*A CLARIFICATION OF ASIAN TONAL FEATURES**

By Thomas Purnell

There are two types of description for the features of tones: notational and hierarchical. So far, models in both of these groups have difficulties accounting for the criteria in (1) which phonologists assert are essential for a successful theory of tonal features.

(1) a. features must categorize all tonal inventories, contrasts and synchronic alternations
b. features must account for tonogenesis and diachronic alternations
c. features must define natural classes

By reviewing how the two descriptive models handle these criteria, it is the purpose of this paper to propose changes to the characterization of hierarchical features of tone in light of recent developments in the theory of feature geometry.

1. NOTATIONAL DESCRIPTIONS. The first category of feature descriptions contains three kinds of notational characterizations of tones: alpha (e.g., H,L,M),[1] numeric (e.g., 1,2,3,4, etc.), and schematic (e.g.,˩ ,˧ ,˥ , etc.).[2] These notations were designed simply for discussing various tone systems on some gross level, such as using the alpha notation for non-contour systems of many African languages and the schematic notation for Asian tonal contours. Consequently, thesenotations cannot be utilized to sufficiently articulate the nature of tones.

To begin with, none of the three methods are able to categorize the inventory of tonal contrast. The alpha notation cannot differentiate well between tones which are not quite H, L, or M. The following tones in a five tone system may all be erroneously labeled as M: [+high, +central, -mid], [-high, +central, -mid], [-high, +central, +mid].[3] Although the schematic notation is a shorthand method for visualizing contour tones, it lacks precision and definition of a tone's fundamental properties. Also, the numeric system is only recognizable in relation to the maximum number of tones within a specific language, i.e., tone 3 by itself is not the same tone across all languages.

Additionally, each notational method mentioned above is primarily synchronic in nature and is unable to provide insight into, or explain the occurrence of, tonogenesis in Asian languages. In Proto-Vietnamese, for example, tonogenesis is thought to have evolved through three basic steps from Khmer which uses pitch extensively without the use of tones (cf. Haudricourt 1954, Matisoff 1973). First, the final consonants, -s/-ʃ lost their supralaryngeal tier via lenition, leaving final spirants and producing an -h/-ʔ alternation. Secondly, the final consonants, --h/-ʔ, became falling and rising tones respectively, again by assimilation and deletion in which the vowel developed a tonal distinction. Finally, the initial consonants developed a vocalic pitch contrast, with $C_{i[\alpha voice]}$ becoming $V_{[\alpha pitch]}$. It is very difficult to use one of the notational methods, as is attempted in (2), to capture the nature of how tone evolved in Vietnamese.

(2) a. *alpha notation*

pas → pa^{HL}

b. *numeric notation*

pas → pa^{21}

c. *schematic notation*

pas → pa

Each attempt fails to disclose the nature of the change from pas → $pà_{[-pitch]}$. Furthermore, although there is evidence that in some Asian languages, like Chinese, certain groups of tones can be shown to evolve from a similar underlying pitch, no real insight into the nature of tones can be displayed in notational descriptions.

Finally, the notations make no accurate predictions about natural classes. Numeric and alpha notations are too powerful since there is no way to determine, in an inventory of 5 tones, that tones 1 and 4, and 2 and 5 are natural classes where the former set of tones is low and the second pair is high in regard to tone, or that tones 1 and 2 are low and 4 and 5 are high in regard to pitch.

2. HIERARCHICAL DESCRIPTIONS. The second category of feature descriptions contains at least two systems of hierarchical features. In a hierarchical model, tones are arranged by some natural order, e.g., [-High] is lower than [+High]. The first system, proposed by Wang (1967), employs seven features to categorize thirteen tones Wang found in Asian languages: [Contour], [High], [Central], [Mid], [Rising], [Falling], and [Convex]. As to the treatment of tones, Wang's system is able to account for the difference between pitch/tone contours. The problem with this set of features, however, is that it accounts for natural classes by using natural classes, rather than by using the features that comprise the natural classes. For instance, rising tones are composed of two tones, the first of which is lower in pitch than the second (e.g., LM, LH, or MH).

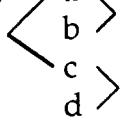
In the second system, Yip (1980) developed a two feature system using a primary Register feature, [Upper], which is subdivided by a Tone feature, [High], creating the hierarchy in (3).

(3)

Register	*Tone*
+Upper	+High
	-High
-Upper	+High
	-High

This model quite nicely relies on the relationship of only two features and avoids the problem of being overly specific like Wang's model. Furthermore, it proposes that the Tone feature was developed during the second step of tonogenesis while the Register feature developed in the third step, and it can account for natural class alternations in (4). This model claims that a ~ c, a ~ b, and c ~ d are natural classes. However, Yip's feature system needs to be revised in light of recent developments in the theory of feature geometry, primarily with regard to branching and nodes.

(4)

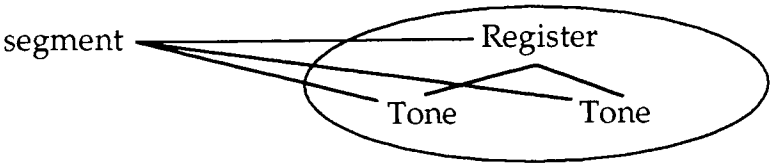


a ~ c = [+Upper] ~ [-Upper]
a ~ b = [+High] ~ [-High]
c ~ d = [+High] ~ [-High]

3. FEATURE GEOMETRY. Yip's theory makes a problematic claim, which influences its ability to describe tonal contrasts. The model in (3) asserts that although the Register and Tone

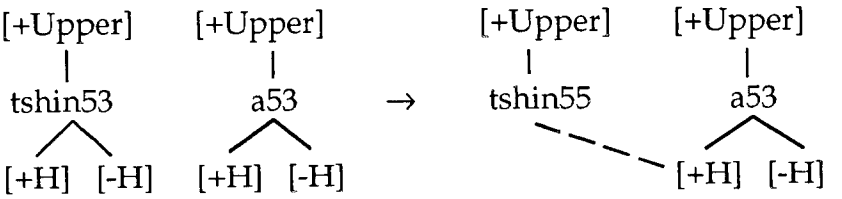
features are closely related, they are on different autosegmental levels, as Yip shows in (5).

(5)

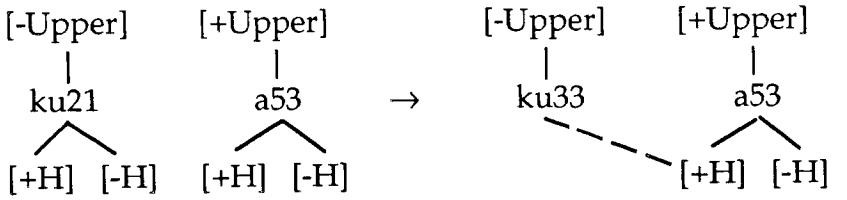


For some time, tonal features have been known to be autosegmental in that the features must follow the well-formedness condition's (WFC) association conventions connecting the tone to the vowel segment, while maintaining feature stability (Goldsmith 1991). But what is at issue here is whether or not the features are on the same or different autosegmental levels. Yip claims that Register and Tone are independent because of Tone deletion rules, like those involving the suffix /-a^{53}/ in Amoy (6),[4] in which the Tone feature is changed while the Register remains stable, permitting an a ~ c type alternation, as in (4).

(6) a. *small scale*

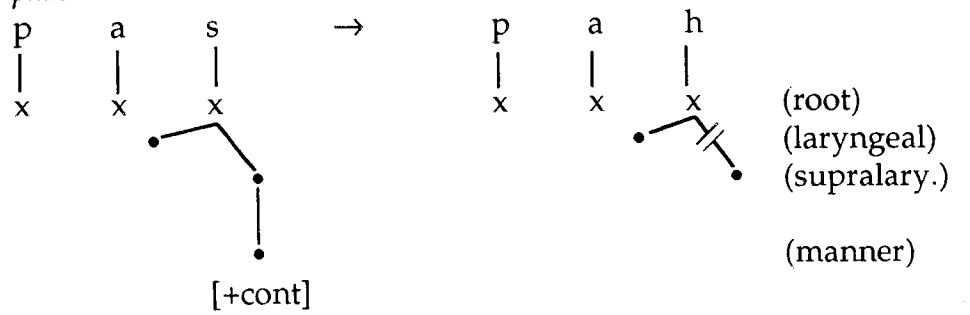


b. *uncle*

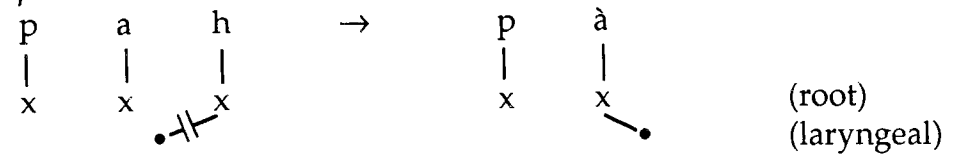


4. REVISION TO YIP'S DESCRIPTION. According to Yip's model Register and Tone are separate nodes. A possible revision to this model would be to place Register and Tone on the same node since they are similar in their dealing with laryngeal activity. The case of Proto-Vietnamese tonogenesis (mentioned above) displays just how closely pitch and tone are related. Notice how, in the second phase of tonogenesis (7b), the laryngeal node from the deleted final consonants joined to the vowel to form tones.

