

ESPP Talk

I'm going to end the session today by talking about pragmatics, and children's development – how they learn to make inferences about what others' mean. I must warn you that I do not have a full or definitive answer to the rather provocative question that my title poses, but I hope to share my attempt to address it and some thoughts on possible theories and avenues for future research.

The puzzle – for a linguist at least – is this: a dominant view of communication, Gricean or neo-Gricean pragmatics, involves, as an inherent part, hearer's reasoning about the speaker's beliefs and intentions. Firstly, for communication in general, Grice's notion of non-natural meaning is elaborated as involving the hearer's recognition of the speaker's intention to communicate something and intention that the hearer recognise this intention. This is ostensive-inferential communication, in relevance theoretic terms. Secondly, in the kind of inference I'm interested in today, an implicature. Lets take this example of one type of implicature that will crop up in both studies I'm talking about, known in the trade as an ad hoc quantity implicature. Imagine I say to you, 'he took the card with bananas'. Now, based on the literal content – the semantics – of what I've said, this is ambiguous, as both cards have bananas. At minimum, on the 'at least bananas reading, you can reason that I don't know whether he took me the card with bananas or bananas and pears. However, on the assumption that I know all information relevant to the utterance and that I'm a cooperative speaker, you can enrich the interpretation as 'he took the card with only bananas. That's why it's called an *ad hoc quantity* implicature – it's about the quantity of information offered and expected, and this is based on a scale or partially ordered set constructed in the context, or ad hoc. And this is known as the Competence Assumption, and taking the Epistemic Step.

These features of pragmatic reasoning have therefore obviously linked it to Theory of Mind.

However... meanwhile in developmental pragmatics studies, the trend has been 'how low can we go' – demonstrating that younger and younger children than previously thought are able to understand such implicatures. Right down to aged 3, in fact, for some implicature types. But... standard tests of Theory of Mind, like False Belief tests, are only consistently passed by kids aged 4 and upwards. So, you can see the puzzle emerging for linguists here: how can kids be so good at implicatures if they don't have Theory of Mind?

I suspect that for psychologists this puzzle is not so puzzling: Theory of Mind itself is still far from perfectly understood, and there are accounts of gradual or of very early development, that might ease a pragmatician's worry. However, as a linguist, I want to find out: what are children doing when they make pragmatic inferences? Are they engaging in reasoning about others' beliefs as pragmatic theory would suggest?

In our **first study**, we tested monolingual English-speaking children, aged 2;8-5;11, on their abilities to understand implicatures, and to reason about others' beliefs. They completed a story-based picture-matching task, with ad hoc quantity, scalar quantity and relevance inferences, as well as a change-of-location and unexpected-contents false-belief tasks. Just as in the example above, in the picture-matching task, the picture chosen indicates whether children have derived an implicature or only the literal content (in which case the choice is ambiguous and they have to guess).

Corroborating findings in the recent literature, kids generally did well with implicatures, and certainly improving with age. But, ToM scores did not predict their implicature scores, once age, gender, SES and structural language were taken into account.

However, on reflection this kind of design might not reveal an association for all sorts of reasons: the lack of variance in implicature scores at the crucial age, 3-4; the differences in the nature of the

tasks; the possibility that the false-belief tasks are challenging for children for other reasons, like their linguistic complexity or attentional demands.

Therefore, in a **second study**, we tried to investigate more directly children's abilities to take into account the speaker's beliefs in implicature understanding. So far in developmental pragmatics studies, experimental paradigms have typically involved ideal or simple context for the speaker and hearer – where the speaker's beliefs are not at stake: relevant information is in common ground, or the speaker can be assumed to be fully informed and co-operative, with no reason to think otherwise. Just as in our first task. But this means that you can't tell whether children are reasoning about the speaker's beliefs and intentions, or using more egocentric heuristics.

For adults, however, there is evidence that they do *not* derive an implicature when the speaker is ignorant: they do not make the Competence Assumption and take the Epistemic Step, if it is not justified – if there is information in the context that the speaker is not fully informed. Can kids do this too?

In this study, visual perspective-taking was used as an instantiation of speaker beliefs. You may be familiar with this set-up – the director task, or cubby-hole task, much used in referential communication studies. We combined it with an implicature picture-matching study, a bit like in the first study here. I'll briefly walk you through the different conditions, just so it's clear what's going on.

Firstly, most simply: common ground unambiguous. Here there is only one picture that could match the utterance "Pick the card with apples", and it's in common ground. This is just a check the game is working.

Secondly, common ground ad hoc. Here, there are two picture cards in common ground that are semantic matches for the utterance "pick the card with bananas" – but only one that matches the exhaustive inference. This is to check that children doing this study can derive ad hoc implicatures as we would expect.

Thirdly, privileged ground ambiguous. Here, there are again two picture cards that match the utterance, “pick the card with oranges”, but crucially, one is in common ground and one is in privileged ground. This condition is designed to check that children are able to take into account the speaker’s perspective when there is a simple semantic ambiguity.

