Pragmatic development in early childhood

Danielle Matthews
University of Sheffield

What drives pragmatic development?

Communicative environment
Communicative ability
Social, Cognitive & Motor skills

Learning from communicative exchanges
A review of individual differences
Choosing what is worthy of mention

Very early developments

- 1st year of life (early vocalisation, pointing, IJA, RJA)
  - large individual differences not explained by environmental differences except the most extreme (e.g., due to severe/profound hearing loss)
- From 18 months clear evidence of caregiving effects
- Conversational experience critical for pragmatic development (delays for deaf children of hearing parents)

Learning from experience

- Experimental studies show preschoolers, while often ‘egocentric’ show remarkably rapid learning
- Best when child wants to communicate, is asked to repair, cues to need for repair are clear and feedback includes a model (Matthews et al., 2007, 2012; Sarilar et al. 2013)
- Only generalize only so far - social schemas, heuristics
- Constantly refining expectations about what people will say in a given setting. If predictions aren't met, they seek to find out why – or correct you! (Matthews et al, 2010; Morisseau et al., 2013)
Morisseau, Davies and Matthews (2013)

Seeking to explain unexpected

Communicative environment

Learning from communicative exchanges

A review of individual differences

Choosing what is worthy of mention

Social, Cognitive & Motor skills

Communicative ability

Individual differences: a review

Underpinnings
- Vocab, grammar
- Social cognition (joint attention, desire/knowledge/ignorance/false belief)
- Executive function (inhibition, working memory, cognitive flexibility, generativity)

Pragmatic skills
- Naturalistic conversation
- Parent/teacher report
- Standardised tests
- Referential Communication
- Narrative
- Irony understanding

Matthews, Biney & Abbot-Smith, in prep

Vocabulary
- By far the strongest and most consistent associations with pragmatic ability are to be found with 'formal language' skills – most often vocabulary

Social cognition - Typical
- Lack of correlation can often be explained by lack of variance
- When there is substantial variance on both ToM and Pragmatics measures these tend to be correlated
- But when vocabulary is controlled for it accounts for most variance - modest remainder often still explained by ToM
- Often little specificity - composite tests (to permit range)
- ToM tasks with high verbal demands
- Links strongest when theoretically matched, e.g., evidence that real world mindful conversation correlates with lab tasks of ToM (De Rosnay et al. 2014), 2nd order ToM and Irony

Social cognition - Atypical
- Maintaining an ongoing topic of conversation is associated with social cognitive function even when vocabulary is controlled (> contribution of Social Cog)
- Some studies (e.g., using ADOS –g) find no role for ToM once other covariates accounted for (Pellicano)
- Associations stronger when:
  - two measures are more similar (items from tests sometimes show ‘crossover’)
  - theoretically it’s clear why the two should be associated, e.g., 2nd order theory of mind and irony comprehension
Executive Functions: typical

- Higher order skills that allow individuals to think and behave in a flexible, controlled and goal-directed way (working memory, inhibition and cognitive flexibility, organisation, planning, self-control and generativity)
- Some good evidence for role of inhibition in communicative perspective taking, socially appropriate (polite) language and talkativeness
- Some role for working memory in contingent responding, comprehending irony but general less research on this
- Mixed picture wrt cognitive flexibility
- Like social cognition, many EF tests have a strong language load

Executive functions: atypical

- Some studies suggest EF can explain pragmatic impairments (ASD: Pellicano, 2013)
- Others that language impairment explain deficits in EF (Akbar, Loomis & Paul, 2013 - inner speech to regulate non-routine behaviours)
- Others still find no association
- Often composite measures – necessary but lack specificity
- Some good non-verbal tests of EF – perseverative errors (failure to disengage) and ESCS (McEvoy et al. 1993)
- Generativity and pragmatic competence (Bishop & Norbury, 2005)

Conclusions

- Enormous amount of attention paid to social cognition globally, little so far to pin this down and little on 'lower level' factors that could very likely be playing an important role

Question for workshop

- What is the future for individual differences methods?
- Useful for clustering and for predicting – how can it be useful for building a cognitive architecture?

What’s worth talking about?