(7) a. *phase one*

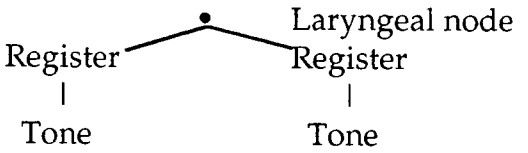


b. *phase two*



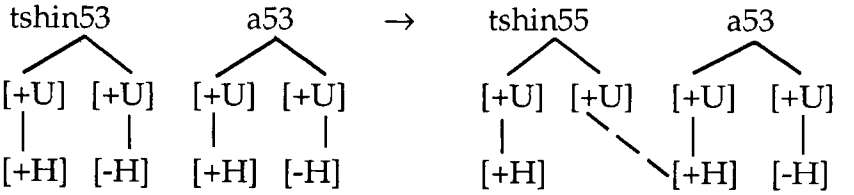
A revised model of (5) would place non-branching, but binary, features under the laryngeal node as in (8). This latter model is preferred, however, primarily because the current theory of feature geometry claims that no feature node can branch, except for class nodes like the root, laryngeal, and supralaryngeal nodes (Piggott, 1988, cited in Buckley, 1992). Thus, neither the Register tier nor the Tone tier (nodes, for all practical purposes), can branch, disallowing (5). Separating the two features, Register and Tone, onto two autosegmental levels is not permissible because of the logical nature of the hierarchy of features in (3), i.e., Tone is a subdivision of Register. Therefore, if Tone is a subdivision of Register, then Register is the head of Tone. Yip's theory also makes the claim that while the features are posited on different levels, they act in conjunction with each other. As a result, this revised model (8) can account for Asian tonal contrasts, such as the tonal inventory of Mien (see Appendix I), as well as Wang's tonal inventory (see Appendix II).

(8)

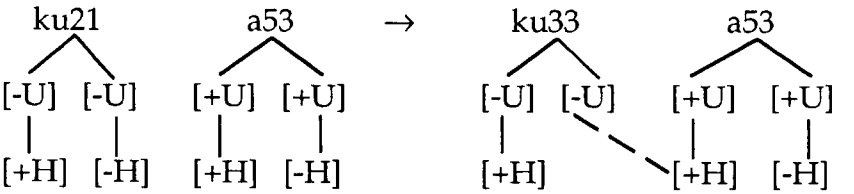


Also, the revised model can handle the Amoy data (6). However, the deletion and subsequent spreading must be explained since there are two branches from the laryngeal node. Looking at the data in (9), it is clear that only the Tone portion of the latter laryngeal branch actually deletes.

(9) a. *small scale*



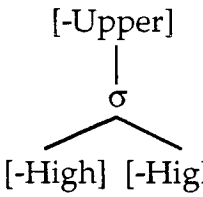
b. *uncle*



5. CONCLUSION. This paper has set out to revise the features for tone: Register and Tone. The revisions stem from the current notion that only nodes can branch and that since both features are produced in the same part of the mouth, they should be connected to the same node, that being the laryngeal node.

By way of extension, this paper would also like to suggest that theoreticians should be wary of derivations involving notational descriptions. Consider the Mandarin sandhi rule in which tone 3 becomes tone 2 when followed by another tone 3. The reason this sandhi occurs to two adjacent tone 3's is because the most complex tone is doubled. Yip begins her analysis of this rule using the conversational representation for tone 3 as in (10).

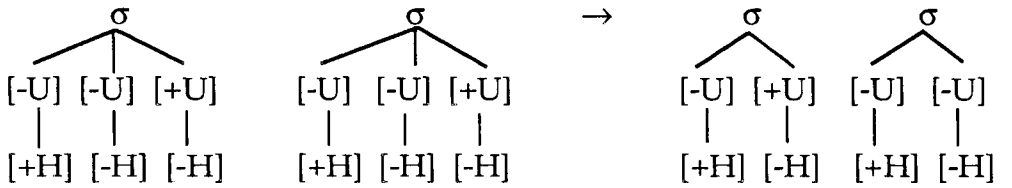
(10)



She proposes that sandhi occurs because of the dissimilaition of adjacent segments, i.e., on the first tone, the [-Upper] becomes [+Upper] and the second [-High] becomes [+High].

Taking the underlying representation as our starting point,[5] however, this example is reduced to a two-step ease of articulation process. The first tone 3 (214) becomes 24 while the second tone 3 becomes 21. This output of the second tone, then, is better resembled by (11) rather than by (10).

(11)



The two steps, then, involve eliminating the middle branch on the first tone and then eliminating the final branch of the seond tone.

(12) *Rule 1*

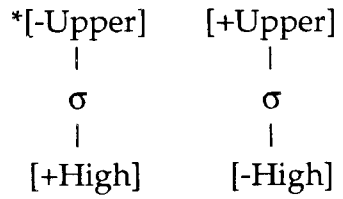
$$[\text{-Upper}] \rightarrow \text{ø} \ / [[\text{-Upper}] \_\_ [\text{+Upper}] \ldots]$$

Rule 2

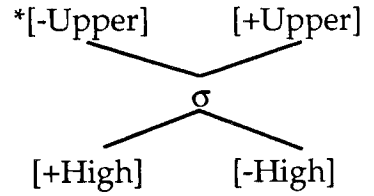
$$[\text{+Upper}] \rightarrow \text{ø} \ / [\ldots [\text{-Upper}]_2 \_\_]_{\text{phrase}}$$

One advantage this revised model has over its predecessors is that it can account for cross Register tones, as is the case with Mien tone 5 (Appendix I). Yip's model fails to account for the tones that begin as [-Upper, +High] and resolve as [+Upper, -High], without having to create a new segment. Neither creating a new segment (13) nor combining two nodes onto one segment (14) will work in Mien words where a geminate is not present, like /24/ "again" and /k24/ "older brother". However, only if the model conforms to the fact that only the laryngeal node branches can this tone be account for (15).

(13)



(14)



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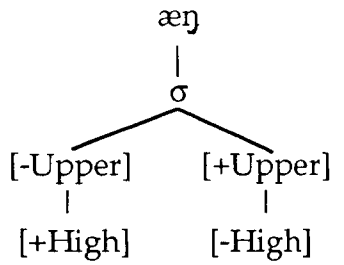


Notes

* Thanks to Herbert Purnell for his helpful suggestions. All errors are my own.

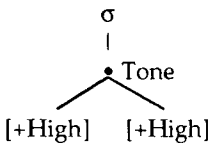
[1] This class of notation includes practical orthographic conventions, such as in Mien where-v represents a high rise-fall tone, -h represents a falling tone, -x represents a rising tone (Purnell, 1992).

[2] This class of notation includes diacritical marks.

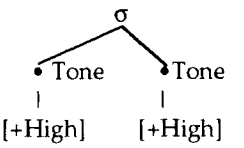
[3] Using Wang's (1967) features.

[4] Note that Yip assumes that the Tone tier deletion occurs to the roots permitting the spreading of the adjacent tone. However, if the tones are two features (ii) rather than one node (i), then a double deletion must occur to explain the disappearance of both tones. The fact that (ii) is also invalid is dealt with in section 4.

(i)



(ii)



[5] It is recognized that with sandhi the starting point is probably the representation that exits the lexicon but has not undergone any fast speech rules. Additionally, with the loss of thetheoretical distinction in recent years between the lexical and post lexical areas, it is especially important to begin with the underlying representation.

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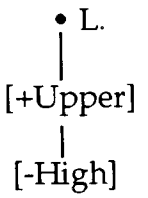
December, 1992; revised February, 1993

Appendix I. *Mien tones.* (revised version of Purnell, 1992)

Tone

1.



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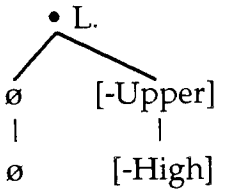

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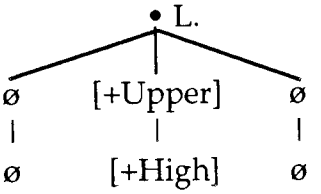

Tone

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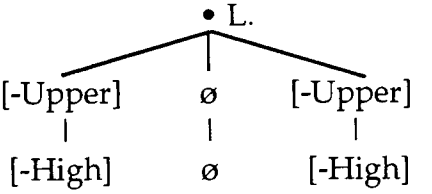

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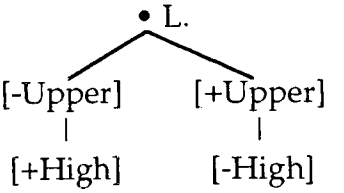

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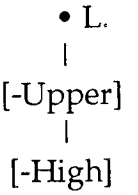
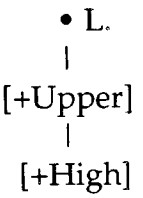


Appendix II. *Chinese tonal inventory.* (revised version of Wang, 1967)

Tone

1.



