

4. PRAGMATICS AND MODULARITY

University of Gent, November 2012

Deirdre Wilson
deirdre.wilson@ucl.ac.uk

1. Introduction

Two trends in late twentieth-century research on language and communication:

- 1a. An increasingly **inferential** view of pragmatic interpretation (Grice, Sperber & Wilson)
- 1b. An increasingly **modular** view of the mind (Fodor, Chomsky, Hirschfeld & Gelman)

Fodor's assumption about mental architecture (Fodor 1983):

- 2a. The senses plus language are **input modules** (fast/automatic/unconscious/context-free).
- 2b. Pragmatics is a **central thought process** (slow/reflective/conscious/context-dependent)

Module: A **domain- or task-specific mechanism** (often innately determined) which is not just a special case of a more general mechanism (Sperber 2005).

Input module: Takes **non-conceptual representations** as input, yields **conceptual representations** as output.

Standard view of pragmatic processes (Grice, Fodor 1983, Wilson & Sperber 1986):
 Pragmatic processes are not language-like but **inferential** (and therefore **non-modular**).

Recent accounts of modularity (Gigerenzer et al. 1999, Sperber 2002):

Some inference is carried out by **inferential modules**: 'fast and frugal heuristics' which exploit regularities in a particular cognitive domain and yield valid conclusions only in that domain.

Inferential module: Takes **conceptual representations** as input, outputs **conceptual representations** which are **deducible from**, or at least **warranted by**, the input.

New direction for research on pragmatics and modularity (Sperber & Wilson 2002):
 Pragmatics as an **inferential module** which applies to the domain of **overt communication**.

Today's aims:

- 3a. To consider the evidence for a domain-specific comprehension module.
- 3b. To discuss what concepts and/or procedures such a module might contain.
- 3c. To consider the implications for pragmatic development and mental architecture.

2. Pragmatics as an exercise in mindreading

Grice was the first to treat pragmatic interpretation as an exercise in **mindreading**.

Mindreading: Inferring the **mental states** of others from clues provided by their behaviour

.

Question: How does mindreading work?

Hypothesis A: Mindreading is a central process – a form of commonsense reasoning.

Hypothesis B: Mindreading is carried out by special-purpose **inferential modules**.

2.1 Mindreading as a central (common-sense, general-purpose reasoning) process:

Grice's account of pragmatic interpretation:

He said that P; he could not have done this unless he thought that Q; he knows (and knows that I know that he knows) that I will realise that it is necessary to suppose that Q; he has done nothing to stop me thinking that Q; so he intends me to think, or is at least willing for me to think, that Q. (Grice, 1989b: 30–31)

This 'working out schema' is a classic case of **belief-desire psychology**, applying **general-purpose reasoning mechanisms** to premises based on **explicit assumptions about the relations between mental states and behaviour**.

Wilson & Sperber 1986 also saw pragmatic interpretation as a central reasoning process involving the attribution of a mental state on the basis of clues provided by the speaker's behaviour, albeit a **spontaneous, intuitive process** rather than a **conscious, reflective** one.

Early evidence of mindreading/communicative abilities in infants

- 4a. 'Reading the mind in the face/eyes/voice' (Baron-Cohen et al, Csibra 2010)
- 4b. 'Social referencing' (checking adult's face for signs of danger in new objects, 11 months)
- 4c. Pointing to inform or share attitudes with others (12 months - Tomasello et al. 2007)

Mindreading plays a role in vocabulary acquisition (Bloom 2000)

Adult experimenter: I am going to 'plonk' Big Bird.

Performs apparently accidental action (marked by saying 'Whoops'), followed by apparently intentional action (marked by saying 'There' and looking pleased).

Two-year-olds, when later asked to 'plonk Big Bird', tended to imitate the apparently intentional action. (Tomasello & Barton 1994)

'[In vocabulary acquisition] even very young children infer the referential intention of the speaker (through attention to cues that include line-of-regard and emotional indications of satisfaction) when determining the meaning of a new word.' (Bloom 1997: 10)

Evidence that difficulties in mindreading are linked to difficulties in communication

- 5a. People with autism have difficulties reading faces and voices.
- 5b. Children with autism don't engage in social referencing.
- 5c. Children with autism don't point to inform others or share attitudes.

