

Introduction

Speech is a more common expression of language than written communications.

Dialogue - interactive use of language with one or more other people; often spoken; but new technologies also mean writing can be a dialogue too - e.g. text messaging.

Monologue - often written, but can be spoken too - e.g. a formal presentation.

Understanding how we communicate using language is central to the study of cognition as communicating is probably the most important activity (social, cultural, cognitive) task we engage in.

More research has been done on the comprehension of written communications than dialogue - findings of research allow us to go beyond the narrow concept of 'construction' - [ch. 6] - e.g. in the understanding of multiple sentences across a text. This involves the integration of non-linguistic background information - so language processing must be less 'encapsulated' than the simpler view explored in [ch. 6]

Written language and discourse

To differentiate a collection of sentences from a text, linguists argue two characteristics are required of it.

Cohesion - the interpretation of an expression depends on the interpretation of previous expressions. These co-interpretations act to link the text together. Anaphora (repeated reference) is often used to achieve cohesion - explicit in the text through pronouns and connectors like but, or.

Coherence - not always necessary to have cohesive anaphoric links between sentences. Coherence can be achieved if inference can be used to link sentences into a coherent (linguistic, psychological) whole.

Chapter 7 - Language in action

Cohesion and coherence operate together - i.e. they are not independent of each other.

As well as anaphora (references), cohesion can be signalled through a temporal sequence of events - which in turn depends on the coherence of a passage as a whole.

General knowledge is used to help make coherent connections in discourse.

Brown and Yule - contrast discourse as product (coherence formed by the text alone) vs discourse as process (coherence from the mental processes we use to interpret a text.)

Underlying processes of text interpretation

1. Anaphora resolution

Most widely studied aspect of text comprehension, according to **Graham**. Understanding a text means we need to keep track of who is doing what and when.

Likely that several cues help us to resolve pronoun based anaphora:

(a) Gender cues - gender marking (he vs she); animacy marking (he, she vs it); reflexivity (he vs himself, she vs herself)

(b) Main character vs secondary character

(c) General knowledge - e.g. if you don't have X, you can't give X away. Someone without X might want X etc.

2. When word meaning is used

Eye tracking as a technique for studying when meaning is being accessed. E.g. **Traxler and Pickering** - comparison of how people read sentences that make

sense (That's the pistol with which the man shot ...) vs those that don't (That's the garage with which the man shot ...) Found first fixations on "shot" were longer in sentences that didn't make sense than those that did.

Implies that the meaning of the word "shot" is accessed and meaning incorporated immediately - consistent with the view of discourse called incremental interpretation.

3. Non-literal meaning

'John asked the man if he could tell him the time' is interpreted as a request for the current time and not a question about their ability to tell the time - the literal meaning of the sentence.

To deal with indirect speech, **Glucksberg and Keysar** say the standard account is:

- Derive a literal interpretation
- Assess the literal interpretation against context
- If a literal meaning is a poor fit (and only if), derive a non-literal interpretation.

Implies indirect speech acts should take longer to process than direct ones. However, this is not so in some cases. Non-literal interpretations are generated even when not needed - suggesting they are derived automatically.

Glucksberg et al - Time to assess literal truth of 'some desks are junkyards' is slower than obviously false statements like 'some desks are roads'.

Lakoff - provided numerous examples of metaphors used in every day language - so such cases are not rare - e.g. when John heard about his wife he exploded; it is morally right to fight poverty.

4. Inferences

Processes giving rise to coherence are known as **inference-making**. Psycholinguistics makes a distinction between **necessary inferences** (e.g. The picnic things came out of the car. The beer was warm). Here the (necessary) inference is that beer is part of the picnic things.

Haviland and Clark - first to show these inferences take time to occur. Self paced reading; examples like the one above that do not explicitly mention the subject of the second sentence in the first take 100ms longer to read. The extra time taken is to draw that type of inference - a **bridging inference**.

Elaborative inferences - those that are not strictly necessary. e.g. "The angry man threw the vase against the wall..." People often infer the vase breaks - but such an inference is **defeasible** (cancellable) in the light of further evidence "... but the man missed and the vase landed on the sofa."

