

# Links Between Media Exposure and Language & Literacy Development

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# Overview

Who is Affected by What Content Under Which Circumstances?

Links among Media Exposure and Language & Literacy Development

- Onscreen Print

- Macrostructures

- Forms of Media

- Poverty

Transfer of Learning

- Immediate

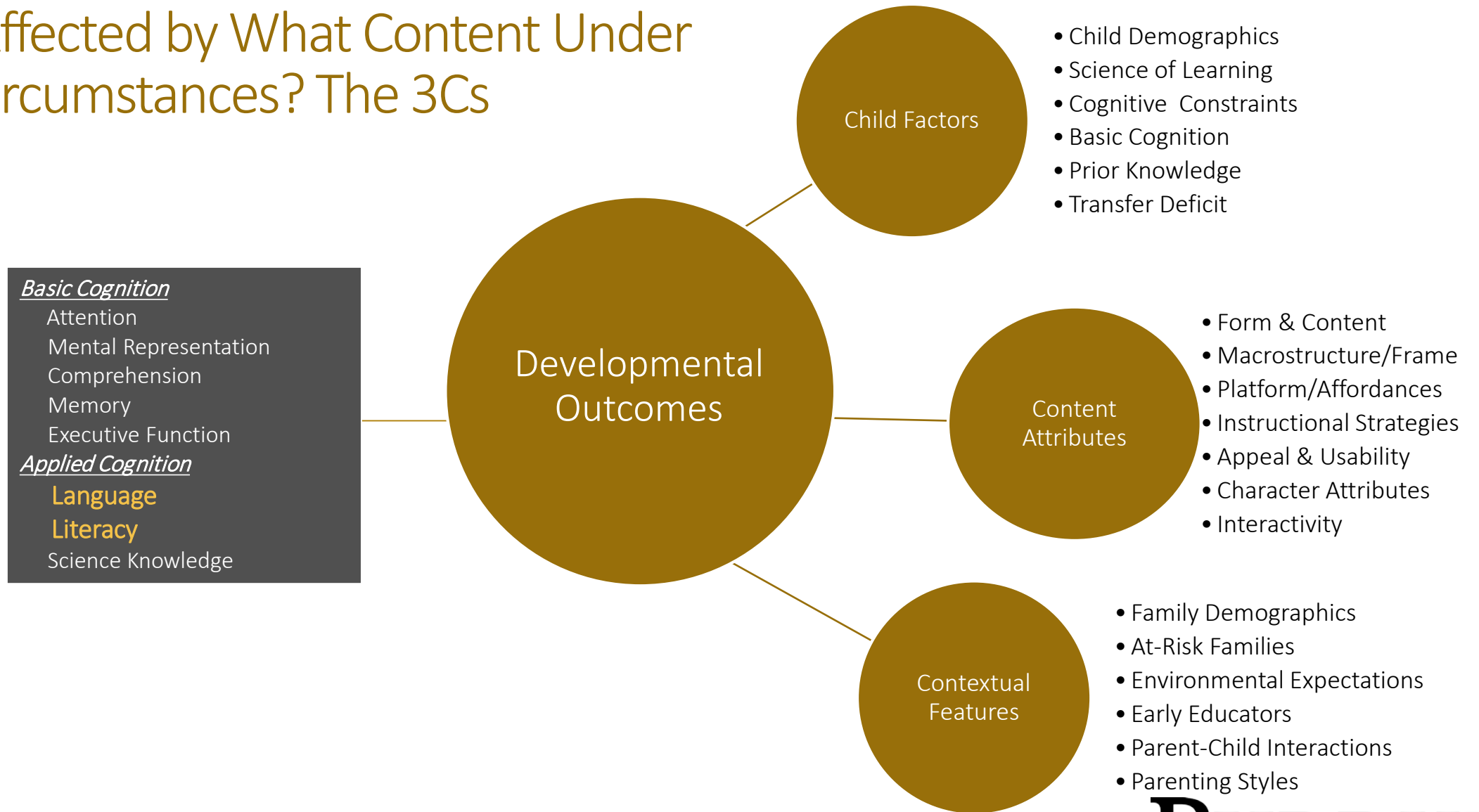
- Cumulative

- Long-Term

- Co-Use

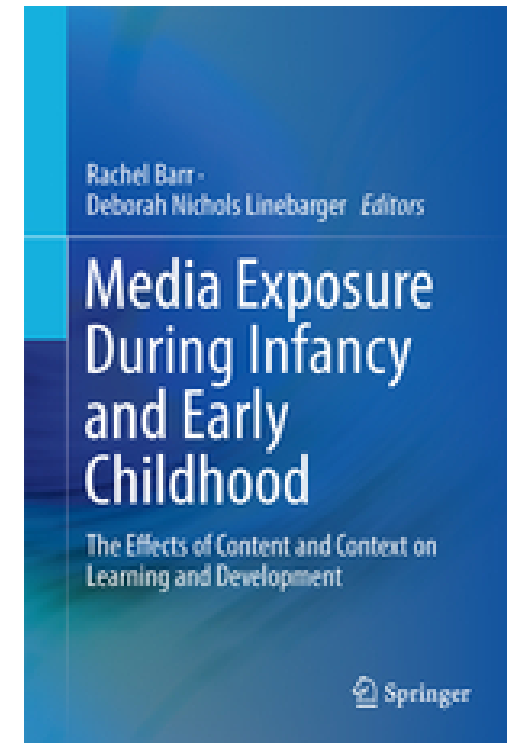
Facilitating Transfer to Accelerate Learning Using Media

# Who is Affected by What Content Under Which Circumstances? The 3Cs



# Who is Affected by What Content Under Which Circumstances? The 3Cs

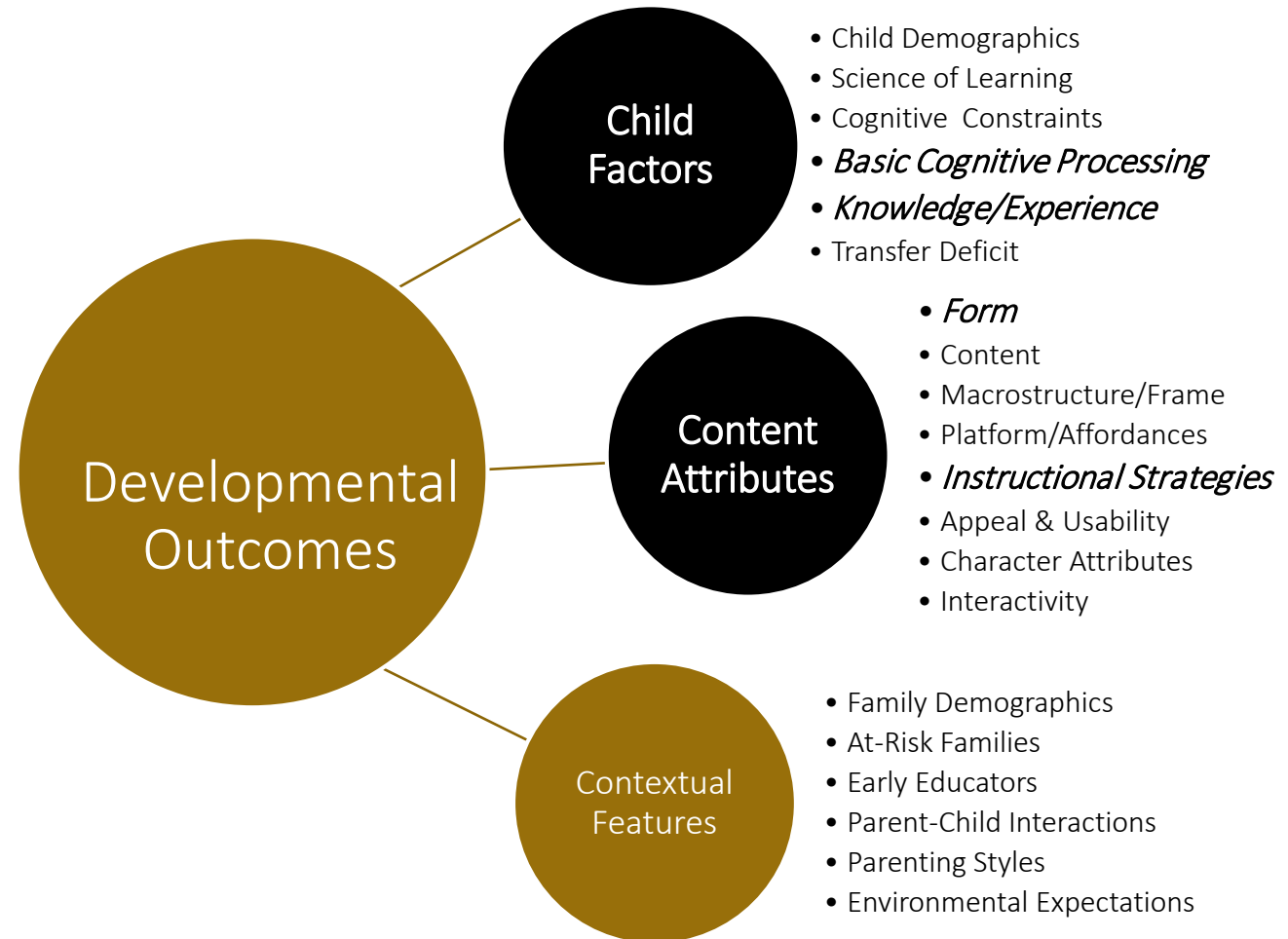
Micro-level *CONTENT ATTRIBUTES* need to work in concert with macro-level *CONTEXTUAL FEATURES* to provide duplicative content across multiple modalities while taking into account a *CHILD'S INDIVIDUAL DIFFERENCES*



