Topics in Experimental Pragmatics

UCL Linguistics Short Courses 25/26

Instructors:

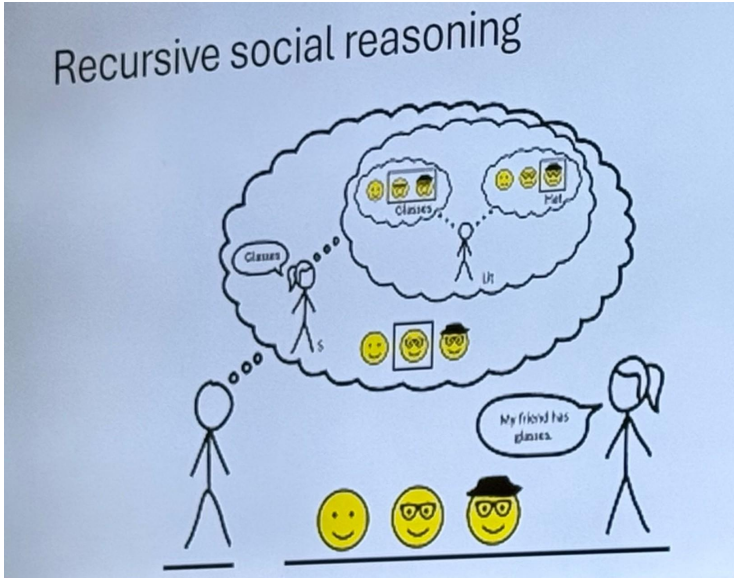
- **Erying Qin**
- **Shenshen Wang**
- **Joseph Keir Petrie**

Recap

- **Experimental Pragmatics**
  Inference/reasoning plays a central role in pragmatics

- **Scalar Inference/Scalar Implicature (SI)**
  ‘Some of the cards are hearts’

- **Negation**
  e.g.:
  in waitrose ‘this product is not cheap’
  ‘Shenshen is not in the office’ →she is in the gym



- **Bayesian Inference**
  a method of statistical inference where you update your belief about a hypothesis or model based on new evidence

Today's Roadmap

- **Developmental Research on Scalar Inference/Scalar Implicature (SI)**
  - Children and adults understand quantifier and number scales differently
  - A systematic review of the acquisition of SI in typically developing children

- **Perspective-taking**

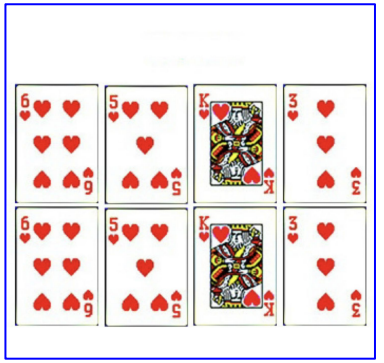
- **Perspective-taking in pragmatic inferencing**

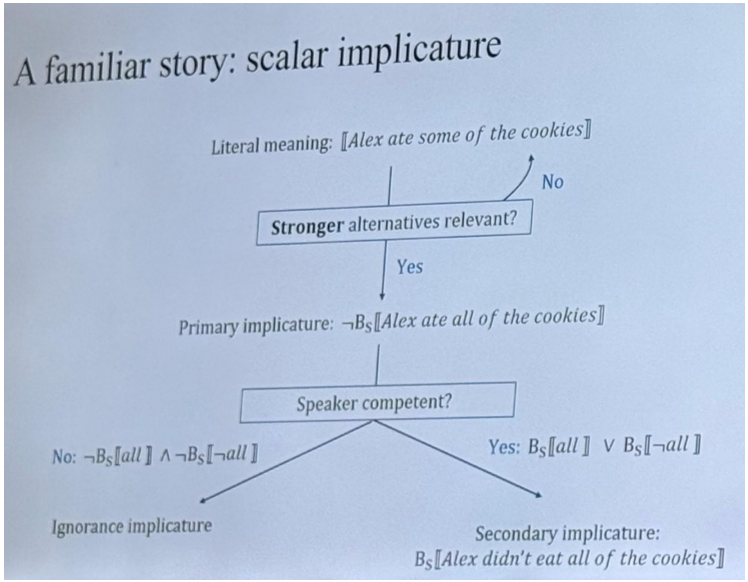
Recap on Scalar Inference/Scalar Implicature

(1) Some of the cards are hearts.

