cannot support an automatic alignment/imitation-based model because it is impossible to produce a perfect imitation – the monitoring system would be reporting continual error. Although the mechanism allows for degrees of alignment, we lack a rule for determining how much alignment is required.

Interestingly, the strongest evidence cited by P&G for phonetic alignment comes from Goldinger's (1998) study of lexical shadowing. However, Goldinger's procedure assessed perceived *imitation,* which is not equivalent to phonetic similarity. Imitations of the voices of well-known figures by vocal impressionists are caricatures that exaggerate particularly salient features rather than produce acoustically accurate reproductions. The remainder of the published evidence for phonological imitation is mainly of increased similarity in speech rate and pitch (Giles et al. 1991; Natale 1975a; 1975b) and voice onset timing (Sancier & Fowler 1997). In a continuously variable system, what degree of similarity constitutes an imitation?

3. Interlocutors' speech does not always become more similar over the course of their interaction; in some cases, interaction yields divergence rather than convergence. Moreover, the speech of different participants may change to different degrees; convergence can be radically asymmetrical. It would be little more than an annoyance if such departures from symmetrical convergence were random, but frequently they reflect social processes that are fundamental to the interlocutors' interpersonal relationship and the ways in which they define the interaction situation. For example, Bourhis and Giles (1977) found divergence in accentedness when a talker's ethnic identity was devalued. Gregory and Webster (1996) found that the symmetry of pitch convergence between a talk-show host and his guests depended on the guest's status relative to that of the host – not surprisingly, higher-status guests changed less than their lower-status counterparts. Again, it is difficult to reconcile such phenomena with an automatic priming explanation. It seems more plausible to suppose that they derive from a prior assessment that sets up the system to evoke particular kinds of priming.

Although our commentary is directed at what we see as deficiencies in P&G's theory, we applaud their attempt to move beyond participants' goals and intentions and focus on the psychological mechanisms that make dialogue possible. Their thoughtful article is admirable in both its scope and depth, and offers much to contemplate. A complete account, we believe, will require a hybrid model in which alignment or imitation derives from both the kinds of automatic processes they describe and processes that are more directed or reflective. Hybrid models of this sort may be less tidy (although not necessarily less mechanistic) than the one P&G propose, but they do seem necessary to capture the subtlety and richness of dialogic phenomena. We are reminded of an anecdote about French President François Mitterand, who, when asked by an acquaintance if she might address him using the personal *tu* form, responded, "Si vous voulez." Even in cooperative settings without misunderstanding, alignment may be used strategically – language is used in the pursuit of individual goals. An elaboration of how a situation model incorporates key aspects of social and interpersonal dynamics would increase the explanatory power of a mechanistic theory of dialogue.

One alignment mechanism or many?

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Abstract: Pickering & Garrod (P&G) suggest that communicators synchronize their processing at a number of linguistic levels. Whereas their explanation suggests that representations are being compared across individuals, there must be some representation of all conversation participants in each participant's head. At the level of the situation model, it is important to maintain separate representations for each participant. At other levels, it seems less crucial to have a separate representation for each participant. This analysis suggests that different mechanisms may synchronize representations at different linguistic levels.

Introduction. The core of Pickering & Garrod's (P&G's) article is illustrated in their Figure 2. Participants in a conversation are attempting to achieve alignment between linguistic representations at the phonetic, lexical, semantic, and discourse levels simultaneously. Two key questions arise from this figure. First, what sorts of representations are being aligned; and second, how is this alignment achieved?

What is being aligned? The target article's Figure 2 illustrates that linguistic representations at a variety of levels are aligned. The authors suggest that representations from one participant's head are aligned directly with those from the other participant's head. This notation is a convenient shorthand, but people cannot directly access each other's mental states. To make this model work as it is drawn, participants must keep track separately of their own knowledge at these levels, as well as the knowledge of other participants.

For some levels of discourse, this separation is more critical than others. For the situation model, it is important that speakers know what information is possessed by the listener. This information is crucial for ensuring that given new conventions are followed when generating sentences, for ensuring that new utterances are relevant to the discourse, and for maintaining common ground (Clark 1996; Sperber & Wilson 1986). A key question is the degree of information participants must have about their partner's knowledge (Keysar 1994; Keysar et al. 1998).

At other linguistic levels, the distinction between one's own knowledge and that of a partner may be less crucial. It may not be necessary to distinguish between one's own grammatical constructions and those of a partner. Similarly, representations of phonology and prosody of speech need not be kept separate in order to process a discourse. This distinction in the knowledge required to process and use language for the situation model as opposed to grammatical or phonetic representations suggests that these levels may differ in the degree to which people are aware of the effects of alignment. In particular, people may recognize that they have designed their utterances to convey particular kinds of information that their partner does not have. In contrast, they may be unaware that the grammatical, phonological, or prosodic form of one sentence has been influenced by the form of a sentence spoken previously by a partner.

How are representations aligned? The target article refers to the process that synchronizes participants' linguistic representations as alignment. The discussion of the roles of linguistic representations in the previous section suggests that there may not be a single alignment mechanism at work. In particular, the discourse-level representation (e.g., the situation model) is the only one that really seems to require a separate representation of what is known by each conversational participant. In contrast, the lower levels of representation need not have distinct representations for each participant.

When there are separate representations for each conversa-

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tional participant, a structural alignment process like the one posited to be involved in analogical reasoning and similarity can be used to help synchronize representations (Gentner 1983; Gentner & Markman 1997). The structural alignment process takes pairs of relational representations and places them in correspondence. Structural alignment requires that the relations and objects that are matched be seen as identical (or can be decomposed into structures that are partially identical). Thus, this process provides a method for creating semantic parallels between people's situation models and their representations of conversational partners' situation models.

