

Date: February 14, 2018

Title: Impact of Media Exposure on Infants and Toddlers

Clinical Question

<i>P</i>	<i>(Population/Problem)</i>	In children less than 2 years of age
<i>I</i>	<i>(Intervention)</i>	does limited exposure* to screen media*
<i>C</i>	<i>(Comparison)</i>	versus routine exposure* to screen media
<i>O</i>	<i>(Outcome)</i>	affect social, emotional, motor, and cognitive development?

Definitions for terms marked with * may be found in the Supporting Information section.

Target Population for the Recommendation

Children less than 2 years of age.

Recommendation

It is recommended that children less than 2 years of age experience less than 2 hours of screen media exposure per day, to decrease risk to their motor (*Lin, 2015 [3a]*), cognitive (*Krcmar, 2010 [2b]*; *Lin, 2015 [3a]*; *Tomopoulos, 2010 [4a]*; *Radesky, 2016 [5b]*; *Radesky, 2015 [5b]*), language (*Krcmar, 2010 [2b]*; *Lin, 2015 [3a]*; *Richert, 2010 [4a]*; *Tomopoulos, 2010 [4a]*; *Radesky, 2016 [5b]*; *Radesky, 2015 [5b]*), and emotional (*Napier, 2014 [1b]*; *Lin, 2015 [3a]*; *Radesky, 2016 [5b]*; *Radesky, 2015 [5b]*) development.

Note: Content of media exposure for children less than 2 years of age should be child directed*. (*Napier, 2014 [1b]*; *Krcmar, 2010 [2b]*; *Lin, 2015 [3a]*; *Radesky, 2016 [5b]*; *Radesky, 2015 [5b]*; *Richert, 2010 [4a]*; *Tomopoulos, 2010 [4a]*).

Note: While screen media is not recommended to be utilized as a calming technique, medical procedures are specified as a dedicated time where use of screen media can be useful as a soothing strategy. *Radesky, 2016 [5b]*.

Discussion / Synthesis of Evidence related to the recommendation *(See Appendix for the Evidence Table of Included Studies)*

The evidence consisted of 7 articles, comprised of two randomized control trials, one longitudinal study, one cross-sectional study, one systematic review, one expert opinion, and one guideline, which fit our inclusion criteria and assisted in answering our PICO question. These articles addressed fine and gross motor (*Lin, 2015 [4a]*), cognitive (*Krcmar, 2010 [2b]*; *Lin, 2015 [3a]*; *Tomopoulos, 2010 [4a]*; *Radesky, 2016 [5b]*; *Radesky, 2015 [5b]*), language (*Krcmar, 2010 [2b]*; *Lin, 2015 [3a]*; *Richert, 2010 [4a]*; *Tomopoulos, 2010 [4a]*; *Radesky, 2016 [5b]*; *Radesky, 2015 [5b]*), and emotional (*Napier, 2014 [1b]*; *Lin, 2015 [3a]*; *Radesky, 2016 [5b]*; *Radesky, 2015 [5b]*), development as impacted by screen media exposure in children under the age of two. It has been found that there is a detrimental effect on these areas of development with screen media exposure that is greater than two hours and consisting of non-child directed content (i.e. background and/or adult-focused screen media exposure) (*Napier, 2014 [1b]*; *Krcmar, 2010 [2b]*; *Richert, 2010 [2b]*; *Radesky, 2016 [5b]*; *Radesky, 2015 [5b]*; *Lin, 2015 [3a]*; *Tomopoulos, 2010 [4a]*). The guideline does specifically isolate the use of video-chatting as one source of interactive screen media which is appropriate for children younger than 18 months of age (*Radesky, 2016 [5b]*).

Motor Development

One cross-sectional study indicated a negative impact of screen media* exposure, specifically television exposure greater than two hours on fine and gross motor skill development. Among children younger than 2 years of age who watched any amount of television, 17.2% were found to experience developmental delays in motor skills. Children exposed to excessive screen time spend less time on developmentally enriching activities that promote development. Children miss opportunities to refine their motor skills and improve their motor development (*Lin, 2015 [3a]*).

