives (or prepositional datives for that matter). There was a fairly wide range of verbs among first uses of both constructions, and only two children used the same verb in their first uses of both dative constructions.[74] In order to avoid the claim that two-year-olds know what the DO-dative or prepositional dative constructions are independent of the verbs that may appear in them (as the neoconstructional approach would have us believe), one would have to argue that 15 of these 17 children produced independent verb islands with two object slots (__ __) of a particular type (non-prepositional) significantly earlier than different independent verb islands with two argument slots of a different type (one being prepositional) due solely to the frequency

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[74] See Section 3.3.1 for details.

of these individual verbs in the input or some other factor or combination of factors. On the face of it this seems quite improbable.

In short, I submit that a usage-based account of how children might come to learn what they know about datives (as shown in Chapters 2 and 3) struggles to achieve the level of descriptive and explanatory adequacy that our deductive learning proposal—which follows from the neoconstructionalist approach—achieves quite easily. The deductive proposal succeeds at the cost of attributing some knowledge to UG, but the benefits would seem to be worth the price. In addition to solving a particular problem concerning how children leave dative constructions, the innate knowledge that I have posited opens up avenues for future research on the origins of conceptual structure and the relationship between this structure and the building blocks of language acquisition. Further development and testing of this proposal are needed, of course, but for now I feel that it has the advantage. That said, no account or proposal can explain everything. Thus, the next section briefly discusses one aspect of how dative verbs are distributed that must surely be learned from the input.

4.4 What must be learned

Dative verb-specific behavior, as Pinker (1989), Levin (1993), and Rappaport Hovav & Levin (2006) have capably demonstrated, seemingly requires a significant amount of lexical learning. Innate structure and deductive reasoning will not help in this domain, which I have not focused on (though see Section 1.1) but which is nevertheless important to keep in mind. By verb-specific behavior I mean two things. First, there are idiosyncracies like the ability of *tell*, but not *say*, to appear in the DO-dative frame.

(108) a.   I told Kai a story.

      b.   * I said Kai a story.

These irregularities must be learned one by one in all likelihood. Second, there are what appear to be more systematic exceptions to the dative alternation based on semantic subclass (e.g. verbs of continuous causation of accompanied motion in some manner (109) and verbs of future not having (110)) and possibly also based on morphophonological factors (111).

(109) a.   I [carried/drove/dragged/hauled/pulled/tugged] the box to Matilde

      b.   I *[carried/drove/dragged/hauled/pulled/tugged] Matilde the box

(110) a.   * Carolyn envied her good looks to Lisa

      b.   Carolyn envied Lisa her good looks

(111) a.   Tom told/recounted the story to Ben

      b.   Tom told/*recounted Ben the story

One reason that I have avoided accounting for such data is that I saw little evidence in the results of Chapter 2 and 3 to suggest that children know about the subtleties illustrated by them prior to age four. In Chapter 2, there were occasionally hints of item-specific effects—though the experiments were not designed to fully measure such effects—but generally speaking the findings had a verb-general flavor, especially in Experiment 3. In Chapter 3, children were observed to overgeneralize on occasion, which could in theory occasionally lead to explicit correction and possibly a retreat toward the adult distribution for specific verbs, but in general children were somewhat conservative in their productions (e.g. Pinker 1989). Still, children must eventually become adultlike in their mastery of verb-specific behavior. It seems to me that Pinker's criteria-governed productivity hypothesis works well in explaining how they do so.

According to this hypothesis, children must learn narrow-range rules like those applying to the semantic subclasses in (106) and (107). These rules are thought of as conventionalized structures varying from language to language and dialect to dialect that tell a speaker what kinds of events, among those events potentially cognitively compatible with possession change or spatial motion, are licensed in the relevant dative constructions. As a reminder, for Pinker licensing amounts to permitting the application of a broad-range rule converting the semantic structure of prepositional datives to that of DO-datives, with syntax for the two dative constructions assumed to fall out from the application of universal linking rules. His construal of licensing—which is incompatible with a neoconstructionalist account that dispenses with linking—can be divorced from his idea about narrow-range subclasses without preventing the latter from being applied as needed. Interestingly, Ambridge et al. (2007) suggest that the formation of semantic subclasses along the lines of Pinker (1989) and the influence of entrenchment, whereby repeated presentation of a verb in one attested construction discourages or suppresses use of that verb in unattested constructions, work in tandem to help children avoid overgeneralization errors beyond age five. I see no reason to doubt this proposal.

Exactly how children might integrate the fine details of verbal meaning (discovered through reasoning about possible semantic subclasses, entrenchment, and other aspects of verbal distribution) with constructional meaning is a deep question for accounts such as mine, a question that I imagine will and should preoccupy the field for some time. Absent any relevant experimental findings or penetrating insights in this particular area, I must leave the question unanswered for the time being.

4.5 Discussion

We have seen that a neoconstructionalist theory of argument realization very naturally accounts for the evidence presented in previous chapters about the internal structure and meanings of children's syntactico-semantic representations for datives. We have also seen that a neoconstructionalist theory imposes reasonable constraints on the process by which children learn about dative constructions. The deductive learning proposal put forth in Section 4.2 was argued to better describe and explain children's knowledge with respect to datives than a usage-based proposal could. Of course, this claim is subject to debate, which I welcome. In the meantime, where do we go from here?

To begin with, there are large gaps in the timecourse of acquisition for datives that I have laid out in previous chapters. If we think of the findings from Chapters 2 and 3 as landmarks—standing now at ages four and two, respectively—along a path concerning dative-related knowledge, then in my opinion we should attempt to get a better sense of what the path is like between these points. For instance, I would like to test whether configurational structure within the dative verb phrase is present earlier than age four. Our neoconstructionalist account makes strong claims about the inherent availability of configurational structure in the child's toolkit of linguistic knowledge, claims that are eminently testable if only we can find ways to tap into younger children's grammatical knowledge directly. Furthermore, I would like to probe children's understanding of the distinction between possession and location more generally before age two in order to determine whether these notions are truly differentiated prior to or in the absence of language reinforcing the distinction. I will be pursuing this last line of research in the near future, and time will tell what comes of it.