- Lots of research on how, given a message, we manage to communicate with others
- Less on how we decide what is worthy of comment

Principle of informativeness

- Children in the one-word stage engage others by:
  - commenting on what they find new or unexpected
  - leaving unmentioned whatever is constant or certain
  
  Greenfield, 1979
- Interlocutors, by virtue of having similar past experiences, tend to find the same things unexpected and judge that commenting on them is appropriate
  
  Bates, 1976
- ‘certainty-uncertainty as the perceptual-cognitive basis for the distinction between presupposition and assertion in language’
  
  Greenfield & Smith, 1976
Principle of informativeness

Mommy’s shoe
Cathy’s shoe
Alice’s shoe

- Object given, possessor changes > comment on possessor
  Greenfield and Zukow (1978)
- Contrast sets are a special case
- But to extent to which it is possible to know about real world probabilities more generally, the same principle should apply

Information theory

- Greenfield & Smith (1976) proposed general principle of informativeness by appealing to mathematical theory of information (Shannon, 1948)
- Information theory: a message provides information to the extent it is unpredictable
- Theoretical proposal left untested at time
- Increasingly large corpora of child directed speech now make it easier to test for general principle - can find out how often children hear about different things
- Language statistics reflect real world probabilities, can provide estimates about what should be noteworthy, all other things being equal
- Test case: adjective noun combinations
Experimental study

- Adjective-noun phrases containing adjectives of varying information content
  \[ IC = - \log_2 \frac{f(\text{ADJECTIVE} + \text{NOUN})}{f(\text{NOUN})} \]
- Experimenter describes pictures using adjective + noun
- 3-year-olds were then asked to describe each picture to a second person (N = 31, replication N = 13)
- Measure: likelihood of child producing adjective
- NB adjectives served a descriptive function rather than a contrastive one (Karmiloff-Smith, 1979)
- Question: will children omit adjectives that are less surprising given the noun, despite them being easier to produce?

Principle of Informativeness

Likelihood of child producing an adjective increases by 22% for each additional bit of information given by the experimenter’s adjective

Repetition

Likelihood of child producing an adjective increases by 24% for each additional bit of information given by the experimenter’s adjective

Bayes factor: 10.78
‘positive evidence’

Principle of informativeness

- Natural variance in the things people tend to say (found in corpora of child directed speech) predicts what children choose to comment on
- We find unexpected things interesting
- And go on to make them the basis of our conversations

Individual differences

- Tendency to remark on the unexpected is open to individual differences
- Some evidence of atypical development in Autism:
  - informativeness (O’Neill & Happe, 2000)
  - statistical learning (Scott-van Zeeland et al, 2010)
- Do individual differences in attention and statistical learning interact with experience of language to predict abilities on these tests?
- To the extent that we track the same probabilities in the world, we find the same things noteworthy and are able to have mutually satisfying conversations
Summary

• Some social communication can rely on ‘emergent co-ordination’ – although in typical development children can move easily to planned co-ordination when necessary (multiple types of audience design)
• Likely to rely heavily on attending to and learning from same things in the environment as others do
• Potential to explore broader range of sources of individual differences in pragmatic ability
• Thereby explain why we learn at the rate we do

Pragmatic Development

1. Overview of research on pragmatic development
2. The communicative infant from 0-18 months
3. The development of speech acts
4. Turn-taking
5. Conversation Analysis and Pragmatic Development
6. Pragmatic Constraints on Speakers’ Theory of Mind
7. Two Pragmatic Principles in Language Use and Acquisition
8. Learning Conventions and Conventionality Through Conversation
9. The pragmatics of word learning
10. The Production and Comprehension of Referring Expressions
11. Scalar implicature
12. Children’s pragmatic use of prosodic prominence
13. The pragmatic development of humour
14. The development of metaphor in signed language
15. Irony production and understanding
16. Narrative Development across Cultural Contexts
17. Children’s Understanding of Linguistic Expressions of Certainty and Evidentiality
18. Crosslinguistic and crosscultural approaches to pragmatic development
19. Atypical pragmatic development
20. Assessing pragmatic development: The LUI

New website for public!
beforefirstwords.upf.edu