# Links: Onscreen Print and Media

## Onscreen Print

- Too much visual and verbal info overwhelms attention (especially when not redundant)<sup>5</sup>
- Little attention to onscreen print (~9% of time OP present)<sup>5</sup>
- Onscreen print (closed captions or strategically placed) improves letter knowledge, phonemic awareness, and word decoding but interferes with program comprehension<sup>1-3</sup>
- Those with < print experience/knowledge did best without onscreen print until a threshold number of views was reached<sup>4</sup>



# A Closer Look: Onscreen Print and Media

- Those with < print experience/knowledge did best without onscreen print until a threshold number of views was reached<sup>4</sup>
  - Asked to view 16 episodes over 4 weeks (could repeat view); parents kept logs (Mean Views = 24.2; SD = 23.8)
  - Receptive and Expressive Vocabulary for words depicted
  - PPVT-4

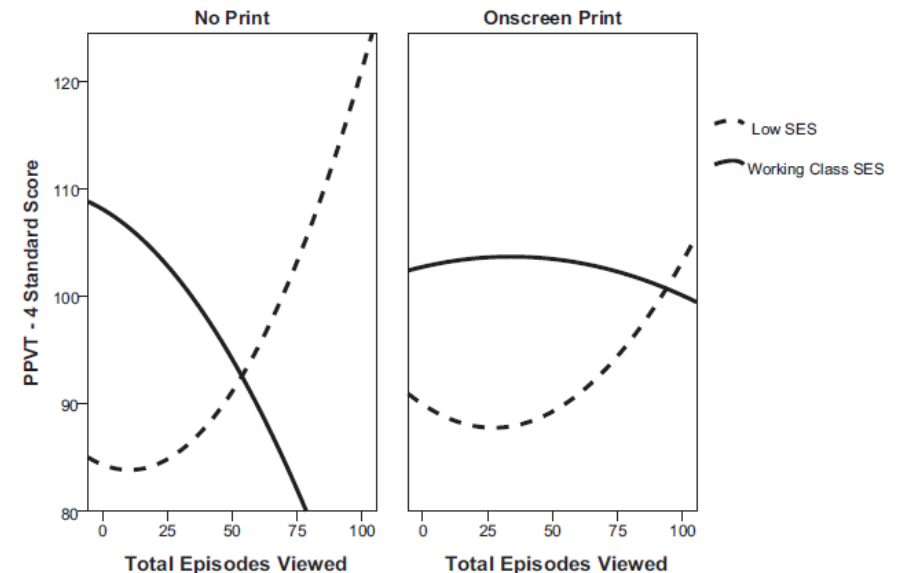
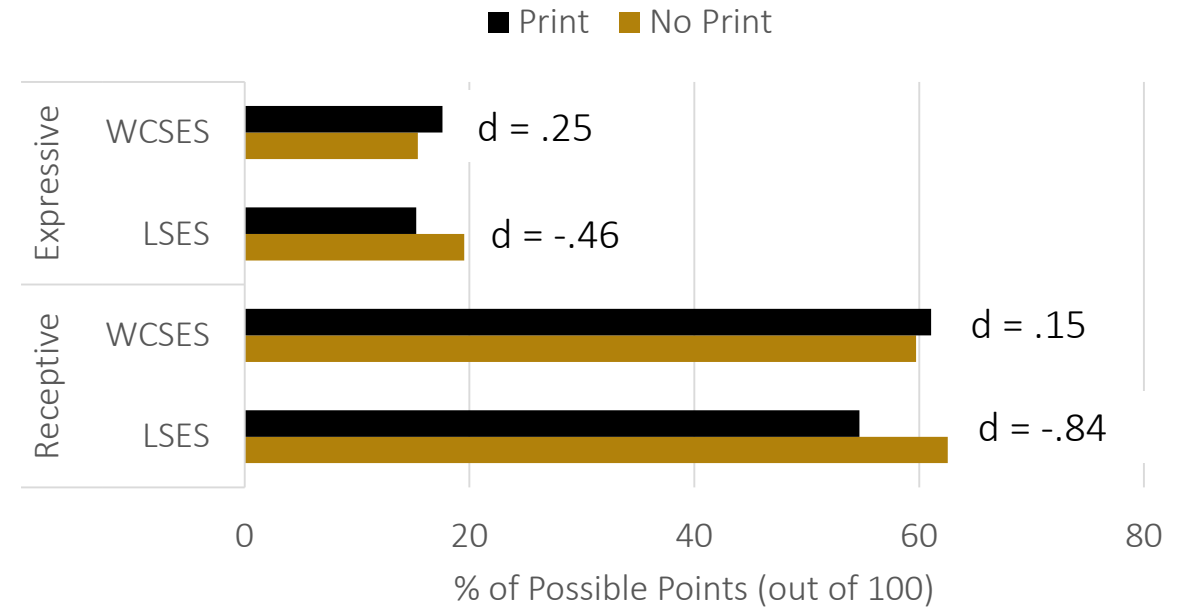


Figure 1. Three-way interaction among episodes viewed, family socioeconomic status (SES), and viewing group for posttest Peabody Picture Vocabulary Test-4 (PPVT-4) standard scores.