CHAPTER 5: CONCLUSION

This dissertation began with a question: What is the nature of the relation between a verb and its arguments? We now have more information at our disposal in deciding among competing answers, as promised. I leave it to the reader to draw his or her own conclusions, but a brief review of the progress made thus far is in order.

To begin with, I have found considerable evidence supporting the two main representational claims of Harley's (2002) neoconstructional approach to argument realization for datives: (a) that the first internal argument asymmetrically c-commands the second; and (b) that the locus of constructional meaning differences for datives can be traced to the presence of a primitive HAVE encoding possession in DO-datives and a different primitive, GO, encoding location for prepositional datives. Back in Section 1.1, it became clear that any theory of datives must explain certain structural asymmetries common to both dative constructions as well as long-noted semantic distinctions observed between them. Harley's approach does both. The structural asymmetries arise from the hierarchical nature of her representations, and the meaning differences fall out from HAVE and GO, which are embedded in these representations. This in itself is notable.

Also noteworthy is the fact that the very same structural asymmetries and meaning differences that have been observed for adults concerning datives have been shown to obtain for children as well. Recall that our review of the literature on the acquisition of datives in Section 1.4 revealed few concrete findings bearing on the precise nature of children's representations for

datives. This gap has now been filled, at least in part. A series of experiments in Chapter 2 revealed that four-year-old native speakers of English and Kannada already have hierarchical representations of the dative verb phrase in which the structurally higher dative object asymmetrically c-commands the lower dative object. In addition, a large-scale corpus study in Chapter 3 showed that two-year-old children show awareness of distinctive possessional and spatial meaning in DO-datives and prepositional datives, respectively, in their earliest productions. These results add to the growing body of work showing how abstract children's early linguistic knowledge truly is. They also confirm that the neoconstructional approach to argument realization works as well for children as it does for adults.

Finally, in Chapter 4 I hope to have demonstrated the viability of a learning account that is compatible with the neoconstructionalist approach. The abstract dative representations that children were shown to have in Chapters 2 and 3 do not strike one as learnable if learning is construed inductively as the building up of rules and structures based solely on cues present in the input. Rather, the available evidence appears to favor deductive learning, whereby children are led to discover innately specified syntactico-semantic representations as a result of careful observation of what datives mean. This deductive learning proposal remains to be more fully fleshed out and tested empirically, but in theory it shows considerable promise.

Toward the end of the last chapter, I outlined a few directions in which this research program could be profitably extended. There are undoubtedly many more. Investigating the acquisition of datives has taken us far from where we began, and the climb has been enjoyable but challenging. I stop now to enjoy the view before pushing forward.

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APPENDIX A: Stimuli (Chapter 2)

(A1) Test sentences for Experiment 1

GIVE	*frame-expected response*
Ann gave Woody his horse	DO-yes
Ann gave him Woody's horse	DO-no
Jeff gave the horse to her rider	prep-yes
Jeff gave her to the horse's rider	prep-no

READ	*frame-expected response*
Miss Alligator read Albert his book	DO-yes
Miss Alligator read him Albert's book	DO-no
Miss Alligator read the orange book to its owner	prep-yes
Miss Alligator read it to the orange book's owner	prep-no

BRING	*frame-expected response*
Bart brought Miss Cow her baby	DO-yes
Bart brought her Miss Cow's baby	DO-no
Auntie brought the baby cow to his mother	prep-yes
Auntie brought him to the baby cow's mother	prep-no

KICK	*frame-expected response*
Coach kicked Lisa her ball	DO-yes
Coach kicked her Lisa's ball	DO-no
Coach kicked the green ball to its owner	prep-yes
Coach kicked it to the green ball's owner	prep-no

(A2) Test stories for Experiment 1

GIVE—DO

Ann has just fed one horse that belongs to Eric and one horse that belongs to Woody. The boys decide that they want their horses back so they can go riding. Ann suggests that they trade horses, but the boys reject that idea. So Ann returns Eric's horse to Eric and Woody's horse to Woody.

Hmm, that was a story about Eric and his friend, Woody. And here's what I think happened…

Ann gave Woody his horse	DO-yes
Ann gave him Woody's horse	DO-no

GIVE—prep

Jeff has just fed a girl elephant that belongs to Eric and a girl horse that belongs to Woody. The boys decide that they want their pets back so they can go riding. Jeff suggests that they trade pets, but the boys reject that idea. So Jeff returns Eric's elephant to Eric and Woody's horse to Woody. The pets are very excited to be back with their riders.

Hmm, that was a story about two animals with pink ribbons, a girl elephant and a cute girl horse. And here's what I think happened…

Jeff gave the horse to her rider	prep-yes
Jeff gave her to the horse's rider	prep-no

READ—DO and prep

Albert (orange) and his friend (green) feel like reading their books before bed, but they can't read, so they ask Miss Alligator (Albert's mother) for help. Miss Alligator asks which books they'd like to read, and they each emphatically pick their own book. So Miss Alligator reads the green book to the friend and then reads the orange book to Albert.

Hmm, that was a story about two alligators, a green alligator and that orange alligator there whose name is Albert. And here's what I think happened…

Miss Alligator read Albert his book	DO-yes
Miss Alligator read him Albert's book	DO-no

Hmm, that was a story about two books, a green book and a pretty little orange book. And here's what I think happened…

Miss Alligator read the orange book to its owner	prep-yes
Miss Alligator read it to the orange book's owner	prep-no

BRING—DO

Bart is babysitting for Miss Cow and Miss Dinosaur, who have gone out for dinner. When they return, Bart gets confused and tries to return the babies to the wrong mothers. Miss Cow and Miss Dinosaur set him straight. Then Bart brings Miss Dinosaur's baby to Miss Dinosaur and Miss Cow's baby to Miss Cow.

