Using Text Messages to Build Parents’ Capacity to Improve Child Language-Learning Opportunities
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Early Language Experiences
- Infants and toddlers from disadvantaged families hear about 30 million fewer words by their 4th birthday than other children (Hart & Risley, 1995).
- Academic success at 9 and 10 can be linked to the talk heard from birth through age 3 (Hart & Risley, 1995).
- Children who fail to acquire effective communication skills can experience relative social isolation irrespective of whatever other abilities they possess (Warren & Waller, 2005).

Promoting Communication Strategies
- Naturalistic strategies, designed to be flexible and individualized to unique skills, needs, and diverse backgrounds of families.
- Strategies integrated with family goals.
- Families implement strategies across daily routines.
- Intervention Coach supports intervention delivery.
- Materials can be found at http://www.talk.ku.edu

Parent Engagement
- Home visiting parenting programs have shown positive results with high-risk populations, but meta-analyses have not reported consistently positive outcomes for parents and children (Astuto & Allen, 2009; Sweet & Appelbaum, 2004).
- Programs that are able to maintain parents’ participation and keep them actively engaged are more likely to achieve improvements in parent and child outcomes (Gomby, 2005).
- A randomized trial examining the impact of cellular phones and text messaging on parent engagement in a home-based intervention resulted in reduced attrition, improvements in responsive parenting, and lower rates of parenting stress and depression (Carta, Lefever, Bigelow, Borkowski, & Warren, 2013).

Randomized Controlled Trial, followed by secondary analyses examining effects of number of text messages sent.

- Families randomly assigned:
  1) Promoting Communication (PC) Strategies (n=69)
  2) PC Strategies PLUS text messaging enhanced PC Strategies (n=58)

Parent and Home Visitor Satisfaction
- Parent Visit Visitor Social Validity Data Summary

Secondary Analyses—Effects of Number of Texts Sent
- Do parents who received more text messages demonstrate greater engagement?
  - For each additional PC strategy-related text sent by home visitors, there would be a 0.26-unit increase in the growth rate of parent-rated engagement, which ranged from 0.31 to 2.29 in this model (0.26, SE = 0.11, p = 0.03)
  - For each additional texts sent from intervention coaches there was a 0.09 increase in the growth rate of home visitor-rated engagement, which ranged from 0.09 to 1.27 in this model.
  - Do parents who received more text messages implement the PC strategies at higher fidelity?
  - For each additional PC strategy-related text sent by home visitors, there was an increase of 3.33 additional PC strategies used by parents, which ranged from 9 to 305 in the sample (3.33, se = 0.05, p < 0.01).
  - For each additional text sent, there was an increase of 2.38 additional PC strategies used by parents (2.38, SE = 0.75, p < 0.01).
- Text messaging dosage had indirect effects on child language outcomes through parent’s PC strategy fidelity?
  - One additional PC strategy-related text sent from home visitor tended to improve parent’s use of strategies, which then led to an increase by 0.09 in their Child Preschool Language ScaleExpressive Communication (PLS-EC) scores (a = 0.09, CI = 0.198, 0.184).
  - The total number of texts sent from home visitors also had a significant mediated effect on PLS-EC through parent’s use of strategies (a = 0.04, CI = 0.004, 0.104).
  - One additional PC strategy-related text sent tended to improve parent’s use of strategies and then led to an increase by 0.11 in their children’s ECI weighted total score (a = 0.04, CI = 0.017, 0.242). Also, a significant mediated effect was found for total texts sent from home visitors on ECI scores (a = 0.06, CI = 0.008, 0.127).
  - One additional PC strategy-related text sent from a home visitor tended to improve parent’s use of strategies, and then led to an increase by 0.20 in observed Child Communication Weighted Total Rate (a = 0.21, SE = 0.07, CI = 0.051, 0.410).
  - The total number of texts sent from home visitors on Child Communication (a = 0.11, CI = 0.012, 0.250).

Text Message Examples
- Text message text message: “I heard little saying “more, more” last week. Try imitating and expanding on this with “more milk, I want more milk.” This can help build her vocabulary.
- Parent's satisfaction of text messaging: “I would continue using the strategies with my children in the future.”
- Parent's satisfaction of text messaging: “It was easy to find time to take care of yourself. Make sure you take time to take care of yourself. Let’s talk more when we meet.”
- Parent Visit Visitor Satisfaction of Text Messaging: “I believe this is a challenging time for your family. You’ve really made it very difficult for me to provide support.”
- Parent Visit Visitor Satisfaction of Text Messaging: “I would recommend the PC strategies to other home visitors.”
- Parent Visit Visitor Satisfaction of Text Messaging: “I would recommend the PC strategies to other parents or family members.”

Randomized Controlled Trial Results
- Differences in the effects of the text messaging enhancement to PC TALK were not found to reach statistical significance:
  - The differences on the linear and quadratic slopes of parent-rated engagement between the intervention and control group were -0.39 (SE = 0.46, p = 0.75), and 0.03 (SE = 0.20, p = 0.26), respectively.
  - The differences on the linear and quadratic slopes of home visitor-rated engagement between the two groups were 0.02 (SE = 0.48, p = 0.97), and 0.002 (SE = 0.5, p = 0.95), respectively.
  - For the growth rate of parent’s use of PC strategies, the difference between the two groups were 0.42 (SE = 0.85, p = 0.62)
  - The effect of text messaging on the growth rates of Preschool Language Scale-Auditory Comprehension, Preschool Language Scale-Expressive Communication, Early Communication Indicator, and observed Child Communication were 0.17 (SE = 0.09, p = 0.17), 0.11 (SE = 0.08, p = 0.18), -0.06 (SE = 0.39, p = 0.25) and 0.04 (SE = 0.06, 0.64), respectively.

Parent and Home Visit Satisfaction
- Items % rating “moderately bad” or “very much bad”

Table: Parent and Home Visit Visitor Social Validity Data Summary