<sup>4</sup>Linebarger, Moses, Liebeskind, & McMenamin, 2014

# Links: Literacy/Language and Macrostructures

## Macrostructures

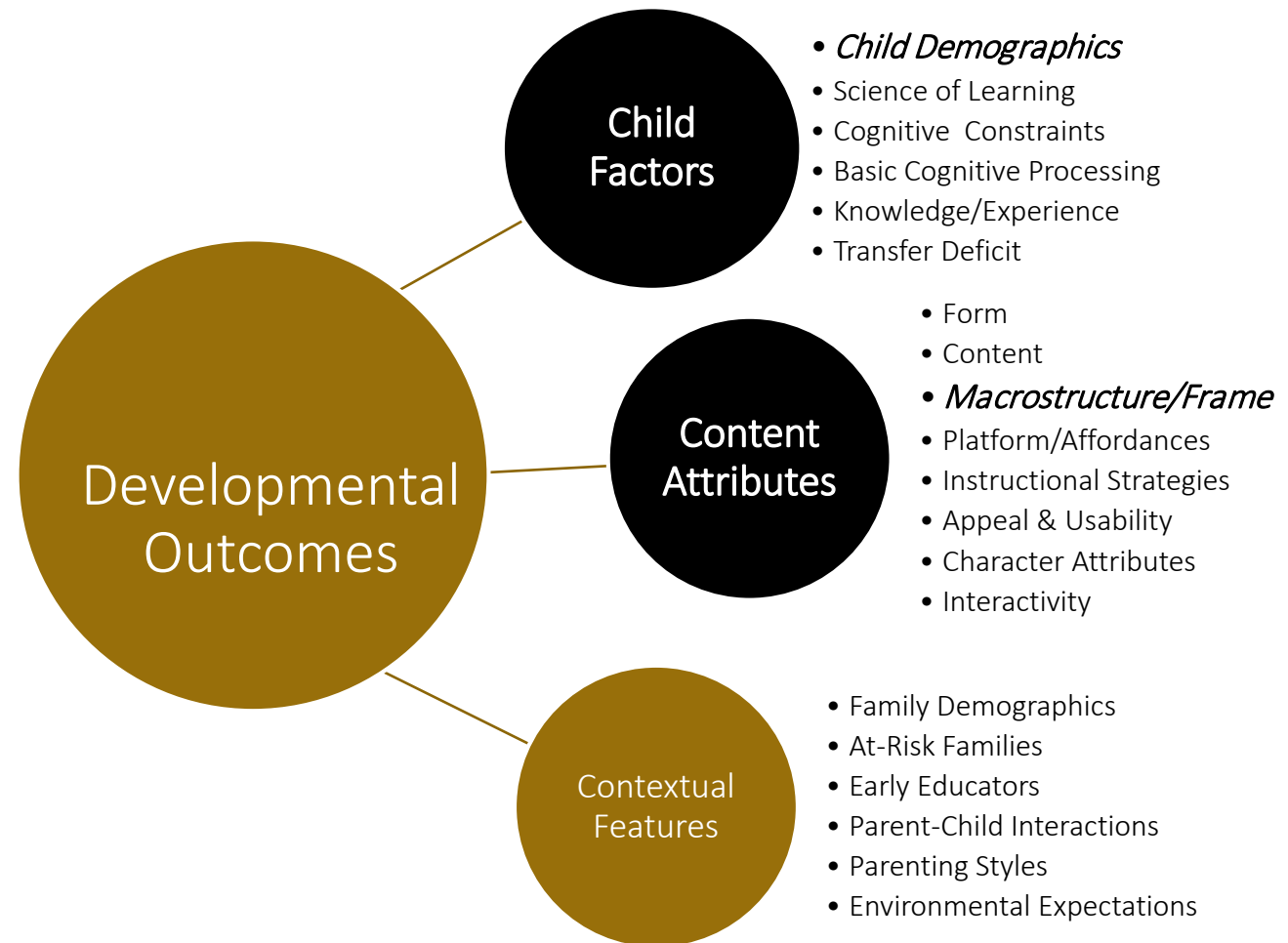
*Definitions:* The frame through which media content is depicted or delivered.

*Types:* Narratives (traditional, story w/in story) vs. expositives

- For infants/toddlers, narratives (+), expositives (-) language outcomes<sup>2,4</sup>
- For preschoolers, narratives > for vocabulary, story knowledge, narrative production, comprehension<sup>1,3</sup>

*Narrative Examples:* Pinky Dinky Doo, Super Why (story w/in); Clifford, Arthur (traditional)<sup>5</sup>

*Expository Examples:* Zoboomafoo, Reading Rainbow, Sesame Street<sup>5</sup>



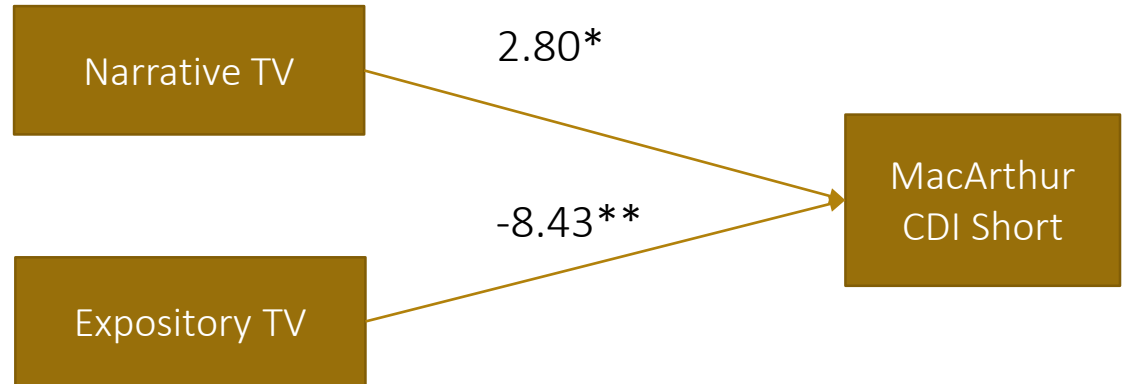
# A Closer Look: Language and Macrostructures

Longitudinal

	MacArthur CDI Long Form	Naturalistic Play Session
Traditional Narrative	8.60 words .61 words/month	1.10 utterances 0.05 (ns) -0.003 (ns)
Interactive Narrative	13.3 words 1.35 words/month	1.78 utterances .22 utterances/month .006 acceleration/month
Expository	-7.28 words -0.26 (ns)	-0.64 utterances -0.05 utterances/month -0.001 deceleration/month

- For infants/toddlers, narratives (+), expositories (-) language outcomes<sup>2,4</sup>
  - Longitudinal study from 6 – 30 months<sup>2</sup>
    - Vocabulary, Expressive Language
  - Nationally representative survey with 8-36 month olds<sup>4</sup>
    - Vocabulary

Survey



<sup>4</sup>Linebarger, Lapierre, & Barr, in prep; <sup>2</sup>Linebarger & Walker, 2005



# Links: Forms and Media

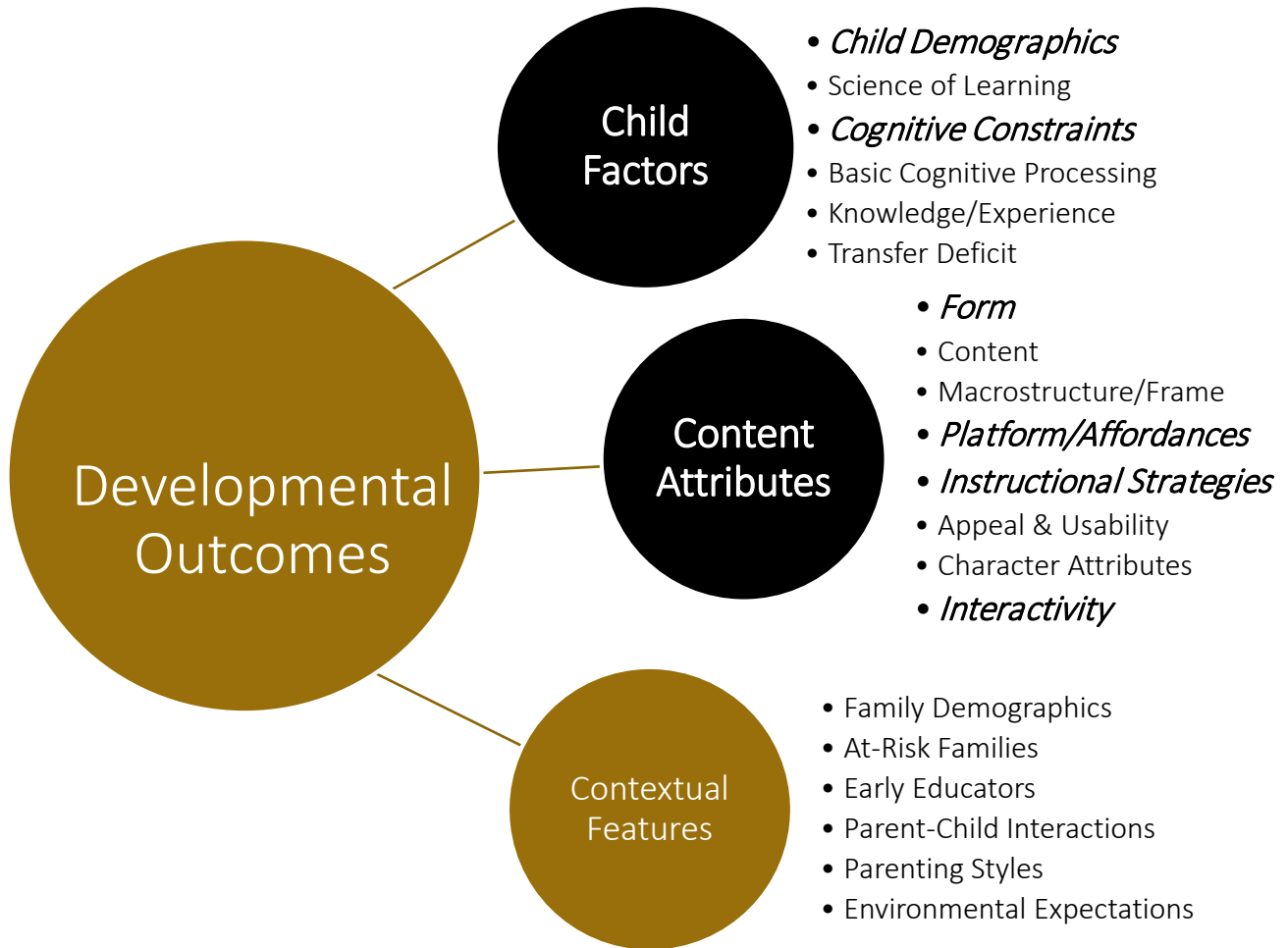
## Form (Production Techniques/Affordances)

