The memory-based view explains why processing appears different in dialogue and monologue situations. It also provides an alternative to the priming mechanism around which P&G build their theory. For monologue experiments, which involve processing language in a decontextualized and artificial situation, there is little in the way of specific prior experience that might constrain the memory retrieval process. The structure of the experiments (e.g., randomized trials, random selection of materials) also makes it unlikely that recent experience within the session will exert a systematic influence on task performance. Hence, monologue-based experiments produce memory retrieval conditions that are sensitive to general properties of one's linguistic experience, such as the frequency of particular syntactic structures or word meanings. On the other hand, dialogue situations foster highly constrained memory retrieval. For example, the perceptual similarity between utterances within a dialogue can constrain memory retrieval so that it most strongly resonates with previous experiences with that particular speaker (see Goldinger 1998). All other things being equal, memory retrieval is also weighted toward more recent experience (see Bock & Griffin 2000). Together, these factors can produce the kinds of repetition and alignment that P&G discuss.

Support for the learning- and memory-based view comes from experiments reported in Kaschak (2003). The participants in these experiments were trained on a syntactic construction with which they were not familiar, called the Needs construction. In the first part of the experiments, participants in the Needs training condition were exposed to the novel construction in sentences such as: "*The meal needs cooked* given that dinner is in an hour." Participants in the control training condition had an identical training phase in which they read the standard version of the Needs construction for their dialect ("*The meal needs to be cooked* given that dinner is in an hour"). By the end of the training phase (which included 10 to 12 exposures to the Needs or standard constructions, depending on the experiment), participants in the Needs training condition read the novel construction as quickly as participants in the control training condition read the standard construction. This is consonant with P&G's claim that recent experience has a strong influence on language processing. Indeed, it fits nicely with the claim that recent experience can override global frequency effects in determining the speed of processing for particular kinds of language.

One of the questions addressed in these experiments was how training on the Needs construction would affect the processing of another construction with which the participants were already familiar: the modifier construction ("*The meal needs cooked vegetables* given that the guests are vegetarian"). Training on the Needs construction sets up an ambiguity between the novel structure and the existing modifier construction, such that the sentence is ambiguous at the word "cooked." The priming mechanism favored by P&G (and discussed earlier in Pickering & Branigan 1998) makes a straightforward prediction about the influence of Needs training on the processing of the modifier construction. Recent exposure to Needs sentences will prime the syntactic features associated with the construction, leading readers to initially choose the Needs interpretation of the ambiguous sentences (thereby slowing processing of the modifier construction).

Kaschak's (2003) results showed that the effect of Needs training on the reading of the modifier construction depends on the particular nature of one's experiences during training. If participants reading, "The meal needs cooked . . ." during training initially interpreted the sentence as the modifier construction before figuring out that the sentence was an example of the Needs construction, Needs training facilitated the participants' reading of the modifier construction. If the participants were given instructions such that they did not initially misinterpret the Needs sentences as examples of the modifier construction, the Needs training did not facilitate processing of the modifier construction. Kaschak (2003) discusses how these data can be explained by assuming that the participants in these experiments remembered not only the outcome of processing the initial examples of the Needs construction, but also the processing work that went into comprehending those sentences. This leads to the conclusion that it is the memory that one has for particular linguistic experiences, rather than a priming mechanism, that may better explain how recent experience with language shapes the way subsequent utterances are processed.

We resonate with many of the arguments and claims advanced by P&G, but we think their explanation can be substantially improved by replacing the notion of alignment-by-priming with alignment based on retrieval from memory of recent processing episodes.

Grammars with parsing dynamics: A new perspective on alignment

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Abstract: This commentary argues that dialogue alignment can be explained if parsing-directed grammar formalisms are adopted. With syntax defined as monotonic growth of semantic representations as each word is parsed, alignment between interlocutors is shown to be expected. Hence, grammars can be evaluated according to relative success in characterizing dialogue phenomena.

Although Pickering & Garrod (P&G) suggest grammars should be compatible with alignment patterns in dialogue, commending multilevel constraint-based formalisms, they could have posed a stronger challenge. Given that dialogues constitute primary data, can linguistic theory provide a basis for explaining alignment? Does some grammar-external mechanism determine alignment, or is it a consequence of the architecture of the language system and the way it is put to use in dialogue? The authors opt for the first alternative. However, with grammar formalisms being promoted which reflect the dynamics of a parser (Kempson et al. 2001; Phillips 1996), alignment can be more strongly buttressed by natural-language grammars than they anticipated.

In *Dynamic Syntax* (Kempson et al. 2001), a grammar formalism is defined that provides such underpinnings. A constraint-based architecture is defined, with syntax as the progressive growth of semantic representations, specifying possible parse routines. That syntactic and semantic alignment go hand in hand, is thus ensured. Semantic representations (logical forms) are in tree format, with the propositional formula assigned to a string decorating the top node and the dominated nodes in the tree decorated with sub-terms of this formula (quantification is expressed in the form of names denoting witness sets, so resulting representations resemble the *situational models* of Johnson-Laird 1983). Growth of logical forms, central to this concept of syntax, is goal-directed – first setting out the overall goal to establish a propositional structure, with subgoals introduced for predicate-argument structure. The partial structure induced by such goals is enriched by updates which the words in sequence provide for these skeletal structures; and these, together with construal of pronouns relative to context (context construed as a sequence of semantic representations), determine the building up of a semantic representation which, when complete, meets the goal (a *goal tree*).

