

Jackendoff might be right: “Linguistics alone cannot sustain the weight of the inquiry. We need all the help we can get from every possible quarter” (p. 429).

7. Afterthought. Jackendoff’s *Foundations* is a result of an incredible intellectual effort. I am very curious to see how the author reacts to remarks coming from an external world.

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Imaginary mistakes versus real problems in generative grammar

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Abstract: Jackendoff claims that current theories of generative grammar commit a “scientific mistake” by assuming that syntax is the sole source of linguistic organization (“syntactocentrism”). The claim is false, and furthermore, Jackendoff’s solution to the alleged problem, the parallel architecture, creates a real problem that exists in no other theory of generative grammar.

Jackendoff’s *Foundations of Language* (Jackendoff 2002) begins with a polemic about a perceived “scientific mistake” in standard generative grammar, which is corrected in his new proposal for the architecture of grammatical theory. The mistake, dubbed “syntactocentrism,” concerns theories in which the only formation rules (i.e., mechanisms that create linguistic representations) are those of the syntactic component. “In short, syntax is the source of all linguistic organization.” In contrast, Jackendoff proposes a model in which there are three independent sets of formation rules (for phonology, syntax, and semantics), a model he calls the parallel architecture. The three independent representations thereby generated must then be related by interface (or correspondence) rules, including rules that relate phonological representations directly to semantic representations.

Before discussing the parallel architecture proposed as a solution to the purportedly flawed standard theory, it is useful to consider exactly how current theories of generative grammar are syntactocentric, given Jackendoff’s characterization. Let us consider the case of the minimalist program (cf., Chomsky 1995; 2000; 2001), which is inaccurately represented in Figure 1.¹

Within a minimalist derivation (e.g., Chomsky 1995, Ch. 4), the first step is the selection from the lexicon of a lexical array, a set of lexical items designated *the numeration*. This lexical array is then used to build linguistic structures via the iterated application of the concatenation operation Merge. Merge builds syntactic structures bottom-up by concatenating two syntactic objects (lexical items from the numeration, or phrases constructed from previous applications of Merge) and labeling the concatenation with the syntactic category label of one of the two concatenated objects, thus creating a new syntactic object.² The syntactic object generated eventually produces a Phonetic Form (PF) that is interpreted at the sensory-motor interface and a Logical Form (LF) that is interpreted at the conceptual-intensional interface.³ Within the derivation of a linguistic expression, there is a point called “Spell-Out” (S/O) where the phonetic features of the expression are sent to the phonological component for further processing, and the rest of the structure moves on to the LF interface. Any changes to the structure of the expression after S/O are covert, because their effects cannot be seen in PF.

Even if Merge is the only formation rule available in the derivation, it does not follow that syntax is the sole source of linguistic organization. The charge of “syntactocentrism” ignores the contribution of the lexicon. Given that the lexicon specifies the

phonological, morphological, syntactic, and semantic structure of lexical items, it too constitutes a major source of “linguistic organization.” If lexical items enter the syntactic derivation with a specification of their syllable structure, then there is no need to independently generate a syllable structure for the whole linguistic expression generated.⁴ The charge of syntactocentrism is simply false for this theory, and as far as I can tell, for any previous theory of generative grammar that has ever been proposed. The notion is little more than a phantom.

Given that lexical entries contain phonological and semantic information, as well as syntactic information – the standard model since Chomsky 1965 – Jackendoff’s parallel architecture creates a serious dilemma. Presumably, the parallel architecture lexicon that feeds the syntactic component contains no phonological or semantic information. Otherwise, the parallel derivations of phonological and semantic representations would redundantly specify information that is already part of the syntactic derivation, thereby undermining the need for parallel derivations in the first place. Ironically, the syntactic derivation under the parallel architecture must be “syntactocentric” – in just the same way that the phonological derivation is “phonocentric” and the semantic derivation is “semantocentric.”