Cognitive Development

One cross-sectional study and the guideline indicate a negative impact of screen media* exposure, specifically television exposure greater than two hours on overall cognitive language and personal social abilities (Lin, 2015 [3a]; Radesky, 2016 [5b]). Lin, 2015 (3a) found that among children younger than 2 years of age who watched any amount of television, that 20.7% experienced cognitive delays. Among children in this same age group who did not watch television 17.2% were cognitively delayed. Self-regulation, empathy, social skills, and problem solving are primarily learned through children exploring their environment, interacting with peers and caregivers, and playing in unstructured, creative ways (Radesky, 2015 [5b]). Longer daily duration, greater than 2 hours, of media exposure at age 6 months predicted lower cognitive development and language development at age 14 months (Tomopoulos, 2010 [4a]). There has been no indication that having infants watch educational or non-education videos has any benefit to their cognitive or language development (Tomopoulos, 2010 [4a]).

Language Development

Evidence shows that screen media* use, specifically non-child directed television programming, in this target age population of less than two years of age, has a negative impact on word learning and language development (Lin, 2015 [3a]; Richert, 2010 [4a]; Tomopoulos, 2010 [4a]; Radesky, 2016 [5b]). The randomized control study implied a potential positive impact on word learning, but the study also states that this outcome only “approached significance” and thus solid definitive conclusions were not able to be stated (Krcmar, 2010 [2b]). The cross-sectional study by Lin, 2015 [3a], showed that among children less than 24 months of age and who watched any amount of television, 31% were delayed in language skills, compared to 27.6% of children of the same age who did not watch television. In this study, among children who were 24-36 months of age and watched more than 2 hours of television per day, 60.9% were delayed in language skills (Lin, 2015 [3a]). Among children in the same age group and who watched less than 2 hours of television per day, 21.7% were delayed in language skills. A longitudinal study, concluded that the detrimental impact increased with exposure greater than two hours (Tomopoulos, 2010 [4a]). Longer, daily duration of media exposure at 6 months predicted lower language development at age 14 months in adjusted and unadjusted analyses (Tomopoulos, 2010 [4a]). Statistically significant negative associations were found for duration of total media exposure with diminished auditory comprehension and expressive communication development (Tomopoulos, 2010 [4a]). Exposure to programming designed with an older child and adult audiences in mind, also predicted lower language scores at age 14 months (Tomopoulos, 2010 [4a]). Videophone interactions are just as effective as real-life encounters in teaching language to 24 month olds, research on whether infants and toddlers can learn from this is limited (Radesky, 2016 [5b]). The American Academy of Pediatrics recommends caregivers avoid digital media use (except for video-chatting) in children younger than 18 months (Radesky, 2016 [5b]).

Emotional Development

The systematic review and guideline also support that extended screen media use can have a negative impact on emotional development in young children (Napier, 2014 [1b]; Radesky, 2016 [5b]). Usage of smartphones and tablets could be detrimental to later social-emotional outcomes when used as the primary method in which children are taught to calm themselves (Radesky, 2015 [5b]). When screen media is used for extended periods of time, quality interactions between caregiver and child that ensure interpersonal stimulation necessary for optimal child brain development are lacking (Radesky, 2016 [5b]). Brains are shaped by relationships and experiences, and most brain development occurs in the first two to three years of life. Early experiences become the basis for relationships, self-control, a sense of coherence and future responses to anxiety and threat as well as the ability to develop resilience (Napier, 2014 [1b]).

