

## Summary of *Order and Structure* (Phillips 1996)

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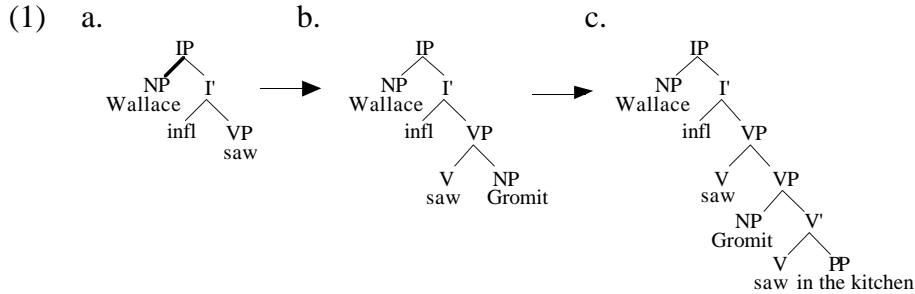
In *Order and Structure* I have two main goals. First, I argue that the grammar should be viewed as an incremental left-to-right structure building system, and that this solves a number of problems in constituent structure. Second, I reassess the relationship between linguistic knowledge and language processing, and argue that mental systems for grammar and processing can be viewed as identical. These two goals are closely related, because an incremental grammar is a necessary component of a unified grammar/processor.

### 1. Constituency

The main evidence for incremental structure building comes from an examination of constituency diagnostics in English. Constituency tests are an essential part of the syntactician's toolbox, but it is well-known that the results of different diagnostics of constituency often diverge or even conflict with one another. Coordination is a relatively 'liberal' test, which identifies the widest range of strings as constituents, and even identifies overlapping strings as constituents – a contradiction under standard assumptions. Other tests are rather more austere, but still lead to contradiction. In complex VPs we find that c-command tests involving binding, polarity item licensing and weak crossover support a right-branching structure for VP in which phrases on the left c-command phrases to their right (Barss & Lasnik 1986; Larson 1988; Stroik 1990), and this analysis is corroborated by coordination evidence (Larson 1988, Pesetsky 1995). On the other hand, tests involving movement or ellipsis favor a more traditional left-branching structure for VP, in which phrases on the right c-command phrases to their left, an analysis also corroborated by coordination evidence. Since we again find ourselves in a contradiction, something must give.

In contrast to earlier work that has reinterpreted some of the tests, or has adopted some version of *flexible constituency* (Ades & Steedman 1982, Dowty 1988, Pickering & Barry 1993, Pesetsky 1995), I argue that the solution to the constituency problem can be found in the properties of incremental structure building.

Over the course of the left-to-right assembly of a syntactic structure, there are predictable changes in which strings of words are constituents: the addition of new material at the right edge of a structure creates new constituents, but often has the effect of destroying existing constituents. This is illustrated in (1), which shows some stages in the construction of the sentence *Wallace saw Gromit in the kitchen*. The string *Wallace saw* is a constituent in (1a), but this constituent is destroyed by the addition of the object NP *Gromit* in (1b). Similar creation and destruction of constituents can be seen in the transition from (1b) to (1c).



Incremental structure building not only makes available constituents that are not available in standard phrase structure models (e.g. 1a), it also predicts which constituents are available to which syntactic processes: a syntactic process may only apply to strings of words that are constituents at the point in the left-to-right derivation when the test applies.

(2) shows a contrast between coordination and pseudogapping. In V-PP sequences coordination can target the verb+preposition (2a), but pseudogapping cannot (2b) (Baltin & Postal 1996). In an incremental grammar this follows because the verb-preposition constituent is destroyed as soon as the complement of the preposition is added, forming a PP constituent. Coordination occurs before the NP is added, allowing reference to the V-P constituent, pseudogapping is licensed after the NP is added.

- (2) a. The sheep looked at and then slept on the rug in the middle of the living room.  
 b. The sheep slept on the rug more often than the penguin did \_\_\_\_ \*(on) the chair.

In general, *any* constituent present during a derivation may be coordinated with a like constituent, because coordination is guaranteed to occur before the constituent is destroyed. Hence the liberality of coordination.

