Effects of a Visual Immersion Experience on Communication in Autism: An Update

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Introduction

• History of using visuals at CHB
• Visual approach to communication now commonly accepted
• Need for research and further development of this approach
• Longitudinal field study initiated in October, 2009

Purpose

• Investigate potential effects of a visual immersion experience on communication and language development
• Refine and expand visual instructional approach
• Identify barriers to implementation and determine solutions
• Train others
Curriculum Framework

• 7 Communicative Operations
  – Protesting/Refusal
  – Organization/Transitions
  – Requesting
  – Directives
  – Commenting
  – Questions
  – Social Pragmatics

• Generally considered non-hierarchical

Design

• Exploratory case study design (ongoing)
  – Uncommon design in field of speech language pathology

• Visual immersion experience implemented across all key environments
  – Home
  – School
  – Community

• Train the trainer model
  – Field director serves as team leader and communication “expert”
  – Trained parents, home aids, family friends
  – Trained teachers, classroom assistants, peers

Design cont.

• Highly intensive project
  – Participant observation in the field (4 days/week)
  – Direct testing and intervention (4 days/week)
  – Discussions with research team (weekly or bi-weekly)
  – Formulation of hypotheses, testing, reformulation and re-testing

• Results from first 2 years for participant 1 reported

Participant 1: BC

– Age: 19 years (17 at study commencement)
– Diagnosis: Autism (moderate-severe)
Procedure

- Gather baseline data
  - Language/communication skills (7 operations)
  - Routines
  - Preferences
  - Mentor goals and concerns

- Develop goals (ongoing)

- Create and implement materials; train mentors (ongoing)

- "Handoff" to mentors; continue to track progress and consult as needed (ongoing)

Data Collection and Analysis

- 3 data sources
  - Field notes
    - Observations (participant observer)
    - Parent/mentor report (conversations, emails)
    - Data from direct intervention activities
  - Video clips
  - Surveys (completed by key mentors)

- Data analysis
  - Quantitative (video clips, surveys, performance measures across the 7 operations)
  - Qualitative (observation; analysis of field notes and video samples)
    - Constant comparative method (Glaser & Strauss, 1967)
      - Compare incidents applicable to each category
      - Integrate categories and their properties
      - Delimit the theory
      - Write the theory

Agenda

- Report on data from 4 operations:
  - Protesting/Refusal
  - Requesting
  - Directives
  - Comments

- Discuss implications for programming and instructional approach

- Conclusions, implications and next steps

Baseline Characteristics

- Comprehension
  - Use of context clues
  - Physical/gestural assistance

- Expression
  - Primarily physical in nature
  - Use of scripted language; echolalia
  - Initiated relatively infrequently

- "Easy-going;" no behavioral concerns

- History of instruction
  - Instruction primarily provided verbally
  - Introduced to V.O.L. “not effective”
  - Prior experience with PECS, Mayer-Johnson symbols

- High level of interest in visuals
Protesting/Refusal

**Definition**

Protesting/Refusal

Behavior that expresses objection, disapproval, or rejection of an environmental stimulus.

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Protesting/Refusal

**Goals**

- Establish a means of symbolic protesting
  - Safe
  - Socially acceptable
  - Universally understood
- Increase frequency of protesting

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Protesting/Refusal

**Baseline**

- Protesting primarily physical in nature
- Relatively infrequent
- No tools/strategies available to support protesting
  - Yes/no questions
- Concerns about over-compliance

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Protesting/Refusal

**Goals**

- Establish a means of symbolic protesting
  - Safe
  - Socially acceptable
  - Universally understood
- Increase frequency of protesting

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Protesting/Refusal

**Baseline**

- 1 year
- 18 months
- 2 years

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Protesting/Refusal

**Intervention**

- Spontaneous use of "stop"
- Intentional responses to yes/no questions
- Spontaneous use of "all done"
Survey Data

• Administered at 3 time periods
  – Baseline,
  – End of Yr 1
  – End of Yr 2

• 5 respondents
  – 3 primary caregivers
  – 1 home assistant
  – 1 program instructor