In determining the strength of the recommendation, the development group made a considered judgment in a consensus process which was reflective of critically appraised evidence, clinical experience, and these dimensions:			
Given the dimensions below and that more answers to the left of the scales indicate support for a stronger recommendation, the recommendation statement above reflect 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.)			
1. Grade of the Body of Evidence	<input type="checkbox"/> High	<input type="checkbox"/> Moderate	<input checked="" type="checkbox"/> Low
<i>Rationale:</i>			
2. Safety / Harm (Side Effects and Risks)	<input checked="" type="checkbox"/> Minimal	<input type="checkbox"/> Moderate	<input type="checkbox"/> Serious
<i>Rationale:</i> Unable to assume long-term effects.			
3. Health benefit to patient	<input type="checkbox"/> Significant	<input checked="" type="checkbox"/> Moderate	<input type="checkbox"/> Minimal
<i>Rationale:</i> Evidence shows that screen media exposure has a negative effect on development which could impact socio-emotional health.			
4. Burden to adhere to recommendation	<input type="checkbox"/> Low	<input checked="" type="checkbox"/> Unable to determine	<input type="checkbox"/> High
<i>Rationale:</i>			
5. Cost-effectiveness to healthcare system	<input type="checkbox"/> Cost-effective	<input checked="" type="checkbox"/> Inconclusive	<input type="checkbox"/> Not cost-effective
<i>Rationale:</i>			
6. Directness of the evidence for this target population	<input checked="" type="checkbox"/> Directly relates	<input type="checkbox"/> Some concern of directness	<input type="checkbox"/> Indirectly relates
<i>Rationale:</i>			
7. Impact on morbidity/mortality or quality of life	<input type="checkbox"/> High	<input checked="" type="checkbox"/> Medium	<input type="checkbox"/> Low
<i>Rationale:</i> Decrease and delays in language development and quality social interactions may decrease quality of life over time.			

Reference List

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- Guernsey, L. (2013, March). Toddlers, Electronic Media, and Language Development. *Zero to Three*, 11-17. [5b]
- Krcmar, M. (2010). Can Social Meaningfulness and Repeat Exposure Help Infants and Toddlers Overcome the Video Deficit? *Media Psychology*(13), 31-53. [2b]
- Lin, L.-Y., Cherng, R.-J., Chenc, Y.-J., Chend, Y.-J., & Yang, H.-M. (2015). Effects of television exposure on developmental skills among young children. *Infant Development & Behavior*(38), 20-26. [3a]
- Mendelsohn, A., Brockmeyer, C., Dreyer, B., Fierman, A., Berkule-Siberman, S., & Tomopoulos, S. (2010, November-December). Do verbal interactions with infants during electronic media exposure mitigate adverse impacts on their language development as toddlers? *Infant and Child Development*, 19(6), 577-593. [3a]
- Napier, C. (2014, March). How Use of Screen Media Affects the Emotional Development of Infants. *Primary Health Care*, 24(2), 18-25. [1b]
- Radesky, J. S., Schumacher, J., & Zuckerman, B. (2015, January). Mobile and Interactive Media Use by Young Children: The Good, the Bad, and the Ugly. *Pediatrics*, 135(1), 1-3. [5b]
- Radesky, J., & Christakis, D. (2016). Policy Statement: Media and Young Minds. *American Academy of Pediatrics*, 138(5), 1-8. [5b]
- Richert, R. A., Robb, M. B., Fender, J. G., & Wartella, E. (2010, May). Word Learning From Baby Videos. *Arch Pediatrics Adolescent Medicine*, 164(5), 432-437. [2b]
- Tomopoulos, S., Dreyer, B. P., Berkale, S., Fierman, A. H., Brockmeyer, C., & Mendelsohn, A. L. (2010, December). Infant Media Exposure and Toddler Development. *Arch Pediatrics Adolescent Medicine*, 164(12), 1105-1111. [4a]

IMPLEMENTATION

Applicability & Feasibility Issues

As at home, children in the hospital setting are often at risk for prolonged exposure to screen media. Based on developmental risks for screen time for children two and younger, there are a number of proposed opportunities to help inform staff and re-enforce with families the need for screen time limits, while engaging in care.

Completion of a staff media exposure impact educational module is one method to ensure the distribution of information to promote adherence to recommendation of limited screen time.

A prompt through The Get Well Network* (or similar system) may help educate families and provide a stop point where the adult would have to make a conscious choice to proceed with screen time via the television in the hospital.

