Dialogue in the degenerate case?

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Abstract: The interactive alignment model treats within- and between-individual co-ordination as essentially equivalent. It is argued that this leads to a conservative account of alignment that presupposes high levels of linguistic and conceptual co-ordination. Data from the maze task are used to argue that this approach is not sufficient to account for important co-ordination phenomena.

Pickering & Garrod (P&G) bring together a large body of empirical evidence that highlights an important phenomenon. Participants in dialogue display higher levels of phonological, lexical, syntactic, semantic, and situational co-ordination than is expected from considering processes of production and comprehension in isolation. The authors propose that the central mechanism driving this level of communicative alignment is priming. This is envisaged as an automatic, bidirectional process operating in parallel on several different levels of representation. Importantly, they suggest that this process operates in essentially the same way both within and between speakers.

The treatment of dialogue participants as effectively interchangeable embodies a strong claim. It presupposes a high degree of equivalence between the representational systems underpinning communicative co-ordination. In places this is qualified as equivalent "in all essential respects" or "basically the same." However, in cases where priming is the mechanism of alignment, the residual differences between individual's representations are irrelevant.

What could underwrite the requisite similarity in mental representation? Priming is itself a conservative mechanism that alters the accessibility but not the form or content of the associated mental representations. For example, the account of co-ordination in the maze game distinguishes a basic repertoire of situational models of the maze (figure scheme, path scheme, line scheme, and matrix scheme) and a variety of referring expressions built up from the lexicon, syntax, and semantics of a fragment of English (Garrod & Anderson 1987). By hypothesis, the same basic repertoire of mental models and fragment of English are available to both participants prior to co-ordination. Priming does not change the repertoire; rather, it promotes alignment by favouring one particular model and its associated referring expressions.

Interactive alignment predicts that when maze game participants co-ordinate on a particular description and situational model, it should become more strongly primed, and they should stick with it. However, several aspects of the experimental data do not fit this prediction. Evolution and development of description schemes are common. As P&G observe, maze game pairs often develop their own idiosyncratic description schemes. Pairs switch description schemes frequently; for example, the isolated pairs in Garrod and Anderson (1987) and the non-community group in Garrod and Doherty (1994). Moreover, pairs do not reliably co-ordinate on the scheme that is most highly primed initially. For example, in Garrod and Doherty's (1994) community group, the line scheme is most frequent initially, but they subsequently co-ordinate on a matrix scheme.

In order to account for phenomena of this kind and to provide for co-ordination where participants are not effectively interchangeable, P&G propose iterative interactive repair as a key additional co-ordination mechanism. If a participant cannot find an interpretation for an utterance, he or she either shifts perspectives until an interpretation can be found or reformulates. This suggestion is not developed in detail, but it appears P&G envisage this basic form of repair as a shift between different co-ordination equilibria in the sense of Lewis (1969).

Data from the maze task suggest that this is inadequate. The results reported by Garrod and Anderson (1987), Garrod and Doherty (1994), and Healey (1997; in preparation) indicate underlying patterns of migration from figure and path schemes to more abstract line and matrix schemes. In addition, when maze game pairs have trouble co-ordinating, there is evidence that they show a reliable preference for shifting to a more basic (figure or path) scheme. The direction of these shifts is not predicted by frequency of prior exposure (Healey 1997; in preparation).

These observations show that the choice between different situational models is not neutral in the way that a co-ordination game or priming mechanism presumes. It is sensitive to the particular properties of the different situational models and, presumably, this relates to their implications for co-ordination. The pattern of preferences for shifts in description scheme and/or reformulations needs to be accounted for by the co-ordination mechanisms.

P&G aim to provide a model of dialogue co-ordination that avoids implausible assumptions about interlocutors constructing elaborate models of each other's context and mental states. This is surely right. Explicit negotiation and repair are relatively rare and do not provide a general account of co-ordination. However, the mechanisms of the interactive alignment model do not seem to do the work required.

Ironically, the idealisation of speaker and hearer as interchangeable reproduces one of the problems with treating dialogue as a form of monologue: the implication that participants are linguistically and conceptually transparent to one another. Interactive alignment focuses on dialogue in the degenerate case: interactions in which people are, in a sense, already co-ordinated. As P&G note, dialogue is important partly because it is the primary context for exposure to and acquisition of language. But this is also the situation in which the assumptions embodied in the interactive alignment model are least likely to be satisfied.

Interactive alignment: Priming or memory retrieval?

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Abstract: Pickering & Garrod's (P&G's) interactive alignment model explains the existence of alignment between speakers via an automatic priming mechanism. We propose that it may be preferable to explain alignment through processes of memory retrieval. Our discussion highlights how memory retrieval can produce the same results as the priming mechanism and presents data that favor the memory-based view.

Pickering & Garrod (P&G) claim that dialogue is marked by a great degree of alignment between interlocutors. The alignment is taken to arise from the operation of a largely automatic priming mechanism. We suggest that much of what P&G ascribe to the operation of a priming mechanism can be captured by a memory-based view of language processing.

The memory-based view is rooted in the assumption that language processing is performed against the background of one's experience. The comprehension of an incoming utterance is guided by experience of utterances with similar structures and meanings, just as experience communicating via speech shapes the production of utterances. This assumption forms the basis of many extant psycholinguistic theories: constraint-based approaches to sentence processing (e.g., MacDonald et al. 1994), memory-based models of text processing (Myers & O'Brien 1998), and theories of lexical access (Goldinger 1998). The memory retrieval mechanism is what has been called a "global matching" process (e.g., Hintzman 1986). That is, the memory retrieval process involves a global, parallel search of memory that is influenced by both contextual and temporal factors (e.g., the retrieval process shows a recency effect when recently processed language is treated as a separate context from previously processed language).

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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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