Instruction following by children with autism:
A comparison of visual cues with spoken cues

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Background

•*Receptive* difficulties

–Children with autism may have difficulty understanding abstract language concepts such as prepositions, yet this has received little empirical attention

•Importance of prepositions in everyday life

–Refer to the location of an object, people, or place; state where a person/object should be placed; instruct child where to position herself

• Spoken input

–Advantages: (1) Readily accessible in natural environments; (2) don't require creation of materials; (3) Predominant mode

–Disadvantages: (1) may produce more errors, (2) decreased motivation

•Augmented input

–"strategies to augment the input provided to AAC users during communication interaction or during instruction in AAC use" (Wood et al., 1998, p. 261).

–Stipulates that the other modality supplements speech

Dynamic Scene Cues	Static Scene Cues
•Full motion video clips that depict the action underlying the concept or directive (Shane & Weiss-Kapp, 2007). •Capture sequence of events	•Photographic or pictorial visual scenes that portray a concept or directive (Shane, 2006) •Capture a single moment

•Augmented input: *Dynamic Scene Cues* plus Speech

–Advantages: (1) Action is explicit;(2) depict agents, actions, and objects in context; (3) contains more information than mere depiction of an object; (4) may yield less errors than spoken directives alone

–Disadvantages: (1) Transient; (2) not always readily available; (3) requires technology; (3) need to be organized

"Put the boy *behind* the lamp"

•Augmented input: *Static Scene Cues* plus Speech

–Advantages: (1) Non-transient, evoke quicker recall; (2) depict agents, actions, objects & their relationships in context; (3) contains more information than mere depiction of an object; (4) may yield less errors than spoken directives alone

–Disadvantages: (1) Not always readily available; (2) need to be properly organized; (3) action is implied rather than explicit

"Put the boy *behind* the lamp"

Purpose

- Limited research supporting the effectiveness of interventions using static and dynamic scene cues (Daughin et al., 2004; Mechling & Gustafson, 2008; Pierce & Schreibman, 1994).
- Dearth of studies comparing spoken input with static and dynamic scene cues without providing explicit instructions in terms of receptive understanding of prepositional phrases
- Given the comprehension difficulties of many children with autism and the potential advantages of augmented input, such comparisons are critical
- Purpose: to compare spoken input to two augmented input modalities (i.e., static scene cues plus speech, dynamic scene cues plus speech) in terms of their effects on carrying out directives that involve object-preposition-location.

Pre-assessments

- Spoken Noun Comprehension
  - Retrieve one object from an array of three objects - all six nouns were tested (figurine girl, figurine boy, figurine man, lamp, box, bowl)
- Match-to-Sample
  - Presented with a photo and asked to match to figurines and objects ("Give me this")
- Imitation
  - Six video clips depicting various actions ("hands on head"); "your turn" or "now you do it;" 2 trials per action
- Placed into categories of "high" & "low" for each task

Procedures

1. Exp. placed target items in random order on table
2. Focused child's attention through gestural or spoken means and repositioning the chair
3. Spoke directive or presented condition specific cue
4. 10 s to respond and a 3 second ITI (Repeat if no response)
5. Provided non-specific intermittent feedback
6. Used count-down board as needed to sustain motivation

Treatment integrity and Reliability

- Assessed for 66% of participants; 7 procedural steps
- 99.4% of steps followed as planned; IOA: 100%

Materials

- Directives (12 in total; 4 each per condition)
  - "Spoken:" spoken by experimenter;
  - "Dynamic:" video clip depicting action to be carried out, presented by examiner using iPad.
  - "Static:" created from the still frame (objects in final position) of a dynamic scene cue
- Figurines and associated props, iPad

Participants

Participants	Gender	Ca[a]	Diagnosis	Imitation	Noun Knowledge	MTS[b]
1	M	8;1	Autism	High	High	High
2	M	10;9	PDD-NOS	High	High	High
3	F	5;6	Autism	Low	Low	Low
4	M	3;9	PDD-NOS	High	High	High
5	M	14;8	Autism	High	High	High
6	F	8;10	Autism	High	High	High
7	M	6;2	Autism	High	Low	High
8	M	6;10	PDD-NOS	High	High	High
9	M	16;8	Autism	High	High	High

a = chronological age b = Match-to-sample

Design and Measures

•Within subjects design

•Dependent variable

–Carrying out the experimenter's directive

•Operational definitions

–Correct: child placed the agent relative to the object per preposition within 10 s of the spoken and/or visual directive

–Incorrect: child placed agent in a location that differed from preposition or if the child took longer than 10 s.

Results

Levine F Statistic: test for equality of error variance.

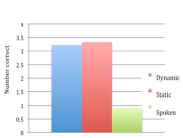
–non-significant (p = .906): assumption of homogeneity of variance has been met.

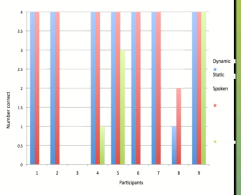
One-way within-subjects ANOVA

–Main effect for condition, F (2, 27) =7.559, p = .003

–Significant difference between spoken and dynamic scene cues (p=.003), and spoken and static scene cues (p=.002)

–No difference between static and dynamic scene cues (p=. 887)





Discussion

•Provides preliminary evidence that static scene cues and dynamic scene cues are more effective than spoken cues alone related to directives involving prepositional phrases without explicit instruction.

•Problematic if spoken cues continue to be used as the primary mode of instruction for children with autism as seems to be the case (Hall et al.,1995).

•Children who scored "high" on the pre-screening tasks also met the targets in the actual experiment

Limitations, Directions, & Conclusions

•Small sample size & small corpus of directives

•Ceiling effects may have influenced results

•Children were presented with *target* objects/ figurines *only* (i.e., no distractors)

•Design did not rule out order effects

•Unclear to what extent responding was under the control of spoken cues in the two augmented input conditions

•Optimize stimuli and replicate

•Children with Autism or PDD-NOS can carry out directives more effectively when input is provided through augmented means (visual [static or dynamic scene cues] plus the auditory modality [spoken], rather than providing input through the auditory modality alone (i.e., spoken).

Key References

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