

Creating a Visual Immersion Experience for One Learner With Autism

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Background

(As of October, 2009)

- Visuals becoming increasingly popular as instructional tools
- Visuals effective as instructional tools
 - Requesting
 - Protesting
 - Organization/scheduling
 - Acquiring new skills
- Individuals with moderate-severe ASD tend to be interested in visual materials (Shane & Alpert, 2008)



Problems

- Clinical emphasis on requesting and scheduling to the exclusion of other functions
- Lack of significant, broad-based change in language and communication skills
 - Strong requesting skills but little use of other functions
 - Overabundance of nouns in the lexicon
 - Reliance on scripted language (often inappropriate)
 - Poor understanding of semantic relations



Project Goals

- Create a visually immersive environment, using completely customized visuals, that aims to support broad-based growth in both language comprehension and language expression for one individual with ASD.
- Investigate potential effects of a visual immersion experience on communication and language development
- Identify barriers to implementation and explore solutions
- Train significant communication partners



Agenda

- Participant and design
- Describe assessment process
- Describe intervention
- Discuss results, conclusions, challenges and areas for further exploration



Participant

- Anne (pseudonym)
- Age: 17 years
- Diagnosis: Autism
- Hearing and vision: no concerns
- Mobility: independently mobile; hesitant on stairs and curbs
- Fine motor: no concerns
- “Easy-going;” no behavioral concerns



Participant

- Home
 - Splits time between mom’s house and dad’s house
 - Mom works from home
 - Dad and stepmom work full time; nanny at home in afternoons
- School
 - Initially: sub-separate classroom within a high school
 - Majority of project: Day school for individuals with developmental disabilities
 - Services: Speech, OT, PT, APE



Participant

- Comprehension
 - Use of context clues
 - Physical/gestural assistance
 - Relatively strong comprehension of nouns (objects, people); difficulty with verbs, descriptors, prepositions
 - Substantial improvement when speech supported by photographs, video modeling, or text
- Expression
 - Primarily physical/behavioral
 - Use of scripted language and delayed echolalia
 - Relatively passive; initiated infrequently
- History of instruction
 - Instruction primarily provided verbally
 - Introduced to VOL – “not effective”
 - Prior experience with PECS, Mayer-Johnson symbols (not currently used)
- High level of interest in visuals



Participant

- Symbolic understanding
 - Can identify photographs of objects and familiar people
 - Able to match photographs, some Mayer-Johnson symbols to objects
 - Large repertoire of sight words (nouns); some ability to decode with comprehension



Participant

- Hobbies and preferences (baseline)
 - Music (singing, listening)
 - Taylor Swift
 - ABBA
 - Movies
 - Mamma Mia
 - Happy Feet
 - Being social



Design

- Roles
 - **Participant**
 - **Family and school team:** Determine needs, implement supports, provide guidance and feedback to field director
 - **Field director:** Bring knowledge about language development and AAC; create materials; problem-solve; provide technology training as needed; serve as liaison between home, school, and hospital; track progress
 - **Hospital-based team:** Support field director, problem-solve
- Significant communication partners involved:
 - Parents, siblings, close family friends
 - Nanny
 - Classroom teacher, paras, SLP, school staff



Design

Curriculum Framework (Shane, O'Brien & Sorce, 2009; Shane et al., 2015):

- Protesting
- Organization/Transitions
- Requesting
- Directives
- Commenting
- Questions
- Social Pragmatics



Design

- Visual immersion experience implemented across all key environments
 - Home
 - School
 - Community
 - Restaurants
 - Beach
 - Horse-back riding
 - Sailing
 - Grocery store
 - Visit family friends
 - Zoo
 - Errands



Design cont.

