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Establishing and Using Routines During Dialogue: Implications for Psychology and Linguistics

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The study of dialogue provides a radically different conception of psycholinguistics from the traditional study of language comprehension and language production in isolation. In what ways might the study of dialogue prove informative about the relationship between language processing and adjacent areas of enquiry, such as linguistics, language acquisition, and cognitive psychology more generally? One particular topic that appears very different when considered in terms of dialogue processing is the nature of the mental lexicon.

The standard position in language processing is that the mental lexicon is a largely fixed resource, acquired during early development. Although people can of course add new lexical entries during their adult life, this is generally seen as a marginal activity. Studies of processing assume that people already know the language that they use, and that the interesting questions involve how they put that knowledge to use (e.g., selecting between pre-existing meanings for a word). There is a clear demarcation between acquisition and processing. In addition, the lexicon is treated as a store that principally consists of small units (either words or morphemes) and that knowledge of larger units is largely limited to idioms, which are regarded as fairly peripheral to "core" language processing.

In this chapter, we propose an alternative view of the mental lexicon that is consistent with evidence from dialogue. We show that interlocu-

This leads to alignment of the situation model, without interlocutors needing to formulate the explicit goal of aligning their models. Even if people fail to align their representations in a specific way, Pickering and Garrod argue they make use of an automatic repair mechanism. Explicit repair of misalignment is very much a last resort. This explains why conversation is so much easier than the complexity of the task would suggest (Garrod & Pickering, 2004).

It is best to explain the model with reference to a few specific experimental results. Garrod and Anderson (1987) noticed that interlocutors tend to converge on particular referring expressions in a 'maze game' task where pairs of participants had to negotiate their way around mazes. For example, if one interlocutor referred to the row of the maze as a *floor*, the other would tend to do so too. In a task involving describing cards, Brennan and Clark (1996) found that partners tended to mirror each others' (often idiosyncratic) descriptions, and indeed often retained distinctions (e.g., specific details about the type of object involved) when these distinctions were no longer necessary for identification. These results suggest that interlocutors rapidly converge on names for referring expressions. Importantly, these studies (and others) found that explicit negotiation about what to call an object was extremely rare and certainly not necessary for alignment. Our proposal (in line with Garrod & Anderson, 1987) is that interlocutors are primed by each other to employ the same form. Since the priming takes place between comprehension and production, it is most straightforwardly compatible with a common coding or 'parity' between production and comprehension, as is increasingly assumed in theories of the relationship between perception and action (e.g., Hommel, Müsseler, Aschersleben, & Prinz, 2001).

Interlocutors also tend to align syntactically. Following classic demonstrations that speakers persevere in their choice of syntactic structure in isolated production (Bock, 1986), Branigan, Pickering, and Cleland (2000) had two participants take it in turns to describe cards to each other and to find those cards in an array. One of the participants was a confederate of the experimenter who produced scripted responses (depending on experimental condition). For example, the confederate might describe a card as either *the cricketer giving the plate to the diver* (the *prepositional object* or *PO* form) or as *the cricketer giving the diver the plate* (the *double object* or *DO* form). The experimental subject tended to mirror the syntactic form used by the confederate, with a *PO* form being considerably more likely after the *PO* prime and a *DO* form being considerably more likely after a *DO* prime. Similar priming occurs within noun phrases (Cleland & Pickering, 2003) and even between languages,

with a Spanish passive increasing the likelihood of an English passive in bilinguals (Hartsuiker, Pickering, & Veltkamp, 2004).