Finally, privileged ground ad hoc. In this condition, there are two cards that are semantic matches for the utterance “Pick the card with pears”. One of these would match an ad hoc implicature inference – but it is in privileged ground. Crucially, ‘the card with pears’ is an optimally informative way to describe the target picture-card from the puppet’s perspective, as the pears are unique from his point of view. This condition tests whether children are able to integrate speaker perspective with pragmatic inferencing, by not deriving an exhaustive inference.

The children tested were aged 5-6 years. Crucially at this age, they can:

- do level 1 perspective taking (assessing what someone else can – or cannot – see) required by this task
- understand that seeing leads to knowing
- pass more complex false-belief tasks
- correctly answer questions about which cards the puppet can or cannot see or know about
- derive ad hoc implicatures
- make ignorance inferences

Lets take a look at the results. As there was a bimodal distribution in the critical condition, I’ve categorised participants as ‘passers’ and ‘failers’ – passers if they score 5 or 6 out of 6 in a condition, and failers otherwise. Firstly, we can see that adults are at ceiling for our common ground unambiguous, common ground ad hoc and privileged ground ambiguous conditions, and they are approaching ceiling in the privileged ground ad hoc condition. This is a reassuring replication of previous findings – though the first off-line study with ad hocs.

The kids are behaving rather differently, though. There is a significant difference between the proportion of passers in the privileged ground ambiguous condition, and the proportion of passers in the privileged ground ad hoc condition. Next, comparing adults and children: there are more adult passers than child passers in both privileged ground conditions. Note here, that these numbers in the privileged ground ambiguous condition for children do not represent 'chance' performance, in the sense that kids are guessing – it represents around half of the children consistently passing, and around half not consistently passing.

What we **find** therefore, is that there are three groups of children, who could represent a developmental trajectory: there are those who do not seem to be able to take into account the speaker's perspective in either the semantic ambiguity or pragmatic inference case; then, there is a group who are able to take into account the speaker's perspective in semantic disambiguation, but not pragmatic inferencing – they persist in drawing an ad hoc implicature when the speaker is ignorant; lastly, there is a very small group who are adult-like in their performance.

This indicates a two-step development: first, children learn to derive pragmatic inferences (they excelled at ad hocs in common ground), and to reason about a speaker's epistemic state – and then, they learn to integrate the two.

Discussion

1. Firstly, it's worth pointing out that this finding fits in with other developmental pragmatics studies which show how challenging it is for children to integrate information from the context into the pragmatic inference. For example, in his work, Dimitrios Skordos found that one challenge for children in deriving scalar implicatures is tracking the Question Under Discussion and generating relevant alternatives – they perform worse when it alternates between quantity and quality.

2. Secondly, these kind of findings are obviously problematic for Gricean theories of pragmatics, where the speaker's epistemic state is an inherent part of pragmatic reasoning, in deriving an implicature. Why would *taking* the epistemic step be easier than *not* taking it? They support recent proposals that suggest that different strategies may be available for pragmatic reasoning – in development and across the lifespan – that may depend more or less on Theory of Mind abilities (e.g., Kissine, 2016; Andres-Roqueta and Katsos, 2017). Some implicatures, like quantity implicatures, may be available just with egocentric reasoning, using world-knowledge, linguistic experience, and expectations about the speaker (without reference to their intentions). For example, one might reason that 'the card with bananas' is a relevant and efficient way to describe this card, and 'the card with bananas and pears' is a relevant and efficient way to describe this card, based on their contrasting features but without reference to speaker intentions and beliefs. This would make the common ground ad hoc implicature available, but not suspending the privileged ground ad hoc one.

3. Thirdly, it could be that we're still looking in the wrong place. *Visual* perspective-taking may be a particular challenge, that obscures children's actual Theory of Mind abilities, compared to *social* perspective-taking, where common and privileged ground is established through discourse and interaction. Moll and Kadipasaoglu argue that social perspective-taking and visual perspective-taking are distinct, and that the first is ontogenetically primary: young infants succeed with perspective-taking when it is based on common experience – shared action, shared discourse – but visual perspective-taking develops later (aged 2 to 3 years), and patchily at that. On top of this, the director-task paradigm, well-used though it is, may have additional challenges, in terms of inhibiting distractor items, and expecting maximal or even over-informativeness in a referential game like this. If this is the case, then perhaps visual perspective-taking is integrated into pragmatic reasoning later in development, in two-steps, while core ToM

abilities, including social perspective-taking, still go hand-in-hand with pragmatic development, as our Gricean pragmatics would lead us to expect. This is where future research needs to take us.

Summary

- Children aged 3 up can excel in some pragmatic inferences, like ad hoc quantity implicatures, when the communicative situation is straightforward

- They may struggle to integrate other aspects of the context, like speaker beliefs

- This makes us question our traditional Gricean view of pragmatics – ToM is *not* always necessary

- But more research is needed, with *social* rather than *visual* perspective-taking