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Variation in language abilities across children; the role of construction-learning

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The conundrum of variation

Humans differ substantially in their ability to acquire and use language. For example, about 7% of children have developmental language impairments. Yet, there is also substantial variation among participants classified as 'language-typical'. Many accounts of variation are framed from the perspective of the competence-performance dichotomy, e.g. children with developmental language impairments have either deficient syntactic competence (Rice & Wexler, 1996), or processing difficulties such as limited short-term memory (Chiat, 2001). However, many have argued that competence and processing are indivisible, representing 'two sides of the same coin'. e.g. Littlemore (2009 p. 2) argues that ***'there is no distinction between language competence and language performance, as performance equates to usage***'. If this is the case, there is no 'free parameter' and no means to explain individual language variation. A solution is to view individual variation as a result of variation in language-**learning** abilities. This study tested this possibility by exploring the relationship between language-learning abilities, and performance on 'static' language assessments. The main research questions were;

- To what extent is there individual variation in language-learning abilities?
- To what extent is this variation associated with performance on static assessments?
- What cognitive mechanisms drive language-learning?

Construction-learning studies

Numerous studies have explored construction-learning by children. These tend to employ novel constructions, e.g. *Verb NP1 NP2* (Wonnacott et al. 2012) with the meaning that NP2 approaches NP1 in the manner of the verb . However, this may be paraphrased using the English locative, e.g. *the cat crawled towards the mouse.* This violates the principle of contrast, that different forms signal different meanings. Therefore it is difficult to create a novel construction which is language-like. To resolve this we identified real low-frequency structures which would be unfamiliar to the children. This increases ecological validity, thereby enhancing our ability to assess underlying learning mechanisms

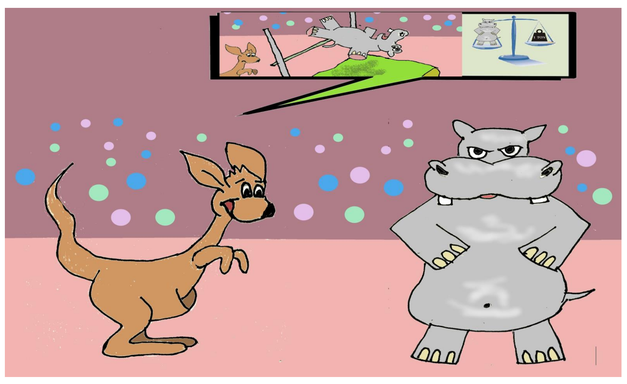
Experimental method

We taught two unfamiliar constructions to 49 typically-developing children (aged 5;2)

(1) What makes you think you can jump higher than me?

(2) **Just because** my legs are short, **doesn't mean** I can't jump high!

(bold face shows constant elements). These are genuine 'constructions' in a construction grammar sense, as they are characterised by relatively idiosyncratic form-function mappings. They have a very specific pragmatic function; to challenge another person's assumptions. Young children are unlikely to grasp this complex pragmatic function. A search of all CHILDES corpora found no instance of a child producing these constructions, while adult usage was very low (21 instances of 'what makes you think...', 10 instances of 'just because'). The structures were presented in a story called 'Animal Olympics'



Little hippo was upset. All the animals laughed at him because he was short and tubby. But then one day the Animal Olympics came to town. This was his chance to prove himself. The first event was the high jump. Guess which animal was best at high jump? That's right the kangaroo.

The kangaroo was mean and horrible, and said '**What makes you think you can jump higher than me?** You're too heavy. Little hippo replied **'Just because I'm heavy doesn't mean I can't jump high**'.

There were 6 different episodes altogether in the story, which was told twice, making 12 episodes overall.

Children were asked to repeat the target sentences. If they were highly accurate (less than 2 word-level errors on past three repetition attempts) the experimenter elicited the construction. If they were not accurate, more support was introduced. Levels are broken down as follows;

Level	Task + level of support	
4	Elicitation	
3	Elicited Imitation (EI = Sentence Repetition)	STARTING LEVEL
2	EI. Sentence broken into chunks with first word highlighted using beat gesture	
1	EI with gesture, and first two words used as cue.	