a. Literal: Some (and possibly all) of the cards are hearts

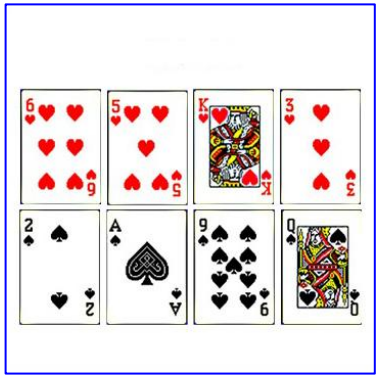
b. Alternative: All of the cards are hearts





c. SI: Not all of the cards are hearts

+> 'Some but not all of the cards are hearts'



Developmental Research on SI

Papafragou & Musolino (2003): Key words

- Developmental research on different interpretations of quantifier and number
- Children (5 y.o.) and adult speakers of Greek →evidence across language
- Truth Value Judgment tasks

(2) a. Quantifiers <some, many, most, all>

b. Connectives <or, and>

c. Adjectives <attractive, pretty, beautiful>

d. Adverbs <sometimes, often, usually, always>

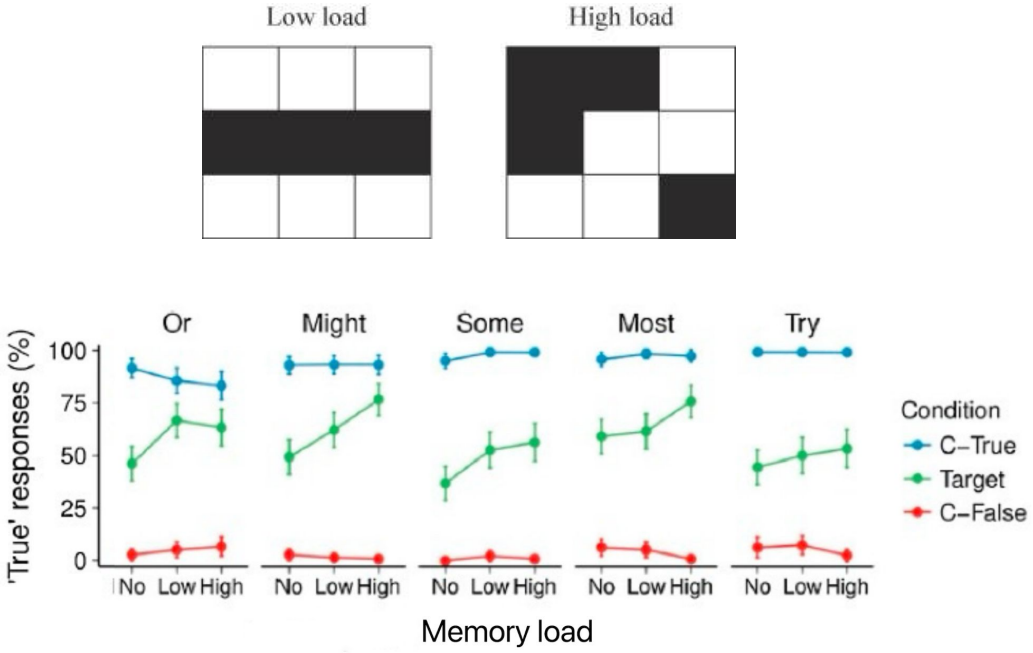
e. Cardinal numbers <1, 2, 3, 4, 5, 6, …, n>

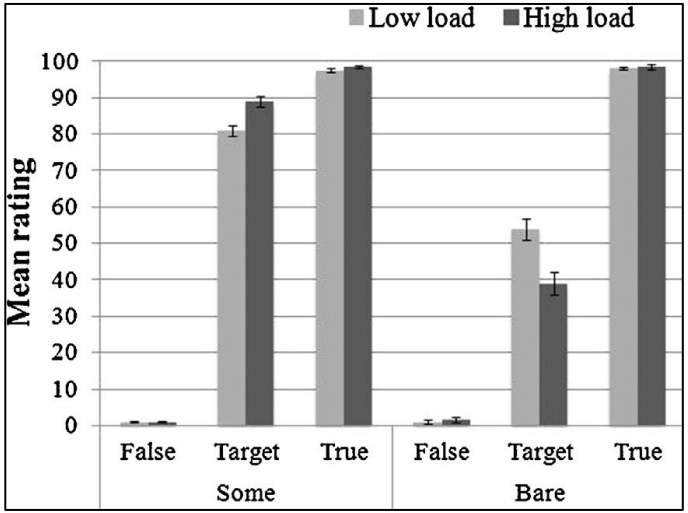
f. Modals <possible that p, probable that p, certain that p>

g. Verbs <like, love, adore>

(Horn 1972)

Papafragou & Musolino (2003): Two working-memory studies as an introduction





'True' responses →no SI (van Tiel et al. 2019)

Bare →Bare Number (Marty et al. 2013)

Papafragou & Musolino (2003): Experiment

Fig. 1. The horses are about to jump over the fence.

