How a Marked Parameter is Chosen: Adverbs and Do-Insertion in the IP of Child Grammar

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1.1 Introduction and Overview:

Chomsky (1988) has made two proposals which make "surprise" predictions about language acquisition. The first proposal is a Least Effort proposal: the speaker will choose a derivation that is shortest. The second proposal is what one can call a "Default-do-insertion" proposal: when a derivation fails to express semantic features (the Full interpretation Principle) do-insertion will occur to carry the semantic feature (e.g.tense). These proposals are then non-parametric constraints on possible derivations in UG. Their meta-theoretical status is unusual. They are not part of the parametric map which, putatively, defines UG and defines the steps through which acquisition must proceed. They could therefore force changes, i.e. stages, both historically and in acquisition which are not simply progressive parametric changes.

Children do not in fact acquire adult grammar instantaneously. It now follows that either "short derivations" or "do-insertion" could appear in

175

176   DO-INSERTION

children's grammars where they are not required in adult
grammars, because certain derivations can be made in
adult grammar but not in the child's grammar. Precisely
this occurs: we find that children will say "did I
didn't do it", "he did left", or "do it be colored".
Each of these examples involves a slightly different
deviation from the adult grammar warranting, under
Chomsky's hypothesis, the deviant appearance of do-
insertion.

        The acquisition evidence offers a still finer
discrimination. We find numerous examples of (1a) but
none of (1b)[1], although (1c) is possible:

(1)   a. it does fits
         b.*"it does is"
         c. it does be

In what follows we will argue that the exclusion of (1b)
leads to a deepening of Pollock's (1989) approach in
light of markedness claims: "be"-raising is unmarked
and internal (or lexical) tense-marking is unmarked (as
in "is"). Do-insertion in (1c) then arises because the
child does not know that "be" takes internal tense. The
use of expressions like "he bes here" supports this
claim. We argue then that do-insertion arises not only
to carry affixes but to articulate marked structures.
Using this acquisition logic, default structures will be
automatically eliminated when tense affixation is
understood. This then may be the most direct and
clearest evidence in favor of Chomsky's implicit claims
about the meta-theoretical status of do-insertion.

        The elimination of do-insertion in favor of an
adult non-insertion analysis fits a larger theory of
Defaults, which has been developed by Lebeaux (1988), as
a fundamental assumption about acquisition. The default
status has an important empirical consequence in terms
of the subset principle (Berwick 1985). If do-insertion
is not a default rule, then it is not clear how it is
eliminated. Suppose do-insertion were an optionally
acceptable means to express tense, as it appears to be
in the grammars of children. Then it would not follow
that affix-lowering would replace it: it could remain
an available alternative, much like heavy-NP shift. In
order for do-insertion to be eliminated, it must have
some intrinsic characteristic which leads the child to
prefer non-do-insertion. Lebeaux (1988) in fact argues

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1. We use the notation *" to indicate unattested in acquisition
corpora.

for a whole series of defaults (in terms of Case theory, adjunction, and other cases), each of which is replaced in this fashion. Like do-insertion, each of these defaults predicts stages (or moments) in acquisition which deviate from adult grammar but do not reflect a parametrically-motivated difference.

The operation of do-insertion is one version of **copying** under Pollock's (1989) analysis, since properties of the verb must be copied onto "do". Why do children prefer copies in these environments ("it does fits") where adults prefer traces? Such questions are usually addressed implicitly or explicitly in terms of **performance**.[2] It is "easier" for an adult to say nothing and therefore a trace is sufficient. It is "easier" for a child to have a copy which indicates a D-structure origin. Yet it is hard to understand why performance demands would be the opposite for child and adult. It seems far more natural to seek a difference in grammars which underlies the putative performance difference.

To answer these questions we follow the spirit of Chomsky's proposals in a different direction. We argue that: children put a copy in a position whose parametric status is underdetermined. We will argue that the existence of a copy for a child where an adult would have a trace has nothing to do with "performance", but rather it is an instance of a child marking one of two parametric options when the parameter is not yet fixed. In particular, copying arises when children have not fully determined whether verb-raising or affix-lowering is the unmarked case in their language. Different lexical items are linked to raising ("be" or "have") and lowering (-ed and -ing). Therefore the child receives information which supports both sides of the parameter. Consequently the decision cannot be immediate. This is not such a radical departure from the usual conception of a child's grammar as a consistent synchronic object.[3] The deepest scientific principles, like gravity, are always imperfectly

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2. We would in fact question all supposed "performance effects" which show subtle grammatical sensitivity. One might in fact regard them in the same manner that one regards speech errors which also obey highly grammatical features.
3. Ultimately when we understand the exceptional character of "construction-specific" rules, we may regard adult grammars as "inconsistent" in an important sense. The notion that lexical items can contain complex structural information allows us to have different lexical items whose structural characteristics are incompatible.

178   DO-INSERTION

expressed in the real world. The logic of this approach
suggests that adult grammars may also be, in part,
parametrically unresolved, particularly when they
exhibit **copying**.

        This proposal, in turn, fits suggestions by
Chomsky (1988) and Pesetsky (1989) to the effect that:
the distinction between universal features and language
particular features are retained in adult grammar. This
means that the adult knows which features of a rule are
universal and which are language particular. It also
leads to the assumption that the adult retains some
knowledge of unchosen parametric options. We turn now
to a broader discussion of the parametric model and then
a more precise presentation of the argument just given.