Vocabulary acquisition in autism

Children with autism are claimed to learn words in the classic empiricist/associationist way

- 6a. They don't monitor the speaker's eye gaze when learning a new word.
- 6b. If they hear a new word while attending to a new object, they assume it names the object.
- 6c. They fail the 'plonk' test described above.

Classic test of 'full-fledged' mindreading ability:

Sally-Anne task (Standard 'false-belief task')

- 7a. The child watches as Sally and Anne play with a ball.
- 7b. Sally puts the ball away in a covered basket and leaves the room.
- 7c. While Sally is away, Anne moves the ball from the basket to a covered box.
- 7d. When Sally comes back, the child is asked, "Where will Sally look for the ball?"

To pass the test, the child must realise that Sally does not know the ball has been moved, and will therefore look in the basket, where she left it, rather than the box, where it now is.

Typical results:

- 8a. Typically developing children up to 4 years of age standardly fail such tests.
- 8b. People with autism or certain types of brain damage have difficulty with both tests.

Arguments against the view that mindreading/communication are central processes

- 9a. Specific (and culture-independent) patterns of development and breakdown argue against the 'child as scientist' view, and suggest an **innately-determined, modular endowment**.
- 9b. There are **double dissociations** between mindreading and general reasoning abilities: people with Asperger's syndrome have good general reasoning but poor mindreading; people with Williams syndrome have good mindreading but poor general reasoning (Segal 1996).
- 9c. Progress in theory building generally involves conscious reflection and collaboration – this is clearly not what happens with children.

Conclusion: The Gricean view of pragmatic interpretation as a **central inferential process** conflicts with **increasingly modular** approaches to **mindreading**.

2.2. Mindreading as an inferential module

Advantages of a modular approach to inference (Gigerenzer et al. 1997):

A **dedicated inferential mechanism** can exploit regularities in its own particular domain and use 'fast and frugal heuristics' to draw conclusions which are valid, but only in this domain.

Examples of dedicated mindreading mechanisms (Baron-Cohen 1995):

Eye Direction Detector: infers what someone is **seeing** from the **direction of their gaze**.

Intentionality Detector: interprets **self-propelled motion** in terms of **goals and desires**.

Advantage of this approach:

An infant doesn't have to reason explicitly: 'Mummy is looking towards the cat. When someone is looking towards an object, they are seeing that object. So Mummy is seeing the cat'. The Eye Direction Detector **automatically** infers from 'Mummy is looking towards the cat' to 'Mummy is seeing the cat', with no explicit additional premise involved.

General picture of massively modular mental architecture: Fodor's **input modules**, plus a range of **inferential modules** (e.g. for naive physics, biology, psychology, morality, etc.)

Current hypothesis in much of developmental psychology (e.g. Bloom 2000, 2002):

Pragmatic interpretation is simply a general exercise in **modular mindreading**, and involves no **special-purpose pragmatic mechanisms** not already present in the mindreading module.

3. Problems with the view that pragmatics is a general exercise in modular mindreading

Problem A: It involves too much mindreading, too soon.

- 10a. Children are heavily engaged in verbal and non-verbal communication long before they pass standard first-order false-belief tests ('Sally believes the ball is in the basket' - age 4)
- 10b. Yet overt communication involves at least four layers of mindreading (i.e. both informative and communicative intentions: 'She intends me to believe that she intends me to believe...')
- 10c. So **either** children have a special communicative endowment **or** this approach is wrong.

Evidence of very early orientation to communicative cues (Csibra 2010)

11a. Day old infants orient to eyes; at 3 days they prefer eye contact to averted eyes.

11b. Newborns orient to speech; at 2 days they prefer 'infant-directed' speech.

11c. Infants are sensitive to contingent response patterns ('turn taking')

These might be seen as innately determined behavioural cues to the presence of an intention to communicate, which are automatically detected and trigger a modular comprehension process.