Priming techniques used to investigate - e.g. if "broke" shows a priming effect on a lexical decision task, it suggests an inference has been made. **McKoon and Ratcliffe** found such inferences are not regularly made and further research is required to understand the circumstances under which such inferences happen.

5. Relating language to knowledge

Understanding of a text depends on the reader having a mental model of what it is depicting.

"Harry put the wallpaper on the wall. Then he put his cup on it"

sounds wrong as we expect cups not to be set in a vertical plane, but on the horizontal. It therefore doesn't integrate into our mental model of the real world, so causes a comprehension problem.

Therefore important for a reader to have the right mental model to be able to understand discourse.

Sanford and Garrod argue much knowledge is organised in situation specific chunks. e.g. if reading about someone buying something in a shop, our knowledge of what this entails become part of our mental representation of the meaning of the text.

How situational information like this, or in other situations like a court case, is represented requires further research.

6. Knowledge, meaning and embodiment

Traditional view of language processing - concepts are abstract, word meanings are represented as mental lists or networks of attributes. Language conveys meaning by abstract words combined with syntactic rules - e.g. **Fodor, Kintsch, Pinker**.

Alternative view argues meaning is derived from how we interact with the world around us. Motivation for this view is the **symbol grounding problem (Harnad)**

Glenberg and Robertson - you cannot retrieve the 'meaning' of **words** from a dictionary - they just contain symbols - e.g. if you look up the meaning of a foreign word in a foreign dictionary (and you don't speak that language) you can't recover its meaning.

Harnad, Searle - symbols only have meaning by being related to things in the world - not to other symbols and words.

Examples - try defining left and right or trudge without reference to the world.

The view that a cognitive activity, such as the understanding of meaning, is bound to our representation of the world is called **embodied cognition**.

A small step from words to **sentences** - these too can

display the symbol grounding problem if they're not connected to perception and action - e.g. John elbowed the pencil to Mary - is unconventional, but possible (as the elbow could move in that way.)

Glenberg and Kaschak - research into 'towards' and 'away' sentences, using imperative, physical transfer and abstract transfer examples.

	<u>'Towards' sentences</u>	<u>'Away' sentences</u>
[Imperative]	Open the drawer	Close the drawer
[Physical xfer]	X handed you the book	You gave X the book
[Abstract xfer]	Y told you a story	You told Y a story

Participants presented with sentences like these plus nonsense sentences - e.g. 'boil the air'. Asked to judge if individual sentences made sense by pressing either a button on a box near to them **or** at the far end - starting position was in-between the two buttons.

Prediction: responses should be faster when the mental representation of a sentence matches the physical movement required.

Results:

For 'away' ; yes is far RT faster than yes is near
For 'towards'; year is near RT faster than yes is far

Even though effect is weaker for imperative sentences, researchers concluded these results support the idea that understanding of transfer sentences is rooted in physical action.

Special topics in understanding text

1. Shallow processing and selective processing

e.g. Moses illusion (**Erickson and Matheson**) - 'Moses put two of each sort of animal into the ark. True or False?'

Failure to use the full meaning of a word = shallow processing - i.e. dealing superficially with meaning.

Different versions of the Moses illusion produce different responses - e.g. substitute Adam for Moses and everyone spots the sentence is false - **Van Oostendorp and De Mul** - as 'Moses' is more similar in meaning to 'Noah'.

Implication is that people don't process words deeply when faced with anomalies - rather than they are not being processed at all.

These findings are not inconsistent with the incremental interpretation hypothesis - implies readers immediately initiate meaning retrieval but it may not be complete.

Baker and Wagner - depth of processing for meaning appears to be dependent on syntactic construction of sentences - falsehoods only spotted 69% of the time when in the sub-ordinate clause vs. 80% of the time when in the main clause.

Bredart and Modolo - anomaly detection better in cleft sentences - concluding that the focus of a sentence receives greater processing.

Forms of sentences therefore appear to influence the amount of processing effort afforded to the retrieval of meaning.

2. Perspective in communicating quantities

Levin and Gaeth - 75% lean leads people to believe meat is of higher quality than when described as 25% fat - even after tasting.

