

## Complex Predicates, Complex Words, and the Morphological Parameterization Hypothesis

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### 0. Overview

- Can cross-linguistic variation be factored out of the computational component of syntax, and derived instead from lexical/morphological characteristics that are independently required to vary? (cf. among others Borer 1984, Pica 1985, Rizzi 1989, Chomsky 1993)
- What would it mean, exactly, for cross-linguistic variation in syntax to be tied to lexical or morphological knowledge? Would the language-particular properties of syntax derive from the presence/properties of individual morphemes in the lexicon? Characteristics of the paradigms of overt inflectional morphology? Properties of (phonetically null) functional categories? (cf. discussion in Snyder 1995b, Snyder & Senghas 1997)

### The Morphological Parameterization Hypothesis (MPH):

Points of syntactic variation that are “global” (i.e. independent of any single lexical item or functional head) are fundamentally parameters of *morphological* variation.

*Key prediction of the MPH:* Global “syntactic” parameters will also have demonstrable consequences for word-formation.

### The Root Compounding Parameter (RCP): (cf. Snyder 1995b)

Open-class, ordinarily non-affixal words {can, cannot} be marked as [+affixal] (and therefore as participating in productive, endocentric root compounding).

### The Complex Predicate Constraint (CPC): (cf. Snyder 1995a,b)

Two syntactically independent predicative heads can share a single argument (and thus form a “complex predicate”) only if they constitute a single word (i.e. root compound) at the point of semantic interpretation.

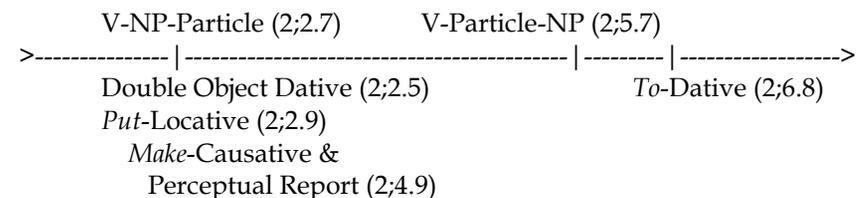
*Key prediction of the CPC:* A language will allow “complex predicates” (in which two heads share an individual-type argument, or two heads jointly characterize an aspectual event-argument) only if the language has the setting of the RCP that permits productive root compounding.

### The Specification Parameter: (adapted from Beard 1996)

Any specificational element (phrasal “specifier” or morphological “modifier”) for a lexical head is ordered to the {left, right} of its structural sister.

## I. The Acquisition of Complex Predicates and Nominal Compounding

- (1) L1 acquisition of English complex predicates (Snyder & Stromswold 1997, Stromswold & Snyder 1995)



- (2)
- |    |                                |                     |
|----|--------------------------------|---------------------|
| a. | Mary picked the book up.       | (V-NP-Prt)          |
| b. | Mary picked up the book.       | (V-Prt-NP)          |
| c. | Alice sent Sue the letter.     | (D. O. Dative)      |
| d. | Alice sent the letter to Sue.  | (To-Dative)         |
| e. | Fred made Jeff leave.          | (Make-Causative)    |
| f. | Fred saw Jeff leave.           | (Perceptual report) |
| g. | Bob put the book on the table. | (Put-locative)      |
| h. | John hammered the metal flat.  | (Resultative)       |

(3) *Syntactic analyses in which (2a-h) form a natural class:*

- Complex-predicate analyses (cf. Larson 1988a,b, 1990; Hale & Keyser 1993; Chomsky 1993; Marantz 1993)
- Small-clause analyses (cf. den Dikken 1995, Kayne 1984, Hoekstra 1988, Sybesma 1992)
- Abstract-clitic analysis (Keyser & Roeper 1992)