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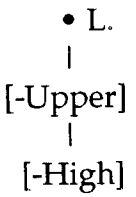

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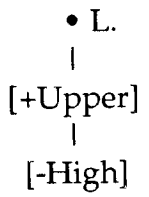

Tone

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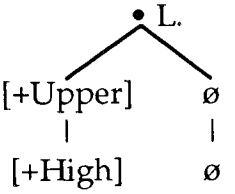

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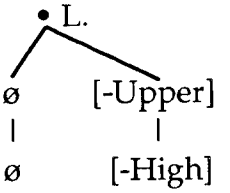

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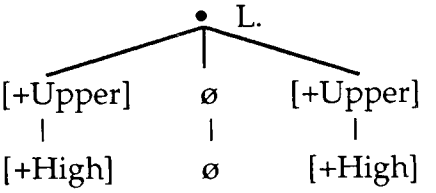

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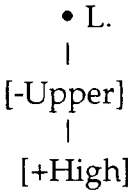
• L.
[-Upper]
[+High]

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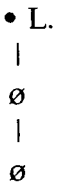
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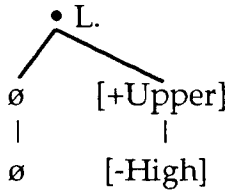
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ø
[+Upper]
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[-High]

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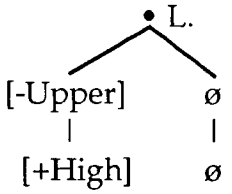
• L.
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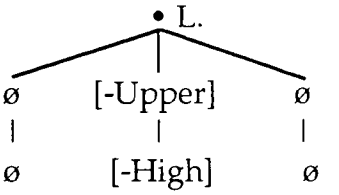
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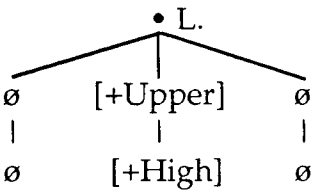
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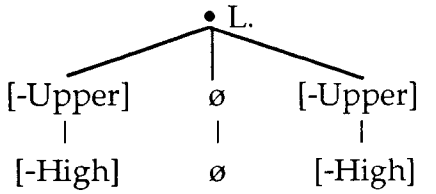
• L.
[-Upper]
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"He's dumb as hell, but he ain't crazy":A Psycholinguistic Analysis of Steinbeck's Lennie Small

By Carl Bailey

In John Steinbeck's 1937 novel *Of Mice and Men*, George Milton, Lennie Small's friend, says to another friend, Slim, that Lennie "is dumb as hell, but he ain't crazy."

The conventional reading of Lennie is that he is retarded, and this is why George has to travel with him, protecting him, since Lennie cannot take care of himself. In a view that is typical of much of the literary criticism of the novel, Howard Levant (1974) says that Lennie is "a huge, powerful, semi-idiot who kills when he is frightened or simply when he is thoughtless . . . Lennie is a reduction of humanity to the lowest common denominator." According to this view, Lennie's retardation explains why he periodically "does bad things," getting both George and himself into trouble and forcing them to abandon one temporary home after another. These troubles derive in large part from Lennie's attachment to "nice things . . . sof' things," including the fur of animals and women's hair. He likes these things so much that he cannot help petting them, and when he pets, he pets too hard — not knowing his own strength — and thus sometimes kills the objects of his affection. This is what happens at the end of the novel, when Lennie kills Curly's wife. Rather than turn him over to an enraged mob, George feels forced to shoot his friend himself. Lennie's inability to learn from previous mistakes has brought his life to this tragic close. Such is the conventional view.

But how "dumb" is Lennie really? And how sane?

This paper will consider the questions of Lennie's retardation and sanity and attempt to use linguistic methods of inquiry in an analysis of the dialogue that Steinbeck has fashioned in *Of Mice and Men*. Specifically we will ask: What does it mean to "sound dumb"? Is Lennie in fact retarded? To answer these questions we will consider in turn Lennie's phonology, syntax, and semantics. We will compare his speech to clinical, linguistic, and psycholinguistic studies of various types of exceptional language use. Finally, we will attempt to relate these considerations to broader patterns in the novel.

I. Phonology

There are a number of nonstandard phonological characteristics of Lennie's speech. In general, these processes seem driven by ease of articulation: in particular, we notice open syllables, cluster reduction, assimilation, and final consonant deletion. For example, Lennie drops the /t/ in "tha's" and "jus'" (alternately spelled "jes'"), the /d/ in "stan'" and "an'," the /g/ in "nothin'" and "strokin'." He also makes use of ellisions and contractions: "gonna" for "going to," "musta" for "must have," "wun't" for "wouldn't," and so forth. Consonant reduction is seen in "Make 'um stop, George" (p. 111 of the Modern Library edition, NY: 1937), fronting in "You ast George," (p.129).

Yet since these pronunciations are largely shared by the other characters in the novel,

mostly farmhands in the Siskiyou highlands near Weed, California, we must conclude that Lennie's phonology is for the most part merely dialectical. George also, for example, says "tha's" and "an'" and "nothin'" and "gonna" and "'um." The only nonstandard pronunciation that seems unique to Lennie is his use of "ast" for "ask," hardly sufficient data to argue for a pattern of distinctiveness.

Not only is Lennie's phonology not distinctive, it is not consistent. Occasionally Lennie will replace his final consonants: "That's it — that's it. Now tell how it is with us" (p. 28). He can even rise to a level of eloquence, in which a standard pronunciation seems to match a sudden verbal fluency. One example is the joyful, shared narration of the Edenic myth that is so important to both George and Lennie.

Lennie begs for another telling of this familiar tale: "Tell about what we're gonna have in the garden and about the rabbits in the cages and about the rain in the winter and the stove, and how thick the cream is on the milk like you can hardly cut it" (pp. 29-30).

George is impressed by Lennie's rendition and wonders why he has to participate: "You got it by heart. You can do it yourself."

Indeed, Lennie's language here is not only eloquent, it is almost perfectly metric. This may be a child's vision of Eden, but it is not a child's voice telling it, either in imagistic or phonetic control (notice all the word-ending "t's" and "k's" in place). We will learn later that this speech of Lennie's amounts to a synopsis of George's (surely oft-retold) version of their paradisiacal retirement home: "Maybe we'd have a cow or a goat, and the cream is so God damn thick you got to cut it with a knife and take it out with a spoon . . . Sure, we'd have a little house an' a room to ourself. Little fat iron stove, an' in the winter we'd keep a fire goin' in it" (pp. 101-102). The point, however, is that Lennie's version, while truncated, is perfectly controlled in its phonology and syntax. It amounts almost to a versification of the prose original.

What accounts for this sudden eloquence? A reader can only speculate. The author may, for example, be "standing in" for his character on some meta-representative level, in order to suggest Lennie's desperate faith in his trumped-up future: the inconsistency can be justified, but it remains inconsistent.

Is this a problem? It depends on the reader. Here, it seems to me, we meet a fork in the road, a possible divergence in the foci of linguistic and literary analyses. It may well be true, as Zellig Harris (1952) has plaintively said, that "the analysis of the occurrence of elements in the text is applied," by literary scholars, "only in respect to that text alone — that is, in respect to the other elements in the same text, and not in respect to anything else in the language." It seems to me also true, however, that within this chosen world, literary scholars, in their search, as M.P. O'Connor (1982) has noted, for "affective" elements, are less likely to be derailed by the above-mentioned sorts of inconsistency. If the register of Lennie's speech "changes" at any one point in the novel, a literary critic is likely to say that the author is attending to other matters; whereas, I take it, the pattern-gathering linguist (again following O'Connor) either gives up that pattern or that text and goes on to other issues.

At any rate, phonology does not seem helpful in answering the questions we have posed ourselves, so let us move on in our analysis of the text.

II. Syntax

In general, it may be that Lennie's syntax is as nondistinctive as is his phonology. One problem is that this is a matter that cannot be determined with precision, for the simple reason that we rarely have instances where two characters (much less more than two) attempt the

same type of structure, one character doing it successfully, the other character "failing." We can say, however, that Lennie's nonstandard syntactic locutions seem to match those of other characters in "distance" (measured in number of operations) from standard speech.

One example is subcategorization errors. Lennie says "Ah, leave me have it, George" (p. 15), using "leave" for "let," whereas George says "I ain't gonna remind ya, fear ya do it again" (p. 17), substituting "fear" for "afraid." These and similar "errors" are of roughly similar magnitude and are again nondistinctive.

Another nexus for comparison are relative clauses and embedded questions. Here at first there would appear to be some difference between how Lennie and George, at least, handle these syntactic strings. George seems to have few problems with them: "We'd have our own place where we belonged" (relative clause, p. 102); "Tell you what made me stop that" (embedded question, p. 73). Lennie, however, seems not to have mastered these structures yet: "The one that his old lady used to make hot cakes for the kids?" (p. 99). Here, showing a child's ignorance of wh-movement constraints, Lennie substitutes "that his" for "whose."

On the other hand, Lennie is capable of producing an embedded clause with wh-movement, a syntactic structure whose difficulty is presumably equivalent (at least) to the misanalyzed "whose" clause: "Tell about what we're gonna have in the garden" (p. 29).

Thus, we are left with the unsatisfying conclusion that both characters are (at least intermittently) able to produce correct NP relative clauses ("what" clauses as objects), but that Lennie, at least, is not able to produce a correct genitive relative clause. Again, the data are nonglobal and inconsistent. Therefore, either because the data are not conclusively differential, or because they are inconsistent, syntax does not seem to be the key to unlock Lennie's exceptionality.

III. Semantics

It is in the semantics of Lennie's speech that we find the richest indications of his exceptional mind.

There are, to begin with, certain incidents of ignorance or misunderstanding. They have been made much of in other readings, and perhaps a single instance will suffice here.

Curly has shown his animus against "big guys," and George is advising Lennie how to handle Curly if there is a confrontation:

"Don't let him pull you in — but — if the son-of-a-bitch socks you — let 'im have it.

"Let 'im have what, George?" (p. 56)

In the literal-minded deconstruction of the idiom, Steinbeck is showing us that Lennie's understanding of the implicature of the utterance is deficient. Fine. But there are other, subtler ways of using dialogue to make the same point.

For example, Lennie's slow train of thought — his 'thinking out loud' — and his propensity to repeat certain key phrases, even as he is rapidly moving from topic to topic, is evident in the following exchange with Curly's wife.

Lennie has just confessed that he likes to pet "nice things . . . sof' things."

"[She] was a little bit reassured. 'Well, who don't?' she said. 'Ever'body likes that. I like to feel silk an' velvet. Do you like to feel velvet?

"Lennie chuckled with pleasure. 'You bet, by God,' he cried happily. 'An' I had some, too. A lady gave me some, an' that lady was — my own Aunt Clara. She gave it right to me — 'bout this big a piece. I wisht I had that velvet right now.' A frown came over his face. 'I lost it,' he said. 'I ain't seen it for a long time'" (p. 156).

