

Best Evidence Statement (BESt)

Date: June 21, 2012

Title: The use of Video-Based Modeling in Teaching Daily Living Skills to Children with Autism

Clinical Question:

P (Population/Problem) In children with autism

I (Intervention) does the use of video-based modeling

C (Comparison)

O (Outcome) improve participation in daily living activities*?

<u>**Definitions**</u> for terms marked with * may be found in the Supporting Information section.

Target Population for the Recommendation:

Inclusion criteria: Diagnosis of autism, ages 3 to 18 years

Exclusion criteria: Unable to attend to video screen for brief periods of time

Recommendation: (See Dimensions for Judging the Strength of the Recommendation)

It is recommended that occupational therapists working with children and adolescents with autism use video-based modeling as a modality for teaching daily living skills (Bereznak, Ayres, Mechling, & Alexander, 2012 [4b]; Cannella-Malone et al., 2011 [4b]; Keen, Brannigan, & Cuskelly, 2007 [4b]; Rayner, 2011 [4b]; Rosenberg, Schwartz, & Davis, 2010 [4b]; Shipley-Benamou, Lutzker, & Taubman, 2002 [4b]).

Discussion/Synthesis of Evidence Related to the Recommendation:

A moderate level of evidence was found in support for video-based interventions. Six studies employed single-subjects designs with small sample sizes. All participants had a diagnosis of autism (with the exception of one subject included in Cannella-Malone (2011 [4b]) who had severe mental retardation and ranged in ages from 3 to 18 years old. Findings from observations were reported in terms of task analyses. Outcomes addressed included activities of daily living such as washing hands (Rosenberg et al., 2010 [4b]), toileting (Keen et al., 2007 [4b]) and tying shoes (Rayner, 2011 [4b]) as well as instrumental activities of daily living such as preparing a meal (Bereznak et al., 2012 [4b]), washing dishes (Cannella-Malone et al., 2011 [4b]), washing laundry (Bereznak et al., 2012 [4b]; Cannella-Malone et al., 2011 [4b]) and feeding pets (Shipley-Benamou et al., 2002 [4b]). Study limitations included small sample sizes (n=3-7), an inability to perform inferential statistics, and an absence of valid and reliable methods of measurement. Despite the aforementioned limitations, these studies generated positive findings in support of video-based intervention. For five of the six studies, all participants demonstrated gains with video-based intervention. Two of five subjects in Keen and colleagues (2007 [4b]) study on toileting did not make gains.

Clinically, video modeling may be advantageous for various reasons. For example, certain tasks may not be easily modeled in a live environment, such as donning one's pants. Also, in children with autism, attention to pertinent information may be better obtained through a video, eliminating the environmental distractions present with a live modality. Cardon and Azuma (2012 [3b]) noted that with video modeling, children with autism demonstrated increased visual attention as compared to a live modality. For these reasons, the positive findings in the studies support clinical significance.

Several variations of video-based interventions exist in the literature; however there is currently insufficient evidence to support any one style of model. *Video modeling* was employed in three studies and consists of using a video that encompasses all steps of a multi-step task (Keen et al., 2007 [4b]; Rosenberg et al., 2010; Shipley-Benamou et al., 2002

[4b]). This is distinguished from *video-prompting*, which requires the child to watch separate videos for each component of a multi-step task. Both Bereznak (2012 [4b]) and Rayner (2011 [4b]) utilized video-prompting with success. Canella-Malone and colleagues (2011 [4b]) compared the effects of video modeling and video-prompting and found prompting to be the more effective modality.

Video-based interventions can also be differentiated by the perspective of the video. Perspectives include *point-of-view* (typically the hands performing a task) or *scene* (typically the full body of the model performing the task). Point of view was more frequently found in the literature, with 4 of 6 studies using this perspective (*Bereznak et al., 2012 [4b]*; *Cannella-Malone et al., 2011 [4b]*; *Rayner, 2011 [4b]*; *Shipley-Benamou et al., 2002 [4b]*). Rosenberg et al. (*2010 [4b]*) utilized a scene perspective to teach hand-washing while Keen et al. (*2007 [4b]*) utilized an animated scene perspective for teaching toileting. Proponents for point-of-view perspectives suggest that this mode further decreases external stimuli and assists the child in focusing on relevant information.

