

Delivering Services to Incarcerated Teen Fathers: A Pilot Intervention to Increase the Quality of Father–Infant Interactions During Visitation

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The absence of a father figure has been linked to very poor developmental outcomes for the child. During incarceration, there are limited opportunities for visitation between fathers and their children. The Baby Elmo Program provides incarcerated teen fathers with parenting training and visitation with their children with the stated goal of enhancing father–child interactional quality. Forty-one incarcerated teen fathers and their infants ranging from 1 to 15 months of age participated in the present study. During individual sessions, a trained facilitator prepared fathers for visits with their children by introducing key concepts such as following the child’s lead, using developmentally appropriate media to illustrate those concepts. After each training session, the incarcerated teen father interacted with his infant and the visit was video recorded. Analysis of the visit sessions focused on father’s time use on different activities, the quality of father–infant interactions, and father’s integration of target skills introduced in the intervention. The time-use analysis revealed that time use changed as a function of infant age. Growth linear modeling indicated that there were significant positive increases in the amount of parent support and infant engagement as a function of the number of sessions. Follow-up analyses indicated that changes between specific sessions mapped onto the target skills discussed during specific training sessions. This study’s preliminary findings suggest that an intervention integrating visitation and appropriate media may be effective for incarcerated teen fathers. Due to the lack of a randomized control group, the present findings are exploratory and are discussed with a focus on further program development.

Keywords: incarcerated teen father, juvenile justice, father–infant interaction, parenting programs, media

Nonresident fathers can play a significant role in the development of their children, depending on their level of involvement (e.g., [Cabrera et al., 2000](#), [Carlson & McLanahan, 2010](#)). Although nonresident fathers typically spend significantly less time with their children than do resident fathers, research suggests that it is not the amount of time but rather the quality of interactions that predicts outcomes ([Brown, McBride, Shin, & Bost, 2007](#); [Lamb & Tamis-LeMonda, 2004](#)). Complete lack of contact with fathers has been linked to very poor developmental outcomes, including poor achievement in school, impaired cognitive function, aggression,

and delinquency ([Shannon, Tamis-LeMonda, London, & Cabrera, 2002](#)). In contrast, studies of low-income families enrolled in the Early Head Start program have demonstrated that when biological fathers remain in contact with their children from birth to 3 years, regardless of whether they reside in the home or not, children’s aggressive behavior is lower and emotion regulation is higher than those who have no contact with their fathers ([Amato & Rezac, 1994](#); [Vogel, Bradley, Raikes, Boller, & Shears, 2006](#)).

During incarceration, fathers do not reside with their children. Children who maintain contact with their incarcerated parent exhibit fewer behavioral problems ([Sack & Seidler, 1978](#); [Stanton, 1980](#)) and have overall better outcomes ([Edin, Nelson, & Paranal, 2004](#); [Klein, Bartholomew, & Hibbert, 2002](#)) than children who do not maintain contact with their incarcerated parent. Maintaining contact benefits the incarcerated parent as well; leading to lower recidivism rates ([Adams & Fischer, 1976](#); [Hairston, 2002](#); [Klein et al., 2002](#)), and is important for successful reentry into the community after release ([Edin et al., 2004](#); [Sampson & Laub, 1993](#); [Uggen, Manza, & Behrens, 2004](#)).

At the time of birth, almost 90% of low-income fathers, both resident and nonresident, report being committed to being involved with their child ([Tamis-LeMonda & McFadden, 2010](#)). There are, however, significant barriers for nonresident fathers to maintaining involvement with their children, including the inability to provide financial support and assistance, geographical distance, and gate-keeping by mothers ([Carlson & McLanahan, 2010](#); [Tamis-LeMonda & McFadden, 2010](#)). These barriers are exacerbated for

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incarcerated fathers (Gadsden & Rethemeyer, 2003). Incarceration can dramatically change fathers' emotional investment in and level of involvement with their children (Braman & Wood, 2003), affecting the maintenance of positive paternal identities (Dyer, 2005). Additional risk factors associated with incarceration include increased rates of mental health difficulties, substance abuse, and poorer education and job prospects (Cassidy et al., 2010; Western, Schiraldi, & Ziedenberg, 2003). Furthermore, children with incarcerated parents are highly vulnerable to maladjustment and more likely to be delinquent, use drugs, experience early pregnancy, drop out of school, and exhibit emotional problems than their peers whose parents are not incarcerated (Chung, 2011; Dallaire, Ciccone, & Wilson, 2010; Murray, 2005; Murray & Farrington, 2005; Myers, Smarsh, Amlund-Hagen, & Kennon, 1999; Trice & Brewster, 2004; Wildeman, 2009, 2010).