The awkward swearing, the straining to remember a close relative's name (Aunt Clara

had raised Lennie), the need to physically measure the length of the long-lost velvet, the sudden recognition that the material had been lost years ago — all of this is a superficial indication of a halting thought process.

More subliminally effective, however, is the repetition of certain deictic forms: "I . . . that . . . my . . . it. . . me

. . . this. . . I . . . I . . . that . . . I . . . it . . . I

. . . it." This repetition dreamily and frighteningly limns an "I-it" world, suggesting an exclusionary inner reality in which Lennie is forever lost to the world around him.

It is in these multiple patterns of repetition that Steinbeck most clearly depicts Lennie's distinctive speech. Lennie's speech in fact gives him away. It suggests that he is doomed to a life of repetition: he cannot avoid doing the things that he does. There are scores of examples of his compulsive behavior, but one of the most haunting is in Chapter 5, in a soliloquy addressed to the dead puppy, which takes place just before Lennie will kill Curly's wife. The following is an excerpt showing some of the repetitions:

"Why do you got to get killed? You ain't so little as mice. . . . Now maybe George ain't gonna let me tend no rabbits, if he fin's out you got killed . . . An he'll say, 'Now jus' for that you don't get to tend no rabbits' . . . God damn you . . . Why do you got to get killed? You ain't so little as mice . . . Now I won't get to tend the rabbits . . . You wasn't big enough . . . They tol' me and tol' me you wasn't. I di'n't know you'd get

killed so easy" (pp. 147-148) (ellipses added).

The repetitions of the central phrases "got to get killed" and "tend [no] rabbits" help to fill in the picture of how Lennie uses language. One's impression here is that Lennie is almost helpless, passive in the grip of ideas that are overwhelming him. He seems both frightened and obsessed. The language seems so powerfully charged, so distinctive, that we may want to stop and ask ourselves: Is this really the speech of a retarded person? This question is best answered by comparison with recorded speech of retarded subjects.

IV. Retarded Speech

It may by now be clear that for numerous reasons, I do not believe that Lennie's language is that of a severely or moderately retarded individual, such as those examined by Yamada (1988) or Curtiss (1988) (even allowing for differentiating affect).

These two important studies both show considerable semantic deficits in the language of the examined subjects. For example, there are serious propositional and lexical deficiencies in the speech of Rick (Curtiss, 1988), a severely retarded 15-year-old:

R: (I) Played checkers. [R. doesn't know how.]
S: How do you play?
R: You just, you just put one pile in.
S: One pile of what?
R: One pile of cards.
S: And then what?
R: And then you put another tape. [R. is looking at a tape recorder.]

Here Rick confuses checkers with cards, and cards with tape recorders. His words seem to have *only* lingusitic weight — i.e., one NP is as good as another — and no referential, real-world value. Rick seems largely limited to the moment at hand and the immediate sensory world around him.

By contrast, Lennie would have no difficulty distinguishing a puppy, for example, from a rabbit. He certainly would be able to talk knowledgeably and with some descriptive detail about both puppies and rabbits, with neither in front of him. Unlike Rick, Lennie does have extra-linguistic reference, and an ability to retain that reference from one moment to another (in fact for years, as the novel shows). Lennie's problem is that this extra-linguistic reference is extremely limited — in fact, Lennie's world will soon consist almost exclusively of mice and puppies and rabbits, as we will show.

Another characteristic of retarded speech is confusion over concepts of number and time. When a sentence calls for numerical reference, Marta (Yamada, 1988), a moderately retarded late adolescent, simply plugs any handy number into the appropriate slot — usually "two" or "three," her favorite numbers. She shows a similar uncertainty with notions of time, her adverbials and verbs sometimes functioning at cross purposes. "It's very soon that they asked us to fly out," is a typical sentence.

One simply cannot imagine Lennie making such mistakes. He shows both an awareness of time and an ability to understand its measurement. He frequently asks George how long it will be before they buy their fabled ranch, and when at last the moment seems at hand, he says:

> "When we gon'ta do it, George?"
> "In one month. Right squack in one month . . ." (p. 107)

Thus, George answers with the precision — if not the predictive accuracy — that Lennie is asking for.

Another of Marta's speech productions is what Yamada calls a "spiel" — an extended soliloquy marked by logorrhea, speech formulae (set phrases that appear reiteratively in these spiels), illogic, unclear anaphoric reference, and frequent inappropriate topic switches. The following is an example recorded by Yamada, with the set phrases italicized.

"*It was kind of stupid*, for Dad an' Mom got um *three notes*, one was a pants store, (of) *this really good friend* and *it was kind of hard*. An' the police pulled my mother out of (there) *an' told the truth*. I said, 'I got *two friends* in there!' The police pulled my mother (and so I said) he would *never remember them as long as we live*! An' that was it! My mother was *so mad*!"

A comparison of this spiel with the earlier quoted speech of Lennie's shows a number of significant differences. In Marta's speech, the words are just words. The deictic references seem to be forgotten before the sentence has even ended. Nouns and pronouns move in and out in an ever-changing (though curiously patterned) kaleidoscopic jumble. There is no sequential logic. Each sentence seems spoken by a different speaker, with a different tale to tell.

Compare this with Lennie's artful, if tortured, soliloquy. Here, as in Marta's speech, there is perseveration. Certain key phrases are repeated. But there is a considerable difference in degree of referentiality. The spiel contains lots of language but little thought. There is no ongoing reference to any extra-linguistic reality. Marta repeats her set phrases because that is virtually all the language she has. Words for her are linguistic slot fillers, almost meaningless in themselves. "Communication" for Marta means producing familar and comforting sounds in the presence of other people.

Steinbeck makes Lennie repeat, on the other hand, to achieve maximum referentiality. The words may refer to an ideational reality, however idiosyncratic and fantastic, that the reader understands (communicative referencing), they may refer to other words in the same speech for emotional effect (emotive referencing), or they may refer to important themes of the author (thematic referencing). As Lennie speaks them, they are simple words, but they do not,

at least to my mind, suggest simple retardation.

V. Schizophrenic Speech

To me, the circular, obsessive, endgame logic of Lenny's eulogy over a dead puppy indicates some degree of schizophrenia. Indeed, this assessment is forcefully supported by the several talking hallucinations that will appear to Lennie on the following pages, among them a gigantic, ear-waggling, schoolmasterly rabbit. These hallucinations appear without bidding and exist only to take Lennie to task, telling him how selfish and crazy and stupid he is. They amount to a classic demonstration of schizoid self-destructiveness.

Now, it is certainly true that other hallmarks of schizophrenic speech are missing from Lennie's puppy-eulogizing soliloquy. Specifically, his speech does not show notable morphological or syntactic aberrations, completely agrammatical strings, bizarre illogic, klanging, echolalia, etc.

Yet there is one characteristic of Lennie's soliloquy that is strongly indicative of schizophrenic speech, and that is the obsessive perseveration we have already noted. Perseveration is not uniquely characteristic of schizophrenic speech, of course. In their study of this speech, Herbert and Waltensperger (1982) found that repetition occurs widely among brain-damaged and organically-impaired populations, including retarded persons. Still, the manner of Lennie's perseveration is quite distinctive. Compare it with the following recorded schizophrenic speech, from the Herbert and Waltensperger study.

"Soon get me home by Easter I hope. Soon may I come home to you at Easter by my birthday. I hope to be home. I hope to be home. I hope to be home soon, very soon. I like chocolate eclairs. I fancy chocolate eclairs. Donuts. I want donuts." The perseveration here is clearly denser than in Lennie's soliloquy, the words repeated more often, more closely together. The force generating them is something akin to word play. The sudden topic shift (from home to eclairs) may remind us more of Marta than it does of Lennie. There is an odd antiquarian cast to the language ("soon may I," "fancy") that seems to occur with some frequency in the speech of educated schizophrenics.

Yet the two speeches are similar, too, in their self-centeredness (the eclair fancier has his own exclusionary reality), their artfulness, and most remarkably in their obsession with a single idea. "Home is presumably where "eclairs" are eaten, just as "no rabbits" is the anticipated outcome of the puppy "getting killed." The obsession in both cases is what supplies the logic, the feeding of one sentence into another, which in turn produces the greatest common difference between Lennie and the eclair fancier on the one hand, and Marta on the other. Can simple retardation account for the degree of obsession apparent in Lennie's speech? It seems doubtful.

Other factors advance the argument for Lennie's schizophrenia. His soliloquy does not mark the first time that he has mentioned tending rabbits. The idea comes up on seven distinct occasions (initiated by either George or Lennie) in the first eighteen pages of Chapter 1. To take care of rabbits is a dream of Lennie's, part of the Edenic myth. But he has dreamed the dream so often that it has taken on a life of its own, turning into "schizophrenic disorganization," in which, as defined by Cameron, "social communication is gradually crowded out by fantasy." This is a perfect description of the pathetic attempts that Lennie makes to communicate with both Curly's wife and Crooks, the humpbacked stable buck; both times he helplessly mentions his dream, and neither character is able to understand him. ("You're crazy as a wedge," Crooks says, and Curly's wife says, "I think you're nuts.")

Some readers may object that Lennie does not *always* sound so confused. True, but real

schizophrenics do not always speak in schizophrenic speech, either. In any case, we need to remind ourselves that Lennie is not a real person, but a fictional construct, one that is being manipulated by his creator for his own purposes. If I am correct, one of these puposes is semi-realistically to represent a mildly retarded, mildly schizophrenic person tragically adrift in a world that is incapable of caring for him. (If I am right, when George says to Slim that Lennie is "dumb as hell, but he ain't crazy," he is simply selecting what he believes to be the lesser of two evils, both of which he really thinks are true. Cf. George's many private references to Lennie as a "crazy bastard.")

