

# The dance of dialogue

**H**OW should experimental psychologists study language? In courses, textbooks, and journals, it is treated alongside other topics such as attention, perception, memory, and reasoning, and it tends to be assumed that researchers should study it in the same kind of way. Specifically, speech sounds, words, and sentences are stimuli just like noises, objects, or problems. But is this the right way to think about them?

Typically a single participant is put into a (darkened) booth and asked to listen to words, read sentences, or name pictures. The participant typically responds by pressing buttons to say whether the stimulus is a word or not, by moving their eyes across the screen in order to read the sentence, or by naming the pictures as quickly and accurately as possible. Sometimes the participant simply sits still and allows the experimenter to record brain activity associated with a word. Such a description characterises the great majority of work in psycholinguistics reported at conferences and in journals, and taught in degree courses.

These experiments seem to have lost sight of the fact that language is used for communication between two (or more) people. Instead, it treats language simply as a stimulus, with the goal being to understand how people process such stimuli. Thus, language comprehension involves decoding a stimulus, or converting it from a sequence of sounds (or marks on a page, or hand movements) into a meaning; and language production involves encoding a meaning (for example, represented in a picture of an object or an event) into sounds. The effect of this is not that psycholinguists fail to study language in a useful way, but that they concentrate on one rather unusual form of language. They study monologue.

## Monologue versus dialogue

Dialogue is undeniably basic: all competent language users can hold a



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conversation, children learn language by interacting with their caregivers, and language evolved through interaction. In contrast, acts of monologue, such as giving or listening to speeches (or indeed writing or reading) are learned activities, which many people never fully master.

Dialogue is a joint activity, in which interlocutors work together on a common task of producing a conversation (Clark, 1996). They rapidly switch between comprehending and producing language. This might appear to be a hard act of task-switching, but in fact they do it with remarkable ease given the apparent difficulty of knowing when and how to respond (Garrod & Pickering, 2004). In contrast, speakers and listeners perform monologue on their own. Though they do not face the difficulty of task-switching, they also do not gain the benefits of a joint activity. For example, addressees in a dialogue provide feedback in the form of assents, queries, or expressions, and such feedback greatly enhances the quality of the narrative (e.g. Bavelas *et al.*, 2000). Similarly, a listener to a monologue is on their own if they fail to understand; an addressee in a dialogue has merely got to work out how to query the speaker.

So why do experimenters put participants in a difficult and derived situation, in which they are either speaking or listening but not both? In these monologue experiments, the communicative goal is probably no clearer to the experimenter than it is to the participant. I think there are two reasons why monologue has become the focus.

First, psycholinguistic theories are modelled on ideas from formal linguistics,

which concentrates entirely on monologue. Linguists study isolated sentences produced by idealised speakers and regard the phenomena of dialogue – jointly constructed utterances, repetitions, disfluencies and the like – as aspects of ‘performance’ that hide speakers’ underlying linguistic ‘competence’ (Chomsky, 1965). But I believe that formal

models of linguistics are inadequate, and that psychologists may be forced to go it alone.

Second, the practical experimental psychologist regards dialogue as too hard to study, with experimental control being apparently impossible. For example, if we wish to determine whether it takes a speaker longer to produce a low- than a high-frequency word, we can present a picture on a screen and monitor how many milliseconds it takes for the speaker to trigger a throat microphone. How can we do anything comparable in dialogue, when the speaker's utterance depends on the interlocutor's behaviour? Well, experimental psychologists are nothing if not methodologically ingenious. For many years, the experimental study of language production was deemed impossible (how could we stop participants saying whatever they wanted?), but this has been completely overcome in the last 20 years (see Levelt, 1989), and there is no reason why the same is not possible for dialogue.

There is, in fact, an important research programme into the psychology of dialogue. Clark (1996) argues for what he

terms a 'language-as-action' approach to dialogue, which has its intellectual roots in the sociological study of language (e.g. Sacks *et al.*, 1974) and which is concerned with understanding the way in which people use language to achieve particular goals. He reports elegant experiments in which interlocutors solve problems such as describing ambiguous pictures to each other (e.g. Clark & Wilkes-Gibbs, 1986). But he does not seek a cognitive theory of what goes on in interlocutors' minds, because he regards that as part of the dominant 'language-as-product' tradition – the decontextualised study of monologue.

