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Funding: Department of Education, Institute of Education Sciences #R324A150103

Caregiver-Provided Learning Opportunities Boost Intervention Effects for Infants with Neuromotor Delays

Natalie A. Koziol, PhD, Christiana D. Butera, PhD, EdM, Kari S. Kretch, PT, DPT, PhD, Regina T. Harbourne, PT, PhD, FAPTA, Michele A. Lobo, PT, PhD, Sarah W. McCoy, PT, PhD, Lin-Ya Hsu, PT, PhD, Sandra L. Willett, PhD, PT, PCS, Audrey E. Kane, PhD, OTR/L, James A. Bovaird, PhD, Stacey C. Dusing, PT, PhD, FAPTA

Grounded Cognition

- The grounded view of cognition posits that children's perceptual-motor experiences and cognitive processes are intricately linked and dependent upon their social and cultural environment *(Barsalou, 2008)*
- Traditional physical therapy early intervention (EI) emphasizes motor milestones without attending to interdependent cognitive skills *(Palisano, 1991; Mahoney et al., 2004)*
- There is a critical need to develop comprehensive therapeutic rehabilitation strategies for children with neuromotor delays that target interrelationships between motor and cognitive development and to evaluate their impact on future cognition *(Lobo et al., 2013)*

Sitting Together & Reaching to Play

(Harbourne et al., 2018, 2021)

- The recently developed START-Play physical therapy intervention uses activities that encourage motor learning and problem-solving embedded in play
- Therapists scaffold caregivers' abilities and confidence in setting up the child's play environment and tasks and encourage them to integrate intervention strategies into their daily family routines
- Caregivers assist with identifying appropriate levels of challenge for their child, and participate in skill building of object permanence, means-end understanding, body/object affordances, and joint attention through social and motor-based interactions


MR290

Examining Response to Intervention

- START-Play had positive effects on sitting and fine motor skills but no effect on cognition *when aggregating across the full sample.* However, START-Play had a positive effect on cognition *among children with a severe motor delay* *(Harbourne et al., 2021)*
- Understanding factors that contribute to response to intervention is vital for providing appropriate individualized care *(Field-Fote, 2019)*
- Intervention effects may also depend on caregiver-provided learning opportunities, which have been linked to children's cognitive development *(Lobo & Galloway, 2008)*
- Caregiver involvement is malleable and a key ingredient of START-Play, suggesting that START-Play may also impact caregiver-provided learning opportunities over time

Current Study

- The current study draws on a larger randomized clinical trial *(Harbourne et al., 2018)* evaluating the efficacy of START-Play vs. Usual Care EI on the motor, cognitive, and language outcomes of infants with neuromotor delays
- RQ1: Does the effect of START-Play on children's cognitive skills depend on caregiver-provided learning opportunities?
- RQ2: Does START-Play impact caregiver-provided learning opportunities over time?

Eligibility Criteria

- Inclusion criteria
  - 7 to 16 months of age (prematurity-adjusted)
  - Neuromotor disorder (e.g., high risk for CP)
  - > 1 SD below the mean on the Bayley-3 gross motor subscale
  - Able to prop sit but not get in and out of sitting
  - Able to spontaneously move arms
- Exclusion criteria
  - Primary diagnosis other than a neuromotor disorder
  - Medical complications/hospitalizations that would limit participation
  - Plans to move out of the area

Sample

- 112 eligible infants, M = 10.8 months corrected age (SD = 2.6)
- 57% boys
- 70% White, 10% Black, 8% Asian, 8% Multiple Races, and 4% Other
- 18% Hispanic or Latino
- 45% with severe motor delay (≥ 2.5 SD below the mean)
- 19% had a history of seizures and 26% a brain injury or hydrocephalus
- 2% of caregivers < HS diploma, 13% HS diploma, 26% some college, 26% Bachelor's degree, 33% postgraduate degree