1.2 Acquisition Theory and Developmental Evidence
        It is important to articulate the fact that our
goal is to provide a **theory** of how acquisition may
occur, not a developmental sequence in which we state
exactly what a child's grammar is at a certain stage or
age. Knowing what a child's grammar is at a particular
age is of interest, but it is no more necessary than
knowing what the grammar of one individual is in writing
a grammar of English. There are no full grammars of any
individual speakers of Standard English. We do not
require of theoretical work on intuitions that it
guarantee that the grammar of any one individual be
explicit or even consistent. Nor should we require of
acquisition theory that any putative "stage" be
completely explicit or consistent. Because our goal is
to articulate a theory, we will use evidence that is
fairly rare and drawn from different children at
different ages. We treat them as reflections of
logically necessary points in acquisition which may have
been crucial at an earlier point in acquisition.

        The fact that the evidence may be "rare" might
lead one to believe that it is marginal, or as is often
said, a reflection of "performance". A child may pass
through stages silently. For instance, we do not expect
to see the child choose the Head-parameter, since input
may allow an instant choice (VO or OV). Therefore the
naturalistic data is used only as a source of clues
through which to develop a model that meets the primary
question: how is acquisition possible under any
assumptions? It simply shows that once we obtain a
possible theory, we can then seek to answer questions
about which features of the acquisition process are
explicit and which ones are implicit, which remain in

the grammar as lexical exceptions, which disappear slowly and which disappear instantly.

Naturalistic data and experimental evidence may also, at the stage examined, understate a child's grammatical knowledge and nevertheless provide insight into what earlier stages must have been. Demonstrations that a child at a given age does or does not know some feature of grammar simply fail to address the logical problem of acquisition.[4] The child's variation at a given age, unless the same variation holds for an adult, suggests that the child has more than one dialect, one of which is an earlier stage of acquisition.

There are, now, a number of proposals in acquisition theory which address the Primary Linguistic Data problem, i.e. they structure the fashion in which input is allowed into the system.[5] Lebeaux argues for a variant of the lexical learning hypothesis:[6] children attack an input by projecting either 1) a D-structure based on lexical content (**theta**-structure) or 2) an S-structure based on a surface string, for which the D-structure is not completely evident. In brief, two predictions which follows from Lebeaux's analysis are that[7]:

(2)   All movement sites can be directly generated.

(3)   S-structure has two possible D-structures.

We will call these **monolevel** representations because though both D-structure and S-structure are conceptually available to the child, the connection for a given structure may be opaque. There is direct acquisition evidence from Davis (1987)[8]:

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4. See Lebeaux (1990) for discussion of the notion that a child's grammar may be stagewise inconsistent. See work by Crain *et al.* (1990) for evidence that different experiments elicit knowledge at different ages. We take any experimental results (as Lebeaux does) which show a deviation from adult response to be a clue to how a child attacks the acquisition problem: selection of a particular grammar. Evidence of stagewise inconsistency may nonetheless be important for applied linguistic perspectives.
5. See Roeper (1981) for discussion of an input filter which has this function.
6. See Borer (1984); Nishigauchi & Roeper (1987); Wexler & Manzini (1987); Clahsen (1989); Weissenborn & Verrips (1990) for a variety of proposals about lexical learning.
7. This is, of course, a revived version of the principle of Structure Preservation proposed by Emonds (1976).
8. See also Akmajian & Heny (1973), Menyuk (1973).

(4)   "are you put this on me"
        "are you get this down"
        "are you help me"
        "are you know Lucy's name is"
        "are you want one"
        "are you got some orange juice"
        "are this is broke"
        "are you don't know Sharon's name is"
        "are you sneezed"

The fronted auxiliary is initially analyzed as an
independent question morpheme which seems to be directly
generated without an IP origin.

        The assumption (3), that the learner can project
an S-structure without being certain of the
corresponding D-structure, fits the possibility that
there is parametric indeterminacy at certain stages of
acquisition. We will explore the consequences of (3)
for do-insertion and then briefly, for wh-movement in
what follows.

1.3   The Lexical Representation of Parametric Knowledge

        How is a child's knowledge represented in an
indeterminate phase? We argue that the potential for
parametric ambiguity is a natural corollary of the
Lexical Learning hypothesis[9], in the following way.
Subcategorization frames allow the existence of, in
effect, complex lexical items. If subcategorization
frames can be individually represented, then they can
have unique and even idiomatic structure (Williams & Di
Sciullo (1987):

(5)a   a good time was had by all
   b   *all had a good time

The idiom exists only in the passive and the bare
quantifier is not a possible subject in modern English.

        Now if children build up sets of lexical items,
including their subcatgorizations, then the
subcategorizations can directly represent the **output** of
transformations (under the hypotheses above). In
addition, one set of items could have one parametric
setting and another could have a different one. The
child, for a period of time, might remain unsure which

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9. See Borer (1984); Nishigauchi & Roeper (1987); Wexler & Manzini
(1987); Clahsen (1989).

parametric setting is productive and which is
exceptional. Let us illustrate.