- Highly intensive project
 - Participant observation in the field (4 days/week)
 - Direct intervention and ongoing assessment (4 days/week)
 - Discussions with hospital team (weekly)
 - Formulation of hypotheses, testing, reformulation and re-testing
 - 2 years of data collection; 2 additional years of intervention



Procedure

- Gather baseline data
 - Language/communication skills, symbolic knowledge
 - 7 Functions
 - Areas of need
 - AAC history
 - Routines
 - Preferences
- 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

- Data sources
 - Field notes
 - Observations
 - Data from direct intervention activities
 - Parent/mentor interviews and report
 - Conversations
 - Emails
 - Video
 - Surveys (completed by key mentors)




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



Assessment and Intervention

7 Communicative Functions

- Protesting
- Organization/Transitions
- Requesting
- Directives
- Commenting
- Questions
- Social Pragmatics




Protesting/Refusal

Definition (Shane et al., 2009)


Protesting/Refusal

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




Protesting/Refusal Baseline Performance

Baseline
<ul style="list-style-type: none"> • Relatively infrequent (0 protests observed in video data) • Physical/behavioral in nature <ul style="list-style-type: none"> • Ignoring, turning away • Concerns: <ul style="list-style-type: none"> • No symbolic means of expressing language of control (e.g., no, stop) • Concerns about over-compliance




Protesting/Refusal Goals

Goals
<ul style="list-style-type: none"> • Establish spontaneous, symbolic protesting • Increase frequency of protesting




Protesting/Refusal: Instruction

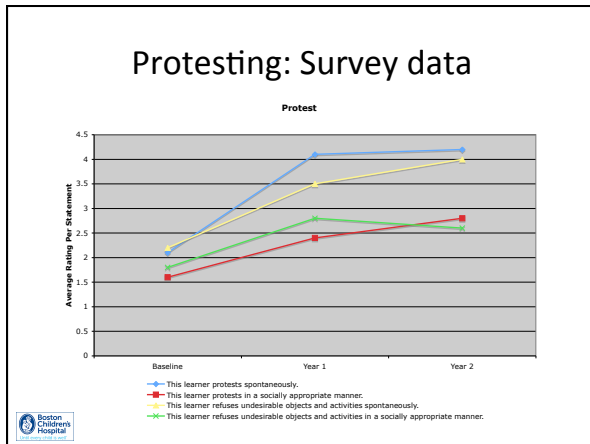
- To establish spontaneous, symbolic protesting:
 - Teach symbols for language of control
 - More/all done
 - Stop
 - Make them available during daily interactions
- To enable expression of yes/no preferences
 - Teach the meaning of symbols for yes/no
 - Integrate into daily conversation



Spontaneous Protests: Video Data

- Baseline: 0 protests
- 2-year follow-up: 0 protests





Protesting/Refusal Summary

Baseline	Current (year 2)
•Primarily physical in nature	•Continued physical protesting; addition of symbolic protesting (speech, visuals) •Stop •No •All done
•Relatively infrequent	•Increased frequency of spontaneous protesting reported by mentors
•No tools/strategies available for eliciting information	•Mentors now better able to elicit information more effectively •Yes/no questions
•Concerns about over-compliance	•Mentors report increase in protesting

Boston Children's Hospital

Requesting

Definition (Shane et al., 2009)

Requesting

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


Boston Children's Hospital

- ### Requesting Assessment
- Skills to be explored
 - Does Anne request? How?
 - What does she request? Can she ask for all the things that matter to her?
 - Can others elicit information about her preferences from her?
- Boston Children's Hospital

Requesting Baseline Performance

Baseline


- Spontaneous requesting primarily physical in nature (occasional use of scripted phrase)
- Relatively infrequent (2 requests initiated in video data)
- 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 Goals


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



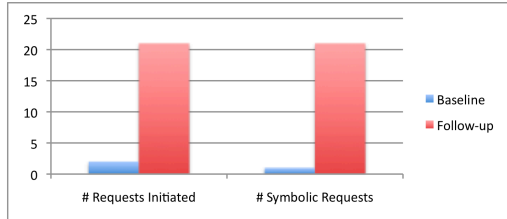
Requesting Instruction

- Create visual representations for highly preferred items
- Engineer environment to require symbolic requesting
- Use distracter visuals to encourage intentional choice making
- Teach the meaning of “yes” and “no” in a choice making context
- Provide visuals for choice-making across multiple contexts
 - Apps for choice making
 - Low tech visuals
 - Text