The parallel architecture puts an enormous burden on the interface/correspondence rules, one that they must surely fail to carry in even the simplest cases. If, as Jackendoff seems to be claiming, phonological representations contain no syntactic information, then there must be a correspondence rule that links the phonological representation of *persuade* to the lexical category V, rather than some other lexical category. However, the phonetic labels of words in a language are fundamentally arbitrary – what Chomsky (1993) calls “Sausseurian arbitrariness” – so there is no systematic way (i.e., via rules) to correlate phonetic labels and lexical categories. The same point applies to the connections between phonological and semantic representations. Given the parallel architecture, nothing in the phonological representation of *persuade* tells us that it corresponds to the semantic representation of *persuade* rather than the semantic representation of *try*. The standard solution to the problem of Sausseurian arbitrariness is to list the correspondences in the lexicon, traditionally the repository for idiosyncratic properties of a language. But once we do this, the motivation for the parallel architecture evaporates.

NOTES

1. It is important to note that the minimalist program is a program for research investigating very general questions concerning the optimality (in some interesting sense) of the computational system for human language and more generally the possible “perfection” of language design. (See Chomsky 1995; Freidin 1997 for discussion.) These questions by themselves do not provide a theoretical framework or a particular model, let alone a specific theory. At present, the minimalist program is being investigated in a variety of ways, where specific proposals are often mutually exclusive, as is normally the case in linguistics, and rational inquiry more generally.

2. Thus phrase structure is constructed via transformation and therefore there is no phrase structure rule component. Movement transformations in this theory also involve a form of merger, where the syntactic object moved is concatenated with the root of the phrase containing it. When two independent objects are merged, this is called external Merge; whereas when a syntactic object is displaced to an edge of the constituent containing it, this is called internal Merge. The two types of Merge correspond to the distinction between generalized versus singularly [*sic*, technical term] transformations in Chomsky (1957 and earlier).

3. There is no further conversion of LF to “semantic representation” as indicated in Figure 1. Furthermore, following up on Note 1, recent proposals have questioned the existence of any level of representation like LF (see Chomsky 2002).

4. The same argument can be made regarding semantic representation. Assuming that the structures Jackendoff proposes for the semantic representation of verbs are on the right track, these structures could just as easily be part of the semantic specification of the lexical entry for predicates where the elements labeled “Object” in Jackendoff’s lexical representations are variables to be replaced with constant terms from the actual sentence in which the predicate occurs. Again, there is no need to generate

these semantic representations independently of the syntax and then have the problem of relating the two independent representations.

Linguistics fit for dialogue

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Abstract: *Foundations of Language* (Jackendoff 2002) sets out to reconcile generative accounts of language structure with psychological accounts of language processing. We argue that Jackendoff's "parallel architecture" is a particularly appropriate linguistic framework for the interactive alignment account of dialogue processing. It offers a helpful definition of linguistic levels of representation, it gives an interesting account of routine expressions, and it supports radical incrementality in processing.

It is easy to argue that dialogue is the basic setting for language use (Clark 1996). Yet historically, generative linguistics has developed theories of isolated, decontextualized sentences that are used in texts or speeches, in other words, in monologue. In turn, this failure to address dialogue at a linguistic level is one of the main reasons why psycholinguistics have also ignored dialogue. In contrast, Pickering and Garrod (in press) propose a specific mechanistic account of language processing in dialogue, called the *interactive alignment* model. This account assumes that in dialogue, interlocutors align their linguistic representations at many levels through a largely automatic process. It also assumes that alignment at one level can promote alignment at other levels. This explains why coming to a mutual understanding in dialogue is generally much easier than interpreting or producing utterances in monologue. In this commentary we consider how Jackendoff's framework in *Foundations* relates to this account.

Jackendoff considers how linguistic theory can elucidate language processing (Ch. 7), a surprisingly fresh approach from a generative linguist. However, he does not explicitly consider how his "parallel architecture" might relate to language processing in dialogue. Here, we argue that the architecture turns out to be particularly helpful in understanding how interactive alignment comes about. First, it is consistent with multiple independent levels of representation with links between the levels. Second, it offers interesting insights into the linguistic representation of semi-fixed or routine expressions such as idioms, which we argue play an important role in dialogue processing. Finally, it is consistent with incrementality in both production and comprehension, which appears necessary for understanding dialogue.