        In English, there is an exceptional use of matrix
clause "seem" with pro-drop. A National Geographic
article begins with (6) which is not possible with (7)
the following sentence:

(6)   Seemed pretty as a picture.
(7) * appeared pretty as a picture

The child could then build up two sets of verbs: one
set allows pro-drop ("seem"), and one set does not
("appear"). The parametric decision could still depend
upon a different syntactic analysis: recognition of
expletives. The presence of expletives then sets the
parameter against pro-drop and marks one verb set as
lexical exceptions. This model would allow the child to
countenance contradictory evidence without necessarily
changing the grammar back and forth or ignoring all
evidence that did not fit the current parametric
hypothesis. In fact many transformations remain linked
to a class of lexical exceptions. For instance, tough-
movement is possible with only a limited class of
adjectives. The grammar of verb-movement has just these
characteristics. Pollock argues that inflection lowers
in English, with the exception of "be" and "have" (see
below). Thus the child is confronted with neutral data
("John runs"), data which favors verb-movement ("John is
always happy"), and data which favors lowering: ("John
always sings songs").[10] The *prima facie* facts invite,
therefore, just the kind of model we are advancing.

2.1 Pollock's Approach to IP
        We begin with a brief look at IP structure.
Pollock (1989) has proposed an elaborated IP in which
several elements which have often been represented as
Heads or only affixes are represented as full Maximal
Projections with the power to function as barriers and
block the assignment of a theta-role. The claim
crucially explains why "do" appears with negation, but
not in simple declarative sentences:

(8)a   John hits the ball.
   b   John does not hit the ball.

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10. This topic is considered in Pinker (1984) following joint work
of Pinker and Lebeaux. The notion of "underspecification" is
discussed there in terms of inflectional paradigms.

182   DO-INSERTION

A separate Tense-Phrase and Modal Phrase precede a
Negative Phrase. In English the tense-marker will lower
to give the verb tense unless a negative intervenes
because the negative blocks this movement. Do-insertion
then occurs to carry the tense which preserves adjacency
between the verb and its complements (8b). The structure
involved looks (roughly) like this:

```
(9)                     IP
                       / \
                    Spec   TP
                          / \
                        T   (AuxP)
                        |     /\
                     (past)  M  NegP
                       do       / \
                              Neg  VP
                                  / \
                                Spec  V
                                 |    |

                              <==  have
                                   be
```
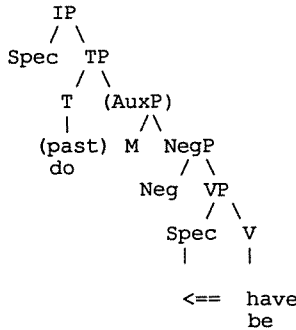
The "do" appears if the tense is stranded: it must
attach to a verb which is a Head.

     The do-insertion rule, under this approach is a
"substitute verb" that is required only when the verbs
in question must assign a theta role and which copies
the theta properties of the verb. Where the verbs do
not assign a theta-role, they can freely raise over
negation. This arises in English for verbs like "be"
and "have".

(10)a.*John doesn't be happy.   (John isn't happy)
     b.*John does not have gone. (John hasn't gone)
     c.*John did not be singing. (John wasn't singing)

Pollock notes these facts and offers an explanation:

     "It is tempting to assume that those facts follows from the
     correct definition of what a substitute verb is....Earlier
     we analyzed auxiliary *be* and *have* as verbs whose lexical
     entries lack a theta-grid. Thus it is plausible to assume
     that in (10) (the trace of) do does not have anything to
     copy, thereby remaining semantically empty."

Therefore ungrammaticality results.

     The phenomenon of do-insertion is a special
feature of English, different from French, because in

English the tense marker lowers while in French the verb raises. The consequence is that in French an adverb can appear between the (raised) verb and the direct object, while in English nothing comes between the verb and the direct object:

(11)a. he always opens doors
    b.*he opens always doors
    c. Pierre lit toujours de livres
          (he reads always books)
    d.*Pierre toujours lit de Livres

How does a child fix these subtle features of grammar? In general adverbs have great freedom: "(always) John (always) can (always) play (*always) ball (always)". Why would a child assume that there is just one position that is ruled out? The first question to ask is when children attain this knowledge, unless UG plays a role?

        As a background for this question, let us observe that the child receives inconsistent evidence.

(12)a John runs
    b John is always happy
    c Bill always sings songs

In (12a) both raising or lowering could have occurred. In (12b) raising must have occurred, while in (12c) lowering must have occurred. A tightly constrained linguistic system should allow the child to correctly analyse each of these sentences instantly. However, it may be unclear which is the lexical exception and which is the general rule.

2.2 Acquisition Facts
        In computer searches I examined hundreds of cases of do-insertion[11], and specifically searched for combinations of "do+be", "do+is", "do +was".[12]   In addition I performed a search of all "-ly" structures in Adam and then used a set of common adverbs to perform searches on the other children in the CHILDES corpus. The adverbial phrases searched for include: "maybe", "still", "even", "really", "only", "probably", "always", "never", "sometimes". I present here representative

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11. The data assembled below is partly well-known data drawn from work by Davis, Valian, Winzemer, Mayer, partly from my own two children and searches of CHILDES.
12. Some examples of "do+have" are included, but this was not the focus of searches because of the complex nature of "have" in adult grammars.