(4) *Details of methodology and analysis:*

- Study of longitudinal records of spontaneous speech for (12) children from the CHILDES database (MacWhinney & Snow 1985, 1990).
- All constructions studied are used with high frequency in the speech of adults and older children.
- Age of acquisition was taken as age of first clear use, followed in all cases by regular use shortly afterwards (cf. Stromswold 1996).
- Age of acquisition of Double Object Datives was significantly correlated with V-NP-Particle ( $r = .82; p = .0012$ ), Make-causative and Perceptual Report ( $r = .75; p = .0051$ ), Put-Locative ( $r = .84; p = .0006$ ), and To-Dative ( $r = .76; p = .0043$ ), though only marginally correlated with V-Particle-NP ( $r = .51; p = .0881$ ).
- Age of acquisition of Double Object Datives was not significantly different, by *t*-test or sign test, from the ages for V-NP-Prt, Make-causative and Perceptual Report, or Put-Locative.
- Double Object Datives were acquired significantly earlier than To-Datives by simple sign test (11:0 with one tie,  $p = .001$ ), by *t*-test ( $t(11)=4.15, p = .002$ ), and by a modified sign test based on relative frequencies in later transcripts ( $p < 1.73 \times 10^{-12}$ ).
- Age of acquisition of V-NP-Prt was significantly correlated with V-Prt-NP ( $r = .76; p = .0040$ ), but V-NP-Prt was acquired significantly earlier than V-Prt-NP by sign test (8:0 with 4 ties,  $p < .008$ ) and by *t*-test ( $t(11)=2.89, p = .015$ ).

- V-Prt-NP was acquired significantly earlier than To-Dative by sign test (10:1 with 1 tie,  $p = .012$ ), though the difference was not significant by *t*-test.

(5) *Parametric interpretation of the data (cf. Snyder & Stromswold 1997)*

- Three parametric properties of English need to be acquired before the full range of complex predicates in (2a-g) becomes grammatically available.
- V-NP-Particle, Double Object Dative, Make-Causative, Perceptual Report, and Put-Locative constructions depend on some parametric property, "A."
- To-Datives depend on Property A in conjunction with a second parametric property, "B."
- V-Particle-NP constructions depend on Property A in conjunction with a third parametric property, "C." (Snyder & Stromswold tentatively identify Property C with Property B.)

(6) *Hypotheses concerning the nature of Property A (Snyder 1995a, 1995b, 1996)*

- The English complex predicates in (2) necessarily involve a morphological compound at some abstract level of grammatical representation.
- The point of grammar ("Property A") that children are acquiring when they suddenly begin producing English complex-predicate constructions, is the knowledge that the type of compounding required for complex predicates is available in English.
- The relevant type of compounding is *productive* root compounding.

(9) Acquisition of English nominal compounding

Motivation:

Dutch (Neeleman & Weerman 1993, Neeleman 1994), Afrikaans (LeRoux 1988), and Mandarin (Sybesma 1992, den Dikken 1995) all have close counterparts to the English resultative and verb-particle constructions, in which the main verb appears to form a morphological compound with another constituent in the VP.

"Lexical" root compounds are readily found in languages (e.g. French) that lack the paradigmatic complex predicates of English; thus, only *productive* root compounding is potentially relevant to Property A.

(7) (Neeleman & Weerman, p.436, 6-7)

