

Preferential Looking Tests of *Wh*-Questions in Children with Specific Language Impairment

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I. Introduction

- Specific language impairment (SLI): presence of language difficulties in the absence of related factors (Leonard, 1998)
- Comprehension difficulties in children with SLI may be result of limited linguistic processing ability
- Wh*-question comprehension tasks used to assess processing limitations (Deevy & Leonard, 2004)

Structural Distance

Subject question: *What* [*x* was hitting the flower]?

Object question: *What* was [the apple hitting *x*]?

- Location of gap (e.g., *x*; argument position to which the *Wh*-word is related) must be identified before *Wh*-question can be interpreted
- Greater distance between *Wh*-word & gap = delay in interpretation = higher processing demands

Subject questions: shorter distance (gap: subject position)

Object questions: greater distance (gap: object position)

- Greater structural distance in object questions may result in higher processing load (Deevy & Leonard, 2004)

Syllabic Distance

Long subject question: *What* [only just now *x* was hitting the flower]?

Long object question: *What* was [the apple only just now hitting *x*]?

- Adverb padding (e.g., *only just now*) increases length in # of syllables without changing structure

Long questions should be more difficult than short

Linguistic Processing Limitation Account

- Predicts that *long object* questions are the most difficult to understand because structural & syllabic distance increase processing demands

Current Study

We used preferential looking (PL) to examine the extent to which preschool-age children understand *Wh*-questions

- Eye movements may provide more detailed account of language processing (Tanenhaus, 2000) than pointing or naming tasks
- Research using PL revealed simple *Wh*-question comprehension at 15-months of age (Seidl, Hollich, & Jusczyk, 2003)
- We used PL to examine effects of structural (e.g., subject vs. object) & syllabic (e.g., short vs. long) distance on children with SLI as compared to typically developing (TD) children

We predict:

- SLI < TD group performance
- Object < subject questions
- Longer (e.g., padded) < shorter (e.g., unpadded) questions
- SLI group will demonstrate the greatest difficulty with *long object* questions where processing demands are the greatest

II. Methods

Participants:

- 11 children with SLI (*M* age = 5;3; SPELT-II < 10th %-ile) & 11 TD children (*M* age = 4;6; SPELT-II > 17th %-ile) matched for receptive vocabulary raw scores (PPVT-III); All participants: age appropriate nonverbal ability & oral structure/function, passed hearing screening, appeared neurologically unimpaired



Visual Stimuli:

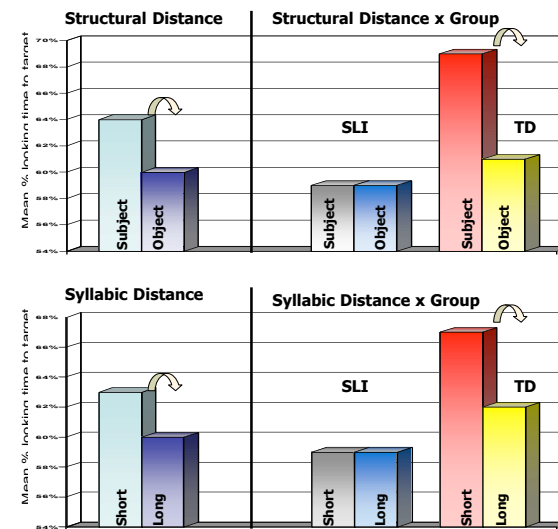
- Saw movie of object hitting another object on LCD projection display

Verbal Stimuli:

- Heard variety of pseudo-randomized questions (after action) manipulated for structural (e.g., subject, object) & syllabic (e.g., +/- padding) distance

Data:

- Eye movements recorded during study and later coded frame-by-frame
- Analyzed eye movements conducted after question presentation; calculated % looking time to target (vs. non-target)
- Mixed-model ANOVA: group (e.g., SLI, TD), structural distance (e.g., subject, object), syllabic distance (e.g., short, long)



III. Results

- In preliminary task (e.g., identify objects shown on screen), demonstrated above-chance looking behavior (TD: 75%; SLI: 71%)
- Supports assumption that eye movements reflect comprehension

Significant Main Effects

- Structural Distance ($F(1, 20) = 5.27, p = 0.03$)
- Syllabic Distance ($F(1, 20) = 4.70, p = 0.04$)

Significant Interactions

- Structural Distance x Group ($F(1, 20) = 4.64, p = 0.04$)
- Syllabic Distance x Group ($F(1, 20) = 3.73, p = 0.068$) * *marginal*

IV. Discussion

Main effect for structural distance

- Deterioration in performance on object questions
- Interaction of *structural distance* x *group*: TD group is creating subject/object asymmetry

Main effect for syllabic distance

- Deterioration in performance on long (e.g., padded) questions
- Interaction of *syllabic distance* x *group* (*marginal*): TD group is creating short/long asymmetry
- SLI group: variability in distance does not create variability in performance
- Increased processing demands should = reduced performance

We propose that the children with SLI were using a non-grammatical strategy to answer the *Wh*-questions.

Overt Strategy: look for the object *not* named in the question

Question: *What was the apple hitting?*

Overt Strategy: not apple, must be flower

To test Overt Strategy:

- Introduce ambiguity by using 3 objects in visual stimuli (instead of 2)
- Overt Strategy not sufficient because 2 objects not named in question
- Predict SLI group performance < TD group performance

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