184   DO-INSERTION

data taken from these children. A more careful search
of this data with other adverbs, larger contextual
windows, and careful age correlations would be in order.
The purpose of these searches was to establish the
existence of a set of phenomena. Exactly how each child
progresses through them remains an important research
topic.

     There is straightforward evidence that children
are not raising main verbs to the tense position,
because:

(13)   There are no instances of an adverb between the
             verb and direct object.

We find (14a), but not (14b):

(14)a. "he always closes doors"
     b.*"he closes always doors"

This is the opposite of French.[13] Nonetheless, the
analysis of raising seems to be in place as soon as
adverbs and auxiliaries are available in English because
in my searches of several thousand adverbs, none like
(14b) ever occurred. The presentential position, post-
sentential, post-subject, and post-auxiliary positions
are all used[14]:

(15)   "we always do that at school sometimes" (Adam)
        "Even I want you to drive me to school" (Tim)
        "I once did it last night"(=I did it once last
           night) (Tim)
        "Do you know what even was happening" (Tim)
        "why does sometimes Andy doesn't look like Andy"?
           (Abe)
        "Daddy doesn't mostly get it" (Daniel)

I have chosen unusual examples to reveal the productive
use of these adverb positions. None, however, appear
between the verb and the object. The post-verbal
position for adverbs, predictably, occurs only with the
verb "be": "Laurie is always a Mommy too".

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13. See Meisel (1985); Weissenborn (1987); De Haan (1987); Pierce
(1989); Clahsen (1989); Deprez & Pierce (1990); Tracy et al.
(1990) for pertinent discussion of negation in French and German.
Their evidence supports the notion that children have at least a
finiteness node, a subpart of IP, from stages that are even
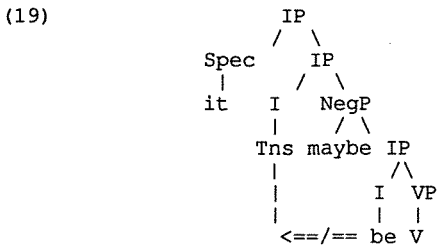earlier than those examined here.
14. Again a closer analysis or more intensive diary search might
be appropriate just at the moment when auxiliaries appear.

2.3 Adverb Barriers

There are a few very precise examples of sentences in close sequence which reveal that the child operates with an articulated IP structure where an adverbial node can block tense-lowering. Consider:

(16)   a. "Is that my meat/ It maybe be my meat"
        b. "It maybe be dark...it maybe be dark"

(17)   a. "I always be a mummy"
        b. "Laurie is always a Mummy too"

(18)   a.*Laurie be always a Mummy too"
        b.*It be maybe mine"
        c.*be it dark?

The tensed element occurs before the "always" form (16b,17b), but not after (16a,17a). These examples point again to the articulated IP structure where an intervening node must be preventing a connection between Tense and "Be". In these two examples we see that the Tense does not lower onto the verb just where there is an intervening adverbial element: "maybe" and "always".

(19)   IP
                       / \
                  Spec   IP
                   | / \
                  it   I   NegP
                         | / \
                      Tns maybe IP
                         | /\
                         | I VP
                         | | |
                        <==/== be V

This suggests that adverbs can play a barrier role in the transmission of tense as well as negation. This leads to the hypothesis that the NegP node which we have utilized should perhaps have a broader definition: AdvP. The one case "maybe" in fact seems to be both negative and adverbial.[15] Other examples from Adam:

(20)   Robin always be naughty"
        "because Indians always be bad"
        "he always get to nursery school"

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15. In addition, a notion of "intervenor barriers" has been developed by Rizzi (1990) where he also argues that negation functions as an adverbial.

186   DO-INSERTION

It is clear that the structure prevents the verb from connecting to the pre-adverbial tense position.[16] Despite the fact that the IP domain is one where considerable language variation exists, it is has been precisely triggered.

3.1   Do-Insertion
Under the predictions above, we would expect that do-insertion, being an *in-situ* default representation of structure, should be immediately available to children.[17] Adam, like all the others, shows do-insertion in the adult manner (40=protocol number):

(21)   40 "you didn't change it, did you"
        41 "I didn't see no tigers"
        42 "I didn't put no pant on"

This is not insignificant. Were do-insertion to be the last feature of grammar to emerge, we could readily explain it as a marginal phenomenon which one would expect to be difficult to acquire. Instead it is a default rule that a child has immediate access to in UG.

We turn now to a variety of other contexts in which do-insertion occur (first extensively analyzed by Mayer, Erreich, & Valian (1978). These cases do not usually exist in isolation, which is why there has been a strong tendency to regard them as performance "errors". But some forms never occur. This cannot be predicted by performance alone.

The existence of the following forms in acquisition is perhaps the best straightforward evidence that the child attempts to project tense as an independent node:

(22) a.**Strong Verb Cases**   [from Davis summary]
        "I did broke it"   "Jenny did left with Daddy"
        "What did you bought"   "I did fell when I got blood"
        "I did rode my bike"   "he could caught that"
        "What did you found"   "What did I told"
           [from Roeper]
        "did you broke that port"
        "why did you left your extra keys at home"

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16. It is apparently possible for a child to delete the Tense marker, which may reflect a stage before "do" is used to mark its position.
17. See also Penner (1989) for discussion of *tun*-insertion in Swiss German. It is also commonly used in Dutch and German by children and parents speaking to children "tue die Hände waschen" [do the hand (to) wash]. It therefore substitutes for V2.