In contrast, I believe that such a cognitive theory of dialogue is possible, and should be the central goal of psycholinguistics. It should demonstrate how mental mechanisms are used in natural interactive language, and should draw on experimental methods that are based on those used to study monologue but which are adapted to dialogue. It should not ignore monologue, but should treat it as a special case. Different kinds of dialogue involve different degrees of interaction, from 'free conversation' through much

more formal settings such as interviews, and monologue can be seen as one end of this 'dialogic continuum'.

### **A mechanistic theory of dialogue**

Monologue is successful when a language user encodes or decodes a stimulus, but what makes dialogue successful? Pickering and Garrod (2004) argued that success occurs when interlocutors come to have the same understanding of the relevant aspect of the world. In other words, they align their mental states (see Garrod & Pickering, *in press-a*). For example, they refer to the same entities and represent the same information about those entities. This alignment builds up as the conversation proceeds. More precisely, we assume that people construct a situation model that represents salient aspects of the situation under discussion, such as information about space and time, causality and intentionality, and salient characters. This is a relatively standard notion from research in monologue, such as text processing (e.g. Zwaan & Radvansky, 1998).

Dialogue is extremely repetitive, with interlocutors imitating each other's language in all kinds of ways (e.g. Tannen, 1989). According to our interactive-alignment account, this linguistic repetition is the principal cause of alignment of situation models. In brief, interlocutors tend to repeat sounds, words, grammar, and abstract aspects of meaning. People use the same representations when producing and comprehending language. When interlocutors hear an utterance, they activate acoustic representations, lexical representations corresponding to its words, grammatical representations corresponding to its grammar, and so on (see Pickering & Garrod, 2005, 2006). These representations retain activation and are therefore more likely to be used – in other words, dialogue involves a great deal of linguistic priming. Such imitation routinely takes place without the interlocutors being aware of it, which therefore suggests that the mechanism of alignment is largely automatic and unconscious (Garrod & Pickering, *in press-b*). This is very similar to non-linguistic imitation, as studied in social psychology (Chartrand & Bargh, 1999).

There is much evidence for alignment in dialogue, starting with studies of 'speech accommodation' (Giles *et al.*, 1992) and analyses of transcripts (e.g. Tannen, 1989).

In an experimental study, Garrod and Anderson (1987) found that players in a maze game tend to use the same terms to refer to their positions in a maze (e.g. 'row' or 'level') and to use the same description schemes, for example referring to their positions by coordinates ('B6' or 'D8') or paths ('two along three up', or 'four along one up'). We have also found that interlocutors align their 'reference frames', for example whether they interpret 'left of' in relation to their own orientation or the orientation of the reference object (Watson *et al.*, 2004). But our work has focused on the remarkably strong tendency to align grammar.

### Alignment of grammar

People tend to repeat their own grammatical choices (Bock, 1986; Pickering & Branigan, 1998) and therefore show syntactic priming (or syntactic persistence). Could such priming occur between interlocutors in dialogue? If so, it would indicate that comprehension and production share grammatical representations.

To investigate this, we had a participant and a confederate play a game in which they took turns to describe cards to each other and to find the matching card in an array in front of them (Branigan *et al.*, 2000). They were told that we were interested in how people communicated when they could not see each other, but in fact we wanted to see whether the participant repeated the confederate's choice of grammatical form. We found an enormous effect (by the standards of experimental psychology). For example, depending on whether confederates produced 'the chef giving the jug to the

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swimmer' or 'the chef giving the swimmer the jug' (which are grammatically distinct constructions with very similar meanings), participants tended to repeat the confederate's choice of grammatical form. In such studies, debriefing questions indicate that participants are not aware of what they are doing. We argue that tendency to repeat linguistic form underlies alignment in dialogue.

We also manipulated whether prime and target used the same verb as each other (e.g. *give-give*) or used different verbs (e.g. *show-give*). When they used the same verb, participants were 55 per cent more likely to use the same grammatical form as their confederate than to use the opposite form; when they used different verbs, this difference dropped to 26 per cent. In both cases, the tendency to repeat form was very considerable, but it was much stronger when the verb was also repeated. This finding illustrates a principle of the interactive-alignment model: alignment at one level (in this case, lexical alignment) enhances alignment at other levels (in this case, grammatical alignment). This means that alignment can 'percolate up' through the different linguistic levels to the critical level of the situation model.