Obviously, Steinbeck was no clinical psychiatrist, and his purpose in writing *Of Mice and Men* is not to provide textbook examples of schizophrenic speech. Naturalistic representation is not his highest priority. Furthermore, even when Lennie's speech does "sound schizophrenic," the author has other designs to attend to.

VI. Broader Patterns

One of these purposes is purely thematic. Thus, at the same time the repetition of "tend [no] rabbits" and "got to get killed" may suggest schizophrenic perseveration, they also reach spatially throughout the novel to reinforce two important themes. The first reaches back to the Edenic myth of bucolic retirement, the second ahead to George's feeling that he has no choice but to kill Lennie. (In fact this second theme has been reiteratively drawn as a circumstantial necessity for killing animals: Candy's dog must be shot because it is old, Slim's puppies must be drowned because the mother cannot take care of so many, the bear-like Lennie must be shot to prevent his falling into the hands of the mob.) The morality of these killings may of course be questioned (and has been, at some length), but the point here is that the killings are thematically linked, and the repetition of the phrase "got to get killed" points to this linkage.

The truth is that Lennie and Steinbeck are both compulsive repeaters. Perhaps no other author — certainly no other major novelist — repeats so much, in so many overlapping cyclical patterns. Steinbeck not only repeats words and phrases, of course. He repeats gestures, conversations, stories, actions, incidents, descriptions, themes, images. A productive example would be instances of the cave-cage-trap-mouth image cluster: counting them would take some time.

All of this is done to help the reader, of course. Most are admirers of Steinbeck's artful design, but there are readers who complain that Lennie's influence on his creator becomes too pervasive in *Of Mice and Men*. Some readers question the degree of repetitiveness in general in the novel. The suggestion has been that many of the events are over prepared, and that the ending, in which George struggles with himself for several pages before killing Lennie, is excessively drawn out.

Whatever the merit of these complaints, they overlook the triumph of the creation of Lennie Small. In Lennie, Steinbeck has found a perfect foil, an obsessed individual whose halting language credibly reflects his limited grammar, his inner conflicts and the themes of the novel, while at the same time building enormous sympathy for the character.

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Parallel Distributed Processing and Universal Grammar: Complementary Concepts in a Biological Explanation for the Critical Period in Language Acquisition

By Mary Meares

'Language offers one of the most complex challenges to any theoretical paradigm.'
Lachter and Bever (1988)

1. Introduction

Linguists studying second language acquisition have discovered and described a critical or sensitive period when a language can be learned completely. Somewhere around puberty, it appears that the ability to learn a language with native-like competence is lost. Especially in the realm of phonetics and phonology, differences can be found in those who learned the language before versus after the teenage years. Linguists have attempted to explain the language learning critical period with various theories, but the biological basis is still not clear. Most theorists however, do believe that there is some sort of biological process that occurs at puberty, limiting further linguistic learning. Traditional linguistic approaches have focused on the mind and what occurs to limit language learning. The goal of this paper is to contrast the traditional explanations for the critical period with a biologically based model, Parallel Distributed Processing. By combining this concept with that of Universal Grammar an attempt is made to describe the process of language development including the critical period phenomena.

2. Traditional Explanations for the Critical Period: the Mind

The concept of a critical period was developed in observation of animal behavior. Some behaviors, like the imprinting of young ducklings to recognize their mothers (or major care givers) are only possible within a certain limited time period (Newport, 1991). If the behavior does not develop during this critical period, the learning of the behavior is no longer possible. Some type of time constraints affect learning of many different behaviors including the development of vision in kittens and song birds learning their distinctive songs. Lenneberg (1967) theorized that language learning undergoes the same type of critical period in humans. Many linguists who have studied the critical period worked to develop research with the goal of describing the parameters and patterns of the critical period (Seliger, 1978). Others have attempted to discover why the critical period occurs in terms of reasons and explanation

(Scovel, 1988; Bever, 1981; Newport, 1991) and it is this that this paper will discuss.

Bever (1981) divided theories explaining the critical period into three different categories. The first was that proposed by Lenneberg (1967) that there was a loss of neurological flexibility at the time of puberty. The second category of theories was that of the language learning capacity being totally filled. This concept is easily disproven by the vast discrepancy in the language abilities of both pre- and post-pubescents. Bever's third category was that of theories where cognitive development interferes with language learning. Krashen's Model and Felix's theory support this third category.

Krashen attempted to explain the critical period in terms of the Monitor and Affective Filter Hypotheses. Adults, according to Krashen (Larsen-Freeman and Long, 1991), have an affective filter that effects their ability to intake language as well as a monitor which they use to monitor and edit their own output. These factors, especially the filter, impose limitations on the adult learner. Although it is possible for this filter to be lowered, this happens completely only in rare optimum circumstances. According to Krashen, the filter, therefore, is the cause of the critical period.

Newport (1991) further questioned the nature of the critical period. She developed two possible scenarios for the diminishing of the ability to learn languages. The first perspective is that 'the underlying learning mechanism itself undergoes maturational decline or decay' (Newport, p. 114). This was Lenneberg's view of the critical period. Newport advocates consideration of an alternate perspective. Rather than a decline, it may be that maturational changes in other processes affect language learning, masking this ability. Felix's theory is an example of this perspective.

Felix (1985) developed the Competition Theory. This theory states that language and problem solving are located in two different modules of the mind. The language module matures first and is active until the problem solving component begins to interfere. The problem solving component matures as individuals enter Piaget's formal reasoning stage, around the age of puberty. At this time the problem solving module tries to take over language learning, but it is not as good at it as the language learning module. This competition is what appears as the critical period according to Felix.

3. Brain

Part of the difficulty in clearly explaining what happens in the Critical Period lies in the problem of the brain versus the mind. All of the previously described explanations for the Critical Period involve the mind. An alternative is to theorize about the brain and how its functioning affects language acquisition. Although medical science is progressing in its quest for knowledge about the brain, one of the difficulties that linguists and scientists share is the problem of examination of neural processes as they occur. In studying the brain, we can observe language production (or output), evidence gained through use of technology (such as CAT and PET scans), and the physical structure of the brain after death, but not what is occurring in the brain as language is produced. All three of these approaches leave much to be learned about behavior and development of neurons and the connections between them, as well as the roles of different areas of the brain. The development of computers and artificial intelligence have allowed theorists to model human development, however the artificial technology cannot at this time match the human abilities to process and produce language. In spite of this, it is important for linguists to consider what is known about the brain in evaluating the validity of theories of language acquisition. Neurological explanations of language can augment cognitive theories to form a sound model.

Many of the theories and models of second language acquisition discussed in this paper and elsewhere have a way of explaining the critical period, yet most are based on logic, not biology; on mind, not brain. The Language Acquisition Device, the Affective Filter, and so forth are all just metaphors that give explanations based on concrete studies of human language acquisition behavior. There is nothing wrong with developing a metaphor to cognitively explain why something may occur, but it is also important to look at the brain itself and what scientists think neurologically is possible. Jacobs (1988) warns against taking metaphors as literal truth citing their 'deceptive appeal' (p.329). Much is not known about the brain, yet in the literature there are some examples of neurobiological evidence and theory.

4. Neurological Explanations for the Critical Period

One neurobiological explanation has been developed by Jacobs (1988) primarily using neurological evidence rather than observation of behavior and applications of suitable metaphors. Although it is scientifically impossible at this time to know what actually happens inside our heads, Jacobs attempted to reconcile knowledge of the brain with the concept of Universal Grammar. He emphasized the importance of the environment and how input has an important role in 'shaping the actual development of neural tissue' (p.309). The brain has approximately 100 billion neurons, each with 50,000 to 200,000 dendritic spines connecting it to other neurons. After birth neurons do not reproduce, but the connections grow and become more complex as a child develops. A second language learned after these connections are established must utilize the existing neuronal framework. Jacobs acknowledges the metaphorical nature of the term universal grammar and he had difficulty reconciling what form universal grammar might take with what is known of the brain, but does recognize the genetic preprogrammed predisposition for language.

In another study focusing on neurological explanations, Walsh and Driller (1981) maintained that the reason that infants were not ready to use language was that their neural connections were not well established. In the first two years, there is a large amount of growth in the dendrites, the receptive surface of neurons. They also document the fact that most connections are made by the age of six to eight. This is used to explain the difficulty in acquiring native-like phonological proficiency. Instead of new connections being formed, the first language pattern of connections is used to approximate the new language. They conclude, however, that the critical period only holds true for speech not 'higher order linguistic functioning' involving abstraction, verbal cognition and construction (p.16).

5. Combining Physical and Mental Theories

The problem with all of the previously described theories is that they do not take into account both the mental and physical knowledge that is available. What is needed is a theory that explains both what comes out of our mouths (the output produced) and what happens in our heads (the hardware that processes the data). Combining neurological information with knowledge of linguistic output, a new more comprehensive theory has been formed. Building on what is known from both human and computer sciences, Parallel Distributed Processing or connectionism models the brain and attempts to produce the resulting language produced by humans. I propose that this model bridges the biological/cognitive gap. A description of this theory reveals that it is compatible with both biological and cognitive notions.

6. Parallel Distributed Processing: A Biological Approach

Parallel distributed processing (PDP) is a recent theory that attempts to focus on the

behavior of the brain. For the purpose of this paper I will describe the basic principles that define PDP: parallel processing, neural connections, and the weightedness of connections. The first, and most basic tenet of this theory, states that information in the brain is parallel (rather than serial) processed. This means that rather than going step by step, as in rule based systems, information is processed simultaneously. The knowledge that we have of neurons and dendritic connections supports this principle. PDP theory also is based on the belief that symbolic rules are not the basis of language processing, but rather that the neural connections or pathways in the brain are strengthened by the use of the first language and any other languages learned as a child. The third principle of PDP theory is that all neural connections are not equally joined, but rather they are 'weighted' with some having more weight or in other terms, a stronger connection. Conversely, some connections are more flexible than others, but the level of flexibility may be determined by genetic predisposition or by the influence of input.