Problem B: Comprehension raises special problems not raised by general mindreading

12a. The range of **speaker's meanings** that can be conveyed by uttering a sentence in a given context are **vastly** greater than the range of **actions** an agent can perform in a given context. Some evidence is needed that the same inferential procedures work for both.

12b. The standard procedure for inferring intentions from actions doesn't help with inferring a speaker's meaning from an utterance.

Standard procedure for inferring intentions from actions

13a. Decide which effect of the action the agent could have both predicted and desired.

13b. Assume that this was the effect he intended to achieve.

Why this procedure won't help with utterance interpretation

14a. Here, the desired effect just **is** the recognition of the speaker's meaning.

14b. But speakers often say unexpected/unpredictable things, and we still understand them.

14c. In these cases, we can't **first** identify a predictable and desirable effect, and **then** infer that the speaker's intention was precisely to achieve this effect.

All this provides evidence for a **dedicated comprehension module**, a **specialised sub-module of the mindreading module** (which is already seen as containing many sub-modules).

Question: What concepts and mechanisms might such a comprehension module contain?

4. Pragmatics as a sub-module of the mindreading module (Sperber & Wilson 2002)

Innate detector for cues to ostensive acts (cf. Csibra 2010).

Domain-specific regularity: Ostensive acts create **presumptions of optimal relevance** not created by other stimuli, which a domain-specific comprehension mechanism might exploit.

Relevance-guided comprehension heuristic

15a. Follow a path of least effort in deriving cognitive effects. Consider interpretations (disambiguations, contextual assumptions, implications, etc.) in order of accessibility.

15b. Stop when your expectation of relevance is satisfied.

Input premise: Speaker uttered sentence S (with the following linguistic meaning(s)).

Output conclusion: Speaker meant (intended me to believe that she intended me to believe) P.

Further evidence for a dedicated comprehension module? Possible double dissociations between mindreading and communication: e.g. 'pragmatic language impairment' in children without autism. (Bishop 1997) (mindreading intact, but communication impaired),

Conclusion: We have some evidence for two distinct metarepresentational abilities: (a) a **mindreading** ability for inferring mental states from behaviour, and (b) a **communicative** ability for inferring speakers' meanings from overt communicative acts.

5. Understanding and believing

Background

The relation between understanding and believing has been vigorously debated in philosophy (and to some extent in psychology), but not much discussed in pragmatics.

Two hypotheses about the relation between understanding and believing

A: Assertions are believed by default. We don't **first** understand them and **then** assess their credibility. We start by believing, and doubt them only in **special circumstances**.

"Speech is a form of direct perception of whatever speech is *about*. Interpreting speech does not require making any inference or having any beliefs [...] about speakers' intentions." (Millikan 1984: 62).

"... the comprehension and acceptance of ideas are not clearly separable psychological acts, but rather ... comprehension includes acceptance of that which is comprehended." (Gilbert 1991: 107)

Implication for semantics/pragmatics: This fits well with an approach where explicit content is fixed independently of speakers' intentions and involves no inferential intention-recognition.

B: Understanding and believing are distinct processes, and 'epistemic vigilance' (monitoring the trustworthiness of communicated information) is **always** at work.

Understanding and believing as distinct processes

This is the standard view in philosophy of language/pragmatics in the tradition of Austin, Grice and Strawson (e.g. Austin on 'uptake' vs perlocutionary effects, Grice/Strawson on meaning).

Ostensive communication (Sperber & Wilson 1995)

The communicator produces an utterance intending thereby (simplified version):

16a. **Informative intention:** To inform the audience of something.

16b. **Communicative intention:** To inform the audience of the informative intention.

Here, (16a) is about getting the audience to **believe**, and (16b) about getting them to **understand**. Understanding is a matter of recognising what the speaker **intends** you to believe.

Epistemic vigilance (Sperber et al. 2010)

"... in communication, it is not that we can generally be trustful and therefore need to be vigilant only in rare and special circumstances. We could not be mutually trustful *unless* we were mutually vigilant." (Sperber et al. 2010: 364)

Implications for semantics/pragmatics: Explicit communication may involve just as much inferential intention-recognition as implicit communication; acceptance may not be the default

Evidence for hypothesis B: There is increasing evidence that **inferential intention recognition** (e.g. in saturation, free enrichment, lexical modulation) contribute to explicit content (Bezuidenhout 1998, Origgi & Sperber 2000, Carston 2002, Recanati 2004, Wilson & Carston 2007). The **goal** in comprehension is to recognise speakers' **intentions**.