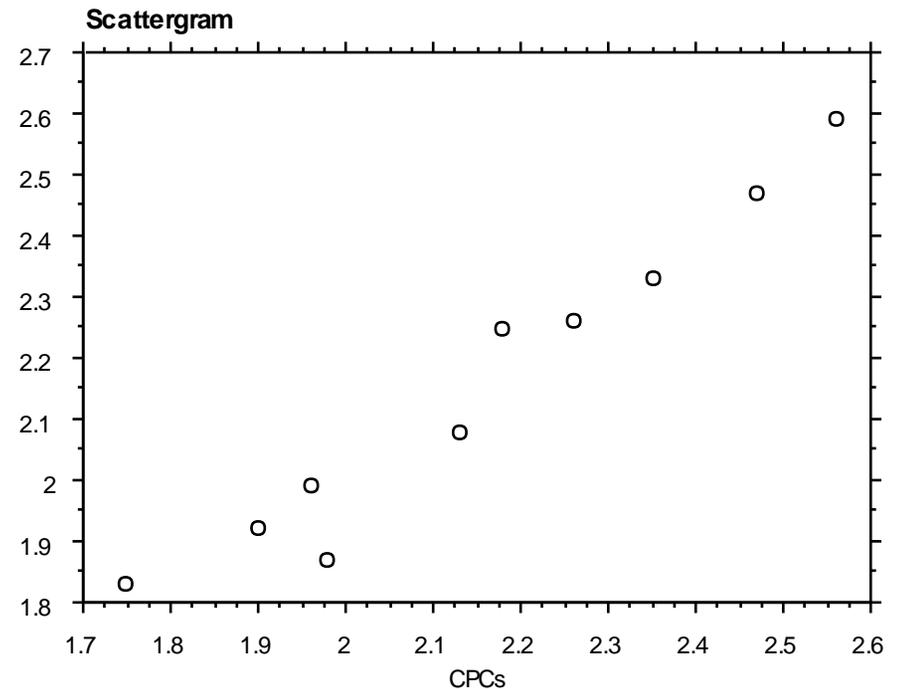
- a. ... dat Jan de deur (vaak) groen (\*vaak) verfde.  
that John the door (often) green (\*often) painted  
'...that John often painted the door green.'
- b. ...dat Jan het meisje (vaak) op (\*vaak) merkte.  
that John the girl (often) up (\*often) noticed  
'...that John noticed the girl.'

(8) (Le Roux, p.241, 9a)

- a. Hy sal nie [die antwoorde by my e] kan af + kyk nie.  
he will not the answers from me can off look not  
'He will not be able to crib from me.'
- b. \*Hy sal nie [die antwoorde by my af e] kan kyk nie.  
he will not the answers from me can off look not  
'He will not be able to crib from me.'

In the spontaneous production data for ten children from the CHILDES database (MacWhinney & Snow 1985, 1990), age of first clear use of each type of complex predicate studied by (Snyder & Stromswold) was extremely well correlated with age of first clear use of a novel (i.e. non-lexical) N-N compound.

First V-NP-Particle (X-axis) versus First Novel N-N Compound (Y-axis) (Ages in years):



Correlation is robustly significant by linear regression test ( $r=.98$ ,  $t(8)=12.9$ ,  $p<.00005$ ), and remains statistically significant even when the variance attributable to various control measures (e.g. age of first lexical N-N compound, age of first attributive Adjective-Noun combination) has been removed by partial regression.

(10) *Acquisition of semantically similar constructions in French*

French generally disallows counterparts to the English complex predicates, but French *faire*-causatives correspond semantically to the English *make*-causative, and have been analyzed (den Dikken 1990) as involving morphological compound-formation. Additionally, French has a productive N-*de*-N construction (e.g. *jouet de bébé* 'baby toy') that is a close semantic counterpart to the N-N compounding of English.

Reasoning: If the hypotheses under (6) are correct for English, then there are two cases to consider.

Case 1: French N-*de*-N constructions and (at least some of) the French candidates for "complex predicate" status depend on a single point of parametric variation, as was argued for their English counterparts.

Predictions of Case 1: Children learning French should acquire N-*de*-N constructions at approximately the same age as these complex predicates. In particular, no French child should acquire N-*de*-N constructions significantly later than the complex predicates.

Case 2: French N-*de*-N constructions and the French candidates for "complex predicate" status do not depend on any single point of parametric variation, in contrast to their English counterparts.

Predictions of Case 2: Children learning French may acquire N-*de*-N constructions at significantly different ages than the complex predicates.