• 59 statements -- each rated on a scale from 1 (strongly disagree) to 5 (strongly agree)

Surveys: Topics Covered

• Language and Communication
• Overall Engagement and Initiation
• Skills Acquisition and Independence
• Mood / Overall Happiness
• Mentor Competence and Confidence

Protesting/Refusal Summary

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Current (year 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Primarily physical in nature</td>
<td>• Continued physical protesting; addition of symbolic protesting (speech, visuals)</td>
</tr>
<tr>
<td></td>
<td>• Relatively infrequent</td>
<td>• Increased frequency of spontaneous protesting (multiple mentors and environments)</td>
</tr>
<tr>
<td></td>
<td>• No tools/strategies available for eliciting information</td>
<td>• Mentors now better able to elicit information more effectively</td>
</tr>
<tr>
<td></td>
<td>• Concerns about over-compliance</td>
<td>• Mentors report increase in protesting</td>
</tr>
</tbody>
</table>

Legend:
- This learner protests spontaneously.
- This learner protests in a socially appropriate manner.
- This learner refuses undesirable objects and activities spontaneously.
- This learner refuses undesirable objects and activities in a socially appropriate manner.
Requesting

Definition

Expressing a desire for objects, activities, people, affection, attention, recurrence, assistance, and information/clarification.

Requesting

Goals

- Provide tools that will help others to gain information about wants and needs ("supported requesting")
  - Intentional choices
    - Response to yes/no questions
    - Open-ended questions regarding preferences
  - Increase frequency of spontaneous, symbolic requesting
  - Expand requests semantically and syntactically

Requesting

Baseline

- Spontaneous requesting primarily physical in nature (occasional use of scripted phrase)
- Relatively infrequent
- No tools or strategies available for eliciting information
  - Yes/no questions
  - Choices
  - Open-ended questions
- Caregivers would like to see greater frequency of expressing preferences

Requesting

Intervention

Subject Behavior

- Supported symbolic requesting
- Spontaneous, intentional, symbolic requesting
- Use of visuals as a tool
Requesting

Syntactic Development

<table>
<thead>
<tr>
<th>Syntactic Structures Used Spontaneously to Make Intentional Requests</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Year 1</strong></td>
</tr>
<tr>
<td>I want + O</td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>Want + V + O</td>
</tr>
<tr>
<td>Want + more + O</td>
</tr>
<tr>
<td>My turn</td>
</tr>
<tr>
<td>Adj.</td>
</tr>
<tr>
<td>V + O</td>
</tr>
<tr>
<td>I want + V</td>
</tr>
<tr>
<td>V</td>
</tr>
</tbody>
</table>

Average Rating Per Statement

Baseline

Request

Year 1

Year 2

Requesting Summary

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Current (year 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Spontaneous requesting relatively infrequent</td>
<td>• Increase in overall spontaneous requesting</td>
</tr>
<tr>
<td>• Spontaneous requesting primarily physical in nature</td>
<td>• Hole to request using symbolic means</td>
</tr>
<tr>
<td>• No tools or strategies available for eliciting information</td>
<td>• Use of varied syntactic structures and parts of speech to request; indicative of generative language growth</td>
</tr>
<tr>
<td>• Yes/no questions</td>
<td>• More tools now available for eliciting information</td>
</tr>
<tr>
<td>• Choices</td>
<td>• Yes/no questions</td>
</tr>
<tr>
<td>• Open-ended questions</td>
<td>• Choices</td>
</tr>
<tr>
<td>• Mentors would like to see greater frequency of expressing preferences</td>
<td>• Open-ended questions</td>
</tr>
<tr>
<td>• Caregivers would like to see greater frequency of expressing preferences</td>
<td>• Mentors report increase in requesting behavior</td>
</tr>
</tbody>
</table>

Directives

Definition

Directives

Language used to control the behavior of another. There is an implicit understanding that a specific directive will be obeyed. Instruction is both receptive and expressive in nature.
**Directives**