The characteristics of the model also vary across the literature. Video self-modeling involves the child watching a video of his or herself performing a task (*Bray & Kehle, 2012 [5a]*). This type of modeling requires the child to be videotaped over a number of trials. The footage is then edited into a final product that includes only the target behavior. No evidence for the use of video self-modeling to teach activities of daily living was identified. Video-based intervention with "other as model" involves the use of an individual other than the self. This variant was used in all six reviewed studies. Adult hands were used in the four studies using a scene perspective (*Bereznak et al., 2012 [4b]; Cannella-Malone et al., 2011 [4b]; Rayner, 2011 [4b]; Shipley-Benamou et al., 2002 [4b])*, and an animation was used as a model in Keen and colleague's (*2007 [4b]*) study of toilet training. Rosenberg et al. (*2010 [4b]*) used a scene perspective and utilized both non-familiar and familiar peers. Two of three children in this study made better improvements with the videos that included familiar peers. However, these videos differed from the videos with non-familiar peers in a number of ways, thus confounding the results (*Rosenberg et al., 2010 [4b]*).

Reference List: (Evidence Level in []; See <u>Table of Evidence Levels</u>)

- American Occuaptional Therapy Association. (2008). Occupational therapy practice framework: Domain and process (2nd ed.). *American Journal of Occupational Therapy, 62,* 625-683. [5a]
- Bereznak, S., Ayres, K., Mechling, L., & Alexander, J. (2012). Video Self-Prompting and Mobile Technology to Increase Daily Living and Vocational Independence for Students with Autism Spectrum Disorders. *Journal of Developmental and Physical Disabilities*, 1-17. doi: 10.1007/s10882-012-9270-8. [4b]
- Bray, M. A., & Kehle, T. J. (2012). Introduction to the special issue self-modeling: Self-modeling as a Treatment for a Myriad of Issues. *Psychology in the Schools, 49*(1), 1-2. doi: 10.1002/pits.20620. [5a]
- Cannella-Malone, H. I., Fleming, C., Chung, Y.-C., Wheeler, G. M., Basbagill, A. R., & Singh, A. H. (2011). Teaching Daily Living Skills to Seven Individuals With Severe Intellectual Disabilities: A Comparison of Video Prompting to Video Modeling. *Journal of Positive Behavior Interventions*, 13(3), 144-153. doi: 10.1177/1098300710366593. [4b]
- Cardon, T., & Azuma, T. (2012). Visual attending preferences in children with autism spectrum disorders: A comparison between live and video presentation modes. *Research in Autism Spectrum Disorders*, 6(3), 1061-1067. doi: 10.1016/j.rasd.2012.01.007. [3b]
- Centers for Disease Control and Prevention. (2012). Prevalence of autism spectrum disorders autism and developmental disabilities monitoring network, 14 sites, United States, 2008. *Survelliance Summaries*, 61(3), 1-19. [5a]
- Keen, D., Brannigan, K. L., & Cuskelly, M. (2007). Toilet training for children with autism: The effects of video modeling category. *Journal of Developmental and Physical Disabilities*, 19(4), 291-303. doi: 10.1007/s10882-007-9044-x. [4b]
- Rayner, C. (2011). Teaching students with autism to tie a shoelace knot using video prompting and backward chaining. *Developmental Neurorehabilitation*, 14(6), 339-347. doi: 10.3109/17518423.2011.606508. [4b]

- Rosenberg, N. E., Schwartz, I. S., & Davis, C. A. (2010). Evaluating the utility of commercial videotapes for teaching hand washing to children with autism. *Education & Treatment of Children, 33*(3), 443-455. doi: 10.1353/etc.0.0098. [4b]
- Shipley-Benamou, R., Lutzker, J. R., & Taubman, M. (2002). Teaching daily living skills to children with autism through instructional video modeling. *Journal of Positive Behavior Interventions*, *4*(3), 165-175. doi: 10.1177/10983007020040030501. [4b]

IMPLEMENTATION

Applicability Issues:

Recommendation adherence will require both video recording and playing equipment. Time and fiscal resources required for initial video production may pose a barrier. Creating and maintaining a user-friendly and readily-accessible video database will support the implementation of this recommendation. Therapists will need to give consideration to the type of video modeling to be used.