Moreover, repetition of lexical items and semantic relations between lexical items enhances syntactic priming. For example, syntactic alignment is enhanced if prime and target share lexical items. In Branigan et al. (2000), the confederate produced a description using a particular verb (e.g., *the nun giving the book to the clown*). Some experimental subjects then produced a description using the same verb (e.g., *the cowboy giving the banana to the burglar*); whereas other subjects produced a description using a different verb (e.g., *the cowboy handing the banana to the burglar*). The magnitude of priming was considerably greater when the verb was repeated. These results demonstrate a link between lexical and syntactic levels, with lexical alignment enhancing syntactic alignment. Not surprisingly, a 'lexical boost' also occurs in monologue (Pickering & Branigan, 1998). Likewise, Cleland and Pickering (2003) found that a boost also occurs when prime and target contain semantically related words: People tended to produce noun phrases like *the sheep that's red* (rather than *the red sheep*) more often after hearing *the goat that's red* than after hearing *the book that's red*. This demonstrates that semantic relations between lexical items enhance syntactic priming. However, we note that Cleland and Pickering found no comparable boost when prime and target contained phonologically related nouns (specifically, differing by only one or two word-medial phonemes, e.g., *sheep* vs. *ship*). This suggests that there may be some limits to the interconnections between syntax and phonology.

INTERACTIVE ALIGNMENT AND ROUTINIZATION

Real interactive language is extremely repetitive, and the comparison with carefully crafted monologue (as in texts) is striking (Tannen, 1989). See for example Table 6.1, which is taken from Garrod and Anderson (1987) and which we discuss in detail here. Pickering and Garrod (2004) argued that expressions that are repeated become routines for the purposes of the dialogue. A routine is an expression that is "fixed" to a relatively large extent. We assume that it has some fixed lexical content, though it may also contain elements that vary (in which case, we refer to it as semi-productive). It occurs at a much higher frequency than the frequency of its component words would lead us to expect (e.g., Aijmer, 1996). Stock phrases, idioms, and some clichés are routines. Groups of people may develop particular types of routine, perhaps in order to aid their fluency. For example, Kuiper (1996) described the fixed language used by auctioneers and sportscasters. Their use of such expressions

certainly is a great aid to their fluency, especially as they are often producing monologues (e.g., horse-racing commentaries).

TABLE 6.1.

Transcript of an extract from a maze-game dialogue taken from Garrod and Anderson (1987).

8----A: You know the extreme right, there's one box.

9----B: Yeah right, the extreme right it's sticking out like a sore thumb.

10----A: That's where I am.

11----B: It's like a right indicator.

12----A: Yes, and where are you?

13----B: Well I'm er: that right indicator you've got.

14----A: Yes.

15----B: The right indicator above that.

16----A: Yes.

17----B: Now if you go along there. You know where the right indicator above yours is?

18----A: Yes.

19----B: If you go along to the left: I'm in that box which is like: one, two boxes down O.K.?