(11) *Method and results of an acquisitional case study (Snyder & Chen 1997):*

Subject: Philippe (Suppes, Smith, & Léveillé 1973)

Method: Philippe's transcripts were hand-searched in chronological order, until the point where Philippe was regularly producing clear uses of the *faire*-causative, the *mettre*-locative, and prepositional prefix verbs (in the sense of di Sciullo 1994), and producing clear, novel (i.e. innovative) uses of the N-*de*-N

construction. In addition, Philippe's later transcripts (transcripts 12-22) were hand-searched for all clear uses of the *faire*-causative, and all novel uses of the N-*de*-N construction, to obtain an estimate of their relative frequency when both were clearly permitted by Philippe's grammar.

First clear uses of *faire*-causative:

Phil 03: 2;2.3  
c'est dur faire rouler tout seul la voiture  
Phil 04: 2;2.10  
faire tourner comme c\*a la montre  
Phil 08: 2;3.7  
fait rouler les voitures dans le jardin  
fais rentrer la chaise

Sample of Philippe's early innovative uses of N-*de*-N:

Phil 12: 2;6.20  
la voiture de tracteur  
[context: in answer to "quelle voiture?"; Ph. is looking for the car to which he had attached a tractor]  
Phil 19: 2;8.15  
le wagon a' grue  
["crane car", apparently referring to a train-car (actually a tractor functioning as part of Philippe's train?) with a crane attached]  
Phil 20: 2;8.22  
un livre de renard  
["a fox-book"; father converts "de" to "du" (full PP), suggesting that the original form was Ph.'s innovation]  
Phil 26: 2;11.7  
des bateaux de crocodile  
[describing pictures of all different types of boats on his beadspread; Ph. uses "crocodile boats" for one type of boat; Mad. asks for explanation, but gets none]  
une voiture de photos  
["a photo car"; Mad. asks what a "voiture de photos" does, and he explains, "elles portent les photos...dans les maisons"]

Relative frequency of *faire*-causative versus N-*de*-N for Transcripts 12-22:  
12 *faire*-causatives versus 6 novel N-*de*-N constructions

(12) *Summary of French Case Study:*

(a) Philippe demonstrated productive use of both N-*de*-N and *faire*-causatives in his corpus, but N-*de*-N was acquired significantly *later* than *faire*-causatives.

(b) The difference in ages of acquisition was robustly significant ( $p < .001$ ) in a binomial test based on relative frequency of the constructions in later transcripts.

(c) N-*de*-N was also acquired substantially later than *mettre*-locative constructions and prepositional-prefix Vs, both of which are approximate semantic counterparts to English complex predicate constructions.

(13) *Learnability considerations*

- Age of first productive, rather than lexical, nominal compounding is the best known predictor of the age of acquisition for V-NP-Particle and other "complex predicate" constructions.
- Productive, but not lexical, nominal compounding patterns with the availability of complex predicates cross-linguistically (see below).
- Yet, how can the child distinguish novel from lexical N-N compounds in the input?
- Argument structure may in fact provide the learner with the requisite evidence for productivity of root compounding in a language such as English.

## II. Cross-linguistic Variation in Compounding and Complex Predicates

(14) Informant-based cross-linguistic survey of the availability of transitive resultatives and of productive nominal compounding (N-N):

[N-N excludes construct states and genitives]  
[Certain classificatory decisions in (Snyder 1995b) have been revised, based on additional informant data]

|           | <u>Transitive Resultative</u> | <u>N-N</u> |
|-----------|-------------------------------|------------|
| English   | Y                             | Y          |
| Dutch     | Y                             | Y          |
| German    | Y                             | Y          |
| Latvian   | Y                             | Y          |
| Mandarin  | Y                             | Y          |
| Khmer     | Y                             | Y          |
| Hungarian | Y                             | Y          |
| Estonian  | Y                             | Y          |
| Finnish   | Y                             | Y          |
| Japanese  | Y                             | Y          |
| ASL       | Y                             | Y          |
| Korean    | N                             | Y          |
| Basque    | N                             | Y          |
| Russian   | N                             | N          |
| Serbo-C.  | N                             | N          |
| Hebrew    | N                             | N          |
| Arabic    | N                             | N          |
| French    | N                             | N          |
| Spanish   | N?                            | N          |
| Italian   | N?                            | N          |

Potential exceptions: *Italian, Spanish*

(15) Intransitive and transitive resultative constructions (di Sciullo, in press)

- Il fiume serpeggia al mare.  
'The river snakes (its way) to the sea'
- Ho caricato l'autocarro pieno.  
'I loaded the truck full (to the brim).'