Relevant CCHMC Tools for Implementation:

None were found.

Outcome or Process Measures:

Outcome data for the use of video modeling to improve participation in daily living activities is not currently available. It is suggested that occupational therapists utilizing the aforementioned recommendation administer the Canadian Occupational Performance Measure (Law & Baptiste, et al., 2005) at baseline and again at follow-up. This assessment is both reliable (test-retest reliability ranged from .85 to .92) and valid (literature supports content, criterion, and construct validity). This instrument will measure the change in a parent's (and/or child's) perception of performance over time.

SUPPORTING INFORMATION

Background/Purpose of BESt Development:

The rate of autism spectrum disorders (ASDs) is increasing, with current prevalence in the United States of America estimated to be 1 in 88 children (*Centers for Disease Control and Prevention, 2012 [5a]*). It is imperative that cost-effective, evidence-based treatment modalities be identified to improve the outcomes for these children. Occupational therapists frequently work with children with autism to improve their functional performance across a wide range of life skills. Interventions range from modifying environments and tasks, to teaching and modeling new skills. Video-based modeling is a treatment tool that has been increasingly studied in the field of education and shows promise for use in occupational therapy. It has not yet been well established in the occupational therapy literature. The purpose of this project was to examine existing evidence related to the use of video modeling as an intervention tool to improve participation in occupation.

Definitions:

Daily living activities: daily living activities are composed of activities of daily living and instrumental activities of daily living. The American Occupational Therapy Association defines activities of daily living as, "Activities that are oriented toward taking care of one's own body," and instrumental activities of daily living as "Activities to support daily life within the home and community that often require more complex interactions than self-care used in ADL" (American Occuaptional Therapy Association, 2008 [5a]).

Search Strategy:

Databases: PubMed, Google Scholar, CINAHL, Cochrane Library, PsycInfo

Search Terms: Video modeling, video + autism, modeling + autism

Limits & Filters: English language, Search Dates: 1990-2012

Date Search Done: 4-17-2012

Relevant CCHMC Evidence-Based Documents:

CCHMC Policy number MCP-G-115: Recording devices/ cell phones/ cameras

CCHMC Policy number MCP-F-121: Video and DVD Viewing at CCHMC

CCHMC Policy number MCP-G-114: Photographs, Films, and/or Vocal Recordings of Patients

SG Form No. 100216: Authorization for Use and/or Disclosure of Limited Protected Health Information

Group/Team Members:

BESt Development Team: Kristen Brevoort, OTR/L, MOT, Division of Occupational Therapy, Physical Therapy, and Therapeutic Recreation

Ad Hoc members: Patti Besuner RN, MN, EBP Mentor, Center for Professional Excellence, Research, & Evidence Based Practice; Michelle Kiger, OTR/L, Division of Occupational Therapy, Physical Therapy, and Therapeutic Recreation

Senior Clinical Director: Rebecca D. Reder OTD, OTR/L, Division of Occupational Therapy, Physical Therapy, and Therapeutic Recreation

Conflicts of Interest were declared for each team member:

\boxtimes	No	financial	conflicts o	f interest we	ere found.	•	
\boxtimes	No	external	funding wa	as received f	for develo	pment of	this BESt

Note: Full tables of the <u>LEGEND evidence evaluation system</u> are available in separate documents:

- Table of Evidence Levels of Individual Studies by Domain, Study Design, & Quality (abbreviated table below)
- Grading a Body of Evidence to Answer a Clinical Question
- <u>Judging the Strength of a Recommendation</u> (dimensions table below)

Table of Evidence Levels (see note above):

Quality level	Definition
1a [†] or 1b [†]	Systematic review, meta-analysis, or meta-synthesis of multiple studies
2a or 2b	Best study design for domain
3a or 3b	Fair study design for domain
4a or 4b	Weak study design for domain
5a or 5b	General review, expert opinion, case report, consensus report, or guideline
5	Local Consensus

[†]a = good quality study; b = lesser quality study

Table of Language and Definitions for Recommendation Strength (see note above):