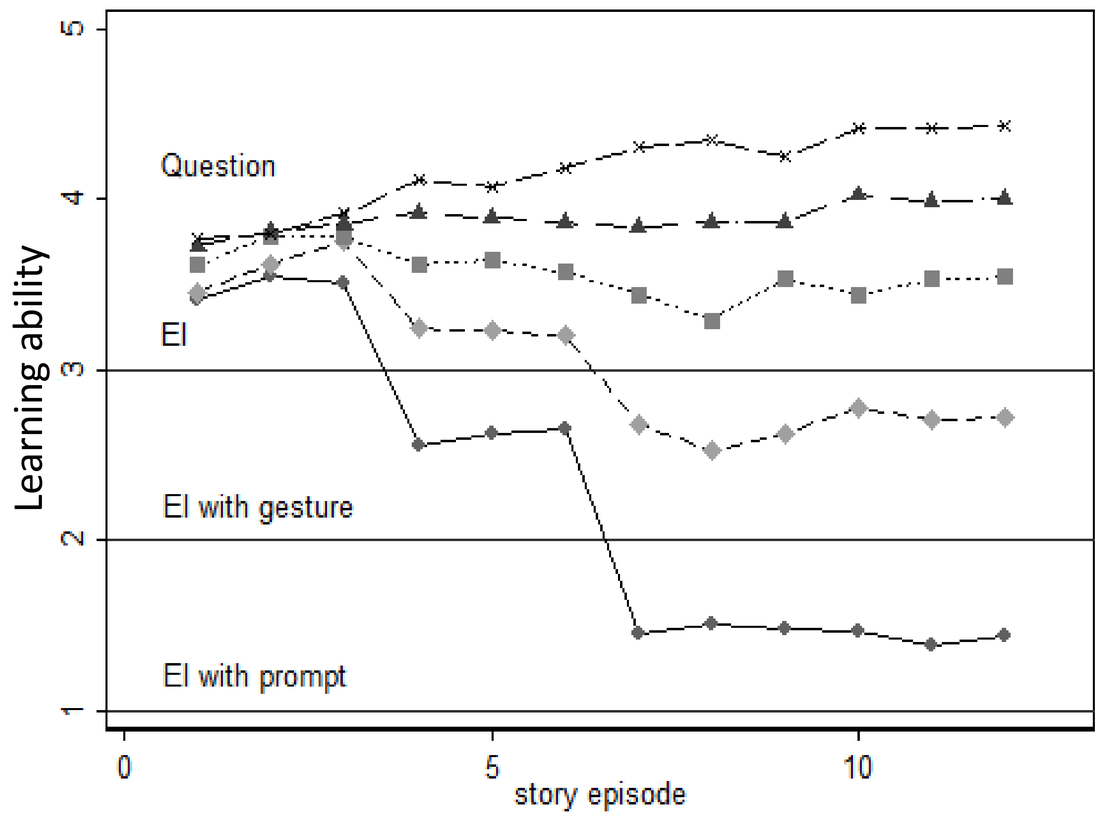
Dependent Variable combined support + accuracy, e.g. 4.5 = 50% repetition accuracy within Level 4, 2.7 = 70% repetition accuracy within level 2. This variable was averaged for the final 3 episodes to create a variable called 'Learning Ability'

2 static assessments were used; the Test of Reception of Grammar (TROG: Bishop, 2003) was used to assess receptive grammar, and the Renfrew Action Picture Task (RAPT: Renfrew, 1997) was used to assess expressive grammar.