**Definitions:** independent of, yet used to mark or convey content. Each technology presents a symbol system with conventions to be navigated and understood

- **TV:** Pans, zooms, moving objects, and noises convey meaning and attract attention, looks to center, participatory cues<sup>1-4,6,7,-10</sup>
- **Computers:** placement of menus, double clicks, looks to the center, left, top<sup>8</sup>
- **Books:** top-to-bottom, left-to-right, print vs. picture<sup>6</sup>
- **Apps:** finger swiping,, interactivity, animations, hotspots, connectivity, object realism, cueing<sup>5</sup>.

**Example:** Background music (on TV) is problematic for infants but adding sound effects that are paired to key content enhances learning<sup>1</sup>

**Example:** Certain formal features (across media/as currently used) attract attention and interfere with learning<sup>1-2,5-7,9-10</sup>



<sup>1</sup>Barr, Shuck, Salerno, Atkinson, & Linebarger, 2010; <sup>2</sup>Goodrich, Pempek, & Calvert, 2009; <sup>3</sup>Hipp, Gerhardstein, Zimmermann, Moser, Taylor, & Barr, 2016; <sup>4</sup>Jennings, Hooker, & Linebarger, 2009; <sup>5</sup>Kirkorian, Pempek & Choi, 2016; <sup>6</sup>Nichols Linebarger, Frey, Fenstermacher, & Barr, 2016; <sup>7</sup>Piotrowski, 2010; <sup>8</sup>Schmitt, Hurwitz, Duel, & Nichols Linebarger, 2018; <sup>9</sup>Vaala et al., 2010; <sup>10</sup>Vaala, Lapierre, & Linebarger, 2009

# A Closer Look: Forms and Literacy

- Certain formal features (across media/as currently used) attract attention away from central content and interfere with learning<sup>10</sup>
  - Young children viewed *Between the Lions*
  - Attention (as time spent fixated) to text was recorded as a function of the amount of non-textual movement onscreen
  - Adults fixated longer on text; however, the same pattern of fixations varied across the 4 movement conditions

Figure 4. Standardized time fixated in text zone as a function of non-textual movement

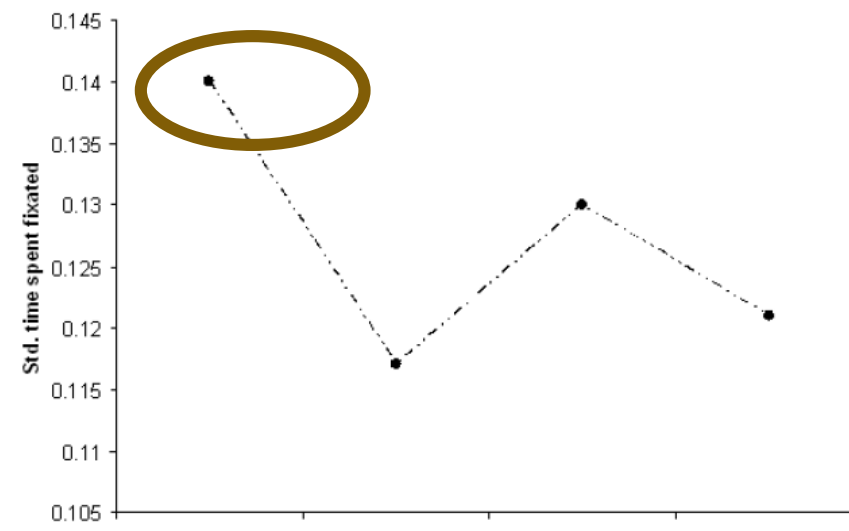
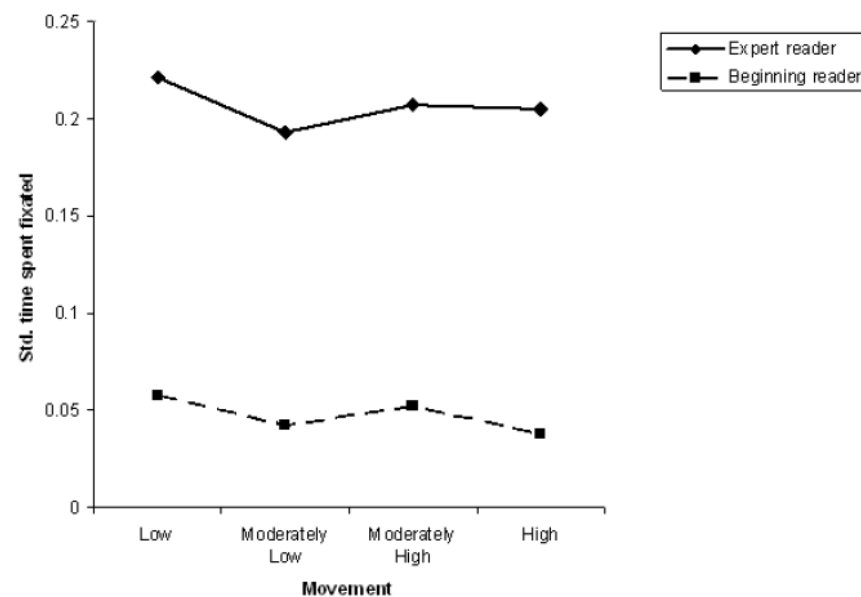


Figure 5. Standardized time fixated in text zone for expert and beginning readers as a function of non-textual movement