Hmm, that was a story about Miss Dinosaur and beautiful Miss Cow. And here's what I think happened…

Bart brought Miss Cow her baby	DO-yes
Bart brought her Miss Cow's baby	DO-no

BRING—prep

Auntie is babysitting for Miss Cow and Miss Dinosaur, who have gone out for dinner. When they return, Auntie gets confused and tries to return the boys to the wrong mothers. The boys get very excited before Miss Cow and Miss Dinosaur set Auntie straight. Then Auntie brings Miss Dinosaur's baby to Miss Dinosaur and Miss Cow's baby to Miss Cow.

Hmm, that was a story about a baby dinosaur and a cute, white baby cow. And here's what I think happened…

Auntie brought the baby cow to his mother	prep-yes
Auntie brought him to the baby cow's mother	prep-no

KICK—DO and prep

It's time for soccer practice, and the girls, Lisa and Kristen, are excited. Coach has all of the soccer balls. He suggests that the girls trade balls for practice, but the girls are having none of that. They like to practice with their own soccer balls, which have the same colors as their jerseys! So Coach kicks Kristen's ball to Kristen and Lisa's ball to Lisa.

Hmm, that was a story about two girls, Kristen and a girl with a black dress named Lisa. And here's what I think happened…

Coach kicked Lisa her ball	DO-yes
Coach kicked her Lisa's ball	DO-no

Hmm, that was a story about two soccer balls, a blue ball and a pretty little green ball. And here's what I think happened…

Coach kicked the green ball to its owner   prep-yes
Coach kicked it to the green ball's owner   prep-no

(A3) Control sentences for Experiments 1 and 2

PRINCIPLE C (Control 1)	*expected response*
He drove Mr. Blue's car	F

ITS OWNER (Control 2)	
Miss Piggy found its owner	T
Miss Piggy didn't find its owner	F

PRONOUN FIRST (Control 3)	
John told her about Darlene's dog	T
John didn't tell her about Darlene's dog	F

(A4) Control stories for Experiments 1, 2, and 2A

PRINCIPLE C (Control 1)

Two butterflies, Mr. White and Mr. Blue, decide to have a race, and Sue's job is to decide who is the fastest. The butterflies consider exchanging cars but decide in the end to drive their own cars. Mr. White goes first. He's pretty fast, but Mr. Blue definitely drives his blue car faster, so Sue declares Mr. Blue the winner.

Hmm, that was a story about two butterflies, a white butterfly named Mr. White and a blue butterfly named Mr. Blue. And here's what I think happened…

He drove Mr. Blue's car	F

ITS OWNER (Control 2)

Miss Piggy finds a box with a toy spaceship inside. Whose is it? She doesn't know. Miss Piggy won't feel right playing with the spaceship until she asks its owner for permission, so she starts looking for the owner. She asks Kermit, but he doesn't have any spaceship toys. So she asks Lando. Sure enough, he lost a toy spaceship this morning! He's happy that Miss Piggy found it.

Hmm, that was a story about a lost spaceship. And here's what I think happened…

Miss Piggy found its owner	T
Miss Piggy didn't find its owner	F

PRONOUN FIRST (Control 3)

Darlene has an amazing dog that talks, and she's just dying to show it off. She lets John in on the secret. He's amazed, of course. After witnessing the talking dog, John goes off to tell his friend Mary all about it. Mary is skeptical, but John insists that he's telling the truth!

Hmm, that was a funny story about a talking dog and two girls, Auntie and Mary. Mary's the one with the long hair. And here's what I think happened…

John told her about Darlene's dog	T
John didn't tell her about Darlene's dog	F

(A5) Test sentences for Experiment 2 and 2A

GIVE   *frame-expected response*
Ann gave every boy his horse   DO-yes
Jeff gave her rider every horse   DO-no
Jeff gave every horse to her rider   prep-yes
Ann gave his horse to every boy   prep-no

READ   *frame-expected response*
Mama read every alligator his book   DO-yes
Mama read its owner every book   DO-no
Mama read every book to its owner   prep-yes
Mama read his book to every alligator   prep-no

BRING   *frame-expected response*
Bart brought every mother her baby   DO-yes
Auntie brought his mother every baby   DO-no
Auntie brought every baby to his mother   prep-yes
Bart brought her baby to every mother   prep-no

KICK   *frame-expected response*
Coach kicked every girl her ball   DO-yes
Coach kicked its owner every ball   DO-no
Coach kicked every ball to its owner   prep-yes
Coach kicked her *ball* to every girl   prep-no

(A6) Test stories for Experiment 2 (bound-true)

GIVE—DO-yes
GIVE—prep-no

Ann has just fed Eric's horse, Woody's horse, Steve's horse, and the alien's horse. The boys decide that they want their horses back so they can go riding. Ann gives Eric the alien's horse by mistake. When Ann realizes it's not his, Ann takes it back and gives Eric his own horse. Ann goes through the same process with Woody. However, by the time it's Steve's turn Ann has figured things out and gives Steve his own horse right away. Then the alien appears, and Ann gives him his cool-looking alien horse.

Hmm, that was a story about a blue alien and three boys. And here's what I think happened…

Ann gave every boy his horse	DO-yes
Ann gave his horse to every boy.	prep-no

GIVE—DO-no
GIVE—prep-yes

Jeff has just fed Eric's horse, Woody's horse, Steve's horse, and the alien's horse. The boys decide that they want their horses back so they can go riding. Jeff gives Eric the alien's horse by mistake. When Jeff realizes it's not his, Jeff takes it back and gives Eric his own horse. Jeff goes through the same process with Woody. However, by the time it's Steve's turn Jeff has figured things out and gives Steve his own horse right away. Then the alien appears, and Jeff gives him his cool-looking alien horse.