Independent levels and the interfaces between them. Jackendoff assumes that phonological, syntactic, and semantic formation rules generate phonological, syntactic, and semantic structures respectively, and these are brought into correspondence by interface rules, which encode the relationship between different systems (Ch. 5). This produces an architecture which is "logically non-directional" and hence not inherently biased toward either perception or production (Ch. 7, p. 198). These two general features of Jackendoff's account make it especially attractive as a linguistic framework for interactive alignment. First, interlocutors can align representations at different linguistic levels (e.g., Branigan et al. 2000; Garrod & Anderson 1987). These researchers argue that the alignment process is largely automatic (operating through so-called alignment channels) and that alignment at one level (e.g., the syntactic) reinforces alignment at other levels (e.g., the semantic) (e.g., Cleland & Pickering 2003). Hence, alignment channels can affect the application of the formation rules, and interface rules are encoded in the links between the levels. It would be difficult to find such a correspondence with traditional generative approaches where only syntax is generative and where

phonology and semantics are "read off" syntactic structures (e.g., Chomsky 1981). Second, the non-directional character of Jackendoff's architecture explains how perception of structure at one level can enhance subsequent production of structure at that level as the literature on alignment in dialogue demonstrates. In other words, so long as the linguistic structures called upon in comprehension and production are the same, there can be priming from comprehension to production and therefore alignment between interlocutors.

The structure of routine expressions. Pickering and Garrod (in press) argue that the interactive alignment process naturally leads to the development of routine expressions in dialogue. In other words, dialogue utterances become like stock phrases or idioms with semi-fixed structure and interpretation. This is reflected in the degree of lexical and structural repetition in dialogue corpora (Aijmer 1996; Tannen 1989). We argue that routinization greatly simplifies language processing because it allows interlocutors to call upon stored representations, which already encode many of the decisions normally required in production or comprehension, rather than having to compute everything from scratch.

Jackendoff provides an interesting discussion of the contrast between lexical storage and on-line construction (Ch. 6). In section 6.5 he specifically addresses the structure of idioms, and in section 6.6, what he calls *constructional idioms*. Constructional idioms are weakly generative constructions such as *take NP to task* or *put NP in (his, her, or their) place*. These behave like complex VPs but include a free variable position inside the complex structure. Of course, all such idioms are assumed to be represented in long-term memory, either as complete packages (i.e., for standard idioms) or as frames with variables (i.e., for constructional idioms). In our framework we assume that routines of all these kinds are constructed through alignment processes. They can therefore be "set up" for a particular conversation, with a particular meaning that holds for that interchange alone. In other words, routines can be transient.

Radical incrementality in processing. A crucial feature of Jackendoff's account for dialogue is that it supports radically incremental processing. Of course, there are good reasons for assuming incrementality in monologue comprehension, as well. Here, we merely point out that the fact that interlocutors can complete each other's utterances or clarify what they have just heard strongly suggests that it must be possible to comprehend fragments of language as they are encountered, and the fact that such contributions are constrained by the syntax of the original fragment indicates that incremental syntactic analysis must occur (see Pickering & Garrod, in press).

Where is the lexicon?

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Abstract: In an attempt to provide a unified model of language-related mental processes, Jackendoff puts forward significant modifications to the generative architecture of the language faculty. While sympathetic to the overall objective of the book, my review points out that one aspect of the proposal – the status of the lexicon – lacks sufficient empirical support.

In *Foundations of Language*, Jackendoff (2002) proposes a substantial "reconceptualization" of the generative architecture of language in order to better integrate linguistics into the study of the mind and the brain. This move is attractive because it allows the author to embrace a wide range of findings within the broader framework of cognitive neurosciences. Thus previously unrelated phenomena, such as grammaticalization in Creole languages, tip of the tongue states, or referential dependencies within sentences are discussed in a unified mental model. While I am in perfect