<sup>10</sup>Vaala, Lapierre, & Linebarger, 2009

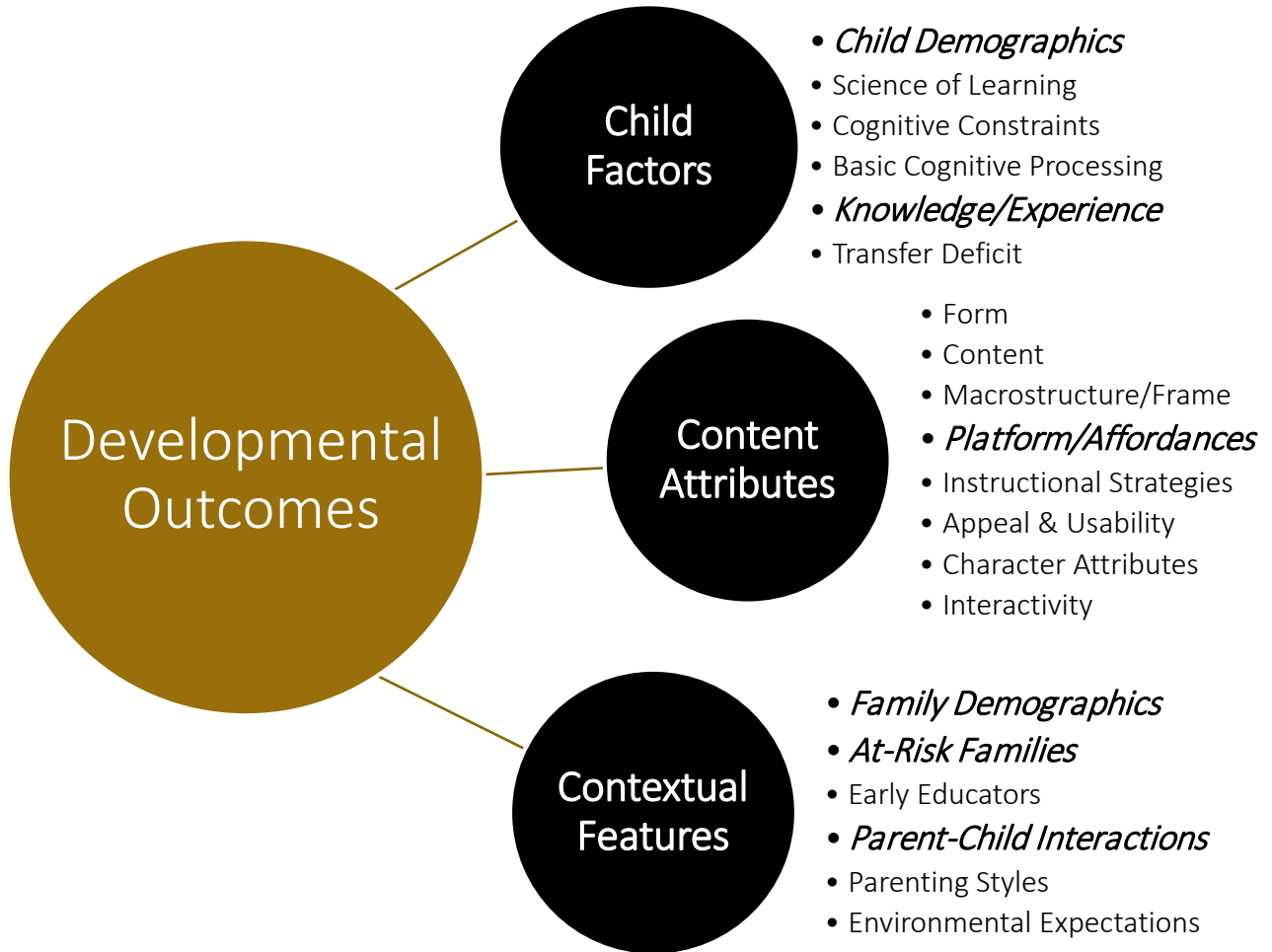
# Links: Language/Literacy and Poverty

## Media and Poverty

- Low SES children show larger gains from educational media based interventions and language<sup>8</sup>
  - Low SES Cohen's  $d = 0.47$
  - Non-Low SES Cohen's  $d = 0.33$

## WHY?

- Use media more, especially TV and VGs<sup>2,5</sup>
- Value the content, especially on TV, more highly<sup>6,8</sup>
- Have fewer traditional literacy resources available<sup>1,3,6-7</sup>
- Low SES parents report engaging in shared TV viewing in ways ~ to Middle SES parents' shared reading<sup>8</sup>
- Media has become an everyday practice



<sup>1</sup>Garrity, Piotrowski, Lapiere, & Linebarger, 2014; <sup>2</sup>Lapiere, Piotrowski, & Linebarger, 2012; <sup>3</sup>Linebarger, 2001; <sup>4</sup>Linebarger, 2015a; <sup>5</sup>Linebarger, Barr, Lapiere, & Piotrowski, 2014; <sup>6</sup>Linebarger, McMnamin, & Wainwright, 2009; <sup>7</sup>Linebarger, Moses, Liebeskind, & McMnamin, 2013; <sup>8</sup>Moses, Linebarger, Wainwright, & Brod, 2010.

# A Closer Look: Language and Poverty

- Low SES children show larger gains from educational media based interventions and language<sup>8</sup>
- Meta-analysis of television exposure and vocabulary
  - Low SES Cohen's  $d = 0.47$
  - Non-Low SES Cohen's  $d = 0.33$

Type of Programming	Vocabulary Outcome	Hedge's $g$ (S.E.)	95% CI (lower – upper)
All	Expressive & Receptive	.399 (.068)	.266 to .532
	Expressive	.614 (.136)	.348 to .880
	Receptive	.268 (.071)	.128 to .408
Educational	Expressive & Receptive	.480 (.076)	.331 to .630
	Expressive	.729 (.163)	.409 to 1.050
	Receptive	.366 (.079)	.182 to .491
Entertainment	Expressive & Receptive	-.452 (.222)	-.888 to -.016
	Expressive	-.567 (.103)	-.768 to -.365
	Receptive	N/A	N/A

MSES Effect Size = .33

LSES Effect Size = .47

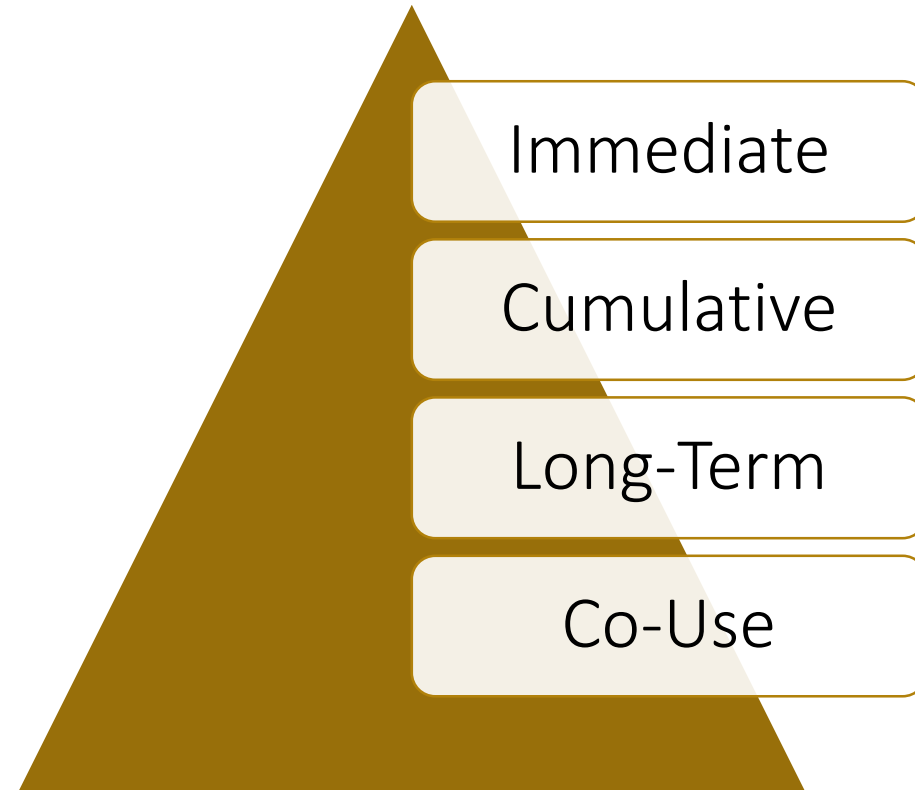
<sup>8</sup>Moses, Linebarger, Wainwright, & Brod, 2010.