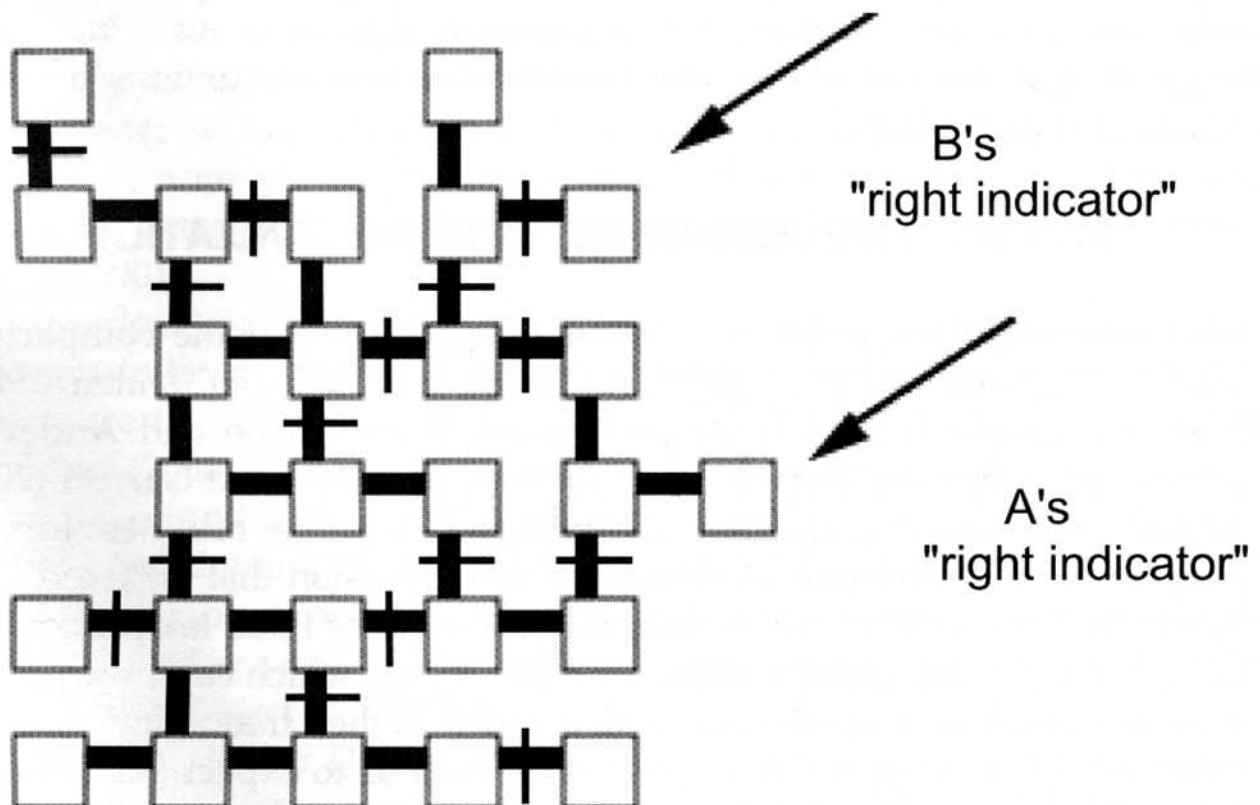


FIG. 6.1. Schematic illustration of the maze being described in the transcript in Table 6.1. The arrows indicate the positions that A and B describe as right indicators.

Most discussion of routines refers to the long-term development of fixed expressions that may well be lexicalized (e.g., Aijmer, 1996; Kuiper, 1996; Nunberg, Sag, & Wasow, 1994). But they may also be established for the purposes of a particular interchange. If one interlocutor starts to use an expression and gives it a particular meaning, the other will most likely follow suit. In other words, routines are set up 'on the fly' during dialogue. We believe that the use of routines contributes enormously to the fluency of dialogue. For example, Pickering and Garrod (2004) give the example *the previous administration*, which can take on a specific meaning (referring to a particular political body) as part of a conversation, and where other interpretations of the individual words (e.g., *administration* meaning work) or of the expression as a whole (e.g., referring to a different political body) are not considered. The establishment of this form of words and meaning as a routine has the effect that interlocutors access it without seriously considering alternatives. In production, they do not make a difficult choice between using the word *administration* or its near-synonym *government*; and in comprehension, they do not consider (non-routinized) interpretations of the words (e.g., of *administration*). After the conversation is over, however, the interlocutors may 'drop' this routine and return to their 'standard' use of the words.

Routines can of course be elicited experimentally, as we illustrate from Garrod and Anderson (1987). Table 6.1 gives a brief transcript of an interaction in which A and B are trying to establish their respective positions in the maze (indicated by arrows in Figure 6.1). Consider the use of *right indicator*, which takes on a specific meaning (referring to a particular configuration within mazes). Once the players have fixed on this expression and interpretation, they do not describe the configuration in alternative ways. Although we can be less certain of what happens during comprehension, the responses to references to *right indicator* strongly suggest that they also understand the expression in its special sense. Similar processes occur when interlocutors agree on a 'shorthand' description of unfamiliar objects, as when referring to a tangram as *an ice skater* (H. H. Clark & Wilkes-Gibbs, 1986).