Sanford et al - people think fat is unhealthy, leading to intuitively satisfactory completions of sentences like:

This product contains 10% fat, which is a bad thing
This product is 90% fat free, which is a good thing

Where a sentence formulation like % fat is used, reading times go up between 5% and 25% fat when

followed by an assertion that the product is healthy and reading times go down for the assertion that the product is unhealthy.

However, if the description is 95/75% fat free, no difference in reading time for the healthy assertion is recorded.

Sanford et al - "fat free" formulation *stops people using the knowledge* they would use with the "fat" formulation of sentences. Different mental operations would therefore appear to be at work.

Perspective effects like this are subtle, but can *influence how we perceive risk* - e.g.

Side effects, including headaches, occur rarely.
Side effects, including headaches, occur occasionally.

... here, the same chance of a side effect can sound good or bad.

Language production as a self-contained process

Consideration of how you produce language when giving a talk or a presentation - a monologue = production as a self-contained process. Seen as more difficult than in the informal context of a dialogue (next section.)

Speech errors and the architecture of the language production system

Study of speech errors informs much of what is known about language production - although errors only run at around 1 in 2,000 utterances.

Different types of speech errors are observed (**Bock and Huitema**):

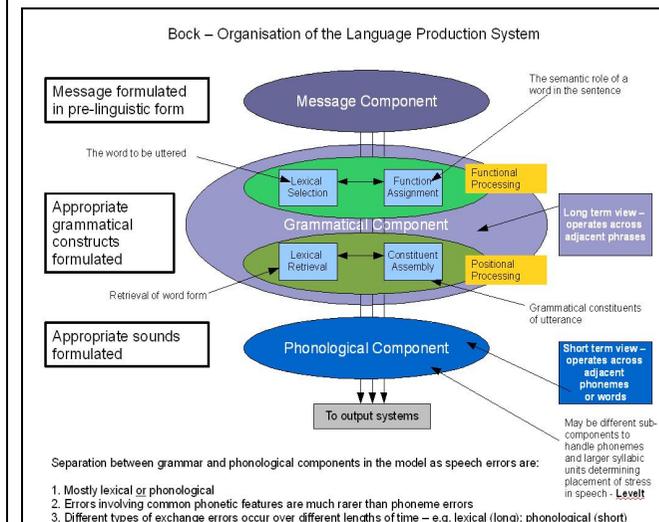
Exchange errors: (word, sound, stranding, phrase) - always occur between items of the same syntactic category - nouns with nouns, vowels with vowels etc.

Suggests choice of linguistic unit in forming an utterance (word or phoneme) is distinct from grammatical considerations.

Stranding: Assignment of number feature on the words window/dome involves a separate stage in the process, as the error 'The window doesn't have any domes' can be made.

'If I was done to that' can be made as an error, (instead of saying 'If that was done to me'). The grammatical marking of the pronoun (I, me) is therefore assigned separately after the position in the sentence has been determined.

On the basis of an analysis of errors, the organisation of the language production system is viewed as below (**Bock**).



Message selection and audience design

Audience design - how a speaker ensures that what they want to say will make sense for a particular listener. Requires complex inferences to be made about what the listener knows. Requires the establishment of **common ground** - what the speaker

and listener share and both know that they share . (Clark).

e.g. “It’s great isn’t it?” - may be a sentence that can be understood by another under one set of circumstances (e.g. when you are certain they know what you are looking at) but can be completely uninformative under other circumstances - e.g. where there is a barrier between you and what you are looking at.

Glucksberg and Danks - can be investigated by the use of a referential communication task. A director (speaker) and matcher (listener). Aim is for the speaker to communicate the order in which a set of items are to be arranged - e.g. blocks with symbols on.

Issacs and Clark - New Yorkers / Non-New Yorkers. If speaker from NY established listener was from NY, then the arranging landmarks of the city was done by naming, otherwise, descriptions of the building were given.

Shows language production in a real context is more than translating ideas into sounds but an assessment of what the listener knows.

Horton and Keysar - put a speaker under time pressure and they don’t always take common ground into account - in other words, speakers based their descriptions based on their own knowledge rather than on common ground. Less time pressure and speakers do tend to explore common ground more; listeners at a later monitoring stage also take account of common ground.