The constellation of risk factors is even worse for incarcerated teen parents. According to the most recent data from a 2010 national census of juveniles in residential placement conducted by the Office of Juvenile Justice and Delinquency Prevention (OJJDP), there are around 52,178 males aged 14 to 18 years in residential placement, with an overrepresentation of minorities (41.5% African American, 22.8% Hispanic, 1.5% American Indian; Sickmund, Sladky, Kang, & Puzanchera, 2011). Incarcerated youth have high rates of substance dependence (estimates range from 35% to 60%) and mental health issues (estimates range from 40% to 70%); these rates are much higher than for non-offending youth (Skowyr & Cocozza, 2007; Substance Abuse and Mental Health Services Administration, 2012). Furthermore, substance abuse and psychiatric disorders are frequently comorbid (Abram, Teplin, McClelland, & Dulcan, 2003; CASA, 2004). It has been estimated that 19% to 30% of all incarcerated teen males are fathers (California Youth Authority; Nurse, 2002; Vera Institute of Justice Ohio, 2011, personal communication, S. Villalobos Agudelo, November, 2012). Juvenile detention facilities offer little opportunity for teen fathers to maintain contact with their children. Increased rates of substance abuse, mental health problems, coupled with a history of neglect or harsh parenting, puts incarcerated teen fathers at increased risk for poor parenting themselves (Cassidy et al., 2010).

Parenting During Incarceration

Parenting during incarceration is determined by both institutional and individual factors. Visitation holds the most promise for promoting child resiliency (Beyer, Blumenthal-Guigui, & Krupat, 2010; Hoffmann, Byrd, & Kightlinger, 2010; Poehlmann, Dallaire, Loper, & Sheer, 2010). The quality of such visits between incarcerated parents and their children is dependent on the context of the visit, which is controlled by the detention facilities (Arditti, Lambert-Shute, & Joest, 2003; Loper, Carlson, Levitt, & Scheffel, 2009). Not surprisingly, there is large variability in resources at different facilities. Hoffmann and colleagues (2010) examined opportunities for parent training and visitation in 999 adult state incarceration facilities. Supervised play activities were more likely to be offered in women's facilities (35%) than male (17%) or cogender (11%) facilities (Hoffmann et al., 2010). Parenting class availability also varied as a function of the facility type, with classes more frequently offered in female facilities (90%), than

cogender facilities (74%), and male facilities (51%). These opportunities are not, to our knowledge, available at youth facilities.

The majority of self-identified fathers in adult and juvenile facilities are motivated to be involved in their children's lives (Parra-Cardona, Wampler, & Sharp, 2006; Secret, 2012; Shade, Kools, Pinderhughes, & Weis, 2012). Although there are clearly issues with selection bias in these studies, it is important to note that high levels of motivation and paternal identity exist for at least a subset of incarcerated fathers. Such findings indicate that there is potential for intervention to draw upon positive psychological investments and to encourage incarcerated fathers to adopt and employ positive parenting practices.

There are, however, risks associated with simply increasing involvement for at-risk fathers. Brown and colleagues (2007) found that among father–infant dyads whose interactions were characterized by high intrusiveness, low engagement, and low warmth, those who spent more time together were more likely to experience an insecure attachment than those who spent little time together. The researchers recommended intervention in cases where fathers face multiple risk factors in order to improve father–child interactional quality and foster later secure attachment (see also Cassidy et al., 2010, for similar arguments).