Incrementality can also explain which tests block each another's application. (3) shows scope and binding possibilities for a simple clause containing a direct object and an adverbial. (4) shows that when the verb-object sequence in (3a) is moved binding possibilities are unaffected (4a) (Pesetsky 1995), but when the same string undergoes VP-ellipsis reciprocal binding fails (4b). (5) shows that when the verb-object sequence in (3b) is targeted by comparative ellipsis scope possibilities are unaffected (5a), but when the same string is targeted by regular VP-ellipsis the distributive scope reading disappears (5b).

- (3) a. Wendolene knitted sweaters for them on each other's birthdays.  
 b. Gromit built all the machines in an evening. (collective & distributive scope)
- (4) a. Wendolene hoped to knit sweaters for them, and knit sweaters for them she did on each other's birthdays.  
 b. \* Wendolene knitted sweaters for them on each other's birthdays, and Preston did on each other's first day of school.

- (5) a. Gromit built as many machines as Wallace did in an evening. (coll. & dist.)  
b. Gromit built all the machines in an evening, and Wallace did in a weekend.  
(coll. only)

The contrasts in (4–5) are explained as follows. In each example a verb-object constituent is targeted. Assuming that both anaphor binding and distributive scope readings depend on a right-branching structure like (1c), which do not contain a verb-object constituent, the structural requirements of the tests are at odds with one another, unless the verb-object constituent can be targeted *before* the clause final adverbial is built, as in (1b). The examples in (4a, 5a) satisfy this; the examples in (4b, 5b) fail this, because the adverbial is already built at the end of the first conjunct, before the ellipsis site is licensed.

*Order and Structure* presents a number of other examples of how incremental structure building can explain the differences between constituency tests.

## 2. Interfaces

The second kind of evidence presented in favor of incremental derivations comes from the fact that it allows morphological and phonological representations to be the input to syntactic derivations, rather than the output, as is commonly assumed. The notorious second-position clitics of Serbo-Croatian often appear in positions which are phonologically rather than syntactically defined (Browne 1974, Halpern 1992). I argue that the placement of clitics can be handled more easily in a theory in which syntactic representations are derived from phonological representations. Although prosodic constituency and syntactic constituency are generally assumed to be independent (Nespor & Vogel 1986), I argue that the constituents of an incremental derivation allow a closer syntax-phonology match than is normally possible, based on a study of intonational phrasing data from Tohono O’odham (Hale & Selkirk 1987), and show that incremental syntactic derivation can explain some otherwise mysterious properties of the distribution of phonological phrasing.

## 3. Architecture

Since the 1960s, work in linguistic theory has focused on characterizing linguistic knowledge in terms of *static* mental representations, and on accounting primarily for grammaticality judgments. The main goal of psycholinguists, on the other hand, has more commonly been to provide a more or less explicitly *procedural* characterization of how speakers perform linguistic tasks such as comprehension or production. It is standardly assumed that mental systems for grammar and processing are separate, and hence that linguists and psycholinguists are not studying the same thing. I reconsider three of the most important arguments for separating the grammar from processing systems, which received their classic formulation in Fodor et al. (1974) and Levelt (1974).

a. *Incrementality*. Given the incremental nature of language production and comprehension, any grammar which is also a model of these processes must be incremental. Clearly, most grammars do not meet this criterion, and therefore must be

considered as separate from processing systems. Of course, if the arguments for incremental grammar outlined above are successful, then this argument falls away.

*b. Ambiguity/economy.* Research in sentence processing over the last 25 years has focused on ambiguity resolution, and the mechanisms proposed to account for ambiguity resolution were not obviously related to any of the mechanisms proposed by syntacticians, hence motivating an independent system. However, economy/optimalty constraints which select the best structure from a set of competing alternatives are closely related to mechanisms for structural ambiguity resolution, and raise the possibility that the two areas may be unified. In a first step towards this I argue that a wide range of biases in ambiguity resolution may be due to a principle favoring right-branching structures, and propose that this is matched by a grammatical economy condition which favors right-branching structures.

*c. Experimental disconfirmation.* A widely recounted chapter in the history of psycholinguistics is the ‘Demise of the Derivational Theory of Complexity’, which is reputed to have experimentally settled the question of the relationship of the parser and the grammar. The DTC was the suggestion that the perceptual complexity of a sentence is proportional to its transformational complexity, as one might expect if comprehension involves running an *Aspects*-style transformational derivation backwards. A detailed review shows that the relevant experimental literature is entirely consistent with the claim that the parser and grammar are identical.

In conclusion, while this dissertation just takes beginning steps towards the specification of a unified system for grammar and processing, I hope to have shown that this goal is more feasible than is generally thought.

## References

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