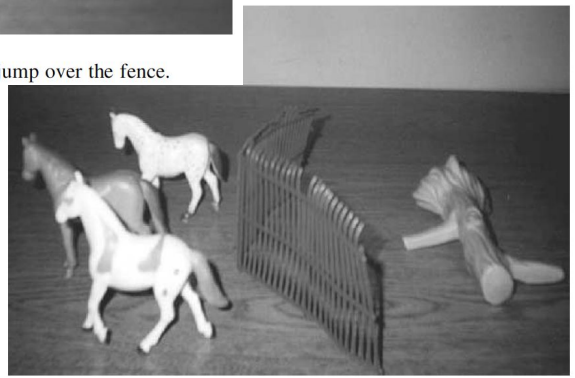


Fig. 2. All of the horses jumped over the fence.

Table 1

Scale type	Puppet statements on warm-ups and critical trials
Warm-ups	This is a horse (True: subjects are shown a horse)
	This is a table (False: subjects are shown a log)
Critical trials	
⟨all, some⟩	Some of the horses jumped over the log
	Some of the rabbits went on the merry-go-round
	Some of the dinosaurs ate trees
	Some of the Smurfs bought dogs
⟨three, two⟩	Two of the horses jumped over the log
	Two of the rabbits went on the merry-go-round
	Two of the dinosaurs ate trees
	Two of the Smurfs bought dogs
⟨finish, start⟩	The Smurf started painting the balloons
	The Smurf started putting the cars into the bag
	The little girl started making the puzzle
	The circus man started bringing down the elephants

Papafragou & Musolino (2003): Experiment

The first experimenter acts out short stories in front of the participants using small toys. The second experimenter plays the role of a puppet (in this case Minnie) who watches the stories alongside the participants. At the end of the story, the puppet is asked to say what she thinks happened in the story. The participants were then asked whether the puppet ‘answered well’. Finally, the participants were asked to justify their answers by explaining why they thought that Minnie answered well or not.

The children were tested individually in a quiet room away from the class. Adult participants were shown a videotaped version of the stories witnessed by the children, including the warm-up stories. They were given a score sheet and were instructed to indicate, for each story, whether Minnie had ‘answered well’ or not. They were also asked to provide a brief justification for their answers.

Papafragou & Musolino (2003): Results

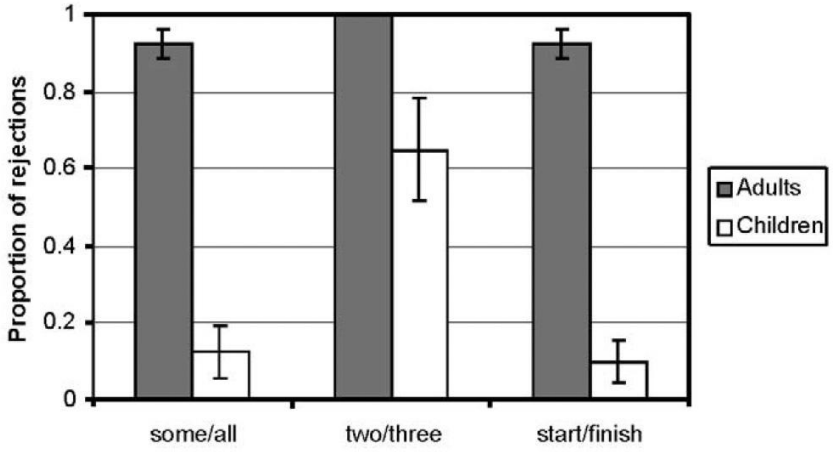


Fig. 3. Subjects' performance on critical trials

Adult participants overwhelmingly rejected the puppet's statements in each of the three conditions, i.e. 92.5% of the time in the <all, some> condition, 100% of the time in the <three, two> condition and 92.5% of the time in the <finish, start> condition. Statistical analysis revealed no reliable difference between these rejection rates ($p = 0.16$).

By contrast, while 5-year-olds rejected the puppet's statements in the case of <three, two> 65% of the time, they almost never did so in the case of <all, some> and <finish, start> (12.5% and 10% of the time, respectively). This difference was confirmed statistically ($p<0.001$). Pairwise comparisons (Tukey–Kramer) further revealed a reliable difference between <three, two>–<all, some> and <three, two>–<finish, start ($p = 0.002$ and $p = 0.001$, respectively) but no reliable difference between <all, some> and <finish, start> ($p = 0.77$).

Porrini & Surian (2023): Introduction to systematic review

What is a systematic review?

A systematic review is a type of research that systematically collects, evaluates, and synthesises relevant studies to answer a specific research question.

Why did Porrini & Surian (2023) use this method?