In the rest of this paper, we provide a first attempt to account for the process of routinization within the linguistic framework developed by Jackendoff (2002), especially Chapter 6 (see also Jackendoff, 1999). We draw a distinction between interactive alignment and routinization. Interactive alignment involves the priming of particular levels of representation and the links between those levels. Producing or comprehending any utterance leads to the activation of those representations, but their activation gradually decays. However, when

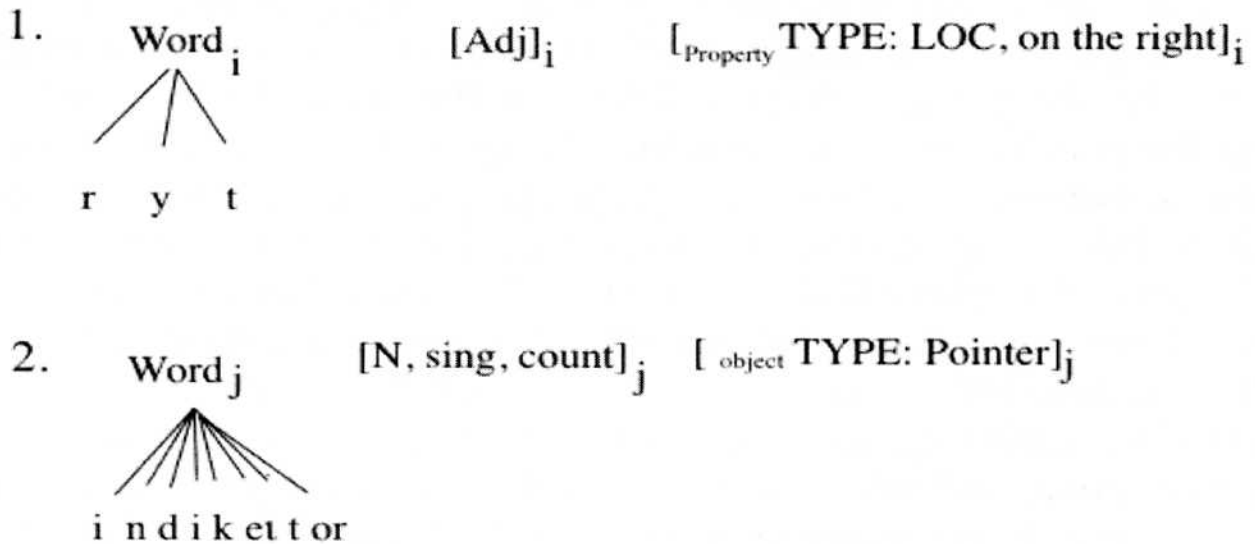


FIG. 6.2. Schematic illustration of the lexical items *right* and *indicator* as accessed before establishing a routine for *right indicator*.

interactive alignment leads to sufficiently strong activation of the links between the levels, routinization occurs. Routinization involves the setting down of new memory traces associated with a particular expression. The expression therefore becomes lexicalized, with a particular semantics, phonology and syntax, in terms of a conception of the lexicon similar to Jackendoff (2002). Routines are comparatively long-lasting and involve a kind of implicit learning. Not surprisingly, the new representations do not normally come about by explicit agreement.

Jackendoff (2002) proposes that linguistic representations (i.e., containing phonological, syntactic, and semantic/conceptual components) may either be stored and accessed directly, or constructed on-line. Anything that is stored and accessed directly he treats as a lexical item. Hence, lexical items can range from morphemes to whole constructions or even stretches of text that have been memorized (e.g., speeches). To explain his account, we need to describe the representation of both traditional lexical items (i.e., words) and more complex lexical items.

Traditional lexical items have a phonological representation linked to a syntactic representation, both of which are linked to a conceptual/semantic representation. Figure 6.2 illustrates the arrangement for the word *right* (in 2.1). The phonology is shown on the left, the syntactic representation in the middle and the conceptual/semantic representation on the right. The three representations are all linked to each other through the subscript *i*. More complex lexical items, such as fixed or semi-productive idioms, are represented as having phonological, syntactic and conceptual/semantic components, but with only partial mappings between the three components. For example, the idiomatic construction

take to task involves separate mappings between the phonological words and the syntactic structure and between the syntactic structure and the semantic structure (see Figure 6.3). These complex lexicalizations provide a suitable framework for formalizing routines because they represent the fixed aspects of the routines but at the same time allow for variables, such as the variable NP in *take NP to task*. Note that Jackendoff (2002) assumes that the variable NP is inserted by a separate rule, and hence does not form part of the lexical item in Figure 6.3.