Proposal about the relation between understanding and believing (Sperber et al. 2010)

Comprehension and **acceptance** may involve two distinct processes which work in **parallel** or in **competition**: one geared to identifying the relevance of what is communicated (on the assumption that it is trustworthy), and the other geared to assessing its trustworthiness.

Hypothesis: There are two broad types of epistemic vigilance process:

17a. Assessment of the **reliability of the speaker** (i.e. the **source** of the information)

17b. Assessment of the **believability of the content**.

6. Vigilance towards the source of communicated information

Are children gullible? Do they start by believing what they are told?

Evidence (see e.g. Koenig & Harris 2007)

Infants at 16 months saw pictures of familiar objects and heard accurate/inaccurate labels from (a) human looking at picture, (b) human with back to picture, (c) audio speaker. They tend to be surprised when label (a) is **false**, when label (b) is **true**, and not surprised either way by (c).

At 24 months, children heard speakers produce accurate/inaccurate labels for several familiar objects and then label a novel object using standard cues (eye gaze, pointing, etc.). They tend to trust only previously accurate speakers, and selectively mistrust inaccurate ones.

3-year olds can take account of speaker's (a) benevolence/malevolence, (b) familiarity/unfamiliarity, (c) attitude (indications of certainty/hesitation), (d) past accuracy, (e) epistemic access (e.g. touch vs. vision) (Mascaro & Sperber 2009, Matsui et al. 2009).

From 4-6, they become able to cope with **intentional deception** (Mascaro & Sperber 2009).

Conclusion: Children appear predisposed to monitor the reliability of **individual speakers** and allocate trust **selectively**, which they do with increasing sophistication.

Evidence on adults (Willis & Todorov 2005)

Participants judged pictures of faces for **attractiveness, trustworthiness, competence, likeability** and **aggressiveness** (a) after 100ms, (b) with no time limit. The highest correlation was for trustworthiness – even more than for attractiveness. This suggests that the general trustworthiness of others is **automatically** assessed (and feeds the source monitoring process).

Hypothesis: Increasingly fine-grained vigilance processes may enable adults to track past accuracy not only for individual speakers, but also for speakers on **particular topics** or in particular **circumstances**, with implications for intra-cultural and cross-cultural variation.

Question: Is reliability of the speaker the only factor affecting acceptance or rejection?

Answer: No: we can accept communicated contents on the basis of **argument** and **evidence**.

7. Vigilance towards the content of communicated information

Some contents are **intrinsically believable** or **unbelievable** (e.g. tautologies, contradictions). However, most communicated information must be assessed for **consistency** or **coherence** with **background assumptions**. How is this done fast and cheaply? (cf. Thagard 2002)

Hypothesis (Sperber et al. 2010)

The **comprehension process** provides “an imperfect but cost-effective epistemic assessment”

Relevance-oriented comprehension:

Involves using a **small, immediately accessible** context to derive **contextual implications, strengthenings** or **revisions** of existing assumptions that would make the utterance **relevant as expected** (on the assumption that it is trustworthy).

“... the search for a relevant interpretation, which is part and parcel of the comprehension process, automatically involves the making of inferences which may turn up inconsistencies or incoherences relevant to epistemic assessment. When such inconsistencies or incoherences occur, they trigger a procedure wholly dedicated to such assessment.” (Sperber et al.: 376)

Vigilance towards the content (coherence checking)

How inconsistencies/incoherences are resolved in children (Nurmsoo et al. 2010)

18 month old children faced a sloping walkway with their mothers at the bottom, encouraging them or discouraging them (e.g. by clapping, holding out arms, or saying ‘No - you’ll fall’.)

Encouragement:

Case A: If the walkway was clearly too steep, they rejected encouragement and didn’t walk.

Case B: If it was unclear whether the walkway was safe, they accepted advice & walked.

