Input Statistics versus Grammatical Function: Comparing Children's and Adult's Learning of Novel Gender-Marked Classifiers

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Background

To become a fluent speaker of a language, children must learn functions of grammatical morphemes and use them appropriately (e.g., Berko, 1979). Some researchers have found young children to be *less* adept at identifying the key semantic dimensions relevant in a given context compared with adults (e.g., Smith et al., 2002), while others have found children to be *more* likely to generalize (e.g., Hudson Kam & Newport, 2005; 2009).

How can children be at the same time less likely to generalize than adults *and* more likely to generalize? We suggest two possibilities: 1) Children are less likely to appreciate a semantic generalization but are particularly attuned to formal regularities; 2) Children's tendency to boost the probability may depend on the nature of the task design, as this tendency has primarily been found in production tasks.

Experiment 1 examines whether children and adults generalize novel classifiers based on a semantically salient category (*natural gender*), or whether their productions depend on regularities in the input. **Experiment 2** uses a forced-choice judgment task to determine whether children's *preferences* for formulations that obey a generalization align with their productions.

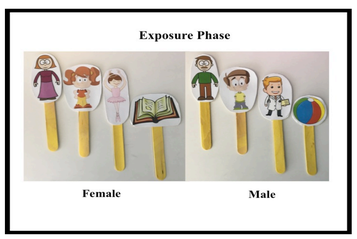
Method & Design

Participants: In **Experiment 1**, participants were 20 monolingual English-speaking 5- to 7-year-olds (*M*=74.0 months; *SD*=6.35; 11 female) and 20 monolingual English-speaking college students (16 female). In **Experiment 2**, participants were 20 additional English-speaking 5- to 7-year-olds (*M*=73.5 months; *SD*=6.68; 8 female).

Stimuli and Design (for Experiments 1 and 2):

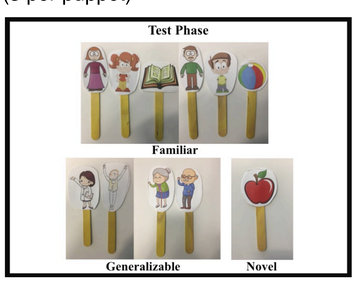
Exposure Phase.

- In 36 learning trials, participants heard two novel classifiers (*po* and *dax*) paired with male, female, or inanimate puppets
- Classifiers were probabilistically (75%) associated with natural gender
- Difference in classifier frequency: 66.7% of practice trials used one classifier and 33.3% used the other



Test Phase.

- Four puppets introduced that were generalizable based on natural gender, as well as one novel inanimate puppet
- 33 total test trials (3 per puppet)



Procedure

Experiment 1 (Production Task)

- **Adults** told they would hear a made-up language, followed by a production test
- **Children** told they would hear a language that a puppet "Mr. Chicken" uses, and they would later be asked to say things the way that Mr. Chicken says them

Experiment 2 (Judgment Task)

- **Children** given the same exposure as Experiment 1, but at test, they were asked which of two options Mr. Chicken would say (e.g., *Which do you think Mr. Chicken would say: "Moop dax mother" or "Moop po mother"?*)

"Mr. Chicken"

Results

Experiment 1:

- Adults performed greater than chance (producing the 'correct' classifier) on both familiar and generalizable classifier trials ($p < .001$ for both)
- Children performed significantly greater than chance on familiar ($p = .029$) but not generalizable trials ($p > .1$) (Figure 1)
- 10/20 children produced the more frequent classifier greater than 67% of the time, suggesting probability boosting; 0/20 adults showed evidence of probability boosting (Figure 2)

Experiment 2:

- Children performed significantly greater than chance on familiar ($p < .001$) but not generalizable trials ($p > .1$) in the judgment task (Figure 1)
- 0/20 children in the judgment task showed evidence of probability boosting (Figure 2)

Figure 1. Proportion correct classifier use for participants in **Experiment 1** (Adult and Child groups) and **Experiment 2** (Child2) for familiar classifier/noun pairs and generalizable classifier/ noun pairs.

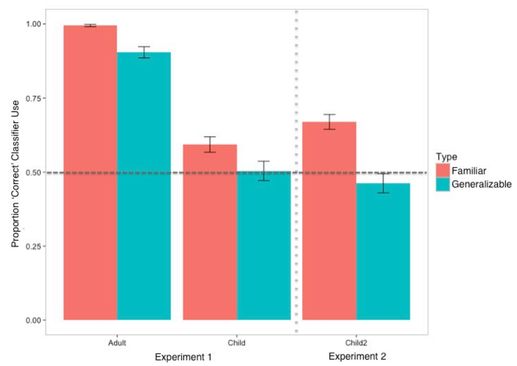
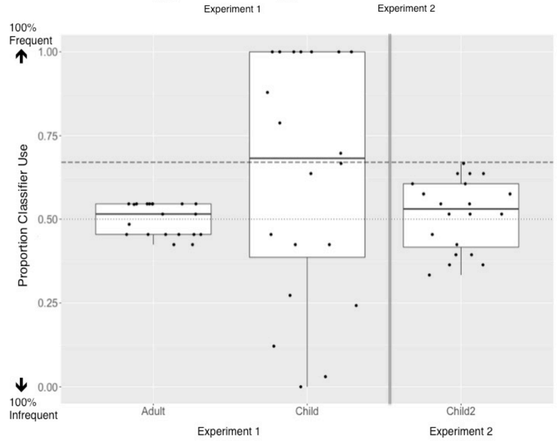


Figure 2. Box-and-whiskers plot showing proportion classifier use (based on input frequency in the exposure phase) for participants' productions in **Experiment 1** (Adult and Child groups) and for children's preferences in **Experiment 2** (Child 2 group).



Summary and Conclusions

While adults in Experiment 1 readily learned the semantic basis of the two classifiers, applying the distinction to familiar and generalizable puppets alike, children displayed no evidence of using natural gender to generalize in either the production task of Experiment 1 or the forced-choice judgment task of Experiment 2.

In **Experiment 1**, the majority of the children (14/20) tended to regularize the language they produced (with 4 children preferring the less frequent classifier). We can conclude that when children witness input they perceive to be unconditioned, either because it *is* unconditioned (Hudson Kam & Newport, 2005) or because they fail to learn the conditioning factors – as in the lexical conditioning in the present study – children tend to simplify the language in their own productions.

In **Experiment 2**, no child preferred the simplified grammar, suggesting that their simplified productions are likely a temporary stage in language learning. That is, since children recognize that a more complex system is normatively preferable, they can be expected to learn and produce the more complex system over time.

Overall, we aim to emphasize two points:

1) Children do not form generalizations as quickly as adults, even when the basis for the generalization is a salient one that is already familiar to them.
2) Children produce simplified utterances, not as an end in itself, but due to high task demands; children display sensitivity to a more complex system before they are able to reproduce the complexity themselves.

References

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