Hmm, that was a story about a special horse from another planet and three regular horses. And here's what I think happened…

Jeff gave her rider every horse	DO-no
Jeff gave every horse to her rider	prep-yes

READ—DO-yes
READ—prep-no

Three baby alligators (Albert, Sammy, James) and a sheep feel like reading books before bed, but they can't read, so they ask Mama for help. Mama reads the sheep's book to Albert, but he doesn't like it and wants his own book, so Mama reads Albert's book to Albert. Mama goes through the same process with Sammy. By the time it's James' turn, Mama has given up on the sheep's book and just reads James his own book. Mama then reads the sheep's book to the sheep.

Hmm, that was a story about a little sheep and three alligators. And here's what I think happened…

Mama read every alligator his book	DO-yes
Mama read his book to every alligator	prep-no

READ—DO-no
READ—prep-yes

(same story as above)

Hmm, that was a story about a white book for sheep and three books for alligators. And here's what I think happened…

Mama read its owner every book	DO-no
Mama read every book to its owner	prep-yes

BRING—DO-yes
BRING—prep-no

Bart is babysitting for Miss Cow, Miss Dinosaur, Miss Elephant, and the Fairy, who have gone out for dinner. When they return, Bart gets confused and brings the Fairy's baby to Miss Cow. She sets him straight, and Bart brings Miss Cow's baby to Miss Cow. The same thing happens with Miss Dinosaur. Then Bart gets a clue and brings Miss Elephant's baby to Miss Elephant on the first try. Finally, Bart brings the Fairy's baby to the Fairy and calls it a night.

Hmm, that was a story about a fairy with blue wings and three mothers. And here's what I think happened…

Bart brought every mother her baby	DO-yes
Bart brought her baby to every mother	prep-no

BRING—DO-no
BRING—prep-yes

Auntie is babysitting for Miss Cow, Miss Dinosaur, Miss Elephant, and the Fairy, who have gone out for dinner. When they return, Auntie gets confused and brings the Fairy's baby to Miss Cow. She sets him straight, and Auntie brings Miss Cow's baby to Miss Cow. The same thing happens with Miss Dinosaur. Then Auntie gets a clue and brings Miss Elephant's baby to Miss Elephant on the first try. Finally, Auntie brings the Fairy's baby to the Fairy and calls it a night.

Hmm, in that story the Fairy had a baby butterfly, and there were three mothers with their own babies. And here's what I think happened…

<table>
<tr><td>Auntie brought his mother every baby</td><td>DO-no</td></tr>
<tr><td>Auntie brought every baby to his mother</td><td>prep-yes</td></tr>
</table>

KICK—DO-yes
KICK—prep-no

It's time for soccer practice, and the girls (Lisa, Kristen, Ann) and Miss Kangaroo are excited. Coach has all of the soccer balls. Coach kicks the kangaroo's ball to Lisa, but then he realizes he's made a mistake and takes it back, kicking Lisa her own ball. He does the same thing with Kristen. By the time it's Ann's turn, Coach knows the drill and kicks Ann the right ball without any hesitation. Then Coach kicks the kangaroo's ball to the kangaroo.

Hmm, that was a story about Miss Kangaroo and three girls. And here's what I think happened…

<table>
<tr><td>Coach kicked every girl her ball</td><td>DO-yes</td></tr>
<tr><td>Coach kicked her ball to every girl</td><td>prep-no</td></tr>
</table>

KICK—DO-no
KICK—prep-yes

(same story as above)

Hmm, that was a story about Miss Kangaroo's brown soccer ball and three soccer balls for girls. And here's what I think happened…

<table>
<tr><td>Coach kicked its owner every ball</td><td>DO-no</td></tr>
<tr><td>Coach kicked every ball to its owner</td><td>prep-yes</td></tr>
</table>

(A7) Test stories for Experiment 2A (bound-false)

GIVE—DO-yes
GIVE—prep-no

Ann has just fed Eric's horse, Woody's horse, Steve's horse, and the alien's horse. The boys decide that they want their horses back so they can go riding. Ann gives Eric the alien's horse by mistake. When Ann realizes it's not his, Ann takes it back and gives Eric his own horse. Ann goes through the same process with Woody. When it's Steve's turn, Ann brings Steve the alien's horse and is corrected, so she takes it back. However, at this point the alien appears, and Ann gives him his cool-looking alien horse. Distracted by the alien, Ann neglects to give Steve his own horse.

Hmm, that was a story about a blue alien and three boys. And here's what I think happened…

> Ann gave every boy his horse   DO-yes
> Ann gave his horse to every boy.   prep-no

GIVE—DO-no
GIVE—prep-yes

Jeff has just fed Eric's horse, Woody's horse, Steve's horse, and the alien's horse. The boys decide that they want their horses back so they can go riding. Jeff gives Eric the alien's horse by mistake. When Jeff realizes it's not his, Jeff takes it back and gives Eric his own horse. Jeff goes through the same process with Woody. When it's Steve's turn, Jeff brings Steve the alien's horse and is corrected, so he takes it back. However, at this point the alien appears, and Jeff gives him his cool-looking alien horse. Distracted by the alien, Jeff neglects to give Steve his own horse.