Discouragement

Case C: If the walkway was clearly easy, they ignored discouragement and walked.

Case D: If it was unclear whether the walkway was safe, they accepted advice & didn’t walk.

So 18 month olds **reject** advice from an otherwise reliable speaker if it contradicts their own **fairly strong** judgement, but **accept** it if their own judgement is more **doubtful**

Hypothesis: Some inconsistencies/incoherences are **automatically resolved:**

18a. Information from an **unreliable source** is **automatically rejected**.

18b. Information from a **quite reliable source** overrides **weakly evidenced** background beliefs.

18c. Information from a **quite reliable source** is overridden by **strong** background beliefs.

Question: What happens when you are quite confident about **both** the reliability of the speaker and your own belief, as in (19)?

19. *You thought Bill was a doctor. Lucy tells you:* Bill is only 22 years old.

Hypothesis: While some contradictions can be automatically (sub-personally) resolved, as in (18a)-(18c), resolving others involves the use of **reasoning proper**.

8. The argumentative theory of reasoning (Mercier & Sperber 2009, 2011)

Mercier & Sperber distinguish between **(intuitive) inference** and **(reflective) reasoning**.

Inference: An intuitive process whose output is a **conclusion** warranted by the **input** (e.g. you see a few people on the underground platform and **infer** that they are waiting for a train). You don't think about the **reasons** for drawing this conclusion: you just draw it.

Reasoning: drawing a conclusion based on an **argument**, i.e. a representation of **reasons to accept it** (e.g. you see a policeman on the platform and look for **reasons** to decide whether he is just waiting for a train, watching for someone, taking a break, etc.)

Argumentative mechanisms: intuitive mechanisms for **producing and evaluating arguments** (e.g. Descartes' *I think, therefore I am* is the output of such a mechanism. Someone who accepts this claim is aware of both the conclusion *I am* and a **reason for accepting it**).

Mercier & Sperber's argumentative theory of reasoning

The primary function of reasoning is **communicative**: reasoning is a tool for **persuasion by speakers** and **epistemic vigilance by hearers** (enabling them to filter communicated contents)

Illustration

20a. *Peter*: Is Bill in today?

20b. *Mary (nodding)*: His car's outside.

21. The fact that *Bill's car is outside* is a good reason to believe that *Bill is in today*.

Argumentation/reasoning in children (Mercier in press)

As soon as toddlers can utter sentences (18-24 months), they use them to justify rule violations or to argue with their parents or siblings (e.g. refusing to pick up toys saying *No, I tired*, or taking back a toy from a sibling saying *That doesn't belong to you*).

Three year olds "can generate and think about positive or negative reasons for pursuing different courses of action or holding different sets of beliefs". They can also cite social rules, consequences of actions or effects on the feelings of others as justifications.

By four, they can use complex forms of argument that cause difficulty to adults in abstract tasks (e.g. *modus tollens* reasoning). This is predicted by the argumentative approach.

Current line of research in relevance theory

22a. Comprehension and acceptance are **distinct processes** which are likely to have evolved together: while communication brings great benefits, the interests of speaker and hearer may diverge, and an over-trusting audience risks being misinformed or deceived.

22b. Comprehension and argumentation are also **distinct processes** which may interact in complex ways (e.g. when an utterance provides a **reason** for accepting a conclusion). This is illustrated by one of our original examples: Peter asks Mary *Do you want some coffee?* And Mary replies *Coffee would keep me awake*. Here, comprehension involves constructing/ retrieving the premise *A good reason for refusing coffee is that it would keep one awake*.

22c. Many discourse markers and connectives seem to have an intrinsic connection with argumentation/ reasoning. We'll look at some possible implications of this tomorrow.