Spanish: Demonte (1991) reports that she accepts (certain) transitive resultative constructions in Spanish.

- (16) a. Pedro pintó la casa verde. (Demonte, ex. 2a, p.166)  
 'Pedro painted the house green.'  
 b. Masticó la carne chiquitita. (ex. 18b, p.175)  
 '(S)he chewed the meat very little.' [result reading]
- (17) a. \*Limpió la camisa blanca. (ex. 24a, p.182)  
 '(S)he washed the shirt white.'  
 b. Pedro edificó la casa \*(muy) amplia. (ex. 2c, p.166)  
 'Pedro built the house wide.'

(18) Generalization (Giorgi & Longobardi 1991, Beard 1996): Fully productive nominal compounding is blocked in a language that has both Head-Modifier order within the NP, and obligatory inflectional suffixation on the head noun of the NP.

Compounding seems to be essentially productive in Germanic but lexically conditioned in a severe way in the Romance languages.... In fact, the structure of Romance compounds, being head initial, is likely to favour the clash of two general tendencies holding in all Indo-European languages: first, that the inflectional features of a compound (gender, number) must occur on the head of such a compound; second, that the inflectional features of a word are morphologically realized as the final part (ending or morphological head in Williams's 1980 sense) of this word.

(Giorgi & Longobardi, fn. 25, pp. 247-248; emphasis WS)

(19) *Sampling of Languages with predominantly Head-Modifier order:*

["Suffixing" = obligatory inflectional suffixation for number/gender/case on the morphological head of the N heading NP]

|            | <u>Suffixing</u> | <u>N-N</u> |
|------------|------------------|------------|
| Khmer      | N                | Y          |
| Indonesian | N                | Y          |
| Malagasy   | N                | Y          |

|            |   |   |
|------------|---|---|
| French     | Y | N |
| Spanish    | Y | N |
| Italian    | Y | N |
| Rumanian   | Y | N |
| Albanian   | Y | N |
| Persian    | Y | N |
| Sc. Gaelic | Y | N |
| Tagalog    | N | N |
| Swahili    | N | N |

(20) *Supporting evidence from Cushitic (based on Tucker & Bryan 1966):*

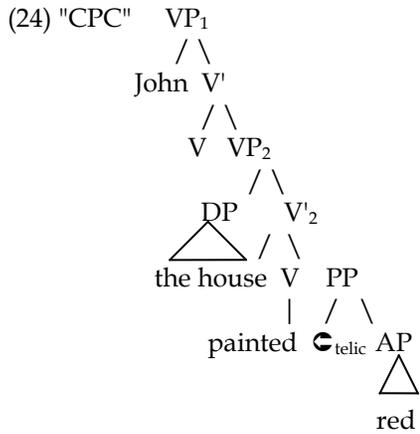
|         | <u>Suffixing</u> | <u>Modifier-Head</u> | <u>Head-Modifier</u> | <u>N-N</u> |
|---------|------------------|----------------------|----------------------|------------|
| Somali  | Y                | N                    | Y                    | N          |
| Galla   | Y                | N                    | Y                    | N          |
| Bedauye | Y                | Y                    | Y                    | Y          |
| Awiya   | Y                | Y                    | N                    | Y          |
| Saho    | Y                | Y                    | N                    | Y          |
| Sidamo  | Y                | Y                    | N                    | Y          |
| Ometo   | Y                | Y                    | N                    | Y          |
| Bilin   | Y                | Y                    | N                    | N          |

*Of the eight Cushitic languages reported, six permit modifier-head order (with adjectival and possessive modifiers), while two do not. Of the former six, five permit productive nominal compounding, but of the latter two, neither exhibits productive nominal compounding.*