Interventions for Incarcerated Parents

Parent training programs in adult prison settings have been successful at increasing the quality and quantity of parent–child interactions, but these interventions are often expensive and labor intensive (Rudel & Hayes, 1990; Wilczak & Markstrom, 1999). Recently, researchers have moved beyond traditional, classroom-based parent training programs to include parent–child visitation sessions as well. A new body of interventions for incarcerated parents and their children include visit coaching, in which an incarcerated parent is assigned a visit coach who assists parents by planning activities and setting goals before the visit, providing support during the visit, and debriefing after the visit (Beyer et al., 2010). Such an intervention may improve incarcerated parents' general skills and knowledge about parenting, along with providing experience-based learning (Buston, Parkes, Thomson, Wight, & Fenton, 2012; Robbers, 2009; Beyer et al., 2010). Overall, empirical evaluation of interventions for incarcerated adult parents has been limited, and for incarcerated teen parents, the literature is scarce. Although fathers are often satisfied with the parenting programs and self-report higher levels of engagement with their children following the intervention (Robbers, 2009; Buston et al., 2012), it is difficult to evaluate the efficacy of such an intervention based on parental report alone. The Baby Elmo program does not rely on parental report, but rather provides a more comprehensive evaluation of the potential benefits of parent training classes and experience-based learning for incarcerated teen fathers, via direct measurement of father–child interactional quality.

The Baby Elmo Program

The overarching goal of the Baby Elmo program is to provide a parenting program fostering father–child interactional quality improvement, secure attachments, and positive father–child relationships during the period of incarceration. The ultimate aim of this two-generation program is that such relationships will improve

developmental outcomes for both the child and the incarcerated teen father (see Barr et al., 2011; Brito, Barr, Rodriguez, & Shauffer, 2012).

Specifically, the manualized intervention includes sections on attachment, infant exploration, and following the child's lead. Following the lead of the child was further emphasized when adding communication techniques of praise, labels, and questions. Video segments from the *Sesame Beginnings* collection were integrated into the curriculum. Pempek, Demers, Hanson, Kirkorian, and Anderson (2011) found that parent–infant interaction quality in middle-income families increased as a function of indirect exposure to the high-quality interactions modeled throughout these infant-directed videos. Integrating media takes a strengths-based approach for incarcerated teen parents, who typically have low literacy rates but a high affinity for and proficiency with digital media (Wilczak & Markstrom, 1999; Rideout, Foehr, & Roberts, 2010). Prior research with low-income adolescent parents found that including educational video components was generally effective at promoting a wide range of positive developmental outcomes for both parent and child (Brown, Yando, & Rainforth, 2000; Coren, Barlow, & Stewart-Brown, 2003). A combination of media-based training and active interaction has been shown to be the most effective way to increase the quality of parent–infant interactions (Huebner & Meltzoff, 2005; Sharry, Guerin, Griffin, & Drumm, 2005).

In the first evaluation of the Baby Elmo program, Barr and colleagues (2011) demonstrated that emotional responsiveness between incarcerated teen fathers and their toddlers increased across sessions of the intervention. Emotional responsiveness is correlated with positive developmental outcomes, including emotional security, social facility, symbolic competence, verbal ability, and intellectual achievement; it is necessary for optimal child socioemotional, cognitive, and communicative development (Ainsworth, Bell, & Stayton, 1974; Bernstein, Hans, & Percansky, 1991; Bornstein, Tamis-LeMonda, Hahn, & Haynes, 2008; Dodici, Draper, & Peterson, 2003). Such a relationship involves an active parent who tries to elicit attention from the child, partakes in age-appropriate interactions, adjusts to meet the child's interests, and attempts to maintain the child's focus through communication and engaged interaction rather than through restrictions and/or intrusions. Persuading these incarcerated teen parents to adopt a new interactional style is a challenge but is possible when the parent is taught how and why the change is important (Lonigan & Whitehurst, 1998; Hart & Risley, 1995). Evaluators coded six different subscales of emotional responsiveness (joint attention, emotional engagement, parental involvement, child involvement, turn-taking, and following the lead) for 20 minutes of each parent–child visit. Twenty incarcerated teen–father–infant dyads, with infants ranging in age from 6 to 36 months, participated in the evaluation. Individual growth curve analyses showed significant gains in measures of emotional responsiveness. There were significant increases found for measures of joint attention, child involvement, turn-taking, and following the lead. Overall, the initial evaluation indicated the program's promise, in that there was an increase in verbal and nonverbal communication between incarcerated teen fathers and their children. Such communication is crucial for developing and maintaining a healthy relationship, both during and after incarceration. Furthermore, there was a significant interaction with age of the infant. Incarcerated teen