References

- Baron-Cohen, S. 1997. *Mindblindness: An Essay on Autism and Theory of Mind*. MIT Press.
- Bezuidenhout, A. 1998: Is verbal communication a purely preservative process? *Philosophical Review* 107: 261-288.
- Bloom, P. 2000. *How Children Learn the Meanings of Words*. Cambridge MA: MIT Press.
- Bloom, P. 2002. Mindreading, communication and the learning of names for things. *Mind & Language* 17:
- Csibra, G. 2010. Recognizing communicative intentions in infancy. *Mind & Language* 25: 141-168
- Bishop, D. 1997. *Uncommon understanding: Development and disorders of language comprehension in children*. Psychology Press, Sussex.
- Fodor, J. 1983. *The Modularity of Mind*. MIT Press: Cambridge MA.
- Gigerenzer et al. 1999. *Simple Heuristics that Make us Smart*. OUP: Oxford.
- Gilbert, D., Tafarodi, R. & Malone, P. 1993. You can't not believe everything you read. *Journal of Personality and Social Psychology* 65: 221-233.
- Hasson, U., Simmons, J. & Todorov, A. 2005. Believe it or not: On the possibility of suspending belief. *Psychological Science* 16: 566-571.
- Hirschfeld, L. & Gelman, S. (1994) *Mapping the Mind: Domain Specificity in Cognition and Culture*. Cambridge: Cambridge University Press.
- Koenig, M. & Harris, P. 2007. The basis of epistemic trust: Reliable testimony or reliable sources? *Episteme* 4: 264-284.
- Mascaro, O. & Sperber, D. 2009. The moral, epistemic and mindreading components of children's vigilance towards deception. *Cognition* 112: 367-380.
- Mercier, H. & Sperber, D. 2011. Why do humans reason? Arguments for an argumentative theory. *Behavioral and Brain Sciences*, 34, 57-74.
- Millikan, R. 1987. *Language, Thought and other Biological Categories*. Cambridge, MA: MIT Press.
- Nurmsoo, E., Robinson, E. & Butterfill, S. 2010. Childrens' selective learning from others. *Review of Philosophy and Psychology* 1: 551-561.
- Segal, G. 1996 The modularity of theory of mind. In P. Carruthers & P. Smith (eds) *Theories of Theories of Mind*. CUP.
- Southgate, V., van Maanen, C. & Csibra, G. 2007. Infant Pointing: Communication to Cooperate or Communication to Learn? *Child Development* 78: 735-740.
- Southgate, V., Chevallier, C. & Csibra, G. 2009. Sensitivity to communicative relevance tells infants what to imitate. *Developmental Science* 12: 1013-1019.
- Sperber, D., 2000 Metarepresentations in an evolutionary perspective. In D. Sperber (ed.): *Metarepresentations: A Multidisciplinary Perspective*. OUP 117-137.
- Sperber, D. 2001. An evolutionary perspective on testimony and argumentation. *Philosophical Topics* 29: 401-413.
- Sperber, D. 2005. Modularity and relevance: How can a massively modular mind be flexible and context dependent? In Carruthers, Laurence & Stich (eds.) *The Innate Mind: Structure and Content*. OUP.
- Sperber, D., Clément, F., Heintz, F. Mascaro, O., Mercier, H., Origgi, G. & Wilson, D. 2010. Epistemic vigilance. *Mind & Language* 25: 359-393.
- Sperber, D. & Wilson, D. 2002/2012. Pragmatics, modularity and mindreading. *Mind & Language Mind & Language* 17: 3-23.
- Tomasello, M. & Barton, M. 1994. Learning words in non-ostensive contexts. *Developmental Psychology*, 30, 639-650.
- Tomasello, M., Carpenter, M. & Liszkowski, U. 2007. A new look at infant pointing. *Child Development* 78: 705-722.
- Wellman, H., Cross, D., and Watson, J. 2001. Meta-analysis of theory of mind development: The truth about false belief. *Child Development* 72: 655-684.
- Willis, J. & Todorov, A. 2006. First impressions: Making up your mind after a 100ms exposure to a face. *Psychological Science* 17: 592-58.
- Wilson, D. 2000/2012: Metarepresentation in linguistic communication. In D. Sperber (ed.) *Metarepresentations: An Interdisciplinary Perspective*. New York: OUP.
- Wilson, D. & Sperber, D. 1986. Pragmatics and modularity. In *Chicago Linguistic Society Parasession on Pragmatics and Grammatical Theory* 22: 67-84. Reprinted in S. Davis (ed.) 1991: 583-95.