Hmm, that was a story about a special horse from another planet and three regular horses. And here's what I think happened…

> Jeff gave her rider every horse   DO-no
> Jeff gave every horse to her rider   prep-yes

READ—DO-yes
READ—prep-no

Three baby alligators (Albert, Sammy, James) and a sheep feel like reading books before bed, but they can't read, so they ask Mama for help. Mama reads the sheep's book to Albert, but he doesn't like it and wants his own book, so Mama reads Albert's book to Albert. Mama goes through the same process with Sammy. When it's James' turn, Mama reads the sheep's book to James, and afterward he asks for his own book. At this point, as Mama is taking the sheep's book

back, the sheep asks for help. So Mama reads the sheep's book to the sheep. Mama then asks James to wait a bit on his own book because her throat hurts from all the reading.

Hmm, that was a story about a little sheep and three alligators. And here's what I think happened…

Mama read every alligator his book	DO-yes
Mama read his book to every alligator	prep-no

READ—DO-no
READ—prep-yes

(same story as above)

Hmm, that was a story about a white book for sheep and three books for alligators. And here's what I think happened…

Mama read its owner every book	DO-no
Mama read every book to its owner	prep-yes

BRING—DO-yes
BRING—prep-no

Bart is babysitting for Miss Cow, Miss Dinosaur, Miss Elephant, and the Fairy, who have gone out for dinner. When they return, Bart gets confused and brings the Fairy's baby to Miss Cow. She sets him straight, and Bart brings Miss Cow's baby to Miss Cow. The same thing happens with Miss Dinosaur. Next Bart brings the Fairy's baby to Miss Elephant and is once again corrected. At this point the Fairy arrives, and Bart brings the Fairy's baby to the Fairy. Bart then tells Miss Elephant that he needs a rest before getting her baby elephant because he's tired from carrying all of the babies.

Hmm, that was a story about a fairy with blue wings and three mothers. And here's what I think happened…

Bart brought every mother her baby	DO-yes
Bart brought her baby to every mother	prep-no

BRING—DO-no
BRING—prep-yes

Auntie is babysitting for Miss Cow, Miss Dinosaur, Miss Elephant, and the Fairy, who have gone out for dinner. When they return, Auntie gets confused and brings the Fairy's baby to Miss Cow. She sets Auntie straight, and Auntie brings Miss Cow's baby to Miss Cow. The same thing happens with Miss Dinosaur. Next Auntie brings the Fairy's baby to Miss Elephant and is once

again corrected. At this point the Fairy arrives, and Auntie brings the Fairy's baby to the Fairy. Auntie then tells Miss Elephant that she needs a rest before getting her baby elephant because she's tired from carrying all of the babies.

Hmm, in that story the Fairy had a baby butterfly, and there were three mothers with their own babies. And here's what I think happened…

Auntie brought his mother every baby	DO-no
Auntie brought every baby to his mother	prep-yes

KICK—DO-yes
KICK—prep-no

It's time for soccer practice, and the girls (Lisa, Kristen, Ann) and Miss Kangaroo are excited. Coach has all of the soccer balls. Coach kicks the kangaroo's ball to Lisa, but then he realizes he's made a mistake and takes it back, kicking Lisa her own ball. He does the same thing with Kristen. When it's Ann's turn, Coach kicks Ann the kangaroo's ball and is corrected. At this point Miss Kangaroo intervenes and excitedly asks for her ball. So Coach kicks the kangaroo's ball to the kangaroo. He then tells Ann that her ball is flat and will need to be pumped up before he can kick it.

Hmm, that was a story about Miss Kangaroo and three girls. And here's what I think happened…

Coach kicked every girl her ball	DO-yes
Coach kicked her ball to every girl	prep-no

KICK—DO-no
KICK—prep-yes

It's time for soccer practice, and the girls (Lisa, Kristen, Ann) and Miss Kangaroo are excited. Coach has all of the soccer balls. Coach kicks the kangaroo's ball to Lisa, but then he realizes he's made a mistake and takes it back, kicking Lisa her own ball. He does the same thing with Kristen. When it's Ann's turn, Coach kicks Ann the kangaroo's ball and is corrected. At this point Miss Kangaroo intervenes and excitedly asks for her ball. So Coach kicks the kangaroo's ball to the kangaroo. He then tells Ann that her ball is flat and will need to be pumped up before he can kick it.

Hmm, that was a story about Miss Kangaroo's brown soccer ball and three soccer balls for girls. And here's what I think happened…

Coach kicked its owner every ball	DO-no
Coach kicked every ball to its owner	prep-yes

(A8) Test sentences for Experiment 3

ACC DAT unaffixed

1. KICK
adhyaapaka avaL-a ceND-annu pratiyobba huDug-ige od-d-anu
teacher   3sf-gen ball-acc   every girl-dat   kick-pst-3sm
'Teacher kicked her ball to every girl'

2. BRING
kaavalugaara avaL-a magu-vannu pratiyobba taay-ige kaLis-id-anu
babysitter   3sf-gen baby-acc   every mother-dat   bring-pst-3sm
'The babysitter brought her baby to every mother'

3. RETURN
Rashmi avan-a kudure-yannu pratiyobba hudugan-ige tan-d-aLu
Rashmi   3sm-gen horse-acc   every boy-dat   return-pst-3sf
'Rashmi returned his horse to every boy'

4. READ
adhyaapaki avan-a pustaka-vannu pratiyondu aame-ge oodu-heeLidaLu
teacher   3sm-gen book-acc   every turtle-dat   read-tell-pst-3sf
'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   3sf-gen ball-acc   kick-pst-3sm
'Teacher kicked every girl her ball'

2. BRING
kaavalugaara pratiyobba taay-ige avaL-a magu-vannu kaLis-id-anu
babysitter   every mother-dat   3sf-gen baby-acc   bring-pst-3sm
'The babysitter brought every mother her baby'

3. RETURN
Rashmi pratiyobba hudugan-ige avan-a kudure-yannu tan-d-aLu
Rashmi   every boy-dat   3sm-gen horse-acc   return-pst-3sf
'Rashmi returned every boy his horse'