Lexical specifications are also defined in terms of tree growth, with each word associated with some input it provides to progressive articulation of semantic representations. That lexical alignment should go along with syntactic/semantic alignment thus follows. The apparent syntax-specific alignment across interlocutors relative to constant semantic content, for example, repeating double-object constructions rather than their full dative equivalent – a putative counter-example to such collapse of syntactic/semantic/

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lexical distinctions – follows from this definition of lexical content. A word with both double-object and full-dative variants provides two distinct forms of update onto a single structure, hence a processing ambiguity. Repeating words across interlocutors will retrieve the lexical specification just used, not some alternant. By collapsing what would in other systems be discrete syntactic/semantic/lexical levels, the multilevel nature of alignment is transformed into a single phenomenon.

We can now see perception/production correspondences and self-monitoring of production as essential, not merely functionally convenient. The consequences of taking parsing as basic when designing a production model are twofold. First, in using the same grammar formalism, the production mechanism must be using the same structure-inducing growth process as is articulated for parsing, the major difference being that in production, the goal tree is known. Following general tree development steps defined by the parser, which in the initial steps of the parse define only a skeletal partial tree, the task is to retrieve from the lexicon some appropriate first word that can take the partial tree so far defined and update it to provide a more developed structure that subsumes the goal tree. If such a subsumption relation holds, then utterance of that word is licensed. This task repeats itself to induce a sequence of words until the goal tree is obtained through the parse mechanism – hence the correspondence between comprehension and production and essential self-monitoring in production.[1]

Alignment between interlocutors is now explicable. The major challenge of production, given some conceptual structure to be communicated, is selecting words to express that content, imposing a general lexicon search. The incrementality of the tree growth mechanisms suggests that this search is activated successively, which is a huge task. However, production, like parsing, is context-dependent; and part of the context is that small subset of the lexicon already accessed. Repeating words accordingly avoids a general lexicon search. Pronouns equally, being place-holders substituted by contextually available representations, sidestep full lexicon access. And with elliptical fragments, lexical search is restricted to the fragment. So the high rate of alignment, as displayed by these forms, arises because production, following the parsing dynamics, is context-dependent, which is essential for minimizing the word-retrieval burden.

Finally, shared utterances are expected. Given the use of parsing tools to induce production steps, in successful communication, interlocutors must coincide on constructing some particular sequence of structures. The shift from parser to producer is thus straightforward if the parser, having constructed some partial tree, makes an abduction step to determine what is needed to complete it. The shift from producer to parser is equally natural: It is a shift into the task of processing lexical input to complete the partial tree, which up to that point was constructed as the means of making production choices.

Hence, there is a stronger conclusion than the authors' modest challenge to linguists. Rather, we might adopt methodologies in which linguistic theories are evaluated by their potential for expressing coordination of comprehension and production in dialogue. Grammar formalisms defined in terms of parsing meet this challenge in a particularly direct way.

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NOTES

1. Modeling generation using the dynamic syntax framework constitutes ongoing research (Purver & Otsuka 2003).

Is alignment always the result of automatic priming?

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Abstract: Pickering & Garrod's (P&G's) mechanistic theory of dialogue attempts to detail the psychological processes involved in communication that are lacking in Clark's theory. By relying on automatic priming and alignment processes, however, the theory falters when it comes to explaining much of dialogic interaction. We argue for the inclusion of less automatic, though not completely conscious and deliberate, processes to explain such phenomena.

In his influential book *Using Language,* Clark (1996) argued against a conceptualization of communicators as autonomous information processors, contending that language use is intrinsically a joint activity and examining communicators' practices from this perspective. His account provides a compelling description of some of the things talkers accomplish in dialogue, but it is weak on details of the psychological processes on which these accomplishments rest. Pickering & Garrod's (P&G's) mechanistic theory of dialogue is an attempt to provide such an account. In many respects, it is quite successful, providing a glimmer of light at the end of a long psycholinguistic tunnel. However, there are some respects in which the theory falls short of its authors' goal of providing a mechanistic explanation for the phenomena Clark described.

There are two key propositions in the target article's argument: first, that communication entails the alignment of participants' situation models; second, that priming is the principle mechanism by which this is accomplished. We find the first proposition more convincing than the second. By stressing the automaticity of the process, P&G's mechanistic theory appears incapable of accounting for the way interlocutors use information in what appears to be a more reflective fashion. Because of space limitations, we shall confine ourselves to just a few instances where the theory is deficient.

1. The automatic priming mechanism appears to leave no room for addressee accommodation in the absence of a misunderstanding, yet there are many examples of interlocutors taking their partners' informational needs into account that are incompatible with automatic priming. For example, Kingsbury (1968) found that Bostonians who were asked, "I'm from out of town, can you tell me how to get to Jordan Marsh?" gave more detailed directions than those simply asked, "Can you tell me how to get to Jordan Marsh?" When asked the latter question in an exotic (nonlocal) dialect, Bostonians also gave more detailed directions. Fussell and Krauss (1992) found that the number of words used in the initial reference to a photo of a landmark in an interactive coordination task was a function of the landmark's perceived identifiability – the more identifiable the landmark was thought to be, the fewer the words used to refer to it. It is not clear how priming could account for these results or those of a host of similar studies (see Krauss & Fussell 1996 for a review). We believe that such "audience design" effects (Clark & Murphy 1982; Fussell & Krauss 1989) occur prior to referent selection, and not just as an attempt to remedy an emergent misunderstanding.

2. Representational alignment requires that two or more entities be identical in some way. Assertions of identity may work for descriptions of relatively abstract syntactic and lexical levels of representation, but not for representations at the phonological level, because the phonological level is graded and repeated phonetic elements (even within the same talker) are not physically identical. Although different instances of a phoneme may be perceived as members of the same phoneme category, perception preserves some phonetic distinctions. Hence, the very level that is the point of contact between talkers, the acoustic-phonetic level,

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