We assume that routines are not simply recovered from long-term memory as complete chunks (e.g., in contrast to Kuiper, 1996). There are a number of reasons to suspect that producing routines involves some compositional processes. First, it can straightforwardly explain how people produce semi-productive routines with a variable element, as in *take X to task*, where *X* can be any noun phrase referring to a person or people. Second, the structure of non-idiomatic sentences can be primed by idiomatic sentences in production (Bock, 2004). Third, it is consistent with the production of idiom blends like *That's the way the cookie bounces* (Cutting & Bock, 1997). Note that evidence also suggest syntactic processing of routines in comprehension. For example, syntactically appropriate continuations to phrases are responded to faster than syntactically inappropriate ones when the phrase is likely to be the beginning of an idiom (e.g., *kick the ...*; Peterson, Burgess, Dell, & Eberhard, 2001).

Let us explain routinization in dialogue by examples from the maze-game transcript in Table 6.1. First, consider the use of *right indicator*. When *B* says *it's like a right indicator* (11), the expression *right indicator* is

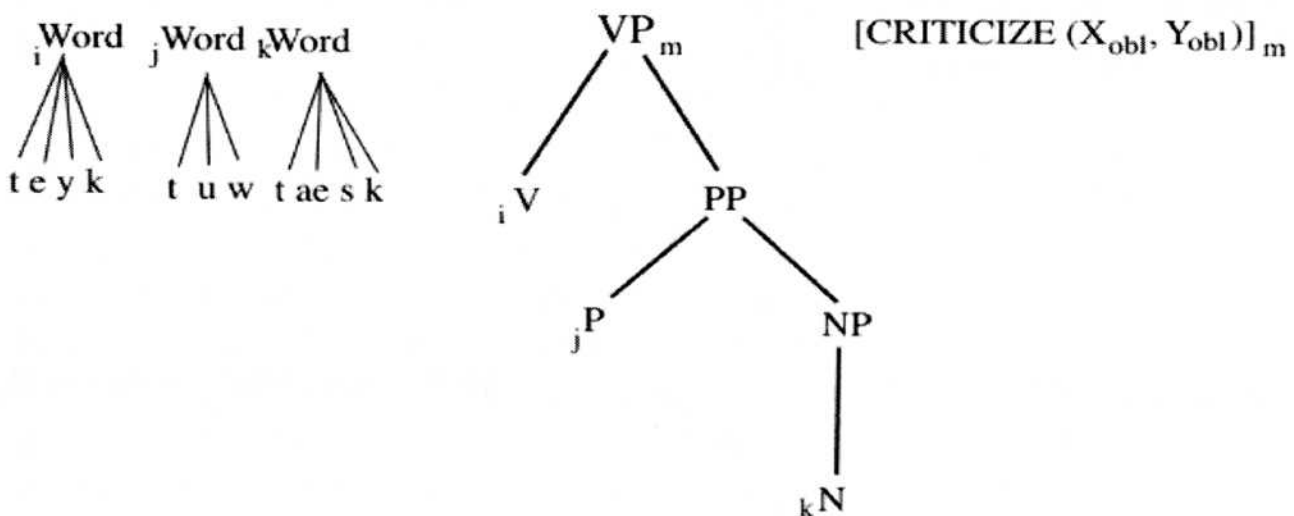


FIG. 6.3. Schematic illustration of how *take to task* is represented as a lexical item in Jackendoff's (2002) framework. By convention, subscripts on the left of a category (here, *i, j, k*) map the phonology to the syntax, whereas subscripts on the right (here, *m*) map the syntax onto the semantics.

not a routine, but is composed of two expressions whose interpretations are relatively standard, and whose meaning involves normal processes of meaning composition. So, *B* accesses the lexical entries in Figure 6.2 and creates a phrase with the structure in Figure 6.4(1). Importantly, however, *B* does not simply use *right indicator* to refer to any object that can be referred to as a right indicator, but instead uses it to refer to a particular type of object that occurs within this maze (see Figure 6.1). *A* accepts this description with *yes* (12), presumably meaning that he has understood *B*'s utterance correctly. He then interprets *A*'s utterance at this stage using the normal processes of meaning decomposition corresponding to the compositional processes that *A* has used in production. The expression *right indicator* now keeps recurring, and is used to refer to positions in the maze. Whereas initially it was used as part of a simile [*it's like a right indicator* in (11)], subsequently it is used referentially [*that right indicator you've got* in (15)]. At some point (we cannot be certain when, but presumably fairly rapidly), it becomes a routine.