Written materials could be produced and available to families with infants and young children, both at the hospital and throughout primary care practices to raise awareness of screen time limits and offer alternative engagement opportunities. Guide families to consult the American Academy of Pediatrics Family Media Use Plan, available at: [www. Healthychildren.org/MediaUsePlan](http://www.Healthychildren.org/MediaUsePlan) develop a media plan.

Relevant CCHMC Tools

Knowing Note: Television and Toddlers

KN-00576 6/2015

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ELM Module: Television and Toddlers

CS 03700 12/2012

Outcome Measures and Process Measures

Developmental outcomes, language, cognition, emotional and motor, are difficult to measure within the hospital environment. Recommendations are for continued routine assessment with their primary care physician with developmental screenings as indicated.

Staff and Family Education

Patient Services staff would be required to complete the ELM Module: Television and Toddlers. Department leadership would facilitate completion of educational module.

Distribute Knowing Note: Television and Toddlers to vulnerable patient population (0-2 years) and their caregivers during admissions. Unit direct care providers would be responsible to document family education on this initiative through inclusion in education tabs in the electronic health record as part of admission and unit orientation. Documentation of this staff education would be tracked as a record of compliance by nursing management.

The Get Well Network* (or similar system) could help educate families and provide a stop point where an adult (staff or caregiver) would have to make a conscious choice to proceed with screen time via the televisions in patients' rooms.

SUPPORTING INFORMATION

Background / Purpose of BEST Development

The first three years of a child's life are uniquely important as this is the most sensitive period for brain development. The experiences a child has during this time will shape the architecture of their brain and build the connections that allow them to develop lifelong skills like problem-solving, communication, self-control, and relationship building, that will allow them to survive and thrive within their family, community, and culture. The development of the brain is influenced by many factors, including a child's relationships, experiences and environment. Interactions and interpersonal stimulation are necessary for optimal brain development. Early experiences become the basis for relationships, self-control, a sense of coherence and future responses to anxiety and threat as well as the ability to develop resilience.

Child life specialists, as experts in child development, are seeking to establish best practice surrounding screen media in this institution as well as institutional responsibility to educate other staff and families on best practice for use in our youngest patients, ages two and under. This project seeks to establish recommendations for screen media exposure within the hospital setting and to assist in creating guidance for the use of screen media with patients younger than two years old. Staff should model behavior and expectations regarding screen media usage consistent with what is recommended for families in the home.

This project also seeks to utilize evidence to determine best practice in order to update hospital educational materials on this topic that can be used to reinforce the importance of limited screen media use in young children.

Definitions

Screen media: Includes television, computer, iPads, smart phones, tablets, video games and any other screen entertainment regardless of educational goals.

Limited exposure: Less than 2 hours per day, including background and adult directed exposure

Routine exposure: Greater than 2 hours per day, including background and adult directed exposure

Child-directed exposure: Media that is geared towards younger children and has active participation.

The Get Well Network: A screen media platform designed to provide health care education and entertainment for patients and their families in the health care setting.

Search Strategy & Evidence Table (See Appendix)

Group / Team Members

Multidisciplinary Team

Team Leader/Author: Nikki Orkoskey, MA, CCLS; Pulmonary, Endocrinology and Sleep Lab; Child Life Specialist

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Other BEST Development Support

Content Reviewers:

Support/Consultants: Mary Ellen Meier, MSN, RN, CPN Center for Professional Excellence and Business Integration; Research and Evidence

Conflicts of Interest were declared for each team member and:

- No financial or intellectual conflicts of interest were found.
- The following conflicts of interest were disclosed:

Note: Full tables of the LEGEND evidence evaluation system 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
- Judging the Strength of a Recommendation (dimensions table below and Rationale)

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):

Language for Strength	Definition
It is strongly recommended that... It is strongly recommended that... not...	When the dimensions for judging the strength of the evidence are applied, there is high support that benefits clearly outweigh risks and burdens. (or visa-versa for negative recommendations)
It is recommended that... It is recommended that... not...	When the dimensions for judging the strength of the evidence are applied, there is moderate support that benefits are closely balanced with risks and burdens.
There is insufficient evidence and a lack of consensus to make a recommendation...	