(22)   b.**Regular Verb cases**   [from Davis]
        "I did fixed it"   "the plant didn't cried"
        "they didn't spilled"   "she didn't goed"
        "why I did break it"   "I didn't missed it"

        c.**Present Tense cases** [from Davis]
        "does it rolls"   "they don't likes to fly"
        "Does he makes it" "does it opens"
        "why doesn't this goes off"
        "why doesn't we has a marble table here"

        d.**Non-copying do-insertion**
        [Roeper corpus, in 16 days]
        "I did catch that bee" "I did jump in"
        "I did put it on"   "I did jump"
        "I did turn it off"
        "I did scare a kitty away"
        "did fall down"
        "did find a butterfly"
        "who did take this off"
        "I did paint this one and I did paint this one
            and I did paint this one"

Pollock argues that tense is an Operator and therefore
prefers a two-position representation. Once again, we
find that a monolevel representation in which both
positions are articulated at S-structure is evident:
tense is marked both on "do" and on the verb.[18] This can
be construed as direct confirmation of the Least Effort
principle in acquisition.

3.2   Do-Insertion in "be" Contexts
        In addition, we find it occurs precisely where
Pollock rules it out, in "have" and "be" environments:

(23) **Do-insertion** for "be" (from Davis: Brown, Cromer,
        Pinker, Roeper, Valian, de Villiers (pc))

        "You don't be quiet."   "didn't be mad"
        "This didn't be colored"   "did there be some"
        "does it be on every day...
        "does the fire be on every day"
        "do clowns be a boy or a girl"

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18. Tense-hopping may occur across sentence boundary: Adam "Was
this is the boat I saw". See Phinney (1981) on cross-sentential
neg-hopping.

188   DO-INSERTION

(24) **Have**
      "it's don't have any oil"
      "it didn't has any"
      "this don't had a nap"

Pollock's criterion is incorrect: "be" forms can elicit
do-insertion. What then is the crucial factor?

     L. Green (1990) observes that Black English
exhibits precisely the same kind of do-insertion with
"be": "do he be sleeping". Now the question arises:
what allows be-raising in SE and what prevents it in
child language. One could argue:

            (a) that the "be" form does assign a theta-role
and   therefore is identical to other non-raising
                verbs, or
            (b) another feature of meaning, namely Aspect,
                prevents raising, or
            (c) that some feature of the agreement system is
                involved.

Green argues, based on aspectual characteristics of BE,
that aspectual verbs do not raise.[19]

     One can also argue that richness of agreement may
be involved. In child language and Black English (BE),
there is evidence for inflectional agreement, but in
both systems the children do not immediately get the
full paradigm ("am", "are", "is"). In BE one finds for
"I is", "you is", "he is" and in child language one
often finds the same (or "I are..." or "he be's here"
and apparent random variation). It is true that aspect
varies in child language as well "sometimes I be dry in
the morning" is found for the habitual reading, and for
what one might call the "generic fantasy" common among
children we find "you be the Mommy".[20] The latter
"subjunctive" reading holds for adults as well. It is
clear that some subtle features of aspect are not
initially controlled by children, while other aspectual
distinctions appear quickly.

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19. There are no examples so far of the form *"do he be sleeping"
with progressive forms in the child language, though I am not sure
that they are impossible. If so, then the non-raising phenomenon
would be limited to main verb "be". However, these progressive
forms are possible in Black English.
20. M. Bowerman (pc), Roeper corpus (1990). See Meisel (1985),
Slobin (1985) and references therein for the common view that
aspect precedes tense. See Meisel (1990) for extensive
discussion.

Nonetheless, the view that "be" raises only when there is a full analysis of the paradigm supports the suggestion by Jaeggli & Hyams (1987) that the "morphological uniformity" of the verbal paradigm is crucial. If the verbal paradigm involves no endings, or required endings, then it is uniform. If the paradigm is mixed, some endings are present and some stems are present, then it is non-uniform. Until the "be" paradigm is securely analyzed as non-uniform, children will not allow "be" to raise.[21] This obviously calls for a deeper explanation. We have the structure (25):

(25)   [$_{spec}$ he [$_{IP}$ is$_i$ [$_{NP}$ not [$_{VP}$ t$_i$ here]

Some strong feature of agreement (i.e. paradigmatic differentiation) is needed to make the connection between the verb and its trace. In effect, then person and number agreement, if relevant, must be matched in order for raising to occur. By hypothesis, when the strong agreement system emerges in child language, the do-insertion option is dropped. Until that point, both the original verb position and the tense position are directly represented in a monolevel analysis.

This then represents another form of lexical constraint on syntactic systems. In effect, the system remains lexical if the paradigm is incomplete. We can state the phenomenon in this fashion:

(26)   Incomplete paradigms cannot support syntactic
        generalizations.[22]

Syntactic generalization then has the form of substituting a category for a particular verb:

(27)   "be" => raising
        generalizes: V => raising

(28)   "push" => attracts tense lowering => push+ed
          generalizes:
        V => attracts tense lowering => V+ed

Incomplete inflectional paradigms cannot undergo generalization. This line of reasoning seems to have promise, but a more refined analysis shows that raising

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21. The case of "have" is difficult to assess because of dialect differentiation. See Pollock (1989) for discussion which is also inconclusive.
22. See Baker (1981) who claims "defective paradigms" do not allow generalization.

is also affected by markedness considerations which we
now discuss.