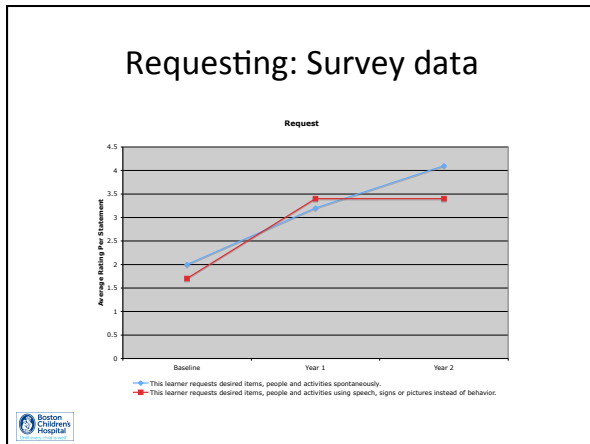
Requesting: Video Data

Summary of Spontaneous Requests



Category	Baseline	Follow-up
# Requests Initiated	2	21
# Symbolic Requests	1	21





Requesting

Syntactic Development

Syntactic Structures Used Spontaneously to Make Intentional Requests	
Year 1	Year 2
I want + O	I want + O
N	N
Want + V + O	Want + V + O
Want + more + O	Want + more + O
My turn	My turn
	Adj. + O
	V + O
	I want + V
	V
	Adj.

Requesting

Summary

Baseline	Current (year 2)
<ul style="list-style-type: none"> •Spontaneous requesting relatively infrequent •Spontaneous requesting primarily physical in nature 	<ul style="list-style-type: none"> •Increase in spontaneous requesting (videos & survey) •Able to request using symbolic means
<ul style="list-style-type: none"> •No tools or strategies available for eliciting information •Yes/no questions •choices •Open-ended questions 	<ul style="list-style-type: none"> •Use of varied syntactic structures and parts of speech to request; indicative of generative language growth •More tools now available for eliciting information •Yes/no questions •Choices •Open-ended questions
<ul style="list-style-type: none"> •Caregivers would like to see greater frequency of expressing preferences 	<ul style="list-style-type: none"> •Mentors report increase in requesting behavior

Directives


Definition (Shane et al., 2009)

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 Assessment


- Skills to explore:
 - Comprehension of directives
 - Within familiar routines
 - Outside of usual context
 - Novel directives
 - Vocabulary knowledge
 - Expression of directives
 - Does Anne direct others? How?
 - Tools that may improve comprehension



Directives – Baseline Performance

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


Goals

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




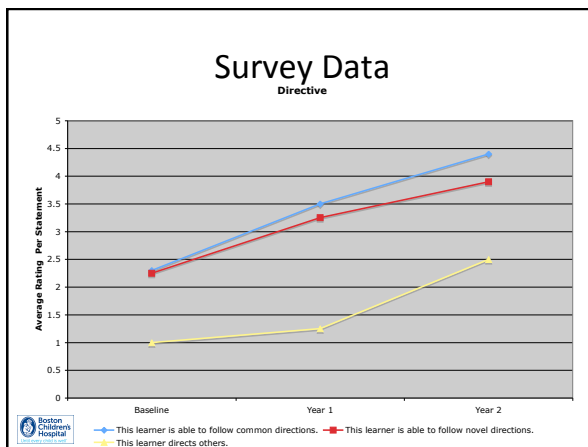
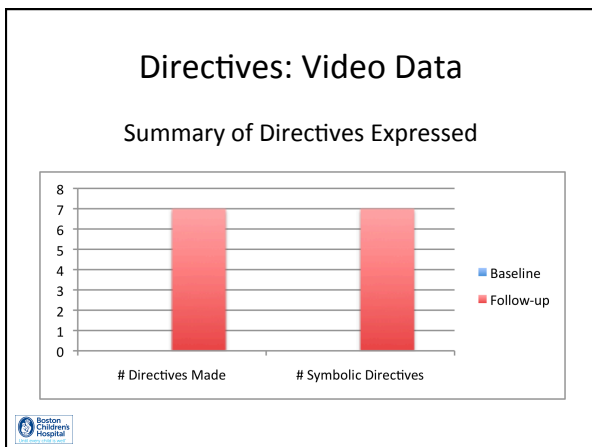
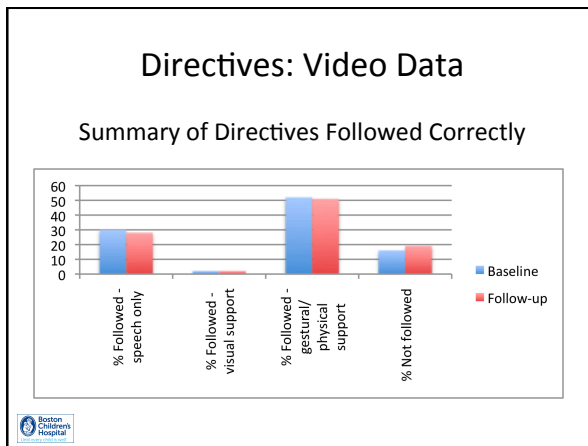
Directives Initial Instructional Approach