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/i/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: Orkoskey, N., Cincinnati Children's Hospital Medical Center: Impact of Media Exposure on Infants and Toddlers, <http://www.cincinnatichildrens.org/service/i/anderson-center/evidence-based-care/recommendations/default/>, BEST 210, pages 1-9, 2/14/18.

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.

The BEST will be removed from the Cincinnati Children's website, if content has not been revised within five years from the most recent publication date. A revision of the BEST may be initiated at any point that evidence indicates a critical change is needed.

Review History

Date	Event	Outcome
2/14/18	Original Publication	Impact of Media Exposure on Infants and Toddlers

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.

APPENDIX: EVIDENCE SEARCH STRATEGY, RESULTS, & EVIDENCE TABLE

Criteria for considering studies for this review

Types of Studies: *All research study designs and expert opinion that addressed clinical question.*

Types of Participants: *Population comprised of children under the age of 2 years.*

Types of Interventions: *Studies of screen media, including television, computer, iPads, smart phones, tablets, video games, and exposure to screen media, including content, time and interaction during exposure.*

Types of Outcomes: *Word learning, attention, focus, language development, gross and fine motor skill development, cognitive development, emotional development.*

Exclusion Criteria, if any: *Population of children over the age of two; Articles published more than 6 years earlier (prior to 2010).*

Search Strategy

Search Databases	Search Terms	Limits, Filters, & Search Date Parameters	Date of Most Recent Search
<input checked="" type="checkbox"/> MedLine <i>via PubMed or Ovid</i>	<ul style="list-style-type: none"> • Infant, infant development, television, media exposure, screen time, sleep, play, tablet, touch screen, background television, executive function, interaction, motor skills, emotional support, social and emotional development 	Publication Dates or Search Dates: <ul style="list-style-type: none"> • 01/2010 to 06/2017 <input checked="" type="checkbox"/> English Language <input checked="" type="checkbox"/> Pediatric Evidence Only: <input checked="" type="checkbox"/> Other Limits or Filters: <ul style="list-style-type: none"> • Participants must be aged 2 and under. 	06/26/2017
<input checked="" type="checkbox"/> CINAHL	<ul style="list-style-type: none"> • Infant, infant development, television, media exposure, screen time, sleep, play, tablet, touch screen, background television, executive function, interaction, motor skills, emotional support, social and emotional development 	Publication Dates or Search Dates: <ul style="list-style-type: none"> • 01/2010 to 06/2017 <input checked="" type="checkbox"/> English Language <input checked="" type="checkbox"/> Pediatric Evidence Only: <input checked="" type="checkbox"/> Other: <ul style="list-style-type: none"> • Participants must be aged 2 and under. 	06/26/2017
<input checked="" type="checkbox"/> Cochrane Database for Systematic Reviews	<ul style="list-style-type: none"> • Infant, infant development, television, media exposure, screen time, sleep, play, tablet, touch screen, background television, executive function, interaction, motor skills, emotional support, social and emotional development 	Publication Dates or Search Dates: <ul style="list-style-type: none"> • 01/2010 to 06/2017 <input checked="" type="checkbox"/> English Language <input checked="" type="checkbox"/> Pediatric Evidence Only: <input checked="" type="checkbox"/> Other: <ul style="list-style-type: none"> • Participants must be aged 2 and under. 	06/26/2017
<input checked="" type="checkbox"/> PsychInfo	<ul style="list-style-type: none"> • Infant, infant development, television, media exposure, screen time, sleep, play, tablet, touch screen, background television, executive function, interaction, motor skills, emotional support, social and emotional development 	Publication Dates or Search Dates: <ul style="list-style-type: none"> • 01/2010 to 06/2017 <input checked="" type="checkbox"/> English Language <input checked="" type="checkbox"/> Pediatric Evidence Only: <input checked="" type="checkbox"/> Other: <ul style="list-style-type: none"> • Participants must be aged 2 and under. <input type="checkbox"/> Other: X	06/26/2017

