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Junction Grammar as a Framework for Psycholinguistic Analysis of Language Acquisition

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The prominent psycholinguistic research defines the goals of psycholinguistics thus:

In contrast to linguistics in the narrow sense, which has in the past been mostly concerned only with determining the most economical description of language and its universal characteristics, the goal of psycholinguistics is to explain [1] how a speaker attains this competence in the first place, and [2] how he uses it in actual discourse. (Russell, Quigley, and Power, 1976:230)

Psycholinguistics is, then, concerned with both the connections between and the mutual influences of language and psychological processes. Recent emphasis in psycholinguistics has focused on the actual cognitive nature of linguistic capacity and the mental representations of language. The study of acquisition proceedings (i.e., the attainment or development of language) can provide insight into various components of linguistic capacity and mental representation. Psycholinguistics, then, though concerned generally with mental representations of language and the correlative psychological structures, specifically addresses questions of

(1) the attainment of language ability,
(2) the nature of linguistic capacity,
(3) the function of that capacity in communication, and
(4) the influence that linguistic capacity and linguistic structure in general exert on cognition.

Most investigations in psycholinguistics must necessarily rely upon linguistic theory of one form or another to guide the analyses. The assumption of structure-changing transformations and the distinction between Competence and Performance, prevalent in most existing linguistic theory, constrain psycholinguistic analyses in ways inconsistent with natural data. Investigation of child language is espe-

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1 Conceived to refer to both "Generative Semantics" as well as to "Interpretive Semantics."
cially limited by these basic assumptions. These two concepts can be major stumblingblocks in the analysis of child language.

The distinction, based on the notions of Competence and Performance, between grammatical and nongrammatical (or "acceptable" and "nonacceptable") utterances artificially creates the illusion that only the "acceptable" class of utterances represents valid language, that utterances not of the acceptable type are non-language utterances (or else the theory disregards them altogether). The basic problem with using theories built upon only "well-formed" utterances (or "ideal speaker-hearer language") to investigate actual language processes is that normal language users (and most notably children) do not conform to the linguists' "ideal" rules for well-formed speech. Even though people don't use language in the way the "ideal "speaker-hearer" is proposed to do, linguistic theory for the most part is based on only those selected utterances which follow the "acceptable" pattern. This of course presents a great problem in analyzing child language—how is the data collector to know which of the child's utterances are ungrammatical (in the context of the child's primitive grammar) and which are not? A theory based only on "well-formed" sentences must be provided only with "well-formed" input or the resultant analysis will be irrelevant if not inaccurate. By this reasoning, transformational theories do not provide an adequate nor an accurate theoretical foundation for the investigation of child utterances because of the restrictions on the type of data such theories require. Children produce so few "well-formed" (in the usual transformational grammar sense) sentences that analysis can only progress by either (1) assuming much additional deleted underlying structure, or (2) by restricting analysis to very few utterances.

Because it doesn't restrict its analysis to only so-called "grammatical" utterances, Junction Grammar is one theory of language-analysis which does facilitate the investigation of child language. Junction Grammar admits as valid language utterances any in-context fragment or otherwise "ungrammatical" utterance, based on the premise that a language theory should reflect the capacities of the language user as exhibited in his actual use of language. Structure-changing transformations impose constraints undemonstrated in actual language data, demanding the internal construction of each statement in its entirety before vocalization takes place. Junction Grammar is uniquely suited to overcoming this problem: "there are no rules in Junction Grammar which bring about a structural change" (Lytle & Packard, 1974:9). That is, lexical strings are formed by the lexical component, cued by the language-independent junction tree, but the structure of the underlying junction tree remains unchanged. In Junction Grammar, lexical rules
interpret and select underlying structure, but there are no alterations or additions to the junction tree in any way. Children often make statements which would be considered unacceptable examples by current transformational theory. Junction Grammar, by accepting all utterances and avoiding structural transformations, provides a more appropriate outline for analysis of child language forms. Thus Junction Grammar can rightly claim to adequately represent child language as well as the normal adult form of language.