# The Importance of Transfer in Learning from Media

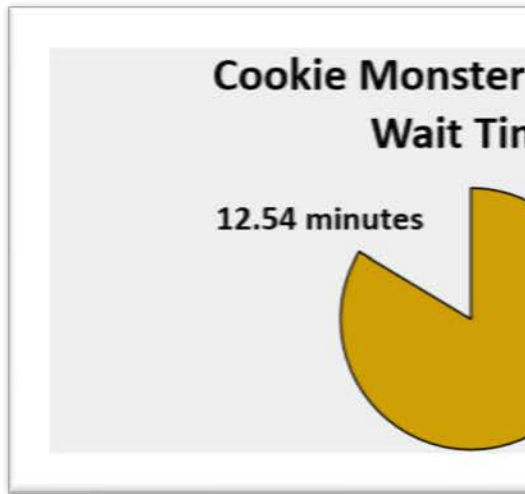
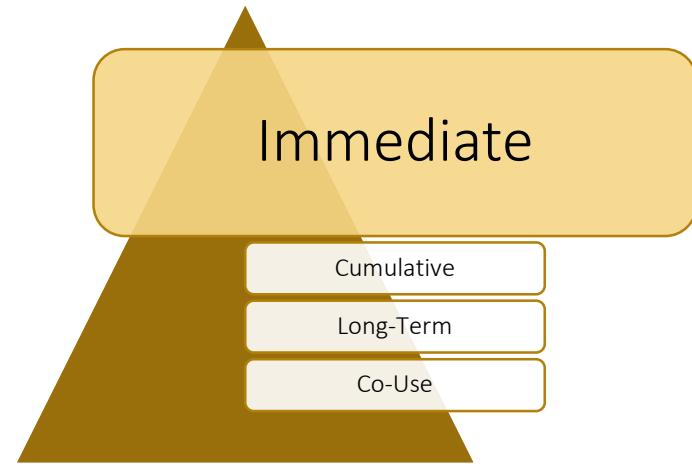
# Transfer of Learning and Educational Media

## *TRANSFER OF LEARNING:*

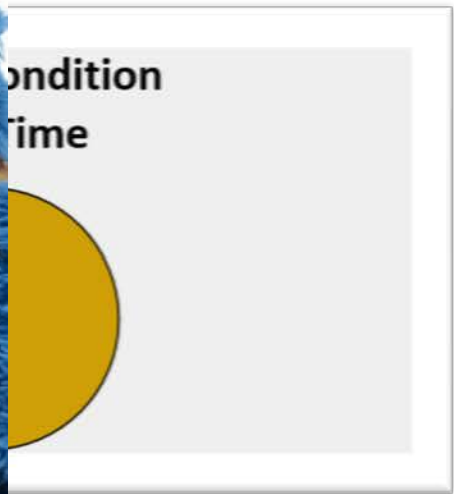
The ability to extend what has been learned in one context to new contexts



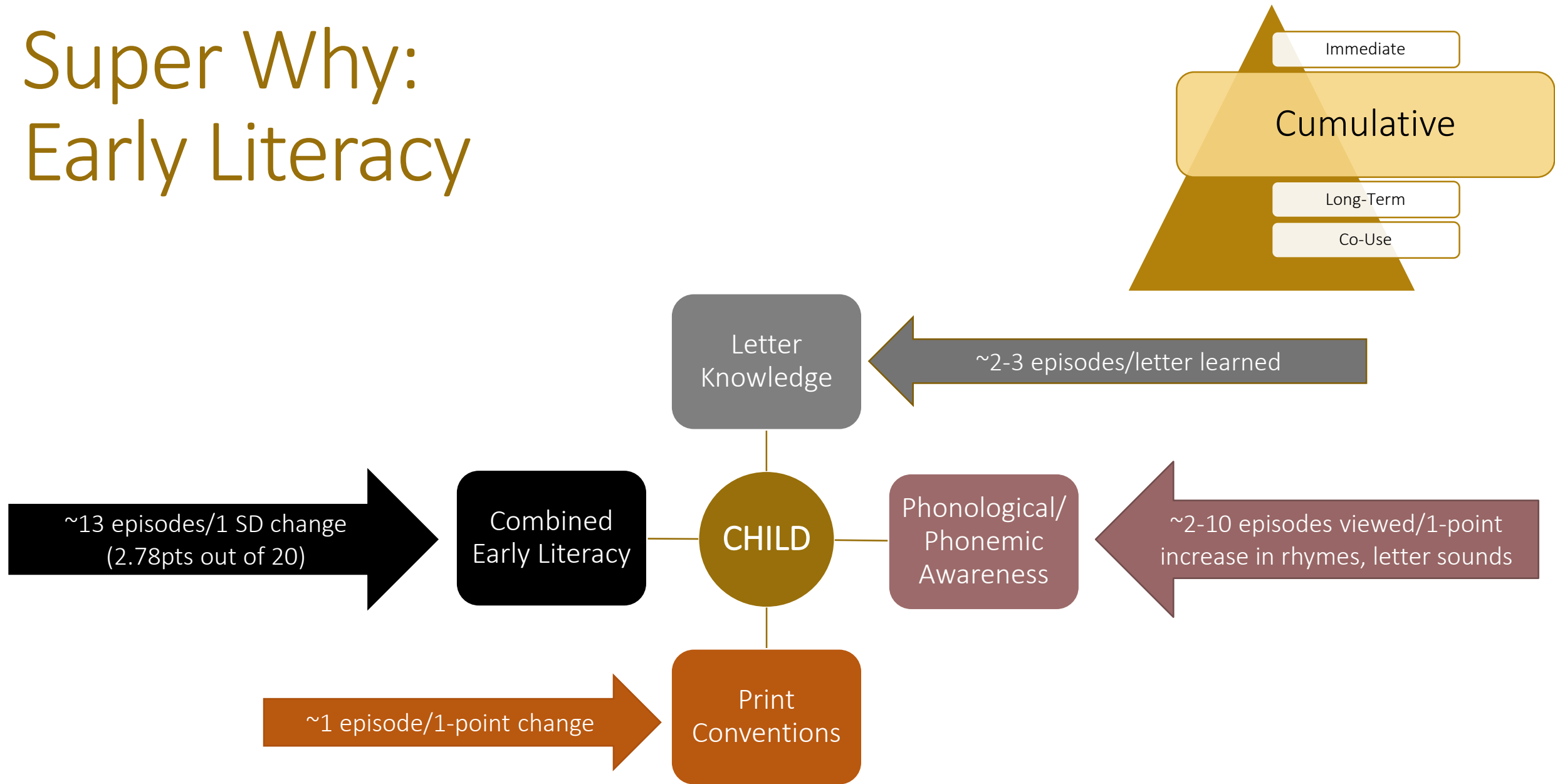
# Cookie Monster: Self-Control



**#CONTROLMESELF**

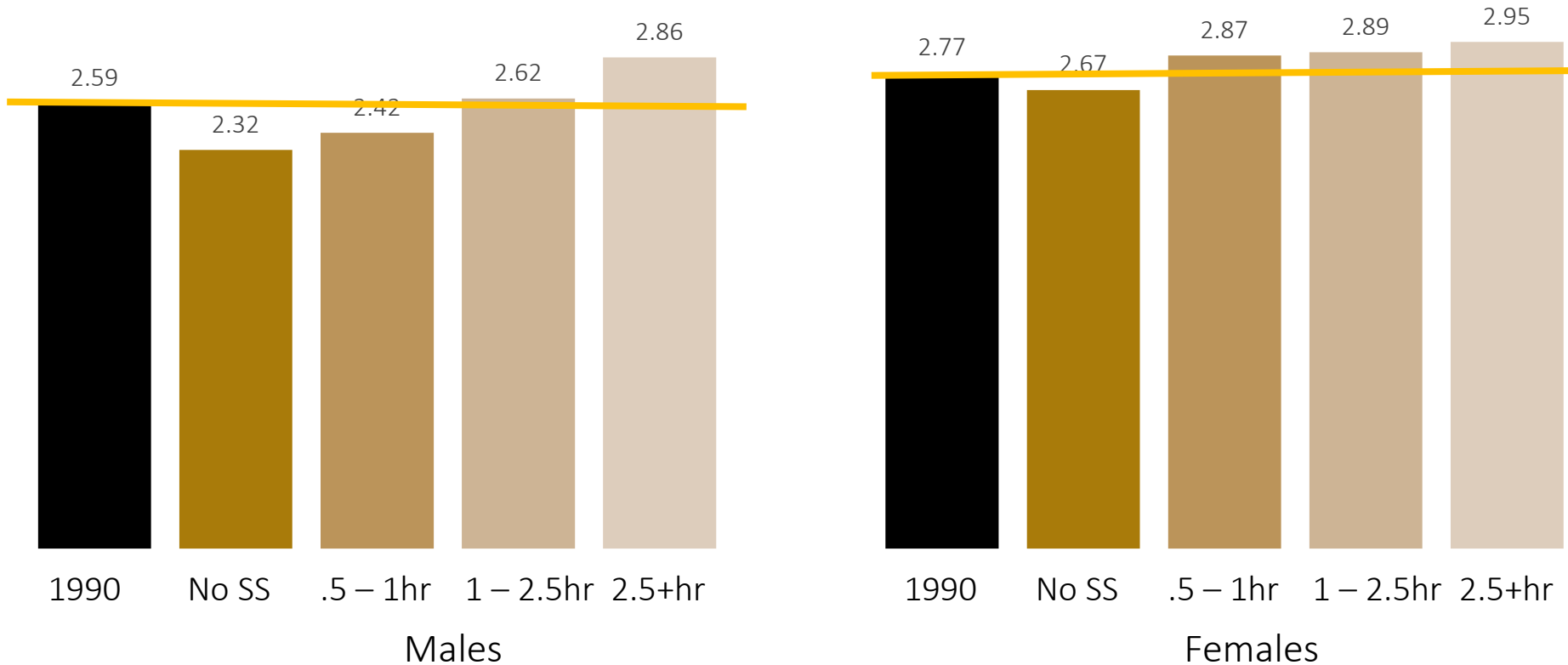
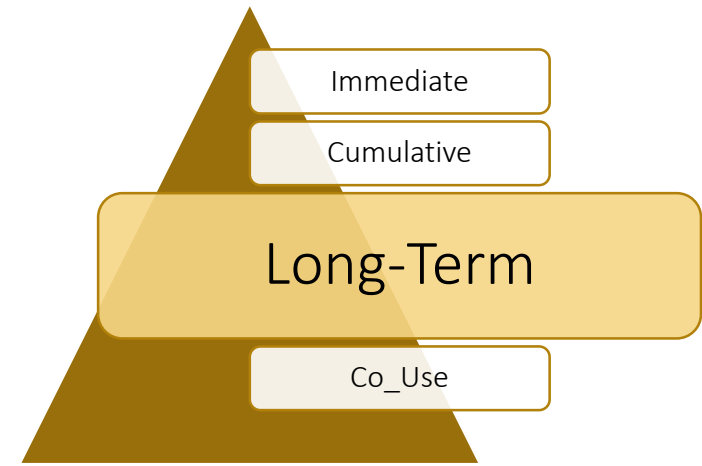