3.3 Lexical Do-Insertion

     Pinker (1984) makes an important observation about
the contexts of do-insertion in child language: it
predominantly involves strong verbs. We find strong
verbs under two conditions: tense-copying ("did broke")
and non-copying ("did break"). In addition to the cases
cited above we find:

(29)   "I did broke it"
        "Jenni did left with Daddy"
        "you did hurt me"

and do-insertion instead of tense-copying:

(30)   "what you did eat"
        "I did see it"

These are not cases of free variation. A few
exceptions exist (like "this didn't has any") but
otherwise we have relatively few reports of cases of
tense-mismatch like:

(31)   *"he does left"
        *"he did comes"

There could still be a stage where tense is not figured
out lexically or misanalyzed, as some have claimed, but
the instances of tense-matching are far too numerous for
one to claim that there is random variation. Note that
if there is a stage where the lexical identity of
different affixes is unclear, this would be quite
different from the assertion that no tense knowledge is
present.

     What then is different about the strong verb
system? Both the verbs which permit raising allow
internal tense marking ("have" and "be"). Therefore the
child may be following a markedness system which
reflects these preferences. Markedness system:

(32) Raising is **unmarked**

(33) within the marked lowering system:
        lowering of an affix (-ed) is **unmarked,**
        lowering a semantic marker is **marked** (past).

(34) internal tense-marking requires lowering of a
      semantic feature, which is **marked**
      [push+ed] [leave+past => left]

Therefore, a child prefers to raise internally marked
verbs, and lower affixes. Any input that is at odds
with this is marked.   Consider these cases:

(35) a. John does sings =>
             marked because lowering occurs
     b. John did left =>
             marked for lowering and lowering
             a semantic marker

Therefore we have a correlation with the fact that the
strong verbs are more likely to exhibit copying and
hence do-insertion if lowering is necessary. And strong
verbs are more likely to raise if we assume that affixes
are, in a sense, designed to move (in this case to
lower). This suggests again that do-insertion, at a
more subtle level, registers derivations that are marked
in terms of UG.

        In fact, adults will also prefer (a) to (b) if
given a choice:

(36) a. ??it does fits
     b. **it does is

This shows that adults register the unmarked nature of
raising. In effect, then, there is an unmarked form of
lexical substitution in UG: substitution on a complex
element [verb+past], rather than on the element
[verb+ed]:

(37) UG substitution: verb + past => was   (unmarked)
                       verb + ed => was   (marked)

This argument has interesting implications for the
notion that lexical insertion can occur at different
points in the grammar. The concept of parallel
morphology, which allows lexical insertion at different
points in a derivation, has been pursued by Hagit Borer
(forthcoming).[23]

23. If a lexical item is internally marked for tense, then,
preferentially, insertion would occur after movement. The new
unit "V+tense" would then receive a single lexical item where both
"verb" and "tense" are represented. This would lead to a natural
constraint on parallel morphology:
i)   Insert single words rather than compositional ones.
      [compositional = two morphologically separate items

3.4 The Excluded Form: Do-Insertion and Tensed "be"

Now let us ask again, exactly why the child would say "Jenni did left"? The answer is that the child is exposed to a contradiction: Internally marked tense should prefer raising. But the presence of preverbal adverbs in adult input ("John has always left") means that the grammar prefers lowering. The form "Jenni left" is ambiguous while the form "Jenni did leave" indicates that the grammar has chosen lowering and that the unmarked preference for "left" (i.e. raising) is not chosen. In other words, the copying indicates the parametric choice. The "do" is inserted infrequently with regular verbs because for regular verbs the lowering analysis agrees with the unmarked case for lowering, affix-movement, although even in this case, the "do-insertion" continues to mark the parametric choice.

This leads to a crucial prediction: "do-insertion" will not occur for the completely unmarked case (38a,b):

(38) a.*"John does is here
     b *"does it is here
     c. "does it fits"
     d. "do it be"

We have examined over 200 examples of auxiliary errors (drawn from the appendices of Davis (1987), as well as from our own data) and found no examples like (38a,b), with the exception of a few fixed forms.[24] This prediction follows because when the child understands the tense on "is"[25] then it has found the unmarked case for raising. Raising is preferred for strong verbs including "be", so two forms of unmarked case match. Do-insertion occurs only when a marked parametric option is chosen. We then predict the presence of (38c), which does occur. We can also predict that (38d) occurs. Children often attempt to regularize "be" and say "he

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            (verb, -ed)]
The converse markedness principle, favoring affix-lowering would be:
ii)   Only Phonetically real elements, not semantic features, are moved.
24. Stromswold (1990) who has done a more exhaustive study and also found no instances of *"does is" (pc). I have found some fixed idiom couple counter-examples: "why do you're going outside", "why do you're giving juice", etc.
25. The logic applies to "has" as well and we have not found examples with auxiliary "have" but some, predictably, exist for main verb "have". Since "have" has extra complications it is not the primary example.

bes here" as if it had no internal tense form.   It
remains to be shown that these two forms correlate in
the grammar of particular children, and possibly that
they correlate with an aspectual usage of "be".