One advantage of thinking about the alignment of situation models as a structural alignment process is that there are several established empirical benchmarks that are hallmarks of analogical reasoning (Markman & Gentner 2000). It is possible to test for the presence of these benchmarks in discourse-level processing. For example, there is substantial interest in discourse on the role of inferences in comprehension (e.g., Graesser et al. 2001; McKoon & Ratcliff 1992). The structural alignment process suggests that inferences are made on the basis of systematicity. Specifically, a piece of information is inferred when there is a correspondence between two representations and there is information in one representation that is connected to the correspondence that can be carried over to the second representation (Clement & Gentner 1991; Markman 1997). Other information is not carried over as an inference. Thus, this view makes a testable prediction about what kinds of information are likely to be inferred by conversational participants. Similarly, experiments could be devised to explore the other published benchmarks.

It is not clear that the structural alignment process should be involved at other linguistic levels. If people do not maintain separate representations for themselves and their partners for grammatical and phonetic processing, then some other process must be involved in synchronizing these representations across individuals. The authors suggest one way this could occur. If the same representations are used for both production and comprehension at the level of grammar and phonology, then these representations will be synchronized by virtue of the nature of the language process. Representations at these levels would be influenced by factors such as priming (as suggested in the target article).

This analysis suggests that factors such as systematicity that should affect the formation of situation models should not have an influence on phonetic and grammatical processing. It would be interesting to carry out studies to explore whether systematicity and other benchmark phenomena of structural alignment affect other levels of linguistic processing. If they did, this would suggest that people are maintaining separate representations of their own processing and that of their partners at a variety of linguistic levels.

Beyond linguistic alignment

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Abstract: Dialogue requires ability beyond the production and comprehension of word strings. The interactive alignment account is good as far as it goes, but it must be embedded in a broader model encompassing alignment of paralinguistic representations.

Dialogue is not only the natural arena for language; it requires abilities that are different from the production and comprehension of sentences and phrases. Children with the variant of autism known as Asperger's Syndrome have good sentence skills but cannot carry on a normal conversation because they have difficulty with eye-to-eye gaze, facial expression, and body gestures that regulate the exchange.

Pickering & Garrod's (P&G's) ingenious account of interactive alignment illustrates gains that can be had in broadening the study of language from monologue to dialogue. I urge upon the authors a further expansion, embedding spoken dialogue within a broader model of human (and ape) turn-taking communication.

Conversations allow interlocutors to share meaning conveyed by body postures, facial cues, and intonation – apart from the particular strings of words that are used. Sometimes the words spoken are irrelevant to the primary representation that is to be aligned. A conversation between two knowledgeable people, ostensibly about Chaucer, may be more importantly a dominance contest, or a seduction, or bonding chatter between friends – though words manifestly about these meanings may never be exchanged.

We often recognize the relationship between conversing foreigners and the general intent of their communication, even though we may not understand their language.

As long as actors can see one another, they can communicate with remarkable efficiency even when distance or a barrier precludes speech. I recall standing with a handsome male colleague on a busy street corner. He whispered aside to me that he was visually flirting with a woman seated on a bus some distance away; he predicted (correctly) that as the bus drove off, she would turn toward him with a broad smile.

Paralinguistic signaling is especially effective in aligning social relationships within a dyad. This enables Ego and Alter to agree on who is the leader and who the follower; to communicate affiliation, affection, or hostility; and to sympathize emotionally. Consider, as an example, how dialogue can establish the relative status of interlocutors, independently of the words that are used.

Spoken or nonverbal "dialogue" is governed by mutually understood rules (Mazur 1985). Some rules are asymmetrical, specifying different actions for a high-status actor and for a low-status one. Two asymmetrical rules are:

1. *The high-status person sets the pace and mood of the conversation, and the low-status person follows.* Pace and mood may be set with smiles, jokes, frowns, exclamations, and volume, rapidity, or intonation of speech. If Ego tells a loud joke, Alter can deferentially comply with a loud laugh or can challenge by substituting an inappropriate response.

2. *The high-status person introduces and terminates major topics of conversation.* This rule, like the previous one, indicates that the high-status person can take control of the conversation, which is the essence of having high status. If both interlocutors attempt to set the conversational agenda, there is a dominance contest. Other rules are symmetrical, applying without regard for the status of the actor. It is the *violation* of symmetrical rules that signals a dominant act, whereas strict conformity to them signals deference or politeness. Important symmetrical rules are:

3. *If one individual is speaking, the other should remain quiet.* If Ego interrupts Alter's speech, Ego has acted dominantly.

4. *A listener who is offered the floor should speak.* A speaker can pass the floor by asking a question of the listener, or by directing his eyes to the listener after concluding a speech. If Ego remains silent after Alter offers the floor, Ego has acted dominantly.

5. *Do not look into another individual's eyes when no one is speaking* (unless in a romantic context). The violation of this rule, silent staring, is a common dominant act among primates, whereas rule-following eye aversion indicates deference.

6. *Look at the speaker's face, especially if the speaker is looking at you.* To look away, suggesting inattention, is hard to do if you respect the person speaking to you. If the speaker is of minor consequence, it is easy to violate the rule, thus showing your dominance. (This rule is inoperative when averted eyes overtly signal submission, as in looking down while being scolded.)

7. *Do not speak loudly, sternly, or angrily.* Shouting matches and arguments are obviously dominance contests.

8. *The speaker should direct the listener's actions by request rather than command, and should avoid a stern or stubborn tone.* To speak in a commanding or inflexible way implies that the listener is of lower status.

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