'...experimental data on the acquisition of quantity implicatures are abundant. There is, however, great variety within the available data: children have been tested in different languages, at different ages and with different tasks, and the phenomenon of quantity implicature has been presented using different scales and in cooccurrence with other linguistic or cognitive factors'

Note that the term 'quantity implicatures' in P&S (2023) is roughly equivalent to scalar implicature used in this module.

Porrini & Surian (2023): Methodology

- **Eight different languages**: Dutch, English, French, Greek, Italian, Japanese, Mandarin Chinese & Spanish

- **Ages**: 2-13 y.o.

- **Six different task types**:
  1. Truth Value Judgment Task (TVJT): make a binary choice regarding the truthfulness (or correctness) of an uttered sentence
  2. Felicity Judgment Task (FelJ): evaluate whether the speaker had ‘said something well’, and therefore to make a judgment on how felicitous the sentence was, rather than true
  3. Referent Selection Task (RefS): pick a referent for a determinate sentence or utterance, be it a picture, a person or an object
  4. Action Based Tasks (ActB): perform an action after hearing a sentence
  5. Communicative Context Assessment (CCA): give a judgment on an event that took place after a sentence (an instruction) was uttered
  6. Speaker Selection Task (SpeS): select which of two speakers uttered a determinate sentence

Porrini & Surian (2023): Results

- **Languages:**
'...Dunn test reveals that there is no statistically significant difference between any two languages'

- Age:

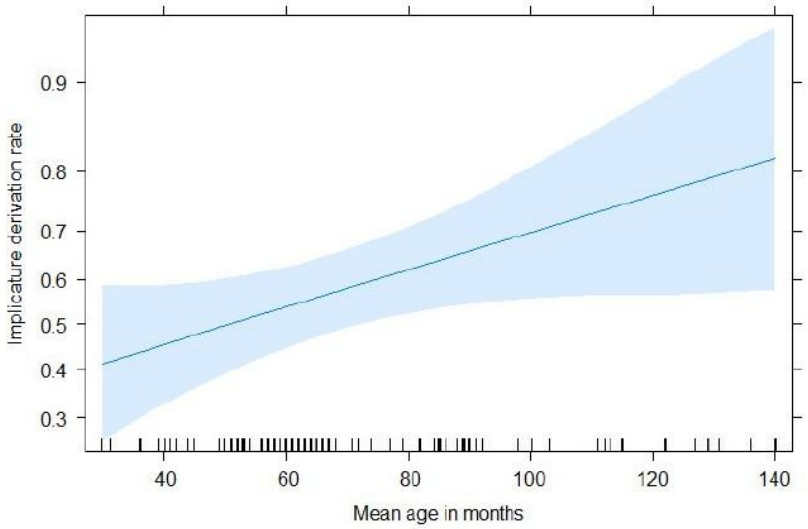


Figure 1: Effect of age

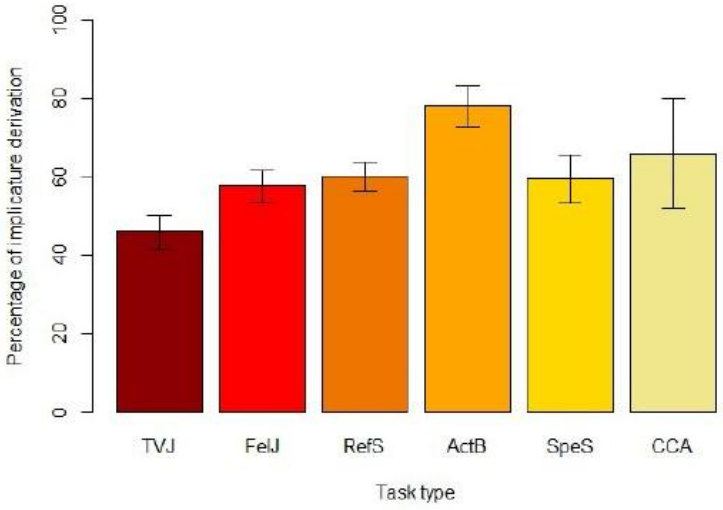


Figure 4: Difference in performance across tasks

- Task:

better with ActB & CCA
→both tasks do not require children to make any meta-linguistic judgments

Perspective-Taking

Social-cognitive steps to a mature understanding of perspectives

- **level 0** (around 1 y.o. as a staging post for the emergence of perspectivity):
  infants do not yet know anything about perspectives, but they can share them in joint attention or joint engagement with others.

- **level 1** (about a year later, at around 2 y.o.):
  visual perspective-taking

- **level 2**:
  children know what but also how others see things.