Junction Grammar holds that all languages are analyzable in terms of junction patterns, that junction rules are a set of language universals, and further, that certain languages make a more extensive or more productive use than others do of selected subsets of the universal pool of allowable junction rules. It follows, then, that specific languages will differ in (1) their selection and distribution of junction rule patterns (i.e., in the subsets selected), and in (2) the manner in which junction patterns are realized as surface strings:

While most languages would use the majority of the possibilities [the set of all allowed junction rules], no one language need necessarily use them all. Furthermore, it would not necessarily be the case that any two languages would utilize exactly the same subset, nor would any two persons using the same language, for that matter. (Lytle & Packard, 1974:25)

It also follows that a child's "primitive" grammar might very well be analyzed as an augmented paucity grammar, possessing both (1) rules gleaned from the adult version of the language involved, and (2) ungrammatical rules, incompatible with the adult version, included because of the child's inadequate understanding of the adult grammar.

In this paper, an analysis of a specific stage in the attainment of language is presented to show Junction Grammar to be an appropriate theoretical background for psycholinguistic research. Specifically, an analysis of Bloom's (1973:233-257) Allison-IV data based around Junction Grammar assumptions is presented. This analysis proposes Characteristic and Feature Aspects as distinctive components of Allison's stage-IV grammar, discussing Positive Immature Features, Negative Immature Features, and Characteristic Naming as representative of Aspects of psycholinguistic attainment grammars. This Junction-Grammar-based analysis shows that Junction Grammar does provide a sufficient and reasonable, indeed advantageous, theoretical foundation for psycholinguistic analysis and theory-construction.
ANALYSIS

A significant problem in language analysis is deciding which utterances to admit as constituting legitimate, meaningful communication. If the stance is taken of assuming the child to intend a full statement in certain contexts when only producing a fragment or a single word, the task of grammatical analysis is greatly affected in that a more complex underlying structure must be assumed than would normally be assumed for that of a single word (thus implying that the child generates the fuller structure, but during lexicalization chooses to leave out parts of the structure, due to context).

In the current analysis, certain short utterances are assumed to represent legitimate underlying structures with some deletion having taken place during lexicalization processes. The grammatical analysis of such structures proceeds much as if the utterance has been a complete sentence structure until lexicalization processes optionally lexicalize only those nodes actually uttered. Herein is one difference between child and adult language—the optional deletion within child language of sections of structure not so optionally deleted in adult language. Often such deletions are massive, resulting in "naming" phenomena. In some cases, the deleted underlying structures can only be vaguely inferred from context; examples from the Allison-IV data (Bloom, 1973:233-257) are: 9.4 "box", 7.3 "bag", etc. It is unclear in these naming instances what the deleted underlying structures are (or if any even exist). The child could mean "here is the box", or "Mommy has the box", or "I see the box", etc., etc. Consequently, in such cases where no complete underlying structure is readily inferable, such naming utterances are considered as meaningful single fragments; no exact complete meaning can be reasonably inferred—neither can any complete underlying structure be reasonably postulated.

Much of child language can be analyzed as originating in one of two processes: 1) as a subset of adult language; i.e., having a selection of the same set of junction rules, but a more liberal use of additional options and these selected rules; 2) based upon a different selection of junction rules (much as the bases for foreign languages' differences). It seems that the first of these two possible processes is more tenable.

The numbering reference system employed in this paper follows Bloom's (1973) scheme, with one additional number, the linear order of the utterance, appended; e.g., utterance 9.4 is Allison's fourth utterance in section 9.
However, in most cases, the deletions the child has made are fairly obvious. This is perhaps the biggest contrast between child and adult language—the child seems to delete nearly anything viewed as redundant or obvious. Allison deletes according to context, subjects, objects, prepositions, and verbs. She does show normal adult deletion of the subject in a few instances (e.g., 23.1 "[you] pour Mommy juice"), most of which are normal imperatives; however, Allison does sometimes retain the subject in an imperative context (e.g., 63.1 "Mommy eat cookie", 71.1/2 "Mommy comb hair"), an abnormal imperative.

Allison showed adult-like capacity with the quantifier more and the negative no, but did not exhibit competency in regards to other quantifiers or negative constructions (i.e., some, less, etc.; or not, n't, none, etc.).