# Super Why: Early Literacy



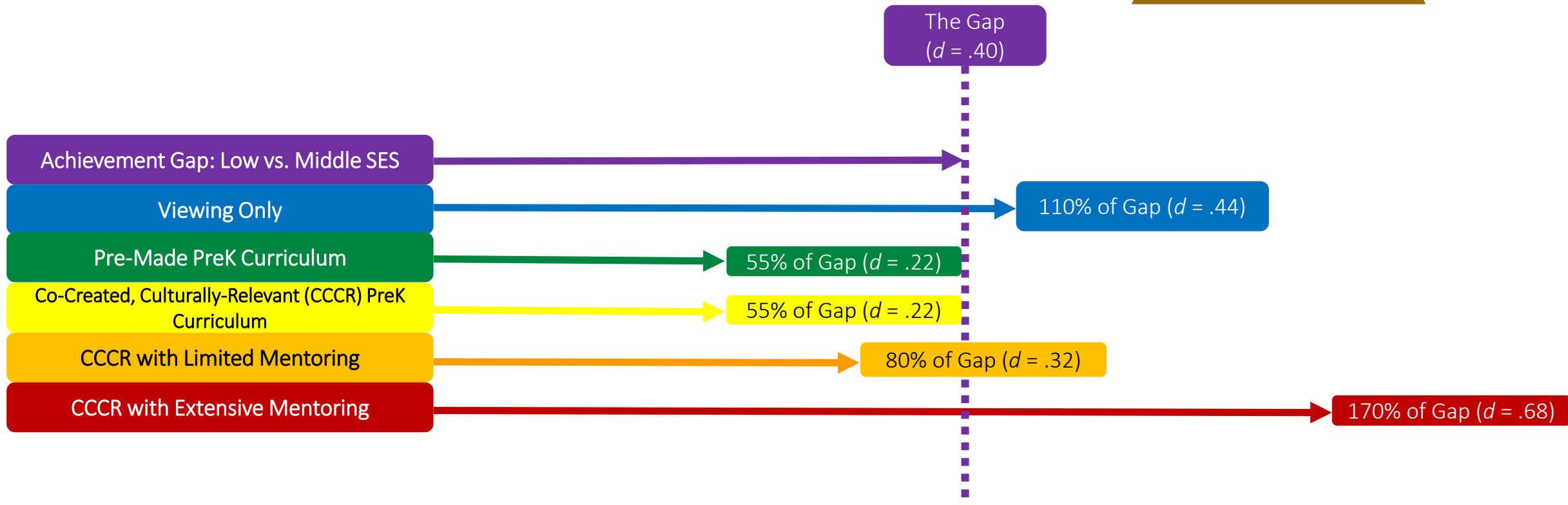
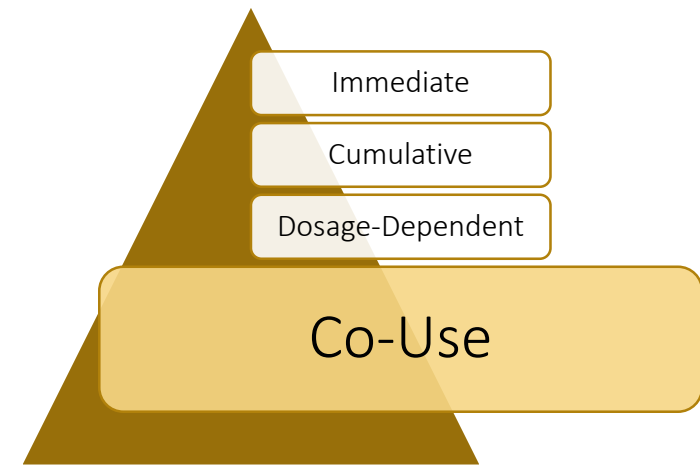


# Sesame Street: High School Grades



Mr. Rogers' viewing at age 5 predicted higher creativity scores in adolescence

# Evolution of Between the Lions: From Viewing to Classroom Use



A grayscale photograph of a person sitting at a desk, using a tablet computer. The person's hands are visible, interacting with the screen. The background is slightly blurred, showing a laptop and some papers. A white rectangular box is overlaid on the image, containing the text.

Facilitating Transfer to Accelerate  
Development Using Media...What Matters?

# Facilitating Transfer to Accelerate Development Using Media...What Matters?

Positive, nurturing relationships and social support

A human brain in good working order

Opportunities to learn

Self-Efficacy (“I can do it”)

Regulation of emotion, arousal, and behavior

A sense of belonging or meaning in life

“Infants are not born into a world of confusion; instead, they are sophisticated learners...who develop gradually and systematically across the first years of life...[and who] under [the right conditions]...come to make sense of [media]

--Rachel Barr & Deborah Nichols  
Linebarger (2016)

# Facilitating Transfer to Accelerate Development Using Media...The Evidence

## What Matters?

Positive, nurturing relationships and social support

A human brain in good working order

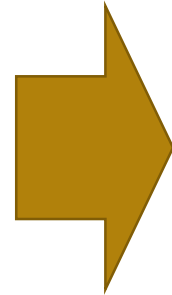
Opportunities to learn

Self-Efficacy (“I can do it”)

Regulation of emotion, arousal, and behavior

A sense of belonging/meaning in life

Involved parents



## Evidence-Based Ways That Media Help

Parasocial relation with onscreen characters enhances learning (Calvert et al., 2014)

High-quality educational experiences provide protection (Fox, Levitt, & Nelson, 2010). Increasing exposure to educational TV is linked to stronger academic performance in both short- and long-term and better behavior (Anderson et al., 2001; Linebarger, 2015b; Linebarger, Barr et al., 2014)

Large body of evidence for learning across multiple domains for children 2 years and up; developing body of evidence for children under two (Fisch, 2004; Barr & Nichols Linebarger, 2016)

