How does language experience support language development? Short-term priming and long-term learning

Leone Buckle[a*], Katherine Messenger[a], Holly Branigan[b], Laura Lindsay[b] and Gemma Catchpole[b]

[a] University of Warwick [b] University of Edinburgh

*Leone.Buckle@warwick.ac.uk

Background

Syntactic priming occurs where children and adults reuse sentence structures that they have recently heard, instead of a suitable alternative (Bock, 1986).

E.g. the likelihood of using a passive is higher after hearing passive vs active sentences.

Long-term priming effects in adults (Bock & Griffin, 2000) suggest that priming reflects implicit learning based on the same mechanisms as children's language learning (Chang, Dell & Bock, 2006).

Our research questions

1. **Do children show long-term priming effects** suggesting that experience of a structure leads to syntactic learning?

2. **How does this compare across development and to adults** – are (younger) children more susceptible to syntactic experience (Chang, et al., 2006)?

Preliminary Evidence

Children and adults completed two priming sessions, one week apart (Branigan & Messenger, 2016).

Children (3;4 – 4;10 years) produced more target structures in Session 2 than Session 1 but adults produced equivalent target structures in both sessions.

This suggests that children are particularly susceptible to learning from syntactic experience while priming.

Aims

We aim to replicate Branigan & Messenger's (2016) study and extend it by:

- examining patterns of learning at specific points in development,
- exploring the timecourse of priming effects.

To do this, we are:

- recruiting and testing larger groups of participants with narrower age ranges.
  - We compare the effects in children at an earlier stage of acquisition for a structure, a later stage of acquisition for the structure, and in adults.
- using larger number of items and two sessions to examine immediate and lasting priming effects
  - We investigate immediate priming and short-term learning (cumulative priming) within a session,
  - We investigate longer-term persistence of these effects between sessions one week apart.

Two experiments examine the timecourse of experience-based effects for:

- noun phrase structures (Expt 1),
- verb phrase structures (Expt 2).

Design

Both experiments have:

- 2 x 2 x 3 designs
  - Prime structure, within-ppts;
  - Experiment session, within-ppts;
  - Age group, between-ppts.
- 48 prime-target trials and 8 filler trials per session

Procedure

Participant and experimenter alternate turning cards and describing pictures of events in a turn-taking 'Snap' task in two separate sessions one week apart (Branigan & Messenger, 2016).

Experimenter's description = prime structure
Participant's description = target response

Experiment 1: Priming of Noun Phrases

Experiment 1 compares syntactic priming of noun phrase structure (adjective noun phrases [AN] vs relative clauses [RC]) in 3-year-olds, 4.5-year-olds and adults. Target structure = RC.

N = 132 *(half of each group tested in Edinburgh and half in Warwickshire)*

- 44 3-year-olds, recruitment range 2;10 – 3;3 years;
- 44 4.5-year-olds, recruitment range 4;3-4;8 years;
- 44 adults, recruited from student population

Prime	Target
 AN: It's a pink clock RC: It's a clock that's pink	 *Hand*
Fillers	
 It's a green bus	 *Snap!*

Experiment 2: Priming of Verb Phrases

Experiment 2 compares syntactic priming of verb phrase structure (actives vs passives) with 3.5-year-olds, 5.5-year-olds and adults. Target structure = Passive.

N = 132 *(half of each group tested in Edinburgh and half in Warwickshire)*

- 44 3.5-year-olds, recruitment range 3;3 – 3;8 years;
- 44 5.5-year-olds, recruitment range 5;3 – 5;8 years;
- 44 adults, recruited from student population

Prime	Target
 Active: The dog is patting the king Passive: The king is being patted by the dog	 *'scratching'*
Fillers	
 *The girls are dancing*	 *Snap!*

Planned analysis

- 2x2x3 mixed effects models to calculate the frequency of **RC** and **passive targets**.
- Fixed effects = prime structure, session, age, cumulative primes
- Random effects = participant, item
- Compare magnitude of **immediate priming** across ages within sessions.
- Examine whether **cumulative priming** predicts magnitude of priming at different ages.
- **Compare priming effects between sessions** to see if there is long-term learning across ages

Expected Results

For **both experiments**, we expect to find:

1. **Immediate priming effects in all age groups** such that participants produce more target structures after target primes than after alternative primes.
2. **Larger immediate priming effects in younger children** than in older children or adults such that participants at earlier stages of acquisition are more susceptible to priming.
3. **Greater cumulative priming within sessions in younger children** than in older children and adults.
4. **Long-term effects of experience that will interact with age** such that younger participants will be more likely to produce the target structure in Session 2 than Session 1 than will older participants.

Implications

- Stronger immediate priming and long-term learning effects in younger children as compared to older children and adults would indicate that children have weaker representations for RC and passive constructions.
- Greater priming in younger children would also provide evidence for error-based learning in children since they are less familiar with RC and passive constructions.
- These results would help to clarify whether children's short-term language experience leads to long-term learning of syntactic structures at particular stages of acquisition.

References

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Language Experience and Development Project

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Website: www.blogs.ed.ac.uk/leadproject **Twitter: @LEADProject2**