In all, the various Aspects observed in Allison's speech can be grouped into two main categories: (1) Characteristics of her language, and (2) Immature Features, resembling in either a Positive or Negative way certain features of adult language. The naming phenomena discussed above represents a basic Characteristic in Allison's language; hiatused subject, object, preposition, and verbal elements, as well as missing grammatical markers, represent Negative Immature Features (that is, features of adult speech which are not exhibited in the child's speech); use of the negation no and the quantifier more embody Positive Immature Features in Allison's language.

VERTICAL PROCESSING

An additional Characteristic present in Allison's language which has much bearing for linguistic theory, and for

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4. The typical child language feature of deleting tense markers and possessive markers, etc. does not fall under this category of deletion. Allison did exhibit these typical ellipses, leaving out markers for 3rd person, progressive aspect, tense, and possessives.

5. Characteristics are features of speech present in the child's language which are not usually admitted as constituting valid language features in "ideal grammatical" speech. If such features were admitted as valid examples by conventional linguistic theories—e.g., if these features were part of the normal adult language scheme—such features would in the present schema be classed as Positive Immature Features.
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Language-generation in general, is the strong implication for a vertically-oriented cycle (Lytle, 1971:97-99); Ellsworth, 1976, Billings, 1973, Billings & Thomson, 1972) in the generation of many of Allison's speech structures. Vertical cyclicity refers to the notion that sentences/structures can be generated by sections—that the entire deep structure need not be completed before lexicalization can occur. This is compared to horizontal cyclicity, which demands that deeper-level structure be completed before any processing on a higher level can occur (as transformational theories must necessarily maintain, due to the requirements of variable reference as concerning the input to the transformational component [see Chomsky, 1965:136]). This characteristic graphically exemplifies the inadequacy of a theory based upon structure-changing transformations—that of not being able to account for utterances apparently produced via a vertical cycle. Such utterances are common and natural to most native speakers, and are not at all aberrant or non-normal examples.

The Allison-IV data exhibit vertical cycling in several cases. Very often Allison produces a word or words, then waits for a short time (indicated in the Data by a single slash [/]), and then completes an SX by using the previously-uttered word(s) as part of the final structure (sometimes incorporating more than one pause). This type of structure-production strongly implies inner processes which (1) form finished surface structure in sections, not necessarily in complete structure-units, then (2) cycle back to the deep structure to process another section from deep to surface form. This assumes that each intermediate processing component can accept noncomplete SX structures as input. Allison's pauses indicate a vertical, not a horizontal, process is likely operating. Examples are many, a good representative is 4.1/2/3 "wiping/baby Allison/chair." This example shows hiatused self-subject and several hiatused markers (be-aspect marker and possessive-marker); its relevance to vertical cycling is in the pauses which appear after "wiping" and after "baby Allison." In each case, the child produced a significant portion of the utterance, then paused; after pausing, she then produced another meaningful portion, and so forth. This structure appears to be a complete structure (SV) as far as the child is concerned: she was, during the production of these portions and pauses, in the act of wiping off her chair. Because of context, there can be little doubt what the child intended the comment to be; the pauses are not significant to the communication, only to the construction—she quite obviously intended the three utterances to form a single complete unit. Consequently, these utterances would be diagrammed as one complete structure in Junction representation: (N+(V+(N$((A*(N*N)+E))))

4.1/2/3 "[self] wiping baby Allison['s] chair"

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It should be pointed out that only utterances separated by a short pause (indicated by a single slash [/]) are considered in this analysis as indications of vertical-like processing.

THE CHARACTERISTIC AND FEATURE ASPECTS

IN THE ALLISON-IV DATA

Within the Junction Grammar framework, several uniquely identifying Aspects are apparent in the Allison-IV data. These Aspects specifically define Allison's stage-IV dialect/language-form in a way not possible under the constraints of conventional theory. The following is a discussion of Characteristic Naming and Immature Feature (both Positive and Negative) Aspects found in the Allison-IV data. Complete listings of all utterances and structural representation, showing the various Characteristic and Immature Features discussed hereafter, are available from the author.