In another study, we had confederates describe pictures of coloured objects such

as a red sheep as 'the sheep that's red' and found that participants often used this relatively unusual form when subsequently describing a picture selves (Cleland & Pickering, 2003). This tendency to repeat form was enhanced when both descriptions referred to the same object (*sheep-sheep*) compared with when they referred to unrelated objects (*door-sheep*), but it was also somewhat enhanced when they referred to related objects (*goat-sheep*). In other words, grammatical alignment was enhanced by semantic alignment (though less than it was enhanced by lexical alignment).

Of course, interlocutors' choice of sentence form can be affected by factors unrelated to alignment. For example, 'put the penguin in the cup on the star' is temporarily ambiguous in the context of an array in which there is a penguin in a cup, a penguin not in a cup, and an empty cup; but it is not ambiguous in the context of a single penguin in a single cup. Speakers were more likely to say 'put the penguin that's in the cup on the star' in the ambiguous case, so that the addressee is not misled (Haywood *et al.*, 2005). However, this tendency to avoid ambiguity was small in comparison to a much stronger tendency to use 'that's' if the addressee had just uttered 'that's'. In other

## DISCUSS AND DEBATE

Is it possible to understand everyday conversation in cognitive terms?

How can alignment be affected by the social situation or social goals?

Is it possible to construct a computational model of alignment?

How do different levels of linguistic alignment interact with each other?

How does linguistic imitation relate to non-linguistic imitation?

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words, the tendency to align can overwhelm other factors affecting language production.

Alignment in comprehension is harder to examine than alignment in production, but we do have evidence that comprehenders persevere in the way that they analyse ambiguous utterances in monologue. In a picture-matching study (Branigan *et al.*, 2005), we found that comprehenders tended to interpret 'the waitress prodding the clown with the umbrella' as meaning either the waitress used the umbrella to prod or as meaning that the clown had the umbrella depending on whether they had just interpreted another expression in the same way. More interestingly, we found similar results when the participant had first produced such a description in response to a picture, thus showing priming from production to comprehension within a participant. We also predict that similar effects would occur between interlocutors, thus demonstrating alignment in comprehension.

All the above work relates to alignment in dyads, but natural dialogue can involve any number of interlocutors. Importantly, people can play different roles in multi-party dialogue, so that the speaker can address a particular utterance to some interlocutors but not others. It turns out that addressees subsequently grammatically align with the speaker to a greater extent than side-participants do: if the speaker addresses A but not B, then A is more likely to repeat the speaker's grammatical choice than B is. However, we found that such alignment is not affected by whether the addressee responds to the speaker or instead addresses another person (Branigan *et al.*, in press). So grammatical alignment at least does not require reciprocity and is therefore not a tacit 'pact' between two interlocutors to speak in the same way as each other.

Finally, grammatical alignment takes place between languages in bilinguals. Hartsuiker *et al.* (2004) had the confederate produce a Spanish active or passive utterance, and the participant respond in English. The participant tended to use the same grammatical form as the confederate, even though the language differed. Schoonbaert *et al.* (in press) found cross-linguistic alignment between Dutch and English, and within English as a second language. When the participant used their second language (English), alignment was

enhanced when prime and target used translation-equivalent verbs ('gooien' – 'throw'), but it still occurred when the verbs were unrelated. Alignment between languages appears similar to alignment within a language, and bilinguals are able to share grammatical information between their languages.

### Conclusions

I have reviewed a range of findings suggesting that interlocutors align their grammatical representations. Together with other work on alignment of words and meanings, it suggests that interlocutors have a very strong tendency to align their language, typically without being at all aware they are doing so.

These studies are of course very much 'laboratory' tasks which are closely related

to studies of monologue and are a long way from most natural interactive language. But they do investigate language as a communicative device and are embedded in a goal-directed task. My research strategy has been to 'branch out' from monologue rather than to jump head-first into the study of natural conversation, largely because tight experimental control is needed to investigate the mechanisms involved in dialogue. But the ultimate aim of this research is to naturalise psycholinguistics in a way that integrates cognitive and social psychological approaches to language and communication.

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