(Moll & Meltzoff 2011)

Level 0

At this stage, infants do not yet know anything about perspectives, but they can share them in joint attention or joint engagement with others - as evidenced by such behaviours as gaze following, alternating gaze between object and co-attender, holding up and showing, or pointing to objects or events. This sharing of attention is qualitatively and structurally different from the tempo-spatial co-ordination of behaviour that is found in primates and it lays the grounds for the more complex forms of taking and understanding perspectives that follow during the next months and years in young childhood.

(Moll & Meltzoff 2011)

Level 1

About a year later, at around 2 years, children reach ‘level 1 visual perspective-taking’: they know what, e.g. which objects in a room, others can and cannot see from their current visuo-spatial viewpoint.

(Moll & Meltzoff 2011)

Level 2

Children know what but also how others see things. They understand the specific way in which something is seen, interpreted, or (re)presented.

(Moll & Meltzoff 2011)

Perspective-taking in pragmatic inferencing

Katsos (2021): Introduction

Communication involves making inferences about what others mean, beyond what they say explicitly. One type of communicative inference is known as an ‘implicature’: for instance, if in answer to the question ‘What is on your card?’, the speaker replies ‘There are apples’, then the listener may infer that there are only apples on the speaker’s card. This is a pragmatic inference that is guided by maxims of how people use language. In this specific case the inference is further known as an ad hoc quantity implicature.

An ad hoc quantity implicature refers to a temporary, context-dependent inference about quantity that is made during a conversation. It's not a fixed, universally applicable rule, but rather something inferred based on the specific context of the utterance or situation.

Scalar implicature in pragmatics involves how speakers and listeners infer additional meanings based on the scalar items mentioned in a statement.

1. Quantifiers <some, many, most, all>
2. Cardinal numbers <1, 2, 3, 4, 5, 6, …, n>
3. Modals <possible that p, probable that p, certain that p>
4. Adverbs <sometimes, often, usually, always>

Katsos (2021): Introduction

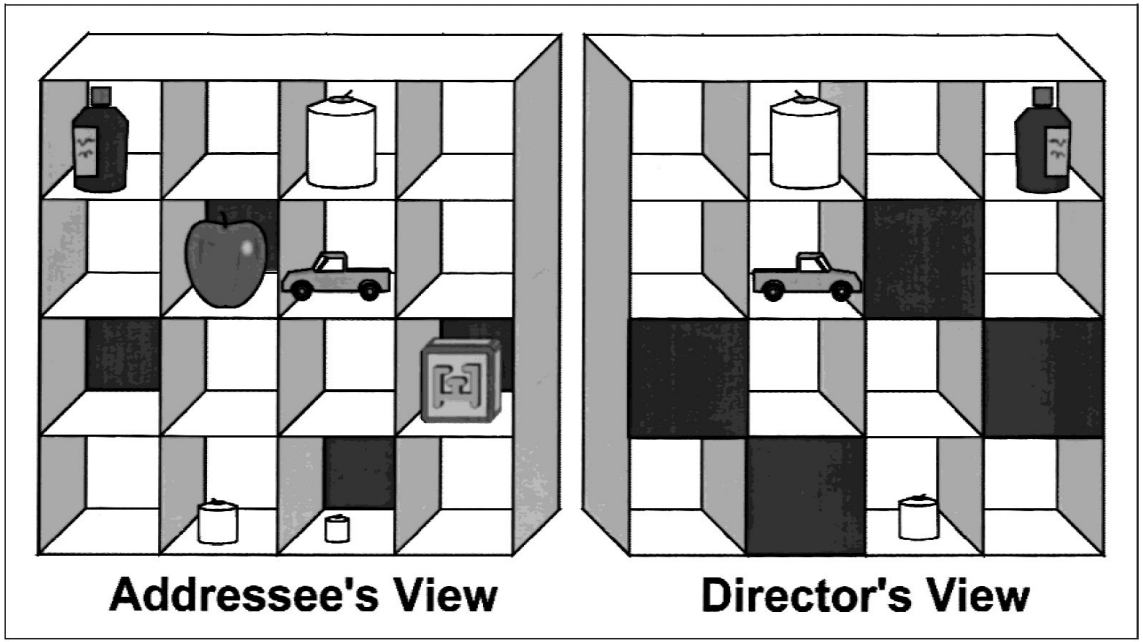


Fig. 1. The 16 slots with a typical set of objects. The addressee's and director's views are distinct because of the occluded slots. The critical instruction (referring to "the small candle") picks out a different candle from the director's perspective (shared candle) than from the addressee's perspective (occluded candle).