PDP provides a clear explanation for the critical period. The development of neural networks occurs easily in children. The critical period is the time when the brain is still physically able to make new connections. Sokolik (1990) describes a hypothetical nerve growth factor that allows children to make new neural connections. At puberty, the availability of this factor diminishes, preventing new connections from occurring in adulthood. This explain the different recovery rates of aphasic children as described by Lenneberg (1967). He found that children under between the ages of two and ten recovered their use of language. At this age, children would still be able to make new neural connections. Children over twelve, however, had only a partial recovery. Based on PDP theory, these older children would have to adapt other neural networks since they no longer are able to produce new pathways. This chemical possibility raises questions of possible reversal of the critical period as neurochemical expertise grows.

The rejection of linear rules is fundamental to PDP. The symbolic, serial approach which can predict phonological linguistic output is not compatible with the speed at which information is processed. Although they may be used to describe what is occurring to the phonemes and the resulting output, linear rules do not explain how the brain manipulates the information. The neural networks of connection in PDP attempt to show how humans can 'exhibit rule-like behavior without explicit rules' (Gasser, 1990). This rule-like behavior seems to be part of phonology (the aspect of language affected by the critical period) but not syntax. Another argument for rejection of the linear processing is that in a linear system, one missing step results in a stop in processing. The parallel system allows other connections to take over for the missing connection. This may explain the possibility of other neural units partially taking over for damaged ones, although with lessened efficiency.

Gasser's description of the PDP views learning as 'the unsupervised association of pattern elements with one another' (p.179). He also takes care to distinguish connectionism from behaviorism, noting the existence of a true feedback connection rather than just a stimulus-response relationship. One of the examples that Gasser presents as support for connectionism is the success in using computer simulations to model learning. Computers can be set up to follow the same developmental processes found in some morpheme acquisitions studies in humans. There have been some difficulties with computers however, in deciding how to set up the system to simulate the brain. These models, and this theory, do explain transfer and can explain the patterns of language that exist, but Gasser maintains that they are incompatible with Universal Grammar and explain the critical period only in terms of the lack of ability of the adult brain to build new connections.

7. PDP and Universal Grammar

It is through the concept of unequal weightedness of neural connections that the concepts of Universal Grammar (UG) can be seen as compatible with PDP. UG can be defined as the constraints on language that humans have, but these constraints by and large are not based on physical constraints. If however, they are constraints based on weights of connections that are present at birth they can be seen as the hardware of the mind. The building of connections through input may then be viewed as the software that conforms to the hardware, or may act to get around it, as a savvy programmer may do. Contrary to Gasser's claim, it is possible to see a clear connection between UG and PDP. UG can be seen as the parameters set within the brain's initial weighted connections. This may be based on binary choices, although the determination to establish a binary system may be a result of rule-based logic, rather than biological predisposition. The processing of input (PDP) then develops connections within the genetic framework, conforming to the specifications of the language heard.

An example from phonology is that of syllable structure. Branching rhymes, nuclei, and onsets are all possible, however there seems to be some restraint on the combinations of these branchings. Phonological studies (Kaye, 1989) have examined languages of the world and found that if the onset in a particular language branches, that the rhyme will also branch. This has been used as a possible example of UG, illustrating the constraints in our heads (usually meant as mental constraints, rather than physical) that limit syllable structure. Based on the linguistic evidence available, it seems to be impossible to have a language with a branching onset but not a branching rhyme. This is an established part of the connections present at birth. As a child learns language phonology, other complementary connections are built up around the established constraint system. An example of this is the input received on cluster constraints and acceptable violations of the sonority hierarchy that are present in languages learned before puberty. After the nerve growth factor disappears, new connections are difficult to form and thus language learning is restrained by the existing phonological networks.

The concept of linguistic markedness may also be based on connections in the brain. Markedness is the concept in phonology that some combinations of features are more likely to occur in any language than other combinations (Kaye, 1989). The less likely a combination is, the more marked it is. When this concept is incorporated into the PDP theories, markedness is seen as the closeness of a neural pathway to a biologically pre-determined connection. The less marked a feature is, the more substantial connection is present prior to input in the first language. More marked features travel along less natural pathways, and therefore may require more input for the pathway to develop.

An analogy can be used to illustrate the roles of UG, markedness, and PDP in language learning. The mass set of neurons in the brain can be compared to a landscape. As the earth was formed, numerous features developed. Rivers, mountains, and forests appeared over time. Within this landscape there are pathways where there were naturally no trees. Some of these may provide bi-directional choices or forks in the road. These naturally treeless pathways are the genetically predispositioned possible connections or UG. Other areas have many trees and underbrush. Over time, new paths can be developed by cutting trees and undergrowth with an ax or machete (nerve growth factor), but after a certain time it becomes impossible to cut more because the tool is lost or dull. This leaves the landscape relatively set with further travel possible only along its established pathways. Second languages learned after puberty must travel along the closest paths available from the first language, although the natural pathways still exist. Pathways closest to natural pathways are less marked that those further away.

8. A Response to Criticism of PDP

Reaction to the connectionist models have not been uniformly enthusiastic. Computer models have limitations and are viewed by some as having been manipulated to give the 'correct' answer. Lachter and Bever (1988) criticized these models, showing that rule-based representations were built into the problem. I maintain that humans have some built-in structure as well, although parallel based rather than rule-based. Our skill in the young but developing field of computer science limits the ability of technology to model the mind totally, however, the computer models that have been used to simulate human language learning have shown that parallel processing based on weighted connections has similar output to human manipulation of phonemes. Lachter and Bever did, however, recognize the importance of these models as tools for increasing understanding of associations and relationships between behavior and underlying structural representations. This critique in fact supports the relationship between UG and PDP. If UG is the 'hardware' of the computer, then a propensity for language is built into our genetic code. The difficulty is in determining UG and building it into computer models in connectionist modes rather than rule-based ones. Much remains to be done in exploring the potential of both these theories and models.

Jacobs' skepticism about UG's physical form within the brain has been met in this paper with a discussion about weightedness of connections. His acknowledgement of preprogramming can be seen as connections that exist at birth. If UG is defined as these pre-existing connections, it becomes more than just a metaphor and addresses Jacobs' concerns.

9. Conclusion

There is obviously a need for more study of second language acquisition and the critical period combining both linguistic theory and neurological knowledge. Just as our vision of the mind is somewhat modular, so are our theories. The question that remains is whether it is possible to explain the behaviors of both the mind and the brain with one unified theory. Parallel Distributed Processing does this, explaining both the output of the mind and the structure of the brain with one theory. The compatibility of PDP with neurological information certainly illustrates the need to consider connectionism as a plausible model. Further development of Parallel Distributed Processing may provide even more convincing arguments for the value of combining the two directions of explanations into this one theory.

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Parameter Settings and the Subset Principle in L2 Acquisition of the Binding Theory

By Takako Kawasaki

1. Introduction

A theory of universal grammar(UG) holds that human beings are innately endowed with a set of **principles** which are true for all languages (this does not mean that these principles always operate in every language.), and **parameters** which vary within defined limits from one language to another. It is assumed that sets of principles and parameters constrain children's first language (L1) acquisition and children set parameters with positive evidence only.

Studies have been done on the availability of UG in second language acquisition (SLA), and the availability of parameter resetting. Many researchers have focused their interests on resetting of the Governing Category Parameter (GCP) in SLA because of its uniqueness. Well-known studies, Finer and Broselow (1986) and Broselow and Finer (1991), investigated parameter setting in SLA and concluded that the learners have picked a value allowed in natural languages but it is an intermediate one, which is neither the L1 nor L2.

However, Broselow and Finer (1991) did not consider the other parameter which seems to play an important role in determining the interpretation of reflexives, that is, the Proper Antecedent Parameter (Wexler and Manzini 1987). In this paper, I will re-examine the data from the study by Broselow and Finer (1991) and suggest that the combination of the Subset Principle and transfer will be able to explain the data.

2. The GCP and The PAP

Principle A of the Binding Theory (Chomsky 1981) illustrates that an anaphor must be bound in its governing category. However, it has been suggested that the choice of governing category varies from one language to another. According to Wexler and Manzini (1987), the GCP has five values as (1) below:

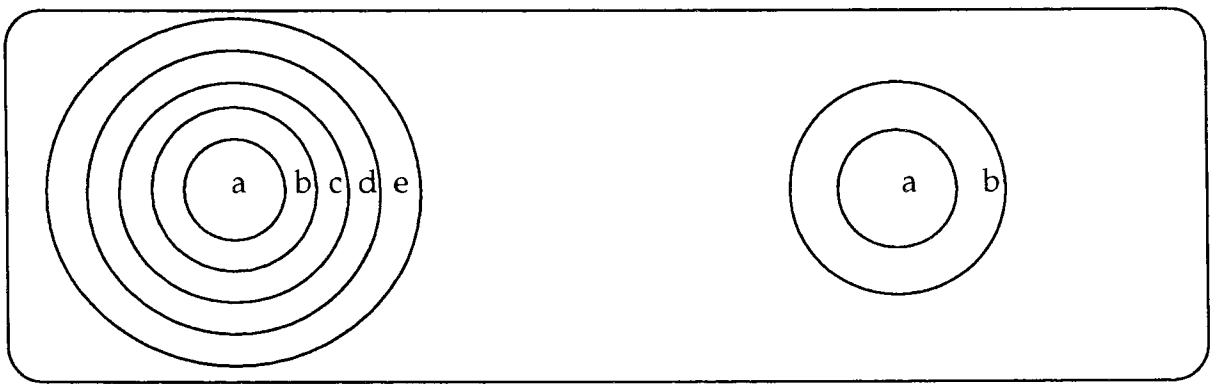
(1) The Governing Category Parameter
A is a governing category for B if A is the minimal category which contains B and
a. has a subject, or
b. has an INF, or
c.has a TNS, or
d. has an indicative TNS, or
e. has a root TNS (Wexler and Manzini 1987:53)

Wexler and Manzini (1987) also proposed another parameter, the Proper Antecedent Parameter (PAP), which has two values in regard to what is allowed as the antecedent of the reflexive in the language.