3.3				1					
Language for Strength	Definition								
It is strongly recommended that	When the dimensions for judging the strength of the evidence are applied,								
It is strongly recommended that not	there is high support that benefits clearly outweigh risks and burdens.								
	(or visa-versa for n	negative recommendations)							
It is recommended that	When the dimensi	nsions for judging the strength of the evidence are applied,							
It is recommended that not	there is moderate	e support that benefits are closely balanced with risks and burdens.							
There is insufficient evidence and a lack of consensus to make a recommendation									
Given the dimensions below and that more answers to the left of the scales indicate support for a stronger recommendation, the									
recommendation statement above reflects the strength of the recommendation as judged by the development group.									
(Note that for negative recommendations, the left/right logic may be reversed for one or more dimensions.)									
Rationale for judgment and selection of each dimension:									
1. Grade of the Body of Evidence			High	\times	Moderate		Low		
Rationale: 6 level 4b articles were included, giving the body of evidence a moderate grade per the CCHMC legend for grading a body of									
evidence.									
2. Safety/Harm (Side Effects and Risks)		\geq	Minimal		Moderate		Serious		
Rationale: No harmful side effects or risks are known or thought to be associated with video modeling									
3. Health benefit to patient		Significant	\boxtimes	Moderate] Minimal			
Rationale: Video modeling has the potential to increase independence in daily activities; this can significantly impact well-being									
4. Burden on patient to adhere to recommendation			Low		Unable to determine] High		
Rationale: Burden for patient to compl	y in the clinic is low,	ho	wever carryover at h	оте	may be associated with a l	high	burden of care,		
particularly with regards to cost of equipment.									
5. Cost-effectiveness to healthcare sys	stem	\geq	Cost-effective		Inconclusive		Not cost-effective		
Rationale: Videos have the potential to be used for multiple patients.									
6. Directness of the evidence for this t	\triangleright	Directly relates		Some concern of		Indirectly relates			
population	_		-		directness		-		
Rationale: The purpose of the reviewed studies was to explore the effectiveness of video modeling in children with autism.									
7. Impact on morbidity/mortality or q	uality of life		High	\geq	Medium] Low		
Rationale: Teaching skills which foster independence can positively impact quality of life									

Copies of this Best Evidence Statement (BESt) and related tools (if applicable, e.g., screening tools, algorithms, etc.) are available online and may be distributed by any organization for the global purpose of improving child health outcomes.

Website address: http://www.cincinnatichildrens.org/service/j/anderson-center/evidence-based-care/bests/

Examples of approved uses of the BESt include the following:

- · Copies may be provided to anyone involved in the organization's process for developing and implementing evidence based care;
- Hyperlinks to the CCHMC website may be placed on the organization's website;
- The BESt may be adopted or adapted for use within the organization, provided that CCHMC receives appropriate attribution on all written or electronic documents; and
- Copies may be provided to patients and the clinicians who manage their care.

Notification of CCHMC at EBDMinfo@cchmc.org for any BESt adopted, adapted, implemented, or hyperlinked by the organization is appreciated.

Please cite as: Cincinnati Children's Hospital Medical Center: The use of Video-Based Modeling in Teaching Daily Living Skills to Children with Autism. http://www.cincinnatichildrens.org/svc/alpha/h/health-policy/best.htm, BESt 136, pages 1-7, June 21, 2012.

This Best Evidence Statement has been reviewed against quality criteria by two independent reviewers from the CCHMC Evidence Collaboration. Conflict of interest declaration forms are filed with the CCHMC EBDM group.

Once the BESt has been in place for five years, the development team reconvenes to explore the continued validity of the guideline. This phase can be initiated at any point that evidence indicates a critical change is needed. CCHMC EBDM staff perform quarterly searches for new evidence in an horizon scanning process. If new evidence arises related to this BESt, authors are contacted to evaluate and revise, if necessary.

For more information about CCHMC Best Evidence Statements and the development process, contact the Evidence Collaboration at EBDMinfo@cchmc.org.

Note

This Best Evidence Statement addresses only key points of care for the target population; it is not intended to be a comprehensive practice guideline. These recommendations result from review of literature and practices current at the time of their formulation. This Best Evidence Statement does not preclude using care modalities proven efficacious in studies published subsequent to the current revision of this document. This document is not intended to impose standards of care preventing selective variances from the recommendations to meet the specific and unique requirements of individual patients. Adherence to this Statement is voluntary. The clinician in light of the individual circumstances presented by the patient must make the ultimate judgment regarding the priority of any specific procedure.