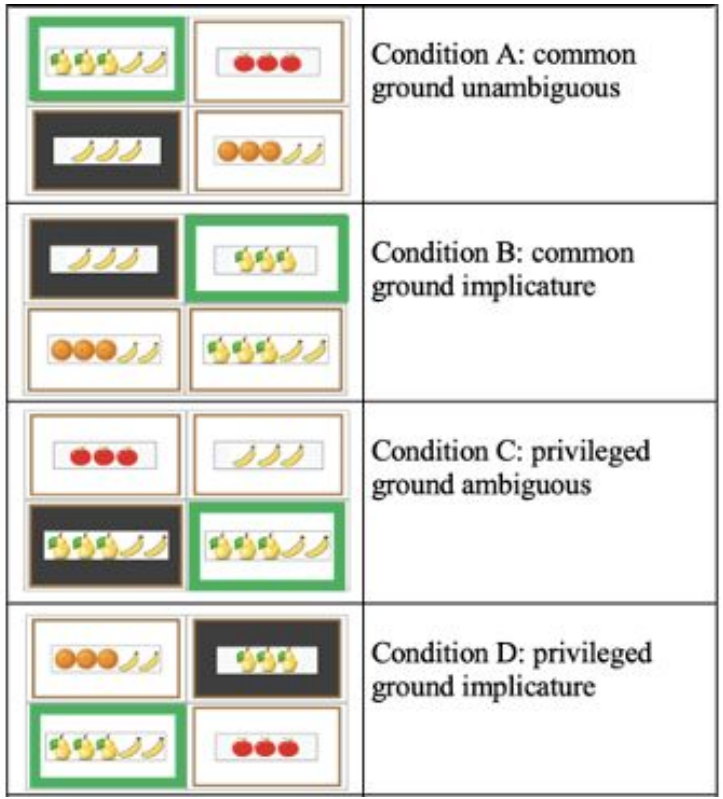
Keysar et al. (2000)

Widely-accepted, though diverse, approaches to pragmatic inference have in common the notion that **ad hoc quantity implicatures** not only involve an assumption that the speaker is observing pragmatic maxims (i.e., general principles that guide how people use language effectively and appropriately to communicate, like giving the right amount of information, being truthful, relevant, and clear), but also take into account the speaker's perspective, including what is in **common ground** with the listener.

Katsos (2021): Introduction

In the example ‘There are apples’, the listener assumes that the speaker knows all the objects on the card and infers that, had there been other objects on the card, the speaker would have said so. If the listener knows that the speaker is not fully knowledgeable about everything that is on the card for some reason, then he does not derive this implicature, but would arrive at the intended meaning that *there are at least apples on the card*, as far as the speaker knows.

Katsos (2021): Implicature + Perspective-Taking task



‘Pick the card with pears’

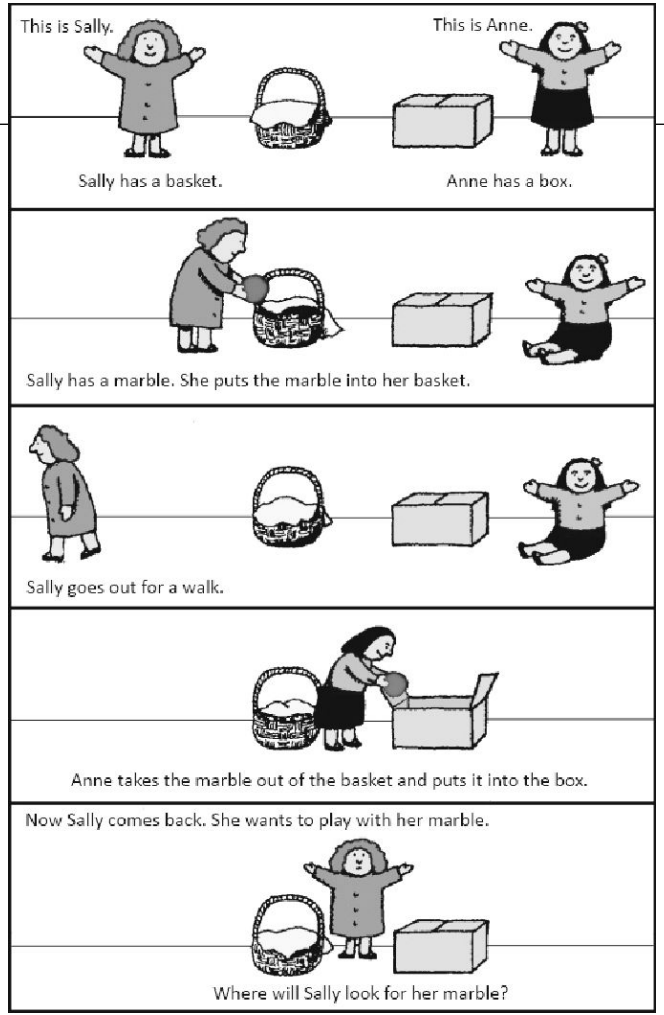
Sample displays from the Implicature and Perspective-Taking task. The shaded square represents the card that is visible to the listener but not the speaker; the green frame around a card indicates that this is the theoretically-optimal response.