(2) The Proper Antecedent Parameter
A proper antecedent for A is
a. a subject B
b. any element B whatsoever
(Wexler and Manzini 1987:64)

In both two cases, the parameter values meet the so-called Subset Condition (Wexler and Manzini 1987:60) as below, that is (3), a type (e) language will allow every NP that is allowed in other types of languages.

(3) the GCP the PAP



The GCP is very unique since it has five values while the other parameters have only two values. For example, the pro-drop parameter has just two values, head right or head left. The GCP is very unique and quite different from other parameters in this point. If we assume that every parameter consists of two-value switches, how can we make it work? Let us assume that each value has two values; + and -, or ON and OFF.

(4) The Governing Category Parameter (version of a set of switches) is a governing category for if is the minimal category which contains and has a(n)

Switch a. subject	ON-OFF
Switch b. INFL	ON-OFF
Switch c. TNS	ON-OFF
Switch d. indicative TNS	ON-OFF
Switch e. root TNS	ON-OFF

Even if we assume the GCP like (4), it still does not quite work, because in the GCP, activating the later values has to presuppose activating the former values, that is, if switch (c) is ON, switch (a) and (b) also have to be ON. Also only two consequent switches can be ON; that is, we should not expect the situation in which switch (a) and (e) are ON and the other switches are OFF. Therefore, each switch cannot be independent in this parameter and in order to make this parameter work, some extra principle would be required, which says that if switch (a+1) is ON, the switch(a) must be ON. Hence, even if we separate each value into switches, the GCP is still very different from other parameters.

In regard to children's L1 acquisition, Berwick (1985) and Wexler and Manzini (1987) have proposed the Subset Principle as a learning principle.

(5) The Subset Principle:
The learning function maps the input data to that value of a parameter which generates a language.

That is, the child first chooses the smallest value of the parameter, and goes beyond only when they encounter the positive evidence for a larger, i.e., more inclusive, grammar. This principle explains the lack of negative evidence in children's L1 acquisition. Does this principle work even in adult SLA?

3. Broselow and Finer (1991

Broselow and Finer (1991) studies the interpretation of English reflexives by 97 adult learners of English as a second language: 30 Korean native speakers whose native language has the value (e) in (1), 37 native Japanese speakers whose native language also has the value (e), and 30 native Hindi speakers whose native language has the value (c). As in the examples below, subjects heard three types of sentences involving reflexives; sentences with object control or exceptional case-marking (6a), sentences with tensed complements (6b), and sentences with subject control verbs (6c).

(6) a. Mr Fat tells Mr. Thin to paint himself.
b. Mr. Fat thinks that Mr. Thin will paint himself.
c. Mr. Fat promises Mr. Thin to paint himself.
(Broselow and Finer 1991:50-51)

They predicted that if the learners succeeded in resetting the parameters, they will choose Mr. Thin as an antecedent in (6a) and (6b) because the English value of the GCP is the smallest, (1a). If the learners transfer the value of their native languages, Korean and Japanese learners will choose either Mr. Fat or Mr. Thin as an antecedent in each sentence.

(7)

	Tensed					*Inf*				
	L	NL	L&NL	NL*	L*	L	NL	L&NL	NL*	L*
KK	47	164	45	2	4	50	258	33	6	5
KE	251	4	1	1	3	305	23	3	6	12
	97%	2%			1%	88%	7%	1%	2%	3%
JJ	63	169	90	3	2	71	206	105	19	7
JE	291	28	6	2	5	295	84	7	15	19
	88%	8%	2%		2%	70%	20%	2%	4%	5%
HH	260	1	0	0	0	239	23	2	5	54
HE	269	1	0	0	0	315	8	0	4	2
	100%					96%	2%		1%	

(Broselow and Finer 1991:53)[1]

From this study, they reported that most of the Korean and Japanese learners (97% of Korean and 88% of Japanese) correctly chose Mr. Thin as an antecedent in the sentences with tensed complements. However, in the sentences with untensed complements (infinitival

complements), less people (88% of Korean, and 70% of Japanese) chose Mr. Thin, and some of them chose Mr. Fat as an antecedent. According to Broselow and Finer, this result appears to show that Korean and Japanese learners could distinguish between tensed clauses and untensed clauses. They suggested that this result cannot be attributed to their L1 value since native Korean and Japanese speakers do not distinguish between tensed and untensed clauses in the sentences as in (6). Also this result cannot come from the target language since English makes no distinction between the binding patterns of reflexives in tensed and untensed clauses in the sentences as in (6).

We may think that the subjects in this study might be advanced learners since most of them correctly chose the right antecedent even in infinitival clause. Broselow and Finer (1991) claimed that the learners distinguished tensed and untensed, but it is not so significant from their tabulations in (7). Also, it is not clear what kind of sentences they provided as sentences with subject control properties with tense as in the starred columns in the tensed section. At least in Japanese, there is no such thing as a control clause with tense. Moreover, they did not provide any conclusion about the difference of learners' interpretation between sentences with subject control and those with object control.

However, when we look at their former study (1986), the results seem to be more significant.

(8) Finer and Broselow (1986): the number and the percentage of responses in tensed and infinitive clauses by six Korean learners:

	Tensed Clause	*Infinitive Clause*	*Total*
local	22(91.7%)	14(58.3%)	36
non-local	2(8.3%)	9(37.5%)	11
either	0	1(4.2%)	1

From their interpretation (1986, 1991)—namely, that the learners have chosen an intermediate value of the GCP—these data seem to indicate that the Subset Principle is not operating in this case. However, if we take the PAP into consideration, and re-analyze the data, we will notice that the learners might not have chosen the intermediate value by distinguishing tensed and untensed, and there are two other possibilities in which the Subset Principle seems to operate.

4. Discussion

If we take the PAP into consideration, we can notice that there are other possible interpretations in which the Subset Principle operates against Finer and Broselow's interpretation.

(9) a. Mr. Fat thinks that Mr. Thin will paint himself.
b. Mr. Fat asked Mr. Thin to paint himself.

From the study done by Broselow and Finer (1991), and Finer and Broselow (1986), Korean and Japanese native speakers could choose Mr. Thin correctly in sentences with a tensed clause like (9a), but were reluctant to choose Mr. Thin, and some of them chose Mr. Fat as an antecedent in sentences with an infinitival clause like (9b). What caused this difference? Based on Japanese or Korean values of the GCP and PAP, they should be able to choose either NP as an antecedent. In each sentence in (9), Mr. Thin is a subject of the verb 'paint' and the

whole sentence should be in the governing category.

One possible reason may be the indirectness of the coindexing in the sentence with the control structure.

(10) a. Mr. Fat thinks [that Mr. Thin$_i$ paint himself$_i$].
b. Mr. Fat asks Mr. Thin$_i$ [PRO$_i$ to paint himself$_i$].

It is assumed that there is a caseless subject, PRO in the embedded clause, in terms of the Projection Principle. That PRO is coindexed with the object, Mr. Thin (Object Control). In the sentence (10b), [PRO to paint himself] is the Governing Category for 'himself,' and 'himself' is coindexed with the subject of the embedded clause, which is coindexed with Mr. Thin because of the object control property of 'ask.' Thus, the coindexing between 'himself' and Mr. Thin is more indirect in (10b) than in (10b).

Therefore, Korean and Japanese learners might be reluctant to choose Mr. Thin as an antecedent.

Some of the learners who incorrectly chose Mr. Fat in (10b) might not have fixed their PAP and still have the value (2a) of PAP, which is the value for both Japanese and Korean. On the other hand, they might have succeeded in fixing GCP into the English value, (1a). This analysis would explain the correct choice of Mr. Thin in (10a), since Mr. Thin is the only subject in the fixed Governing Category, [that Mr. Thin$_i$ paint himself$_i$]. This analysis can also explain the learners' mistakes in (10b), if we assume that some of the learners did not have control structure in (10b) correctly. If they did not realize phonetically unrealized PRO in the sentence (10b) because of its complexity, the only subject in the whole sentence is Mr. Fat.

The problem of this analysis is that Japanese has the same types of control structures presumably.

(11) Mr. Fat$_i$wa Mr. Thin$_j$ ni [zibun$_{i/j}$ o nuru you] tanonda.
sub. obj. refl obj.paint comp. asked

In the sentence (11), Japanese reflexive 'zibun' can refer to not only Mr. Fat but also Mr. Thin, even though Mr. Thin is not a subject of the sentence. Unless we assume the existence of PRO in the embedded clause.

(12) Mr. Fat$_i$ wa Mr. Thin$_j$ ni [PRO$_j$ zibun$_{i/j}$ o nuru you]
sub. obj. refl. obj. paint comp.
tanonda.
asked

If we assume the existence of phonetically unrealized PRO, we find two subjects in the whole sentence, that is, Mr. Fat and PRO. Since PRO is coindexed with Mr. Thin (object control), either Mr. Fat or Mr. Thin can be an antecedent. Thus, Japanese seems to have the same kind of control structure.[2] Then, why did Japanese learners have trouble with the sentence with control structure? This phenomenon seems to support the hypothesis that transfer is the cognitive process, that is, learners have to cognitively realize the similarities between their native languages and the target language in order to transfer the value of their native languages. Control structures are very abstract and not noticed from the surface structure. In this point, it can be said that the control structures are very complex and hard to be noticed. Therefore, the learners might not have been able to directly transfer the control

structure from their native language.