Variables & Measures

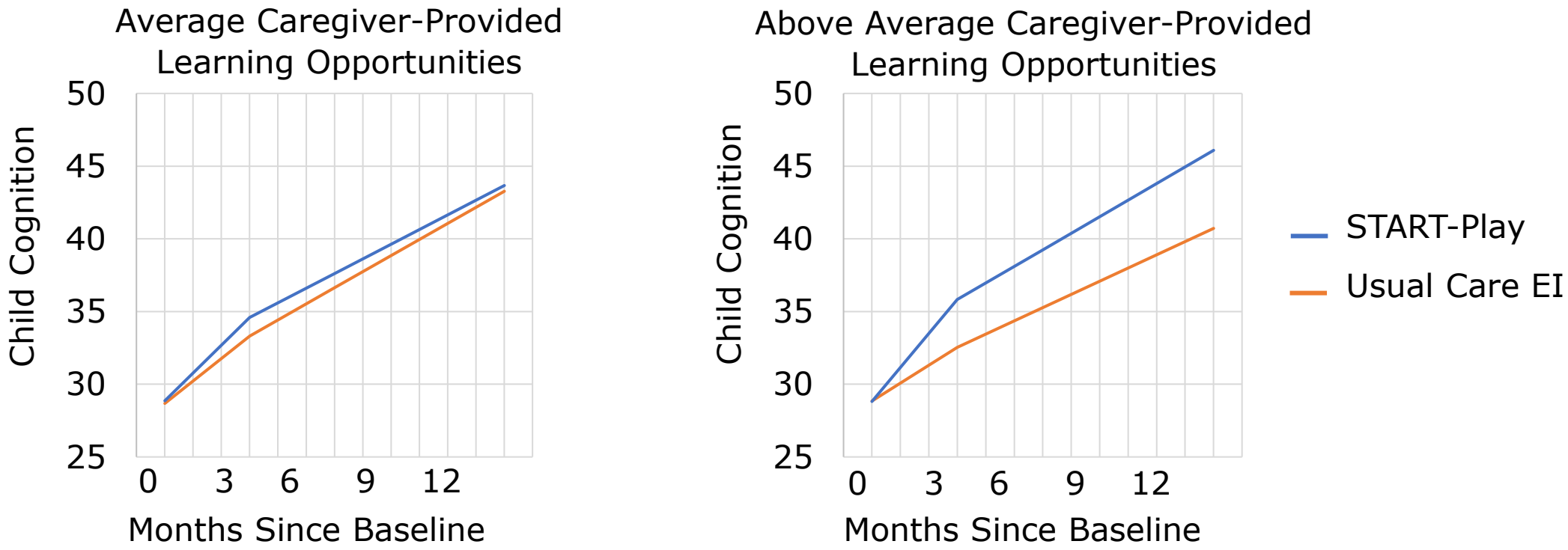
- Children's cognitive skills were measured via the Bayley-3 cognitive subscale *(Bayley, 2006)*
- Caregiver-provided learning opportunities were defined as "[P]arent provides opportunities, through motor activities, for practicing cognitive skills including object permanence, means end, body-object or object-object affordances, and joint attention." Duration of learning opportunities was coded from a 5-minute caregiver-child free play interaction task.
- Covariates included children's baseline motor delay (Bayley-3 motor composite), prematurity-corrected age, clinical site, SES, and access to toys in the home

Procedures

- Participants were recruited from the surrounding areas of Newark, DE (UD); Omaha, NE (UNMC); Pittsburgh, PA (DU); Richmond, VA (VCU); and Seattle, WA (UW)
- START-Play intervention was provided by licensed PTs twice weekly for 3 months (24 sessions total, with each session lasting 40-60 minutes)
- For ethical reasons, no restrictions were placed on UC-EI services for either group
- Outcomes were assessed at baseline (pre intervention) and 1.5, 3 (post intervention), 6, and 12 months post baseline
- Linear piecewise mixed modeling was performed to address the study aims