Wilson et al.(2023): Introduction

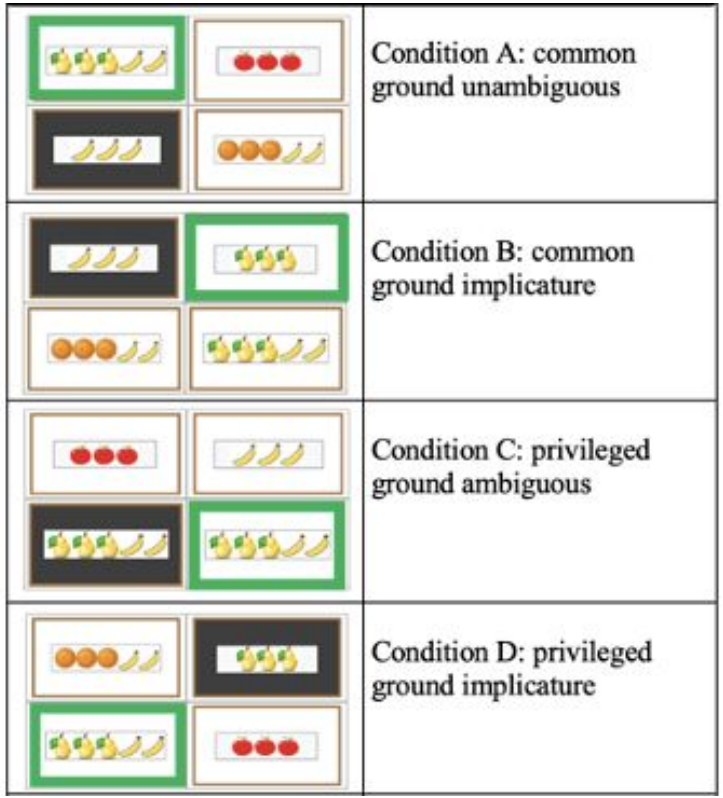
- Children learn Level 1 perspective-taking →assessing what someone can or cannot see
- Children, meanwhile, are capable of pragmatic inferences known as ad hoc quantity implicatures in simple picture-matching tasks, for example, that a speaker who said ‘the card with apples’ meant the card with nothing but apples
- However, it is not known whether children take into account the speaker’s perspective in deriving such inferences, as adults are able to do, and as the received theories of pragmatics claim
- Neurotypical children aged (5 - 7 years) who pass standard False Belief tests such as the Sally-Anne change-of-location task

Wilson et al.(2023): Introduction

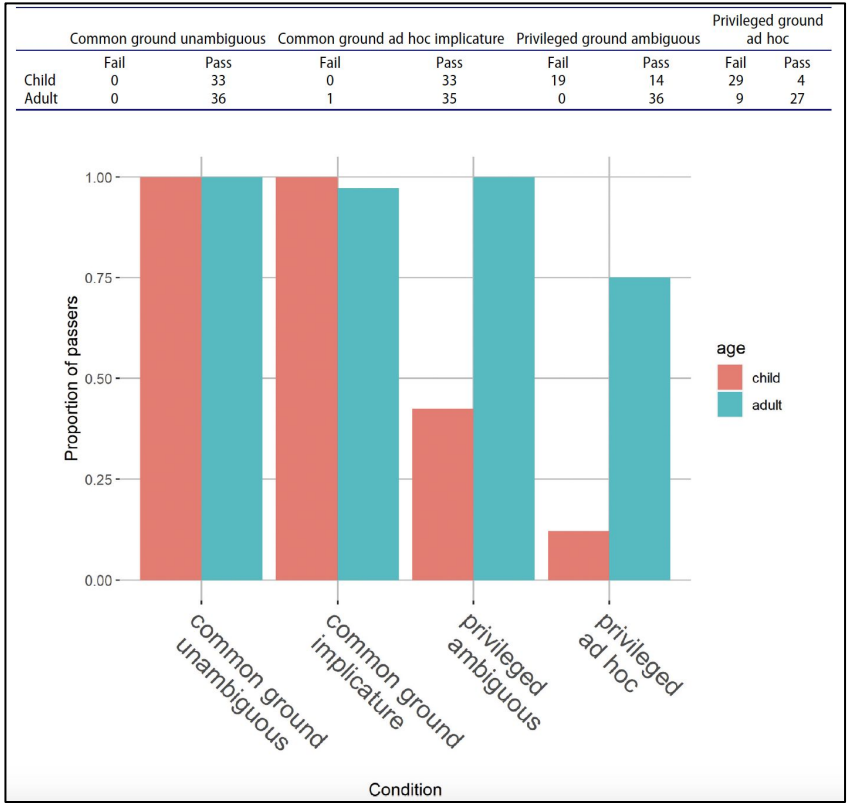
In the Sally-Anne task, a child is told that Sally leaves a toy in a basket, but Anne moves it while Sally is away. The child is then asked where Sally will look for the toy when she returns.