- Begin to use object photographs during daily exchanges (across multiple settings)
- Introduce scene cues (first at tabletop, gradually integrate for daily use)
 - Begin with routine directives and progress to novel/instructional




Directives Ongoing Instruction

- Move away from scenes and toward elements and text
- Build vocabulary (emphasis on non-nouns)
- Introduce elements for expression
- As vocabulary builds, encourage symbol combinations

Directives Summary


Baseline	Current (year 2)
<ul style="list-style-type: none"> •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. •Visual instructional tools show promise at tabletop but not yet effective in natural environment. •No/minimal directing of others (using physical or symbolic means) •Mentors would like to see increased ability to follow directions and directing of others 	<ul style="list-style-type: none"> •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 increase in ability to follow directions •Mentors report increased directing of others



Commenting Definition (Shane et al., 2009)


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).



Commenting Assessment


- Skills to explore:
 - Does Anne comment? How?
 - What does she comment on? What does she react to?
 - Are comments modeled for her?



Commenting Baseline Performance

Baseline


- Commenting primarily physical (reactionary) in nature
- Occasional use of scripted language (basic needs, emotions)
- Some strong foundational skills in place, but not applied for purposes of commenting
 - Able to label familiar nouns, verbs and colors
- Mentors believe that appropriate commenting is an important social pragmatic skill and would like to see more of it



Commenting Goals


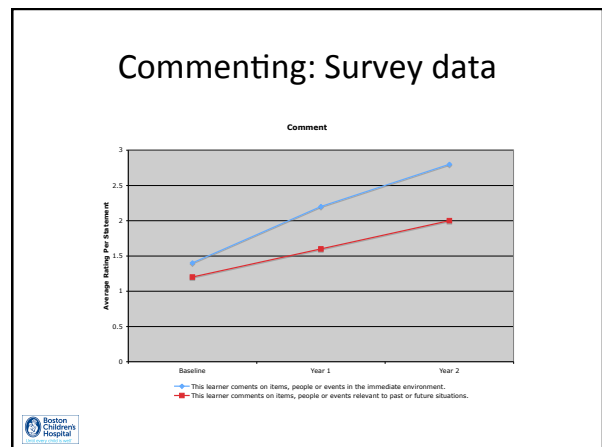
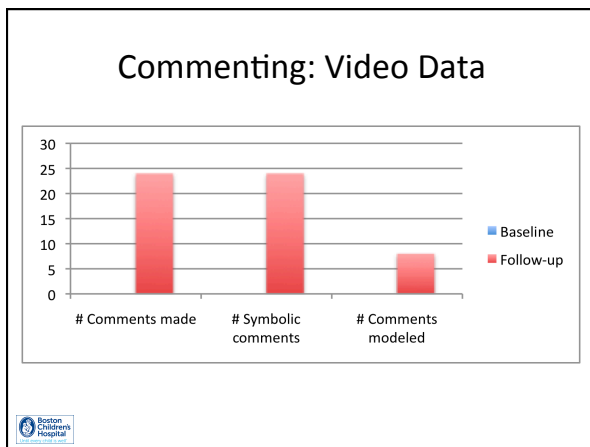
Goals

- Encourage spontaneous, symbolic commenting (no spontaneous comments made at baseline)
- Expand vocabulary
- Expand comments semantically and syntactically
- Increase modeling by caregivers