Self-monitoring

Important part of speech is the ability to monitor and correct it as you go along (**Hartsuiker and Westenberg**) - we know this from the hesitations which occur in natural speech.

Two possibilities for how monitoring operates.

(i) **‘Outer-loop’**: Speaker is listening to and correcting their own output - e.g. stopping and being more explicit about a statement - replacing ‘on the left’ with ‘going from left to right in the second box’. Largely uncontroversial.

(ii) **‘Inner-loop’**: Speaker can correct things before they have had chance to listen to what they have said or are about to say. More controversial.

Evidence for inner-loop monitoring from a variety of sources.

1. **Motley et al** - used tongue twisters as a way of getting speech errors - e.g. ‘barn door’ as ‘darn bore’. Where the potential tongue twister was ‘taboo’ - e.g. ‘tool kits’, fewer errors occurred. Taboo errors must therefore be filtered out before being uttered - if so, must require some kind of inner-loop monitoring.

2. Temporal characteristics of speech errors and their corrections. **Hartsuiker and Westenberg** argued that any correction time <150ms could not be due to outer-loop monitoring. However, they did find a high number of such instances.

Outer-loop monitoring taxes attention while inner-loop monitoring does not. Explains when people under time pressure speak they produce fewer overt speech errors than when speaking slowly. Argued that a shift occurs when under pressure to inner-loop from outer-loop monitoring. **Keysar et al** - this is an explanation as to why audience design will only influence production later on - as such monitoring is a function of the outer-loop process.

Blakemore et al - similar distinction made for monitoring of physical movements - the inner-loop equivalent of motor control is not accessible for consciousness and does not tax attention in the same way that the outer-loop system does.

The challenge of dialogue

(i) Language used in dialogue is different to that used in monologue.

(ii) Dialogue and monologue therefore require different types of processing, which influences the nature of production and comprehension

(iii) A model of language processing is required that takes these differences into account.

What is dialogue?

Garrod and Anderson - maze solving - many utterances are not strictly grammatical; speakers share the production of the same sentence at times; the two descriptions of position in the maze are different.

Clark - despite these feature, the sequence is orderly if we assume dialogue is a joint activity - i.e. requires co-operation and consensus between speakers; meaning results from joint processes

Dialogue and consensus

Dialogue is organised around achieving a consensus (different to reading text, for example). **Schegloff and Sacks** - (i) dialogue turns are linked across participants.

e.g. “Tell me where you are?” - “Two along from the bottom” - “Which side?” ... etc.

(ii) Meaning depends on the participant’s consensus, not dictionary definitions

e.g. “Two along from the bottom, one up” becomes “one along and one up” when consensus is reached.

Schober and Clark - interpretation in dialogue relies on taking part in the interaction itself. Used a referential communication task, but with a third person who could overhear (but not take part in) the dialogue.

Results - over-hearers perform consistently less well than matchers who are able to interact with the director. Implies hearing everything doesn't lead to a full understanding unless interaction with the speaker is possible.

(iii) Dialogue involves co-ordinated processing to enable ambiguity to be addressed. e.g. maze processing - "two along from the bottom, one up" is disambiguated within the dialogue to take on a precise meaning.

(iv) Participants in a dialogue attempt to co-ordinate their conception of a topic. e.g. by establishing a common spatial concept of a maze; or of a common set of patterns (e.g. left turn signals, inverted 'T's etc.) In well managed dialogues, participants always align on the same conception, regardless of its idiosyncrasies.

Dialogue therefore presents a challenge to the standard view of communication as a one-way process of **information transfer**, which underpins much of psycholinguistics. A more useful view may instead be one of **interactive alignment**, with participants aligning their representations at many linguistic levels in order to come to a jointly satisfactory interpretation.

A model of dialogue processing

Interactive alignment account:

(i) Dialogue participants alternate between speaking and comprehending.

(ii) Representations that are useful for comprehension (of any type) will prime matching representations in production.