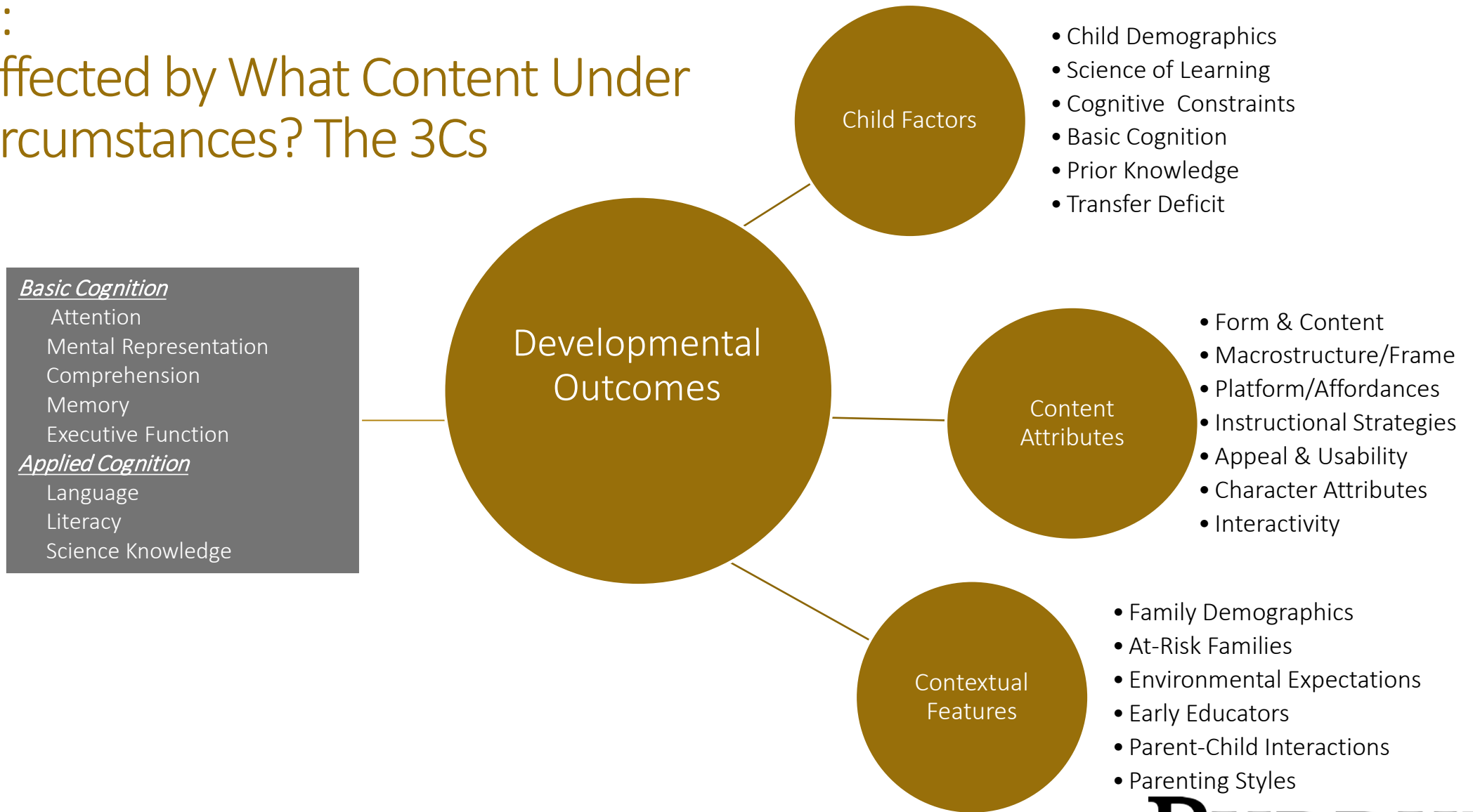
Scaffolds/builds competence; desire/value/preference to use (Linebarger, 2001, 2015b; Linebarger, Moses et al., 2014)

Stronger self-control, executive function with media, esp. high-risk (Gatewood & Linebarger, 2015; Linebarger, Barr et al., 2014)

Parasocial relations, motivation, useful, worthwhile, value (Calvert et al., 2014)

Low-income parents interact with/around TV content in the same way that middle-income parents interact around books (Linebarger, Moses et al., 2014) Parent-child interactions similar across different media (books, screens, pictures; Barr, 2013; Simcock et al., 2010)

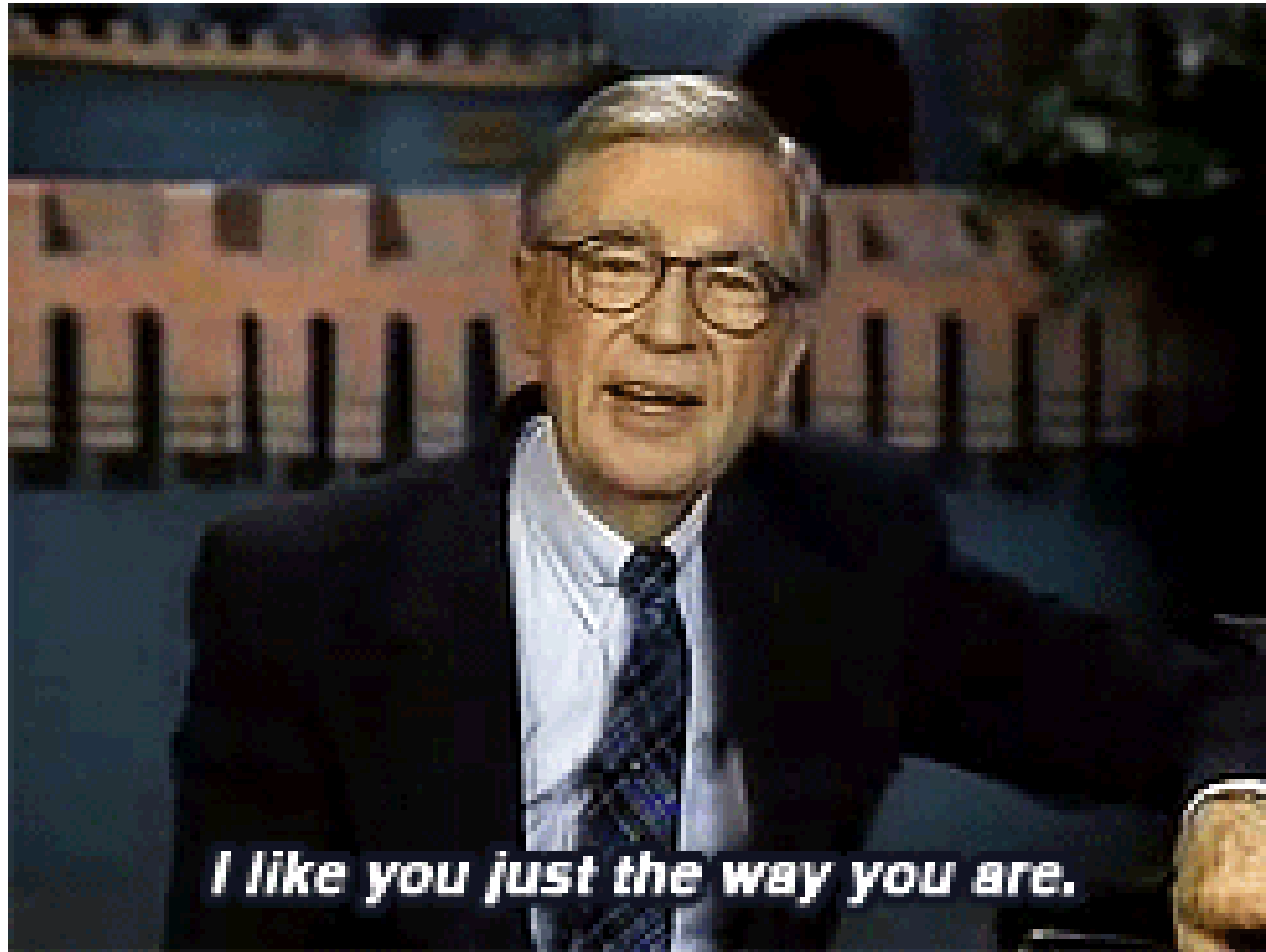
# To Recap: Who is Affected by What Content Under Which Circumstances? The 3Cs



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*Fred Rogers, Mr. Rogers' Neighborhood*



# Questions

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