CHARACTERISTIC NAMING

"Naming" phenomena can be conceived of as originating from one of two probable processes: (1) massive deletion, wherein much of the underlying structure is optionally left out during lexicalization, so that only one word or phrase survives to the surface level, or (2) completed one section at a time are never completed, thus leaving the previously-processed section standing alone. In either case, the junction tree appears the same, because it is impossible to determine just exactly what the child has either deleted or was planning to add. Thus most Characteristic naming utterances are analyzed as fragments, part of a larger (yet undetermined) structure. Some representative examples are:

14.1 "apple juice"
40.2 "tiny cow"

IMMATURE FEATURES

Positive Immature Features. Allison showed facility (and seeming understanding) with both the quantifier more and the negation no. The quantifier more seems to be the only quantifier in Allison's vocabulary at this stage (22 months). Although she apparently handles more competently, she uses

6 See Bloom (1973:149) for criteria of divisions.
no other such restricting word in this corpus. Typical use is in requesting additional food or play, as in:

24.2 "more juice"
75.1 "more [of doing it] again"

The negation no appears in two contexts, as a predicate-level adverb, and as an S-level modifier. Allison apparently could not use any other negation marker; she uses no in contexts which would more normally call for not (i.e., in the case of predicate modification, as in 41.5/6). When produced in conjunction with the typical child language feature of leaving out markers and (in this case) the subject, it might be easy to misconstrue the child's underlying intent in a statement as abbreviated as 22.2 ("no eat krak" [krak appears to be Allison's term here for crumbs]), or 41.5/6 ("no oink"), especially when taken out of context. In context (Bloom, 1973:239, 245), these two utterances appear to approximately mean: Allison will not eat these krak," and "this pig does not oink." Allison was holding dirty crumbs in the context of 22.2, and squeezing a rubber pig whose squeekie-whistle was gone while uttering 41.5/6. Thus it is apparent that no is the only negation-operator in her grammar, since both of these examples would normally require a different negation-marker for such predicate-level modification (i.e., not).

As a sentence-level modifier, no was used in the normal way; e.g., Mommy would ask Allison a question, and the child would respond with, "no," then the corrected part of Mommy's question. It is interesting to note that she did not respond with a full sentence, only with the corrected part of Mommy's question. For example, in 49.1/2, Mommy asks,"is this the big cow?"; Allison responds with "no/tiny" (49.1/2). It is obvious to the child what "tiny" refers to, whereas an adult would be much more likely to respond with "it is the tiny one" rather than just "tiny."

Negative Immature Features. Child speech which does not follow the regular patterning of hiatus in adult speech. Typical is the lack of minor markers, such as possessive 's, but larger deletions also occur. The subject, object, verb, or preposition is often hiatused by the child. Usually the hiatused element is readily inferred from context; to the child, the missing element is obvious and therefore need not be verbalized.
Hiatused subjects. The subject in Allison's sentence could receive several treatments. At times the subject was properly deleted, as in the normal imperative 23.1 "[you-Mommy] pour [for] Mommy juice," wherein the subject is understood-you. However, Allison didn't seem to have a firm grasp on the normal rules of the imperative—sometimes she expressed command-like SX structures, verbalizing the subject (abnormal imperatives): 63.1 "Mommy eat cookies." Very often, Allison would hiatus the subject when she herself was specifically the subject. In this case, the subject would seem to be extremely apparent to the child:

35.3 "[self] open box."
76.2 "[self] drink apple juice again."

Allison often hiatused the subject even when it did not refer to herself. It would seem that the subject of very many of Allison's utterances appeared quite obvious to her. This type of subject-hiatusing appeared in SA, SP, and SV structures:

SA: 49.2 "tiny [cow]"
SP: 5.5 "[cookies] in bag"
SV: 58.1/2 "[truck's sharp edge] bang[ed] baby['s] back"

Hiatused Objects were also common in Allison's speech, both in SP structures and SV structures (that is, in those structures which allow objects). When spoken in conjunction with hiatused subjects, these utterances appear quite abbreviated; in-context description becomes necessary for correct interpretation. For example, 68.1 "squeezing" occurred as Allison was squeezing her cup; thus, 68.1 can be reasonably interpreted to mean "[self] [be] squeezing [this cup]." Example 57.2 is particularly relevant in this context, as it shows both a hiatused verbal object ("pig") and a hiatused prepositional object ("truck"). Again, it should be stressed that without the explicitly-described specific con-