4. READ
adhyaapaki pratiyondu aame-ge avan-a pustaka-vannu oodu-heeLidaLu
teacher   every turtle-dat   3sm-gen book-acc   read-tell-pst-3sf
'Teacher read every turtle his book'

ACC DAT BEN

1. KICK
adhyaapaka avaL-a ceND-annu pratiyobba huDug-ige od-du-koTT-anu
teacher   3sf-gen ball-acc   every girl-dat   kick-ppl-ben.pst-3sm
'Teacher kicked her ball to every girl'

2. BRING
kaavalugaara avaL-a magu-vannu pratiyobba taay-ige kaLis-i-koTT-anu
babysitter   3sf-gen baby-acc   every mother-dat   bring-ppl-ben.pst-3sm
'The babysitter brought her baby to every mother'

3. RETURN
Rashmi avan-a kudure-yannu pratiyobba hudugan-ige tan-du-koTT-aLu
Rashmi   3sm-gen horse-acc   every boy-dat   return-ppl-ben.pst-3sf
'Rashmi returned his horse to every boy'

4. READ
adhyaapaki avan-a pustaka-vannu pratiyondu aame-ge oodu-heeL-i-koTT-aLu
teacher   3sm-gen book-acc   every turtle-dat   read-tell-ppl-ben.pst-3sf
'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   3sf-gen ball-acc   kick-ppl-ben.pst-3sm
'Teacher kicked every girl her ball'

2. BRING
kaavalugaara pratiyobba taay-ige avaL-a magu-vannu kaLis-i-koTT-anu
babysitter   every mother-dat   3sf-gen baby-acc   bring-ppl-ben.pst-3sm
'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   3sm-gen horse-acc   return-ppl-ben.pst-3sf
'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   3sm-gen book-acc   read-tell-ppl-ben.pst-3sf
'Teacher read every turtle his book'

(A9) Test stories for Experiment 3 (bound-true)

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 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….

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…

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…

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…

(A10) Test stories for Experiment 3 (bound-false)

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….

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…

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…

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…

(A11) Control sentences for Experiment 3

PRINCIPLE C (Control 1)   *expected response*

idu niili ciTTey-a pogostiki-nalli kuppaLis-itu
3sn.prox   blue butterfly-gen   pogostick-loc   jump-pst.3sn
'He jumped on the blue butterfly's pogostick'   F

ITS OWNER (Control 2)

Mickey adar-a oDeya-nannu kaaND-a
Mickey   3sn.remote-gen   owner-acc   find.pst-3sm
'Mickey found its owner'   T

Mickey adar-a oDeya-nannu kaaN-al-illa
Mickey   3sn.remote-gen   owner-acc   find-inf-neg
'Mickey didn't find its owner'   F

PRONOUN FIRST (Control 3)

mari girafe avaL-ige huliy-a molada bagge heeL-itu   T
baby giraffe   her-dat   tiger-gen rabbit   about tell-pst.3sn
'Baby giraffe told her about tiger's rabbit'

(A12) Control stories for Experiment 3

PRINCIPLE C (Control 1)

It's the day of the great pogo-stick 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…

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…

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…

(A13) Response rates by item in Experiment 1 (% bound)

GIVE	Children	gram-DO	4/5
		ungram-DO	2/5
		gram-prep	3/5
		ungram-prep	1/5
	Adults	gram-DO	9/10
		ungram-DO	1/10
		gram-prep	10/10
		ungram-prep	5/10
READ	Children	gram-DO	4/5
		ungram-DO	2/5
		gram-prep	5/5
		ungram-prep	3/5
	Adults	gram-DO	10/10
		ungram-DO	3/10
		gram-prep	9/10
		ungram-prep	4/10
BRING	Children	gram-DO	3/5
		ungram-DO	1/5
		gram-prep	5/5
		ungram-prep	5/5
	Adults	gram-DO	10/10
		ungram-DO	1/10
		gram-prep	10/10
		ungram-prep	4/10
KICK	Children	gram-DO	4/5
		ungram-DO	1/5
		gram-prep	4/5
		ungram-prep	4/5
	Adults	gram-DO	10/10
		ungram-DO	3/10
		gram-prep	10/10
		ungram-prep	6/10

(A14) Response rates by item in Experiment 2 (% bound)

GIVE	Children	gram-DO	4/4
		ungram-DO	1/3
		gram-prep	4/4
		ungram-prep	2/4
	Adults	gram-DO	4/5
		ungram-DO	1/5
		gram-prep	4/5
		ungram-prep	2/5
READ	Children	gram-DO	3/4
		ungram-DO	4/4
		gram-prep	2/3
		ungram-prep	3/4
	Adults	gram-DO	5/5
		ungram-DO	0/5
		gram-prep	4/5
		ungram-prep	1/5
BRING	Children	gram-DO	3/3
		ungram-DO	3/4
		gram-prep	3/4
		ungram-prep	3/4
	Adults	gram-DO	5/5
		ungram-DO	0/5
		gram-prep	3/5
		ungram-prep	1/5
KICK	Children	gram-DO	4/4
		ungram-DO	1/4
		gram-prep	4/4
		ungram-prep	2/3
	Adults	gram-DO	5/5
		ungram-DO	5/5
		gram-prep	5/5
		ungram-prep	0/5

APPENDIX B: First Uses of Datives (Chapter 3)