Recall now that strong verbs ("I did broke
it") are the most frequent locale for "do-insertion".
Therefore it is not the fact that "is" has internal
tense alone that leads to the absence of do-insertion,
it is the fact that "be" raises while other strong verbs
do not raise.   The evidence for the child, once again,
is that adults do not say *"I broke always the door" and
consequently neither do children.   Further evidence
comes from "be"-copying.

3.5 Copying and "be":   the non-Parametric Piece of the Chain

In a sentence of the form "is John here" there is
a chain with two traces.   There is raising from the VP
into a Tense Node (part of IP) and then raising into CP
(where TP, following Pollock, is like IP):

(39) $[_{CP}[_{c}is_i$ $[_{TP}[_{T'}$John $[_{TP'}[_T$ t_i $[_{VP}$ $[_v$ $t_i]]]]]]]]$
                 <===========   <===== raising
                                    =====> lowering
                 non-parametric   parametric

The two pieces of this chain have different parametric
status.   One part of it is directly subject to
parametric raising/lowering variation while the other is
not.   Therefore we predict that do-insertion can occur
with respect to one part and not the other.   The do-
insertion provides evidence of the origin of the chain
with respect to lowering.

Although the SAI operation, with respect to
chains, is very much similar to lowering, it does not
have the same parametric status.   The inversion
operation may be connected to the parametric system in a
different way: some languages do not signal question-
formation with inversion.   Within the above derivation,
there is only one parametric ambiguity and therefore
only one position where "do" can be inserted.   There is
direct evidence in behalf of this view.

The effect of do-insertion is to create a copying
environment in many (though not all) instances.   Suppose
copying were the basis of do-insertion, then we would
predict that do-insertion would occur wherever copying
of the tense marker occurs.   Therefore it would   occur
in **both** portions of the chain we have outlined above.

194   DO-INSERTION

In fact, it never occurs with respect to "is" although
as has been widely reported that copying does occur with
the verb "is" (See (Davis (1987)):

(40)   "what's he's doing"
        "what's the mouse is doing"
        "why is there's big tears"
        "what is the woman is doing"
        "Is Tom is busy"
        "Is it's Stan's radio"
        "Is this is the powder"
        "Is that's a belt"

Again, we have found no examples of the form *"what does
the mouse is playing", although as pure performance
errors one might expect to find at least one or two
(i.e. the child says "does" meaning "is"). Once the
verb has raised to tense, then there is no difficulty in
moving to the pre-subject position.

        The reader may have observed that many of our
examples involve inverted "do". In each instance,
though, one must argue that the "do" is first inserted
in IP and then inverted. Or, predictably, once
inserted, it can be copied:

(41)   "why do deze don't unrase"
        "why did you didn't want to go"

Note again, if only the semantic past tense marker were
inverted, then we would predict the presence of *"did
you was here" at the stage where children say "did there
be some".

        The notion that children identify tense before
they do SAI entails a further prediction: no inversion
without tense. There are no reported examples of
question formation without Tense.

(42)   *"what be that

Only "what is that" and "what is he doing" occur. There
are thousands of questions that begin with "is NP", but
no one has reported a question of the form *"be NP".[26]
Under the common hypothesis that these inflectional
forms are in "free variation" for a period of time, the
absence of these forms is surprising.

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26. Exceptions exist in the form of "don't he" in some contexts
where there is an apparent lack of obligatory tense. However
there is dialect variation on exactly this point.

These facts support the view that there is only one way in which to form questions: by movement of a tensed element into the COMP position.

(43) [$_{comp}$ is$_i$ [$_{IP}$ NP [$_{TP}$ t$_i$ [$_{VP}$ V

This must be a feature of UG which belongs to the unmarked core of grammar.

3.6 Summary

Assume that both (a) Verb-raising and (b) unitary lexical insertion are unmarked, then we make the following predictions, under the assumption that do-insertion occurs only when some part of the analysis is marked.

(44)   "it is" => **unmarked**, no *"it does is
         "it does fits "=>
             marked because lowering is involved
         "he did ate" => **marked** because lowering involved
         "he do be sleeping" =>
             marked because no internal tense, so raising
             is not the unmarked case

In sum, all of the forms that involve do-insertion are demonstrably marked in some form. The core of these examples is the marked character of lowering as opposed to raising.[27]

3.7 Individual Variation

There is an important limitation in the acquisition data here. We do not have a microscopic account of how individuals develop. It is possible that children actually move through stages where they have "left", "lefted", "did lefted", "did paint", "painted". Or it is possible that different children manifest different variants, or that the variants are co-temporaneous. It is not possible yet to see if a micro-evolution, which could occur in a matter of days, does occur. There are some examples which suggest that individual children actually continue to be aware of the different alternatives. Pinker (1984) cites these cases

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27. The grammar poses other problems to the learner which could, in principle, complicate the picture. B. Plunkett (1989) points out that "be" is also associated with lowering in contexts like the following: "a boy is being bitten". She (this volume) also argues that the auxiliary "be" may be involved in simple sentences like "John is here", for which the absence of do-insertion in acquisition provides immediate support.

