Improvements in Cardinal, Ordinal, and Spatial Language in Young Children

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Introduction

- Language is an important aspect of child development
- During early childhood, we see rapid gains in cardinal, ordinal, and spatial language linked with problem solving (Brannon & Van de Walle, 2001; Miller, Marcovitch, Boseovski, & Lewkowicz, 2015)
- Cardinal and ordinal language often are investigated together, with findings consistently showing that young children understand and use cardinal labels before ordinal labels (Colomé & Noel, 2012)
- Complex spatial language also improves during early childhood (Hund, Bianchi, Winner, & Hesson-McInnis, 2017; Simms & Gentner, 2019)
- To date, no study has investigated cardinal, ordinal, and complex spatial language development in one paradigm

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. Children were randomly assigned to the Give Me or Tell Me condition in the cars task.

Procedure: Children were familiarized with the cars, stoplight, and garage and with the task. They completed 3 trials using each label type (9 trials total) in counterbalanced order.

Cardinal labels: one, three, five

Ordinal labels: first, third, fifth

Spatial labels: front, middle, back

Procedure

Give Me Condition

- 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

We analyzed children’s responses (proportion correct) using an Age x Condition x Label mixed model Analysis of Variance (ANOVA). Results are depicted in Figures 1 & 2.

Figure 1. Proportion Correct for Each Age and Condition

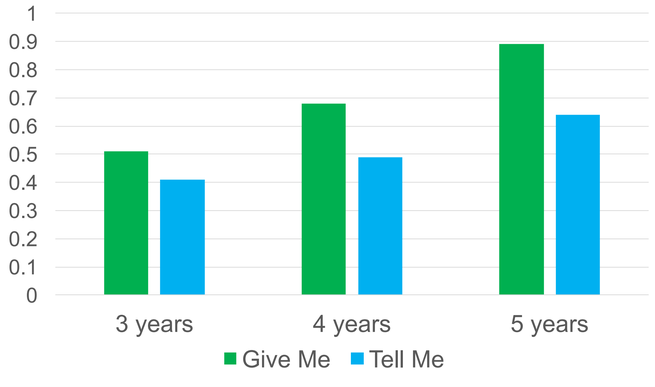
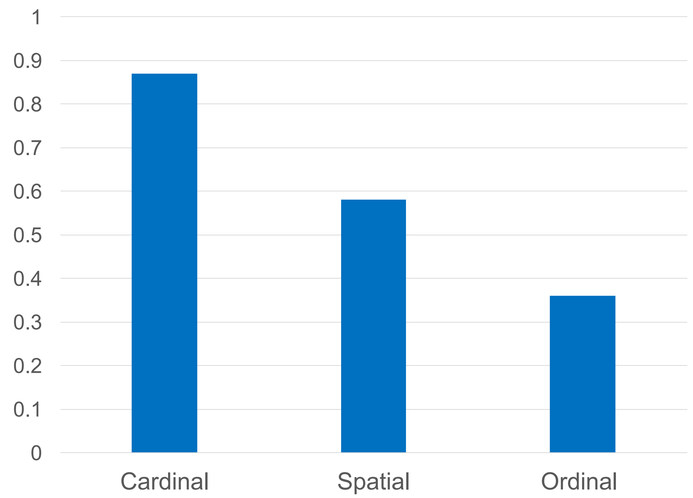


Figure 2. Proportion Correct for Label Type



Conclusion

- Cardinal, spatial, and ordinal language improves significantly with age from 3 to 4 and 4 to 5 years (see Figure 1)
- Comprehension outpaces production (see Figure 1)
- Cardinal labels are easier than spatial labels, which are easier than ordinal labels (see Figure 2)
- This work is important because cardinal, ordinal, and spatial language facilitate problem solving and academic success

References

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