Child	Age	First uses of dative constructions
Abe	2;5.10	I need butter on it # I eat it my butter off I eat it my butter off
	2;5.14	uhhuh # let's go see don't get them for mailman
Adam	2;3.04	give doggie paper
	2;10.30	going get pie for Cromer
Allison	1;10	get Mommy cookie
	2;10	lemme get them for you
April	1;10.30	give Roy it
	2;1.00	I read this piggie book to Mommy
Emily	1;10.18	buy diapers for Stephen and Emmy
Eric	n/a	---
Eve	1;8	Fraser read Eve Lassie
	1;11	Sue making more coffee for Fraser?
Jimmy	2;2.15	bwing [= bring] it fo(r) me
	2;4.29	I'm gonna give him a hug
June	n/a	---
"Lew"	2;5.06	right here Mama hand (th)em to me
Mark	2;7.16	could you get me some apple juice?
	3;4.15	Tim gave is [= this] to us
Naomi	2;0.28	get me a diaper # okay?
	2;3.19	I get lollipop for you
Nathaniel	2;5.18	get it other book
	2;7.01	read the book to Lia

Child	*Age*	*First uses of dative construction*
Nina	1;11.29	feed the llamas food
	2;1.15	I give that to you
Peter	2;1	oh my pen # gonna get mama pen
	2;1	I'll show it to you
Ross	2;7.18	jay said me no [= said no to me]
	2;8.05	I'm going to take these to Susie's # shoes
Sarah	2;10.20	give me some more
	3;1.10	Nana bought it for you
"She"	1;7.18	gi(ve) me that Brittany
	1;11.20	read this to me
Shem	2;2.16	know me my name
	2;3.02	a big man in the uh say thank you to daddy
Steven	2;1.23	give me the apple
"Tow"	1;7.05	give me that one!
	2;5.03	can you do that to it?
Trevor	2;0.27	yeah I gonna give you a bite
	2;6.05	I found anudder [= another] tsair [= chair] for him

VITA

JOSHUA BAIRD VIAU

Department of Linguistics	j-viau@northwestern.edu
Northwestern University	773.206.0667 (m)
2016 Sheridan Road	http://www.ling.northwestern.edu/~viau
Evanston, IL 60208-4090	

EDUCATION

2007   Ph.D., Department of Linguistics, Northwestern University, Evanston, IL
Thesis Committee: Jeffrey Lidz (chair), Stefan Kaufmann, Sandra Waxman
Specialization in Cognitive Science, Spring 2004

2005   Linguistic Society of America Summer Institute, MIT, Boston, MA

2002   CIC Traveling Scholar, Department of Near Eastern Languages and Civilizations, University of Chicago, Chicago, IL (Summer)

2001   M.A., French Linguistics, Department of French and Italian, Indiana University, Bloomington, IN

1999   M.A. coursework completed, International Communication, Department of Journalism and Communications, University of Florida, Gainesville, FL

1996   B.A., Florida State University, Tallahassee, FL
Graduated *summa cum laude*; member Phi Beta Kappa
Majors: English, Comparative Religion

1994-1995   Academic year abroad, Institut des Etudes Françaises, Avignon, France
Coursework in French literature, history, and translation at the Faculté d'Avignon

RESEARCH INTERESTS

First Language Acquisition: Argument structure, possession/spatial motion, quantification

Syntax-Semantics Interface: Dative verbs and other complex predicates, possessives and locatives, quantification

Morphology and Lexical Semantics: Discontinuous idioms, [ɪz]-infixation

Phonetics-Phonology Interface: Derived consonant clusters, clear speech

PUBLICATIONS

Journal articles

In prep.   Viau, J., Lidz, J., and Musolino, J. *Priming of abstract logical representations in 4-year-olds.*

In prep.   Viau, J. *Get your idiomatic constraint building on.*

In prep.   Viau, J. *Accounting for [IZ]-infixation.*

Conference proceedings

2006   Viau, J. Give = CAUSE + HAVE / GO: Evidence for early semantic decomposition of dative verbs in English child corpora. *Proceedings of the 30th Annual Boston University Conference on Language Development.* Cambridge: Cascadilla Press.

2004   Lidz, J., McMahon, E., Syrett, K., Viau, J., et al. Quantifier raising in 4-year-olds. *Proceedings of the 28th Annual Boston University Conference on Language Development.* Cambridge: Cascadilla Press.

Reviews

Forthcoming   Viau, J. Review of Samy Alim H.'s *Roc the Mic Right: The Language of Hip-Hop Culture.* LINGUIST List.

2005   Viau, J. Review of William O'Grady's *How Children Learn Language.* Available online through the LINGUIST List, *http://www.sfs.nphil.uni-tuebingen.de/linguist/issues/16/16-3449.html#1*

PRESENTATIONS

Invited presentations

2007   Viau, J. *The acquisition of argument structure: Evidence from datives.* The Johns Hopkins Language and Cognition Lab, 9 March 2007.

2003   Viau, J. *Derived French onset clusters and the status of schwa.* Laboratoire de Sciences Cognitives et Psycholinguistique, Paris, France, 10 January 2003.

Conference presentations

2007   Smiljanic, R., Viau, J., and Bradlow, A. *Global temporal characteristics of English clear and plain speech.* Poster presented at the 153rd Meeting of the Acoustical Society of America, 4-8 June 2007.

2007   Viau, J. *Asymmetric c-command within the dative verb phrase at age 4.* Annual Meeting of the Linguistic Society of America, Anaheim, CA, 5 January 2007.

2006 Smiljanic, R., Viau, J., and Bradlow, A. *The effect of phonological neighborhood density and word frequency on vowel production and perception in clear speech.* 152nd Meeting of the Acoustical Society of America, 28 November-2 December 2006.

2006 Viau, J., Lidz, J., and Musolino, J. *Priming of abstract logical representations in 4-year-olds.* Boston University Conference on Language Development, Boston, MA, 3 November 2006.

2006 Smiljanic, R., Viau, J., and Bradlow, A. *Lexical effects on vowel production and perception in clear speech.* 3rd International Workshop on Language Production, Chicago, IL, 13 August 2006.

2006 Viau, J. *Introducing English [IZ]-infixation: Snoop Dogg and bey-[IZ]-ond.* Summer Meeting of the Linguistic Society of America, East Lansing, MI, 24 June 2006.