196   DO-INSERTION

from Erreich, Valian, & Winzemer (1980), produced in
close sequence by a child:

(45)   a. "where goes the wheel"
        b. "where the wheel do go"
        c. "where does the wheel goes"

The predictable unmarked form occurs first: "goes" has
internal tense and therefore undergoes V-2 raising. The
verb "goes" here is not surprising, since it has closely
related constructions like "here goes the wheel" where
V-2 does appear (compare: *Here ran the man). This
variation is not surprising if we assume, as Chomsky
(1988) suggests (in reference to second language work by
Flynn (1987)), that the mature speaker retains the
distinction between unmarked UG phenomena and language
particular decisions.[28] It indicates that both the verb-
raising option and lowering are available, but the child
is uncertain about whether it applies to the verb in
question.

        Since verb-raising is, putatively, unmarked we can
make the prediction that the direction of the child's
self-correction would always go from verb-raising to
verb-lowering, as it does above, and never the reverse.
If the grammatical shift were some form of pure
"performance" errors, then we would expect the variation
to be random. Unfortunately we do not have a child
corpus with sufficient refinement to verify this
prediction numerically.

        Other variations occur, all of which fit the mode.
Some children inflect "be" and produce "bes", just as
the child who says "does it be on every day" appears to
have not yet identified the tense marking for "be". We
predict, but have not verified, that the same child does
both.[29]

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28. Verb-raising occurs in a variety of idioms with stern or
extra-serious quality: "we know hostages are alive but we know not
where "(Ted Koppel), "It matters not", "I doubt not what you
say". . Is it productive? "?He bows not before superior force",
"?I like not to be interrupted".
29. Note that participle formation has the superficial form of
agreement as well: "John was pushed." It could also provide
input which would lead the child to believe that agreement between
tensed "do" and tensed verb was natural. Thanks to M. Speas for
pointing this out.

4.1   The Role of Semantics and Illocutionary Force in Do-Insertion

There is a counter-argument to our syntactic claims about the role of do-support: sentences with an extra auxiliary have a different pattern of intonation, emphasis, and even truth value. Could the presence of extra do-insertion be motivated in terms of illocutionary force? Consider the following conversation (which I recently overheard) from two 4 year olds:

(46)   a. "I don't want to go outside"
                and then
        b. "Do you don't want to go outside".

In the narrowest sense, one child wants to know if the other child's attitude agrees with his. Parallel syntax equals parallel attitude. The child has achieved a literary effect. It is one which his grammar currently allows, but which will be eliminated when the do-copying option is eliminated.[30]

This reflects on the modular character of acquisition.[31] Each module undergoes a partially independent set of changes. The External-language (in Chomsky's sense) produced by the interaction of modules is a diverse and complicated product. Consequently possible unambiguous readings may be lost in the growth of grammar.[32] The syntactic module may be simplified at the cost of a semantic distinction. This indicates that simplicity is not measured with respect to the whole grammar, because it may be that a simple syntax/semantics relation is lost in this process of syntactic simplification.[33]

While one might suppose that the reason that do-insertion exists is to preserve such options, we can see that it would prevent numerous changes in the system. We conclude that subtle semantic variation cannot

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30. This does not mean that the same communicative goal cannot be achieved by paraphrase.
31. The same argument holds for sentences that involve several negatives. Properties of focus and emphasis, which we cannot characterize very well, are lost when we no longer say "No I am not a nothing boy".
32. This can be read as a principled statement to the effect that a theory of acquisition cannot depend upon any form of Evaluation Metric (see Chomsky (1965)) since such metrics are in principle uncomputable.
33. Special semantics may be preserved in the lexicon, as in "ain't" with a refusal reading..

198   DO-INSERTION

explain the presence of copying, but rather reveals the
modular limitations on the grammar.

5.1 Conclusion

We have presented a special angle on do-insertion
copying phenomena in acquisition: we argue that it
provides an overt, monolevel, representation of a
derivation which, without the explicit copy, would be
systematically ambiguous. The ambiguity may exist in
the child language, but not in the adult language,
because it reflects different parametric options, not
just different derivational options. There is a
parametric ambiguity between raising and lowering in the
grammar which do-insertion resolves. In the adult
language, there is only lowering and therefore the
ambiguity does not exist. This analysis provides
independent support for the view advanced by Lebeaux
that acquisition data reveals default options, and for
the view advanced by Chomsky that do-insertion is
intrinsically a default option.

Two subtle facts are predicted if this approach is
pursued: 1) the presence of do-insertion copying in
lowering environments ("it does fits"), and 2) its
absence in raising environments with "be". Does the
same argument hold elsewhere?

We have argued elsewhere (Roeper (1990)) that
other forms of copying may occur which delineate
parametric options as well, although there remain
theoretical questions about what the parametric options
are. The analysis extends to three other instances:
auxiliary copying ("Can I can come"), wh-copies ("what
did he say what it is"), and relative copies in French
("sur la balle qu'i l'attrappe"), although they do not
occur in the adult language. Parametric variation in
long-distance rules and parametric clitic doubling are,
by hypothesis, disambiguated by these copies. In sum,
the presence of copies of traces delineates the
distinction between marked and unmarked parametric
choices.

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202   DO-INSERTION

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