How does such routinization occur? We propose that the activation of *right* and *indicator* plus the specific meaning that *right indicator* has in this context leads to the activation of the phonological representation and syntactic representation together with the activation of the specific meaning ("right-hand-protrusion-on-maze"). Therefore the links among the phonology, syntax and semantics are activated (as specified in the interactive alignment model). That increases the likelihood that the

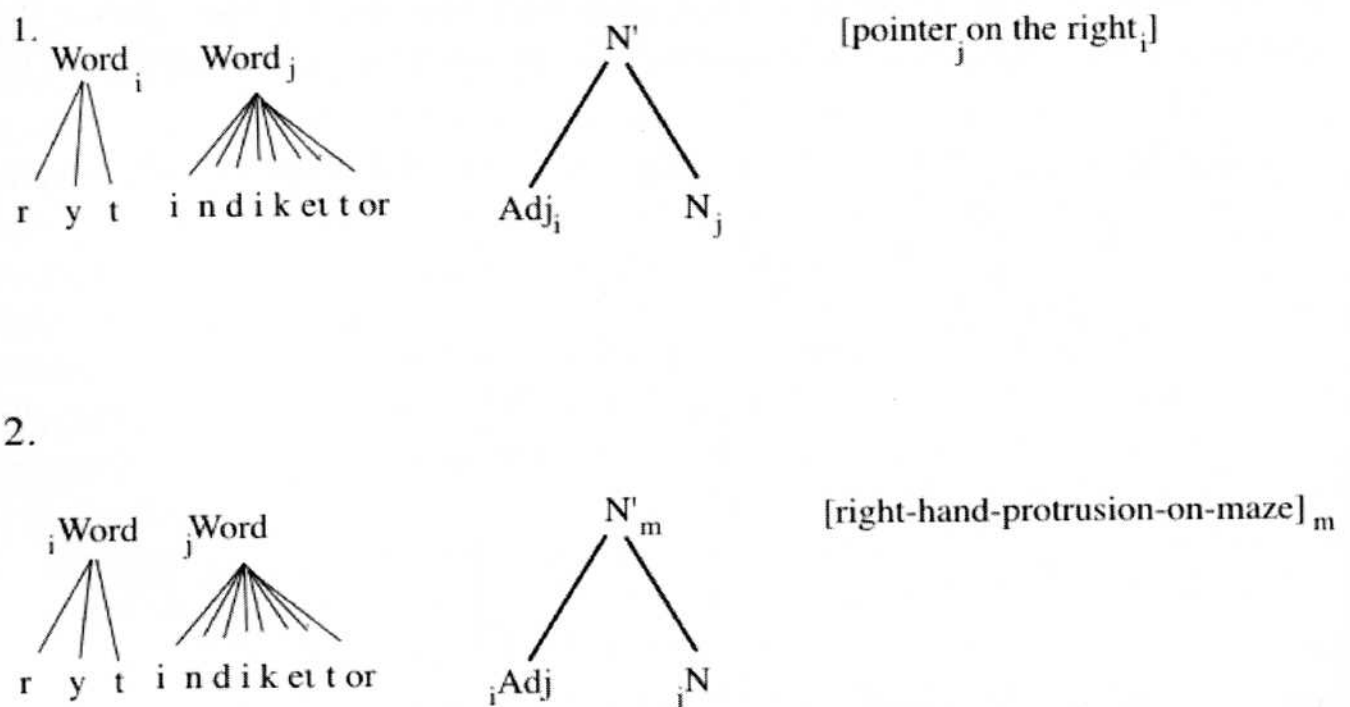


FIG. 6.4. Schematic illustration of (1) the standard interpretation for *right indicator* and (2) the lexicalization of the dialogue routine for *right indicator*.