2006 Smiljanic, R., Viau, J., and Bradlow, A. *Rhythmic characteristics of English clear and conversational speech.* 10th Conference on Laboratory Phonology, Paris, France, 29 June-1 July 2006.

2006 Smiljanic, R., Viau, J., and Bradlow, A. *Rhythm in English clear speech.* 151st Meeting of the Acoustical Society of America, 5-9 June 2006.

2006 Viau, J. *Evidence for early semantic decomposition of dative verbs in English child corpora.* Annual Meeting of the Linguistic Society of America, Albuquerque, NM, 7 January 2006.

2005 Viau, J. *Give = CAUSE + HAVE / GO: Evidence for early semantic decomposition of dative verbs in English child corpora.* Boston University Conference on Language Development, Boston, MA, 4 November 2005.

2005 Viau, J., Lidz, J., and Musolino, J. *Syntactic priming of LF representations in 4-year-olds.* Poster presented at the Annual Meeting of the CUNY Sentence Processing Conference, Tucson, AZ, 2 April 2005.

2005 Viau, J., Lidz, J., and Musolino, J. *Pragmatics and the role of experience in overcoming isomorphism.* Annual Meeting of the Linguistic Society of America, Oakland, CA, 6 January 2005.

2004 Viau, J. *Production does not equal perception: Evidence from French schwa deletion.* Spring Linguistics Colloquium, Northwestern University, 3 March 2004.

2004 Viau, J. *The production and perception of French onset clusters derived by schwa deletion.* Annual Meeting of the Linguistic Society of America, Boston, MA, 11 January 2004.

2003 Lidz, J., McMahon, E., Syrett, K., Viau, J., et al. *Quantifier raising in 4-year-olds* (with co-authors). Boston University Conference on Language Development, Boston, MA, 1 November 2003.

2003 Viau, J. *On the production and perception of derived French onset clusters: Testing acoustic cues to prosodic structure following schwa deletion*. Annual QP Fest, Northwestern University, 9 June 2003.

AWARDS AND FELLOWSHIPS

2006 Graduate Research Grant, $1465, Northwestern University

2005 Paula Menyuk Travel Award, Boston University Conference on Language Development

2005 CUNY Travel Grant, Annual Meeting of the CUNY Sentence Processing Conference

2004-2005 Teaching Assistant Fellow, Searle Center for Teaching Excellence, Northwestern University

2002 Research Grant, $1000, French Interdisciplinary Group, Northwestern University

2001-2002 Northwestern University Fellowship, Department of Linguistics

2000, 2001 Teaching award nominations, Indiana University, Bloomington, Department of French and Italian

1999-2001 Indiana University, Bloomington, Fellowship, Department of French and Italian

RESEARCH EXPERIENCE

2005-2007 Research Assistant, Northwestern University
     Principal Researchers: Ann Bradlow and Rajka Smiljanic

2004 Research Assistant, Northwestern University (Fall)
     Principal Researcher: Jeffrey Lidz

2004 Research Assistant, Northwestern University (Winter)
     Principal Researcher: Chris Kennedy

2002 Summer Intern, Northwestern University
     Principal Researcher: Jeffrey Lidz

TEACHING EXPERIENCE

Northwestern University

2006	Pronunciation and Conversation courses, International Summer Institute
2004	Ling 381: Written English for Non-Native Speakers (Spring)
2004	Teaching Assistant (Winter) Ling 221: Language and Prejudice, Instructor: Laura Dickey Guest lecture on [IZ]-infixation
2004	New Teaching Assistant Workshop (Fall)
2003	Ling 380: Spoken English for Non-Native Speakers (Winter) Focus on Conversational Fluency
2003	Teaching Assistant (Fall) Ling 250: Sound Patterns in Human Language, Instructor: Ann Bradlow Guest lecture on syllable structure
2002	Ling 380: Spoken English for Non-Native Speakers (Fall) Focus on Pronunciation
2001	SPEAK Test Preparation Course, International Summer Institute

Institute for Reading Development, Chicago, IL

2001	Reading enrichment classes for all ages (Summer)

Indiana University, Bloomington

2000-2001	Intermediate French 1 and 2 (F200, F250)
1999-2000	Elementary French 1 and 2 (F100, F150)

University of Florida

1998-1999	Beginning French 1 and 2 (FRE 1130, FRE 1131)

PROFESSIONAL SERVICE

Northwestern University Department of Linguistics

2006-2007	Noon Colloquium Co-Coordinator
2005-2006	Organizer, First Annual Job Search Workshop
2005-2006	Co-Chair of Graduate Student Handbook Revision Committee
2004	Instructor for New Teaching Assistant Workshop
2004	Member of Organizing Committee, Semantics and Linguistic Theory 14
2003-2004	Graduate Student Representative (elected)

2002-2003   Co-Editor of Full Glottal Stop, student-run newsletter

2001-2003   Member of Reception Committee

Northwestern University

2004-2005   Teaching Assistant Fellow, Searle Center for Teaching Excellence

2004   Assistant Project Coordinator for the Project on Child Development

External organizations

2006   Reviewer for *Language Acquisition*

PROFESSIONAL MEMBERSHIPS

2002-present   Linguistic Society of America

2002-present   French Interdisciplinary Group, Northwestern University

PROFESSIONAL AFFILIATIONS

2005-present   Member of Graduate Student Syntax-Semantics Reading Group (Northwestern)

2005-present   Member of Chicago Syntax-Semantics Circle (Chicago area)

2001-present   Member of Linguistics-Psychology-Acquisition Lab Group (Northwestern)

LANGUAGES

English: Native speaker

French: Near-native proficiency

Spanish: Intermediate reading and conversational ability

Arabic: Low-intermediate proficiency in Modern Standard Arabic and Moroccan Arabic