The other possible reason may be transfer from their native language structure. In Japanese and Korean, the object case marker is used for Mr. Thin in a sentence like (10b), while the subject marker is used for the same NP in a sentence like (10a). See examples below.

(13) a. Mr. F wa [Mr. T ga zibun o nuru to] omotta.
sub. sub. refl. obj.paint comp. thought

b. Mr. F wa Mr. T ni [zibun o nuru you] tanonda.
sub. obj. refl. obj. paint comp. asked

(14) a. Mr. F eun [Mr.T ga jashin eul paint hal gorago]
sub. sub. refl. obj. do future
saenggak hamnida.
think verb

b. Mr. F i Mr.T ege [jashin eul paint] harago hamnida.
sub. obj. refl. obj. to ask

(13a, b) are Japanese translations, and (14a, b) are Korean translation of (9a, b). We notice that in both languages, the object case marker is used for Mr. Thin in the control structure. Since Japanese and Korean can choose only a subject as an antecedent, Mr. Thin cannot be an antecedent in sentences like (13b), (14b).

If we assume that some of the Korean and Japanese learners transferred the structure of case marking of their native languages, the data in (7) and (8) can be explained by the Subset Principle. If the learners had chosen the smallest values in both parameters as children do in their L1 learning, the learners should have been able to pick Mr. Thin in both cases; however, because they transferred their L1 case marking structure, they failed to consider Mr. Thin as a subject in sentences with the control structure.

Of course, the value of the PAP could be transferred from their L1 because both Korean and Japanese have the smallest value in the PAP; however, we cannot determine whether the value is transferred or deduced from the Subset Principle.

5. Conclusion

Studies done by Broselow and Finer (1991), and Finer and Broselow (1986) are not enough to let us decide whether or not the learners have picked the intermediate value of the GCP. In order to make this decision, we need to test more complex structures such as Hirakawa's example below:

(15) [John says that [Mr. Fat asked Mr. Thin$_i$ [PRO$_i$ to painthimself$_i$]]].
(Hirakawa 1990:67)

If the learners really pick an intermediate value, distinguishing tensed and untensed, they should not choose John as the antecedent. If we allow John to be the antecedent, it will lead us to conclude that the learners are just transferring their L1 value, i.e., the largest value of the GCP.

Counter to Broselow and Finer's (1991) proposal, other possibilities have been proposed in this paper; namely, the possibilities of the operation of the Subset Principle in adult SLA. If

we assume that difference in the learners' interpretation between tensed and infinitival structures comes from their L1 structures, the data possibly indicates that the learners have picked the smallest values in both parameters as the Subset Principle illustrates in first language acquisition.

From this study, we cannot make any claim about the availability of UG. Even if we assume that the Subset Principle still operates in SLA, it does not necessarily mean that UG is operating in SLA as in L1 acquisition because the Subset Principle is not a part of UG, but just assumes to interact with UG.

Of course, one could also argue that most of the learners have succeeded in resetting the GCP and transferred the value of the PAP from their L1. However, since the Korean and Japanese value of the GCP is the largest and English value is the smallest, it should be harder for the learners to constrain the values because they can constrain the values only by the negative evidence in this case. On the other hand, the Korean and Japanese value of the PAP is smaller than that of English. Thus, it should be easier for them to reset the parameter compared to the GCP because they can get the larger value only by positive evidence.

Thus, there are many possible ways to interpret the data in Broselow and Finer (1991), and Finer and Broselow (1986). As previously mentioned, there are several unclear points in their studies. In fact, when we consider both parameters (the GCP and the PAP) and the learners' native language structures, Broselow and Finer's conclusion—namely, that the learners have picked the intermediate value of the GCP—is not conclusive.

Notes

[1] "The starred columns list interpretations with subject control properties ..., and rowsintroduced by geminates show the native-language results, while rows KE, JE, HE showthe respective interpretations of English sentences by Korean, Japanese and Hindi subjects (the percentage figures reflect these rows). In addition, the columns headed by 'L' show the numbers of responses which reflected a local binder for the reflexive, and the columns headed by 'NL' show the number of non-local bindings. Not all sentences were responded by all subjects and so totals may differ from expectations". (Broselow and Finer 1991:53)

[2]Korean also seems to have the control structure since the same phenomenon can be observed in Korean, too.

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On the Null Subjects of Chinese Weather Verbs *

By Stephen Hayle

In her article *On Null Subjects*, Suner (1982) analyzes the nature of null subjects occuring in certain Spanish sentences. In this paper I will undertake similar analyses to determine the identity of null subjects found in Chinese sentences featuring the weather verbs *xia yu* (to rain) and *xia xue* (to snow), as exemplified in (1) and (2). (Note that tonal markings are omitted throughout in the Chinese examples.)

(1)	Jintian xia yu.	(2)	Dongtian xia xue.
	Today fall rain		*Winter fall snow*
	It is raining today.		It snows in the winter.

Essentially, the question to be answered is whether the null subjects in sentences like (1) and (2) are examples of NP trace or PRO.

I shall deal first with the feasibility of a NP trace analysis of these sentences, as illustrated below:

(3)a. Jintian $[_{NP}\ e_i]$ xia yu_i.
b. Dongtian $[_{NP}\ e_j]$ xia xue_j.

Under this analysis, the NPs *yu* and *xue* appear in subject position in deep strucutre and are postposed by a special rule. However, such an proposal creates a peculiar situation in which the trace is not proceeded or c-commanded by its antecedent—thus making the possibility of binding problematic. Suner (p.69) resolves a similar problem in Spanish by arguing that Spanish is a language in which the empty element may be bound in subject position through the AGR feature of INFL. This solution is not available in Chinese, since Chinese lacks the agreement feature—as witness below:

(4)a.	Wo shuo.	b. Ni shuo.	c. Ta shuo.
	I say.	*You say.*	*He says.*

Therefore, the trace cannot be coindexed with the verb and binding cannot occur. This conclusion is in accordance with the general observation that Chinese sentences do not exhibit subject-verb inversion.

The second possible analysis of sentences like (1) and (2) is that they are semantically and syntactically subjectless. Following Suner's line of argumentation (p.63-64, and footnote 20, p.68), let us examine whether it is possible to form grammatical sentences by embedding

xia yu/xue phrases within matrix sentences featuring raising verbs (5 and 6), control verbs (7 and 8), causative verbs (9), and perception verbs (10):

(5) Hui xia xue.
It can snow.

(6) Kaishi xia yu.
It is beginning to rain.

(7) *Ta mingling xia xue.
He orders it to snow.

(8) Wo xiangxin zai xia yu.
I believe it is raining now.

(9)a. * Kexuejia shi xia xue le.
The scientists made it snow.

b. Kexuejia shi tiankong xia xue le.
(the marker le indicates completed action or a new state)
The scientists made it (the sky) snow.

(10) Haizimen zai kan xia yu.
The children are watching it rain now.

We observe that *xia yu/xue* can occur with raising verbs, which does not conflict with the analysis, since raising verbs do not require a subject in their embedded phrases (Suner, p. 64). However, grammatical sentences can also occur with some control verbs, causative verbs and perception verbs. How are we to explain these phenomena? Perhaps like the Spanish weather verbs which Suner analyzes (footnote 20, p. 68), *xia yu/xue* have PRO as their subject. Examination of the characteristic subcategorizations of the verbs *kan, xiangxian,* and *shi* provides supporting evidence for a PRO analysis.

The verbs *kan* and *xiangxin* characteristically c-select a NP or S', as illustrated in (11) and (12):

(11)a. Wo [$_{vp}$kan le [$_{NP}$ta]].
I saw him

b. Wo [$_{VP}$kan le [$_{s'}$ta kai che]].
I saw him drive a car.

(12)a. Wo [$_{VP}$xiangxin [$_{NP}$ta]].
I believe him.

b. Wo [$_{VP}$ xianxin [$_{S'}$ta shi hao ren]].
I believe she is a good man.

The verb *shi* c-selects a S', as illustrated in (13):

(13) Ta [$_{VP}$shi [$_{S}$.tade pengyou huijia]].
He made his friend go home.

Given this data, it seems evident that verbs embedded under *kan, xiangxin,* and *shi* must have subjects, since they must be full-fledged S's. In the case of certain verbs,as in (11) through (13), the subjects will be lexical. In the case of verbs like *xia yu/xue,* the subject will be phonetically empty but syntactically present—i.e., PRO. The verb *shi* presents a somewhat unusual situation in that it appears to require a lexical subject for its embedded sentences, even in the case off *xia yu/xue.* It should be noted that sentences, even in the case of *xia yu/xue.* It should be noted that sentence (9)b. represents a rather unusual, although grammatical, usage of the verb.

In conclusion, a PRO analysis of the null subjects in (1) and (2) appears the most consistent with the facts of Chinese syntax. Such as analysis is corroborated by the behavior of certain other Chinese verbs which may occur with or without lexical subjects:

(14)a. Zou le.
I'm going/you're going/let's go.
b. Ta zou le.
He's going.
(15)a. Xia ban le.
I'm getting off work/you're getting off work
/let's get off work
b. Hongxing xia ban le.
Hongxing is getting off work.

Note that the very indefiniteness of subject reference in (14)a. and (15)a. suggests PRO with arbitrary control. The only difference between the verbs in (14) and (15) and *xia yu/xue* is that the latter must, for some reason, always appear without a lexical subject.

Notes

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