### III. Approach to resultatives and other complex predicates

- (21) a. John painted the house red.  
 b. John painted the red house.  
 c. John painted the house that was red.
- (22) a. Ta ba fang-zi chi chung hong su. (Mandarin)  
 he BA house paint become red colour  
 b. HE PAINT HOUSE BECOME RED. (ASL)

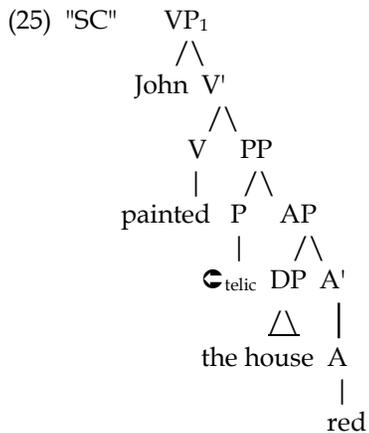
(23) John painted the house  $\mathbf{C}_{telic}$  red.



$\hat{\varphi}$ red $\hat{\varphi}$  =  $\lambda e .[\text{red}'(\underline{\text{Theme}}(e), e)]$

$\hat{\varphi} \mathbf{C}_{telic} \hat{\varphi}$  =  $\lambda P . \lambda e . [P(\underline{\text{Culmination}}(e))]$

$\hat{\varphi}$ painted $\hat{\varphi}$  =  $\lambda x . \lambda y . \lambda e . [\text{painting}'(e) \ \& \ \underline{\text{Theme}}(e, x) \ \& \ \underline{\text{Agent}}(e, y)]$



$\hat{\varphi}$ red $\hat{\varphi}$  =  $\lambda x . \lambda e . [\text{red}'(x, e)]$

$\hat{\varphi} \mathbf{C}_{telic} \hat{\varphi}$  =  $\lambda P . \lambda e . [P(\underline{\text{Culmination}}(e))]$

$\hat{\varphi}$ painted $\hat{\varphi}$  =  $\lambda y . \lambda e . [\text{painting}'(e) \ \& \ \underline{\text{Agent}}(e, y)]$

- (26) a. John painted the house  $\mathbf{C}_{telic}$  red. (Transitive Resultative)  
 b. Mary picked the book up. (V-NP-Particle)  
 c. Mary picked up the book. (V-Particle-NP)  
 d. Bob put the book down on the table. (Put-NP-Particle)  
 e. Bob put down the book on the table. (Put-Particle-NP)  
 f. Bob put the book  $\emptyset_{telic}$  on the table. (Put-locative)

(27) Fred made Jeff wash the car. (Make-Causative)

#### IV. X-Bar Parameters and the MPH

- (28) a. **Base Rule Ordering** (Beard 1996, p.4): The subordinate constituent of a compound X assumes the default position, before or after the head, of the adjunct in the correlate XP.  
 b. The subordinate constituent of a compound N assumes a position identical with the default position of a single, unmodified, lexical adjective in a NP. (Beard 1996, p.6)

- (29) a. [NP/DP the red house]  
 b. [N worm can]

- (30) a. ptea<sup>s</sup> krahom (Khmer)  
 [NP/DP house red]  
 b. kapong' jole:n'  
 [N can worm]

#### (31) The Specification Parameter:

A specificational element (phrasal "specifier" or morphological "modifier") is ordered to the {left, right} of its structural sister.

*Assumptions: Attributive APs are specifiers of NP; multiple specifiers are permitted.*

## V. Conclusions

Cross-linguistic variation in the availability of syntactic “complex predicates” is due to the **Root Compounding Parameter**, in conjunction with the **Complex Predicate Constraint**.

Cross-linguistic variation in the left-right positioning of syntactic specifiers is due to the **Specification Parameter** of the morphological component.

**Morphological parameters apply at all points in the syntactic derivation** (cf. Borer 1991, Chomsky 1995).

The **Morphological Parameterization Hypothesis**, a generalization of the findings to date, is proposed as a working hypothesis, and yields strong, testable predictions.

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