7In relation to imperatives, Allison spoke a few seeming imperatives, 59.11 "be careful" and 35.11 "giddy up horse," which appear to be respectively normal subject-deletion (59.11) and abnormal subject expression (35.11). However, it would seem more reasonable that these two structures are functioning as idioms in Allison's language. They are representative of oft-repeated phrases ("be careful" and in-specific-context phrases ("giddy up horse"), both situations which most often evolve idiomatic expression. Consequently, these two utterances should be classed as idioms, rather than the more seemingly obvious variant imperatives.
texts (Bloom, 1973), such interpretations would likely be erroneous. In the case of 57.2, Allison was in the act of placing the toy pig onto the toy truck as she spoke the words "put on":

9.3 "Mommy open [box]"
57.2 "[self] put [pig] on [truck]"

**Hiatused Verbal element.** Allison saw fit to leave out verbs when that seemed obvious to her. (This type of hiatus invariably causes such utterances to be disregarded as valid data by most linguistic theory.) For example: 7.4 "[self] [take] diaper out" -- in context, Allison was in the process of pulling a diaper out of a bag while speaking 7.4.

**Hiatused Preposition.** Prepositional hiatus was exhibited often in this data. Specific prepositions are often fairly obvious from the situation, and thus don't really need expression. Many language's prepositional concepts are as non-specific in the surface structure as Allison's system apparently is. The prepositions under, from, on, at, for, in, and by all were hiatused by Allison in obvious situations:

31.1 "cookies [in] bag"
28.4/5 "[self] peek [at] Mommy"
24.4/5 "[self] dump [cookies] [onto] baby['s] diaper"

**Hiatused Markers were of four basic types:** (1) tense not expressed (on the verb), (2) progressive aspect be-marker not expressed, (3) third-person verbal marker [s] not present, and (4) possessive marker ['s] lacking. Allison used mostly simple verbs, although she occasionally did use an -ing form of the verb, but she never included the corresponding be-marker in conjunction with it.

(1) **Hiatused tense** was, of course, only detectable in utterances requiring past tense. This ellipsis was shown in such examples as:

25.1 "[Mommy] spill[ed] it"
48.1 "horse tumble[d]"

(2) **Hiatused prepositional be-marker.** Every time Allison used an -ing form of the verb, she invariably left out the appropriate be-marker for the progressive aspect. Apparently, Allison's grammar operates under the assumption that -ing is sufficient to express the progressive aspect. Allison never used her abbreviated form of the progressive in conjunction with an expressed (i.e., surface-structure-expressed) subject, it always appears in hiatused-subject contexts; perhaps this is a (artificial) constraint in her grammar of progressives.
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43.4 "[cow] standing up"
76.1 "[self] squeezing cup"

(3) Third-person marker lacking. Invariably, Allison did not produce a 3rd-person marked verb with a 3rd-person subject. She always used the simple verbal form; e.g., 48.7 "cow moo[s]". Consequently, it sometimes is hard to distinguish hiatused progressive forms from the unmarked 3rd-person forms:

2.2 "baby Allison comb[s] hair" or
"baby Allison [is] comb[ing] hair"
8.5 "baby eat[s] cookies" or
"baby [is] eat[ing] cookies"

(4) Lack of the Possessive['s] marker is universal in Allison's grammar. Never does it appear, even when she repeats a normally-formed structure given by Mommy. This would indicate that the overt possessive is is merely an indication of deeper underlying structure which binds the constituent structures together, regardless of surface structure indicationg. Examples are:

15.4 "[self] eat Mommy['s] cookie"
32.3 "[self] put away Allison['s] bag"

CONCLUSION

Work is still continuing in this direction, but this analysis and these examples do show Junction Grammar to provide a sufficient, reasonable, and indeed superior theoretical basis for psycholinguistic analysis and theory-construction.
REFERENCES