Commenting Instructional Approach


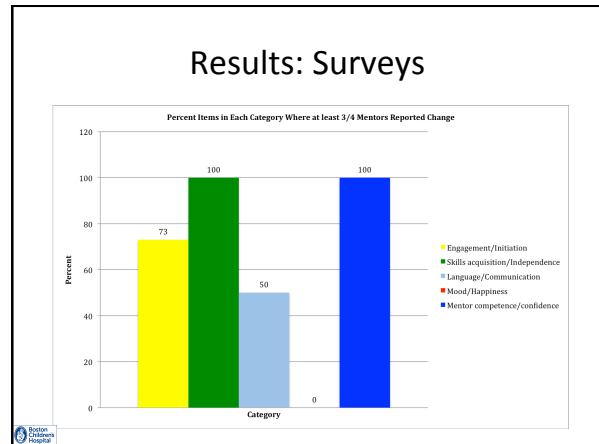
- Use object photographs to model comments on familiar objects in natural contexts
- Teach vocabulary words – emphasis on descriptors
- Gradually increase modeling to include additional parts of speech; comments are modeled when Anne reacts to daily objects, activities, events, experiences etc.
- Model expanded syntax and teach on the side
 - Mixed scene/element displays
 - Topic Displays
 - Picture and video description
- Respond positively to all spontaneous comments

Commenting

Summary


Baseline	2-year follow-up
<ul style="list-style-type: none"> •Commenting primarily physical in nature •Occasional use of scripted language •Some strong foundational skills in place, but not applied for purposes of commenting <ul style="list-style-type: none"> •Able to label familiar nouns, verbs and colors •Mentors believe that appropriate commenting is an important social pragmatic skill and would like to see more of it 	<ul style="list-style-type: none"> •Increased frequency of spontaneous, symbolic, unscripted commenting •Mentors report increase in commenting





Summary of Syntactic Development

Syntactic Structures Used Spontaneously (Unscripted only)

During Year 1	During Year 2	During Year 4
I want + O	I want + O	I want + O
N	N	N
Want + V + O	Want + V + O	Want + V + O
Want + more + O	Want + more + O	Want + more + O
My turn	My turn	My turn
	Adj. + O	Adj. + O
	V + O	V + O
	I want + V	I want + V
	V	V
	Adj.	Adj.
	S + Preposition + O	S + Preposition + O
	Need help with + V	Need help with + V
	Need help with + O	Need help with + O
	Need help with V + O	Need help with + V + O
		S + V + O
		V + Adj. + O
		S + V



- ### Challenges
- Time
 - For training and discussion
 - For language modeling
 - For programming/creating materials
 - Access to visuals
 - Some environments not supportive of technology
 - Pool, beach
 - Outdoors (glare on screen)
 - Internet access for JIT programming at school
 - Technical difficulties
 - iOS updates
 - Backing up and restoring
 - Coordinating passwords across environments
 - Balancing “today” goals and “tomorrow” goals
 - When is it good enough to just have a successful communication exchange using a video? How often do you also need to be modeling text?
- 

Challenges

- Communication context is always changing
 - Learner characteristics
 - Health
 - Medications
 - Family characteristics
 - Educational characteristics
 - Classrooms and personnel change
 - Educational objectives change as approach transition age
- Conflicting priorities
 - IEP objectives



Conclusions

- Visually immersive environment likely had a positive effect on language development and communication in this study.
 - Positive change noted across 7 Operations (4 reported here)
 - Growth in both comprehension and expression
 - No negative outcomes identified
- Ingredients crucial to success:
 - Coordination
 - Knowledge and skills (technical skills, understanding of communication)
 - "Point person"
- 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.
 - Which elements COULD be reasonably implemented, if any?
 - Home-based services for older individuals with CCN
 - SLP as liaison between school and home
 - Concept of defining what needs to be done and clearly assigning roles and responsibilities to all team members
- Next steps and further questions to explore:
 - Continue to explore elements of this model that could be implemented on a larger scale
 - Improve data collection and analysis
 - Compare performance across environments
 - Instructional vs. unstructured
 - Adult-directed vs. participant-selected
 - "Noisy" vs. few sensory distractions
 - Caregiver interaction styles
 - Examine impact on QOL for families and caregivers
 - Explore long-term outcomes
 - What elements of this program continued to be implemented? Which did not and why?
 - Were improvements maintained?