If representations active during comprehension remain active during production, then participants will tend to co-ordinate inputs and outputs. System will be stable if the participants adopt aligned linguistic

representations at every level. **Pickering and Garrod** - this type of interactive alignment supports mutual understanding as alignment serves to link the levels with each other (and not just in linking independent levels within the system.)

i.e. Automatic alignment of representations at all levels establish a common ground between participants - and so aids mutual understanding.

1. Evidence for representational alignment

Aijmer - analysis of dialogue transcripts provides evidence for alignment through repeated linguistic elements and structures.

Specifically: **Garrod and Anderson, Clark et al** - demonstrated alignment of lexical processing during dialogue. Show participants tend to develop the same set of expressions to refer to particular objects and that the expressions become shorter/more similar on repetition with the same partner and are modified if the partner is changed.

Levelt and Kelter - Dutch study - "What time do you close" and "At what time do you close" elicit congruent responses - "Five o'clock" and "at five o'clock". Alignment may therefore be syntactic or lexical (repetition of "at").

Branigan et al - evidence for syntactic alignment - descriptions produced by a confederate such as "the cowboy offering the banana to the robber" or "the cowboy offering the robber the banana" influenced the syntactic structure used by the real participant's description - and more so than in a non-dialogue control condition.

Fowler and Housum - evidence for articulation alignment - when a speaker repeats expressions they become shorter and more difficult to recognise in isolation.

Bard et al - found as much reduction when repetition

was from a different speaker in a dialogue. The two representations are therefore becoming aligned.

Accent and speech rates align - Giles et al, Giles and Powesland.

These types of alignment simplify the production and comprehension processes during dialogue. One way this may have happened is called routinisation.

2. Routinisation in dialogue processing

As alignment allows participants in a dialogue to draw upon representations developed earlier on, it is not always necessary to construct representations from first principles. Routines are developed and used by participants - the process of routinisation.

Routines are largely fixed - they are marked out by (i) the expression having a higher frequency than individual word frequencies might imply and (ii) they have a particular analysis at each level of representation - i.e. syntax, pragmatic use, phonological characteristics.

Extreme examples are "How do you do?" and "Thank you very much".

Up to 70% of dialogue may be routines - but this depends on the definition of a routine. **Pickering and Garrod** claim routines may also be set up 'on the fly' as a result of routinisation during a dialogue - this marks a key differentiator between monologues and dialogues.

The monologue/dialogue distinction & group decision making

Communication is required in group decision making as it is the only way a true consensus can be achieved.

Monologue account (information transfer model) of group decision making implies a group discussion is a series of monologues - therefore, you should tend to

be influenced most by the person who says the most.

Dialogue account (interactive alignment model) suggests that you are most influenced by the people you interacted with the most.

Fay et al - found both accounts correct, but that they depend on the size of the group.

Two sizes of groups discussion plagiarism. Groups had to act like a disciplinary committee and rank in order of relevance 14 issues to a case. Before discussion, each group member had to read a one page summary of the case and then rank each item for relevance. After 20 minutes, they repeated this exercise but for how important they thought each issue was to the group as a whole.

Comparison of before/after rankings and their agreement indicates influence. Transcriptions of the discussions established high and low interaction partners for each individual and the dominant/non-dominant speakers in each group.

Small groups with 5 members - people only especially influenced by their high interaction partners - no extra influence from dominant speakers. This result is predicted by the interactive alignment account.

Larger groups of 10 members - opposite pattern emerges, which is the result predicted by the information transfer account.

Summary

Language involves:

- (i) Access to general knowledge
- (ii) Inference beyond what is said
- (iii) In dialogue, co-ordinated action

Communication fails without these processes.

Garrod and Daneman - much of the individual variation in reading ability is due to differences between a person's ability to access appropriate knowledge and integrate it with the text they are reading.

In text comprehension, anaphora resolution, non-literal meanings and text inferences figure in most accounts in comprehension beyond the word.

Language production if viewed as an isolated process seems similar to the interpretation processes required for comprehension [ch. 6]. When comprehension and production are viewed in the context of dialogue things are different - aligned linguistic representations are required at every level.

Processing of monologues and dialogues has consequences for non-linguistic activities - such as group decision making and interaction.