Search Results & Methods

The initial search for evidence identified 51 articles. 39 articles met the inclusion criteria above. 22 articles were discarded, as they were not related to the clinical question of interest based on title (n=11) and abstract (n=11) review and an additional 5 articles were excluded/discarded for the following reasons: not answering clinical question (n=1), not within age terms (n=3), or lacked strength (n=1). 12 articles were reviewed in full text and critically appraised, 7 of which were relevant to the clinical question. 5 articles were discarded after review for the following reason: not answering clinical question (n=5).

Evidence Table for Included Articles (i.e., articles meeting inclusion criteria)

Author (Year)	Study Type	Age of Child	Number of participants	Exposure	Motor Development*	Cognitive Development*	Language Development*	Emotional Development*
Krcmar, M. (2010)	RCT [2b]	Infants and children 6-24 mo	Study 1: 53 Study 2: 50 (of 53 in Study 1)	<p>Exposures:</p> <p>1) Familiar person live condition: Subjects' mothers presented and labeled five common objects and demonstrated two simple actions to be imitated in person which was recorded for viewing on video</p> <p>2) Familiar person, video condition: Subjects watched the video recorded of their mother labeling objects and demonstrating actions</p> <p>3) Stranger video condition: Subjects watched a video of a stranger demonstrating two actions and presenting five objects in a manner identical to the other two conditions.</p> <p>Study 1: All children had exposure to 3 different conditions: 1) familiar person live, 2) familiar person on video, 3) stranger on video</p> <p>Study 2: Experimental group: (N=25) randomly assigned to view DVD of the mother from Study 1 at home 5 x over 2 weeks</p> <p>Control group: Did not take video from Study 1 home (N=25)</p>		↔ action imitation	↔ word learning overall ↑ word learning for 6-12 month old ↑ word learning for 21-24 month old	
Lin, L (2015)	Prospective cohort [3a]	Children 15-35 mo	N=150 Frequently (n=75) Not Frequently (n=75)	Group 1: Daily TV exposure; frequently (>= 2 hours/day) versus Group 2: Less frequently (<2 hours/day)	↓	↓	↓	
Napier, C. (2014)	Systematic Review [1b]	Preschool children, particularly those under two	n/a	All forms of screen media				↓ including exposure to background TV

Radesky, J. (2016)	Opinion [5b]	Children 0-5 years	n/a			↓ with longer TV exposure	↓ with longer TV exposure ↑ children 24 mos: video chatting with a responsive adult; ↑ play with an interactive touchscreen interface Children 15 mos: ↑ if parent watching along and reteaching content	↓ with longer TV exposure ↓ with non-educational content; likely secondary to decreased parent-child interaction
Radesky, J. (2015)	AAP Policy Statement [5b]	Children 0-2 years	n/a	TV, DVD, mobile and interactive technologies	↓ displacing sensorimotor activities	↓	↓ displacing language-based interactions with caregivers	↓ displacing play-based interactions with caregivers
Richert, R. (2010)	RCT [2b]	Infants 12-14 mo	N=96	Experimental group: Normal home routine plus "Baby-oriented", educational DVD with 30 words highlighted on screen; watched 5 times during a 2 week period for 6 weeks total Control group: Normal home routine and no educational DVD watching for 6 weeks total Study duration: 6 weeks			↔ word learning	
Tomopoulos, S. (2010)	Longitudinal study [4a]	Infants 6 mo	N=259	All electronic media (television, videos/DVDs, movies, and games)		↓ with longer TV exposure ↓ with longer TV exposure + older child and adult content	↓ with longer TV exposure ↓ with longer TV exposure + older child and adult content	

*LEGEND for Developmental Impact

- ↓ Study cited an overall negative impact
- ↔ Study cited an overall neutral impact
- ↑ Study cited an overall positive impact