



The Development of Cardinal, Ordinal, and Spatial Language in Young Children



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Introduction

Language is an important aspect of child development. Our work focuses on three types of complex language: cardinal, ordinal, and spatial labels.

Cardinality development occurs before ordinality, though both increase with age in early childhood (Colomé & Noel, 2012).

Children first learn lists of number words, such as one, two, and three, then they give those words meaning (Slusser, Ditta, & Sarnecka, 2013).

The more number words children know, the greater their comprehension of ordinal (1st or 3rd) orders (Brannon & Van de Walle, 2001).

Being less familiar with ordinal labels can negatively impact problem-solving (Miller, Marcovitch, Boseovski, & Lewkowicz, 2015).

Complex spatial language also improves from 3 to 5 years (Hund, Bianchi, Winner, & Hesson-McInnis, 2017).

Improvement in spatial language also helps with problem solving in young children (Simms & Genter, 2019).

Objective

To specify the developmental trajectory of cardinal, ordinal, and spatial language comprehension and production from 3 to 5 years.



Method

Participants: To date, we have tested 65 children ages 3, 4, and 5 years from local preschools and the community (34 girls, 31 boys).

Measures: Parents completed a demographic survey and a language checklist focusing on the production of spatial and ordinal labels. Children completed our cars task.

Procedure: Children were familiarized with the cars, stoplight, and garage and with each type of language. They completed 9 trials. Researchers noted participants' responses. Children received stickers at the end of their session.

Procedure

Give Me Condition

- The researcher referred to the cars with ordinal (*first, third, fifth*), spatial (*front, middle, back*), and cardinal (*one, three, five*) labels, but the order was randomized.
- Children were asked to place car(s) into the garage to test language comprehension.
 - Cardinal: "Please put one car into my garage"
 - Ordinal: "Please put the first car into my garage"
 - Spatial: "Please put the front car into my garage"

Tell Me Condition

- Children were asked to tell us about the red car among the blue cars to test language production.
 - Cardinal: "How many cars are waiting at the stoplight?"
 - Ordinal: "Look at the red car, what is its position at the stoplight?"
 - Spatial: "Look at the red car, where is it?"