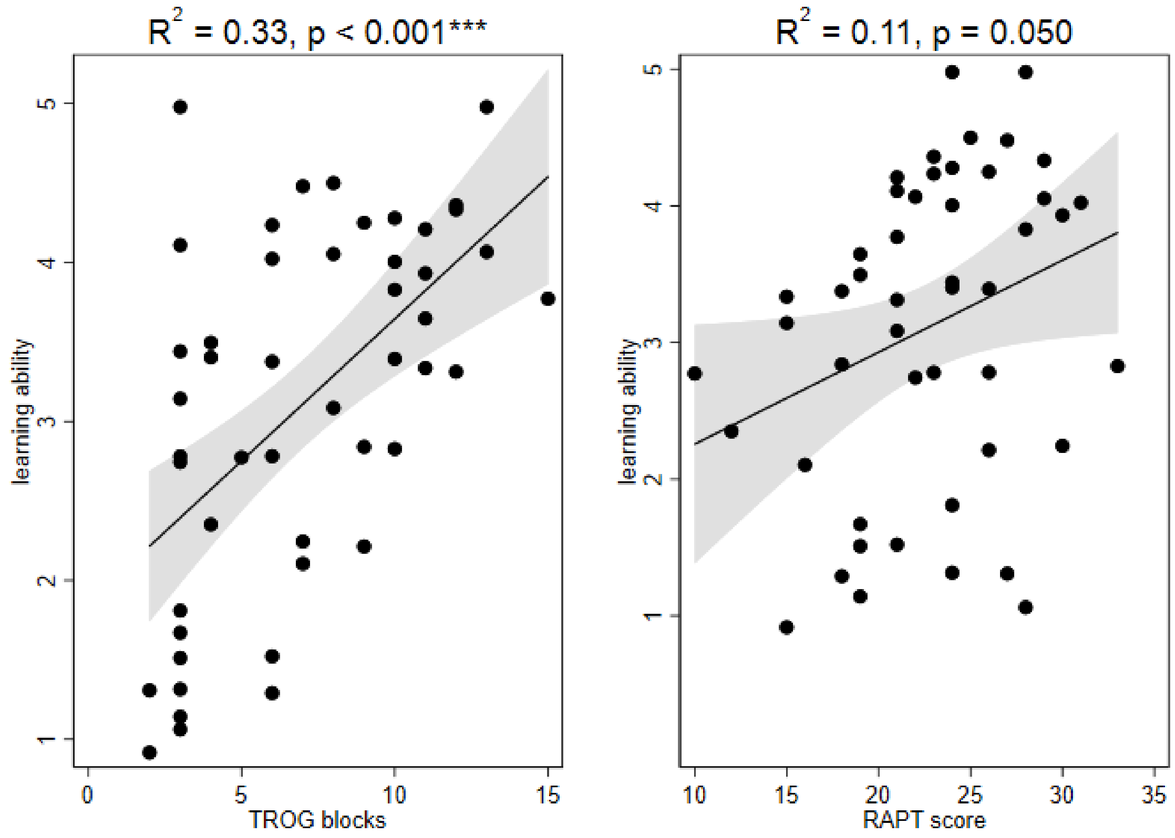
Results

Variation in learning abilities

Children divided into quintiles according to performance on final block



Association between learning abilities and static language assessments



Children found the 'just because' construction more difficult to learn than the 'what makes' construction. This could reflect the occurrence of multiple open slots, and the 'long-distance dependency' between the invariant slots.

Learning Ability was a stronger predictor of performance on the TROG, than short-term memory (repetition performance on the final block)

Conclusions

- **Substantial variation** was observed in learning ability, even within language-typical children
- **Learning abilities predict performance on static language assessments**. This supports the hypothesis that variation in language-learning ability drives variation in overall linguistic abilities
- Structures with multiple open slots (i.e. with a 'dependency') appear easier to learn than structures with a single open slot
- Learning ability was a stronger predictor of static language ability than short-term memory

Caveats

The study enhanced ecological validity by using real language structures, at the expense of control (we cannot be certain that the children did not know the structures).

References

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