Wilson et al.(2023): Experiment

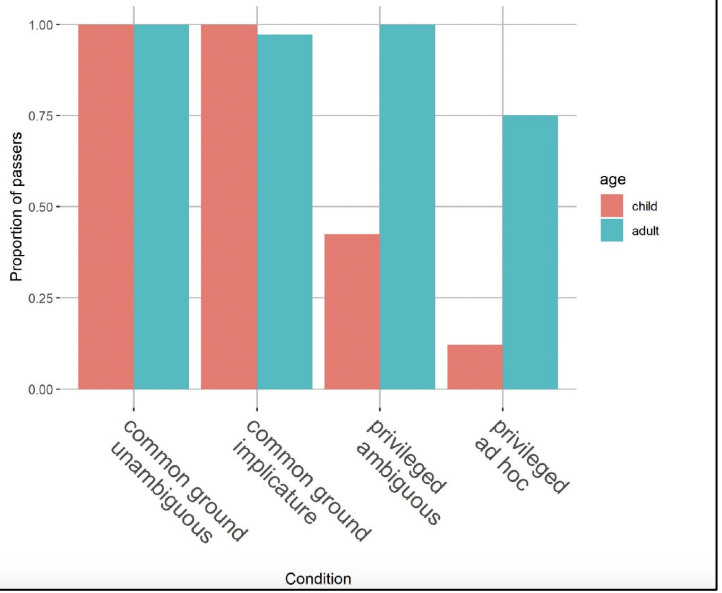


	Common ground unambiguous		Common ground ad hoc implicature		Privileged ground ambiguous		Privileged ground ad hoc	
	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass
Child	0	33	0	33	19	14	29	4
Adult	0	36	1	35	0	36	9	27



Wilson et al.(2023): Results

	Common ground unambiguous		Common ground ad hoc implicature		Privileged ground ambiguous		Privileged ground ad hoc	
	Fail	Pass	Fail	Pass	Fail	Pass	Fail	Pass
Child	0	33	0	33	19	14	29	4
Adult	0	36	1	35	0	36	9	27



- The adult control group was at ceiling in all conditions except the critical privileged ground ad hoc condition, and the child group was at ceiling for both common ground conditions.
- Among children, there were more passers in the privileged ground ambiguous condition than in the critical privileged ground ad hoc condition ($p = .0044$).
- There were significantly more adult passers than child passers in both the privileged ground ambiguous condition ($p < .001$) and the privileged ground ad hoc condition ($p < .001$).

References

Horn, L. R. (1972), *On the Semantic Properties of Logical Operators in English.* Distributed by Indiana University Linguistics Club Ph.D. thesis, UCLA.

Katsos, N. (2021). 'The Implicature and Perspective-Taking Task: A novel way of investigating the relation between pragmatics and mind-reading'. *Cambridge Occasional Papers in Linguistics*, 13(7): 144–157.

Keysar, B., Barr, D. J., Balin, J. A., & Brauner, J. S. (2000). 'Taking perspective in conversation: The role of mutual knowledge in comprehension'. *Psychological Science*, *11*(1), 32-38.

Marty, Paul, Emmanuel Chemla, and Benjamin Spector. 2013. 'Interpreting numerals and scalar items under memory load'. *Lingua* 133: 152–163.

Moll, H., & Meltzoff, A. N. (2011), 'Perspective-taking and its foundation in joint attention'. *Perception, causation, and objectivity* (2011): 286-304.

References

Papafragou, A., & Musolino, J. (2003), ‘Scalar implicatures: experiments at the semantics–pragmatics interface’. *Cognition* 86.3 (2003): 253-282.

Porrini, A. T., & Surian, L. (2023), ‘The investigation of quantity implicatures during typical development: a systematic review’. *Processings of ELM 2*: 219-228.

van Tiel, B., Pankratz, E., & Sun, C. (2019). ‘Scales and scalarity: Processing scalar inferences’. *Journal of Memory and Language* 105 (2019): 93-107.

Wilson, E, Lawrence, R., & Katsos, N. (2023). ‘The role of perspective-taking in children’s quantity implicatures’. *Language Learning and Development* 19.2 (2023): 167-187.