Give Me Condition



Tell Me Condition



Results

Figure 1. Proportion Correct for Label Type

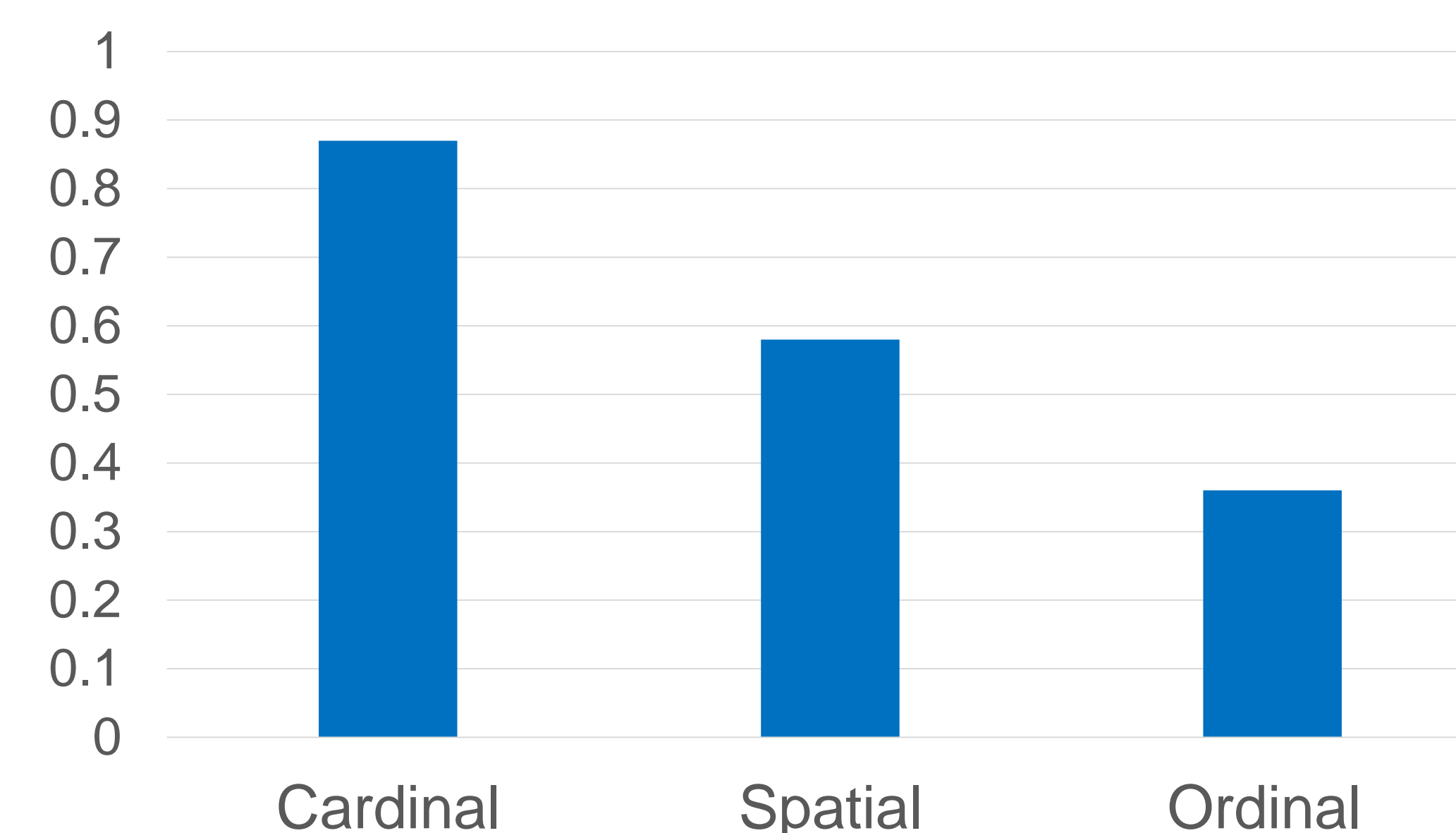
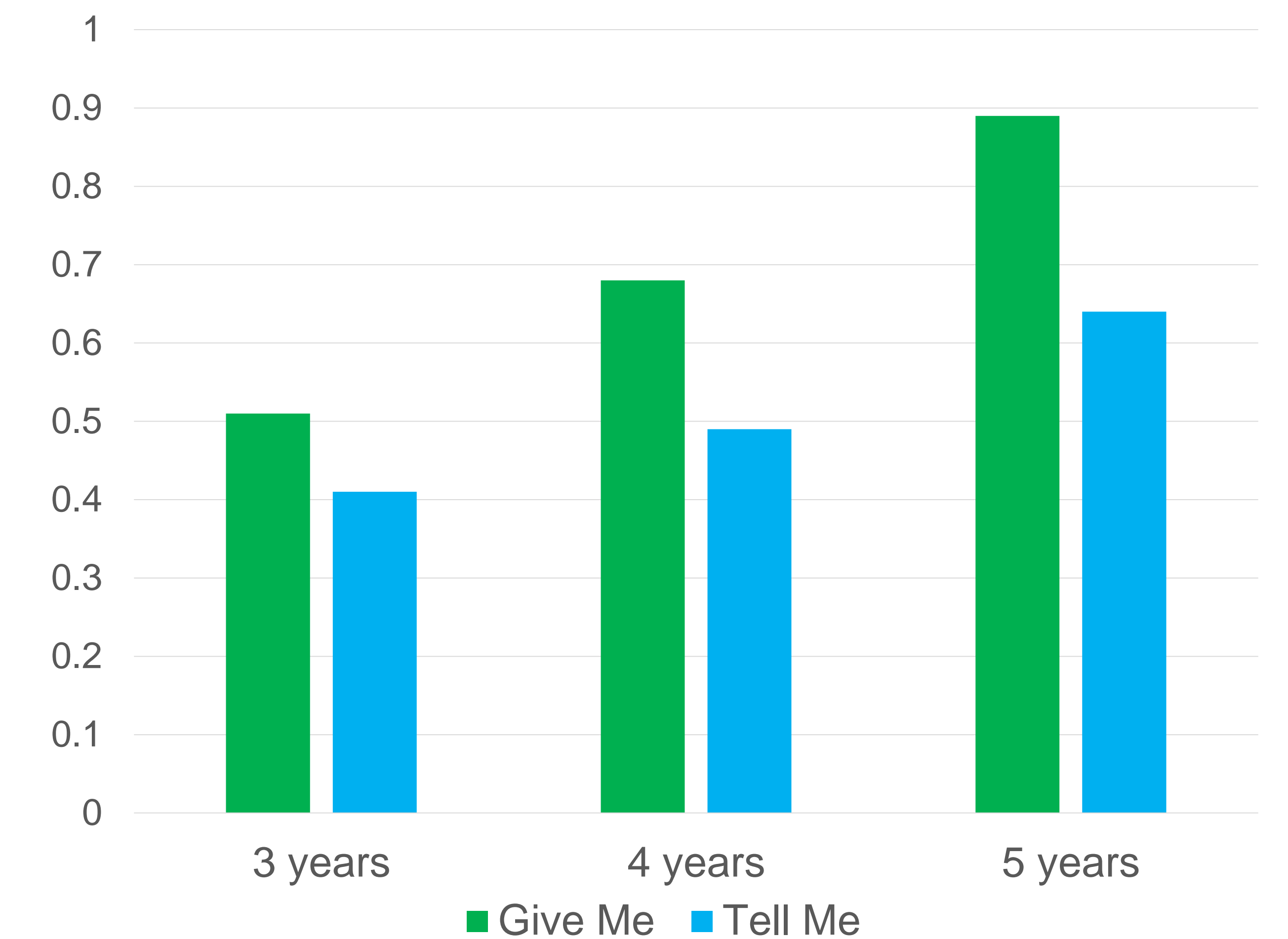


Figure 2. Proportion Correct for Each Age and Condition



Conclusion

- Cardinal language is easier than spatial language, which is easier than ordinal language.
- Comprehension is easier than production.
- Cardinal, spatial, and ordinal language improves with age from 3 to 5 years.
- As future data are collected, we hope to continue to see significant patterns based on age, labels, and conditions. We also will interpret interaction effects.
- This work is important because cardinal, spatial, and ordinal language facilitates academic success.

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