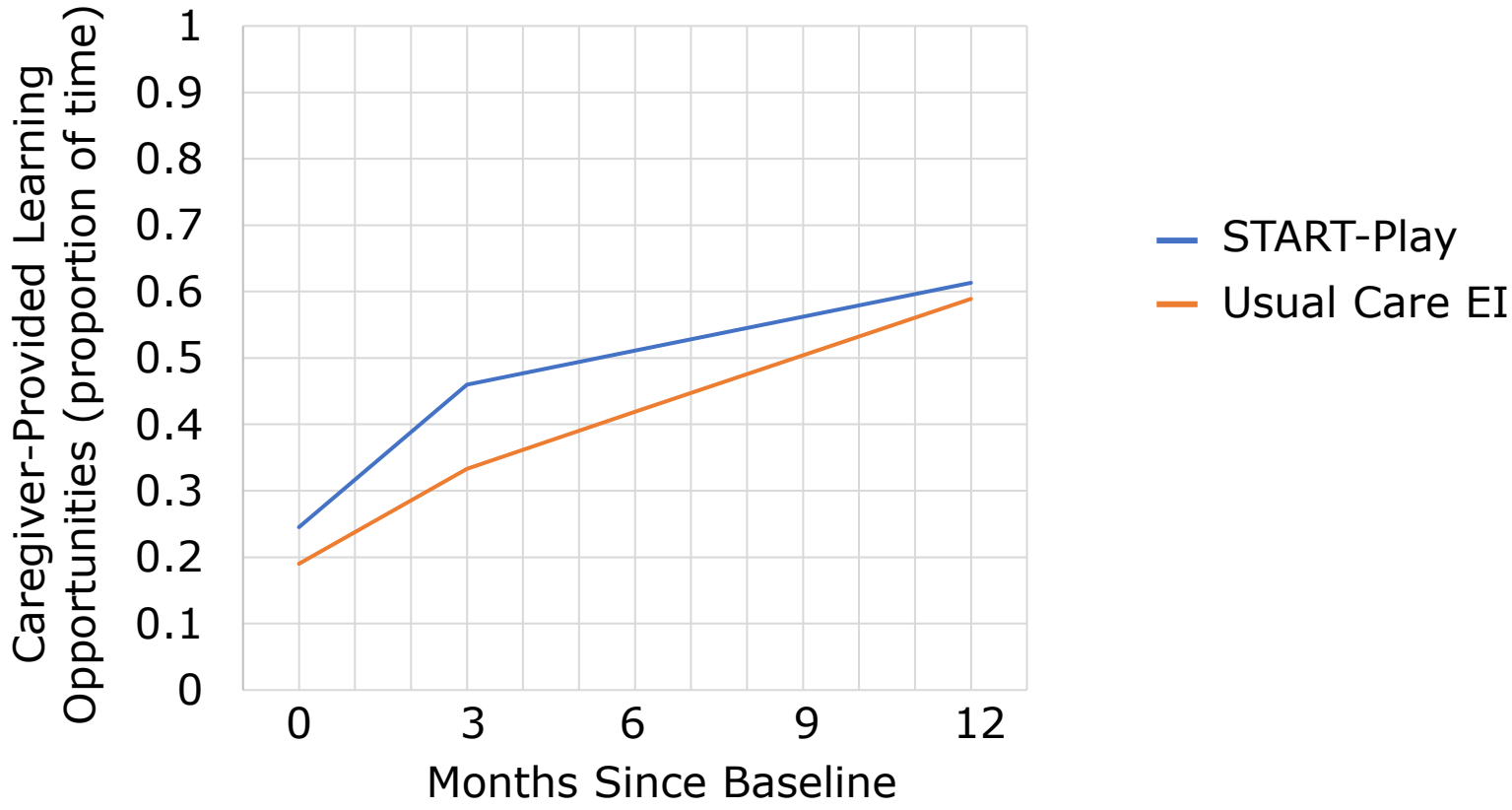
Results (RQ1): The effect of START-Play on children's cognitive skills was more pronounced among children whose caregivers entered the study providing high levels of learning opportunities

Figure 1: Child Cognitive Skills Over Time by Treatment Group and Baseline Caregiver-Provided Learning Opportunities



Results (RQ2): START-Play did not significantly impact caregiver-provided learning opportunities over time. Duration of learning opportunities increased over time for both groups, on average.

Figure 2: Caregiver-Provided Learning Opportunities Over Time by Treatment Group



Take-Aways & Implications (RQ1)

- START-Play had a lasting effect on children's cognition, but this effect was contingent on caregivers providing their child with ample opportunities to practice cognitive skills outside of therapy
- Caregivers should be educated on the benefits of engaging with their child through play
- Caregivers' behaviors are malleable; caregivers who are less cognitively engaged could be provided with additional or different training opportunities to increase information uptake and dosage of learning opportunities for the child

Take-Aways & Implications (RQ2)

- START-Play did not influence the proportion of time caregivers spent providing learning opportunities during a free play task
- However, fidelity data indicated that START-Play caregivers were more highly engaged during therapy sessions than Usual Care EI caregivers *(An et al., 2021)*
- Strategies for improving caregivers' uptake and transfer of START-Play principles should be developed and formatively evaluated
- The START-Play protocol should include strategies for communicating START-Play principles to other caregivers in the child's life
- Additional research is needed to capture the dyadic nature of caregiver-child interactions and the "just right" challenge

Citation

PHYSICAL & OCCUPATIONAL THERAPY IN PEDIATRICS
2022, AHEAD-OF-PRINT, 1-16
https://doi.org/10.1080/01942638.2022.2054301

Taylor & Francis
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Effect of the START-Play Physical Therapy Intervention on Cognitive Skills Depends on Caregiver-Provided Learning Opportunities

Natalie A. Koziol [a], Christiana D. Butera [b], Kari S. Kretch [b], Regina T. Harbourne [c], Michele A. Lobo [d], Sarah W. McCoy [e], Lin-Ya Hsu [e], Sandra L. Willett [f], Audrey E. Kane [g], James A. Bovaird [a], and Stacey C. Dusing [b]

[a] University of Nebraska-Lincoln, Lincoln, Nebraska, USA [b] University of Southern California, Los Angeles, California, USA [c] Duquesne University, Pittsburgh, Pennsylvania, USA [d] University of Delaware, Newark, Delaware, USA [e] University of Washington, Seattle, Washington, USA [f] Munroe Meyer Institute, University of Nebraska Medical Center, Omaha, Nebraska, USA [g] Virginia Commonwealth University, Richmond, Virginia, USA

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Questions or Comments?

nkoziol@unl.edu