**Baseline**

- Able to follow select routine-based, single-step directives in context
- Reliance on gestural and physical support for comprehension of novel directives, complex directives, or familiar directives given out of context
- Comprehension of nouns and some frequently used verbs a relative strength; difficulty with comprehension of more abstract concepts and complex syntax
- No/minimal directing of others (using physical or symbolic means)
- Visual instructional tools show promise at tabletop but not yet effective in natural environment.
- Mentors would like to see improvements in following directives and directing others

**Directives**

**Goals**

- Increase ability to follow directives
  - Provide tools to support comprehension
  - Build receptive language skills
- Establish ability to direct others using symbolic means

**Directives**

**Syntactic Structures Used in Spontaneous Comments**

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>V</td>
<td>V</td>
<td>V</td>
</tr>
<tr>
<td>Adj.</td>
<td>V + O</td>
<td>V + O</td>
</tr>
<tr>
<td>N + preposition + O</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Directives
Summary

Baseline
• How to follow select routine-based, single-step directions in context
• Reliance on gestural and physical support for comprehension of novel directives, complex directives, or familiar directives given out of context
• Comprehension of nouns and some frequently used verbs, a relative strength, difficulty with comprehension of more abstract concepts and complex syntax.
• Visual instructional tools show promise at tabletop but not yet effective in natural environment.
• No/minimal directing of others (using physical or symbolic means)

Current (year 2)
• Increased ability to follow novel directives and decontextualized, familiar directives
• Increased knowledge of vocabulary and syntactic structures
• Proficient in use of tools within instructional and natural contexts
• Ability to direct others has emerged (particularly with visual supports)
• Mentors report increased directing of others

Commenting
Definition

Comment:
A behavior, gesture, or vocalization that represents an intentional attempt to share information with a communication partner about the external environment (e.g., objects, events, sounds, smells) or internal states (e.g., opinions, emotions, physical comfort).

Pre-comment:
A behavior, physical reaction, gesture or vocalization that suggests something to the receiver about what the learner is thinking, feeling or sensing, but that is not intentionally shared with a communication partner. Pre-comments often require inference/interpretation on the part of the communication partner. They serve as the foundation for true commenting.
Commenting

**Goals**

- Establish spontaneous, symbolic commenting
  - Sensory experiences (e.g., sights, sounds, body temperature)
  - Basic needs
  - Opinions and emotions

- Expand comments semantically and syntactically

**Commenting Summary**

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Current (year 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Commenting primarily physical in nature</td>
<td>• Increased frequency of spontaneous, symbolic, unscripted commenting</td>
</tr>
<tr>
<td>• Occasional use of scripted language</td>
<td></td>
</tr>
<tr>
<td>• Some strong foundational skills in place, but not applied for purposes of commenting</td>
<td>• Mentors believe that appropriate commenting is an important social pragmatic skill and would like to see more of it</td>
</tr>
<tr>
<td>• Able to label familiar nouns, verbs and colors</td>
<td></td>
</tr>
<tr>
<td>• Mentors report increase in commenting</td>
<td></td>
</tr>
</tbody>
</table>
Patterns

- Intervention led to change
- Skills maintained in absence of direct instruction
- Fading use of visuals over time
- Generalization to multiple environments and mentors
- Increased semantic and syntactic knowledge across multiple functions
- Comprehension precedes expression

Conclusions

- Visually immersive environment has a positive effect on language development and communication
  - Change noted across 7 Operations (4 reported here)
  - Growth in both comprehension and expression
  - Improvement noted across environments and mentors and operations, according to multiple sources of data
- 4 ingredients crucial to success:
  - Understanding
  - Buy-in
  - Coordination
  - Knowledge and skills (technical skills, understanding of communication)
- Development of generative language seen beyond so-called "critical period"
- Technology was a critical component of implementation

Implications and Next Steps

- This service delivery model is labor intensive but offers possibilities.
  - Critical ingredients must be present
  - Smaller scale implementation
- Next steps:
  - Continue to develop this model
  - Explore possibilities for further implementation

Questions?

Thank you!