parents with younger babies had significantly lower emotional responsiveness scores but also made significantly greater gains during the course of the intervention. A recent report demonstrated that father disengagement at 3 months predicted infant behavioral problems at 12 months of age (Ramchandani et al., 2013), indicating that intervention during the first year of life may prevent early negative developmental trajectories. Given the fathers' widely stated commitment to parenting at the time of birth, the number of risk factors, and lower baseline levels of emotional responsiveness exhibited by fathers of younger infants reported in the first study, this follow-up study restricted the analysis to fathers of young infants to examine whether the Baby Elmo program would be effective for the most committed and yet most at-risk incarcerated teen fathers.

Present Study

To determine whether the Baby Elmo program is appropriate for young infants as well as toddlers, incarcerated teen–father–infant interactions during different activities were measured over the course of the intervention. Along with restricting the analysis to younger babies, we used a standardized measure, the Individual Growth and Development Indicators for Infants and Children: Indicator of Parent–Child Interaction (IGDI-IPCI; Baggett & Carta, 2006), to evaluate the quality of parent–child interactions in the context of everyday activities (Carta, Greenwood, Walker, & Buzhardt, 2010). The IPCI was developed as a measure of the sensitivity and responsiveness of caregivers to children ages 2 to 42 months. It is standardizable, reliably administered, replicable, and sensitive to known differences in various at-risk populations of parents and children (Carta et al., 2010). The IPCI tracks parent and infant behaviors known to promote positive socioemotional development in young children and behaviors known to negatively impact that same development.

In the present study, we examine whether parenting quality increases over time in the Baby Elmo program, as indexed by the IGDI-IPCI (Carta et al., 2010), and whether the skills introduced in the program training sessions transfer to the visits. Given their high motivation for involvement when infants are young, this study focuses on fathers who have infants up to 15 months of age. The findings replicate and extend those of Barr and colleagues (2011) in three ways. First, given rapid developmental change during the first year of life, we examined whether fathers would engage in different activities with infants of different ages, as indexed by a time use analysis. Second, we examined whether interactional quality would increase as a function of time spent participating in the intervention, as indexed by the IPCI. Third, we examined whether fathers would adopt specific target skills introduced in the training curriculum.

Method

Participants

Participants were recruited from juvenile detention centers located in three California counties: Fresno, San Bernardino (three sites), and Sacramento (two sites). Two are long-term commitment facilities serving postdispositional youth, and four are traditional juvenile halls serving youth awaiting hearing. There were no

Table 1
Number of Participants Recruited at Each Site, Number of Days Incarcerated and Number of Participants Who Were Early Dropouts (EDO) and Who Completed the Intervention

County	# days incarcerated	# Participants		Average # sessions	
	(SD)	EDO	Completers	EDO	Completers
Sacramento	187.4 (204)	4	9	2.25	6.67
San Bernardino	163.1 (89)	9	22	2.22	6.91
Fresno	110.3 (91)	10	10	1.80	6.50

differences across the sites in the number of days incarcerated and average number of sessions (see Table 1). In Sacramento and San Bernardino the trainers were line staff, and in Fresno the trainers were graduate social work students.

At entry into each facility, incarcerated teen fathers self-identified in response to either advertisements of the Baby Elmo program or an intake question as to whether or not they had children. Inclusion criteria for the study sample were that the incarcerated teen father had an infant under 15 months of age at enrollment in the Baby Elmo program, had no direct involvement with child protection services for the target infant or any other infant, and had consent from the caregiver to bring the infant into the facility to participate in the study.¹ No incarcerated teen fathers who met these criteria refused to participate. At the Fresno facility, caregivers of participating infants were given diapers as an incentive to bring the infants to the juvenile detention facility for the parent–child visits.

Early drop-out (EDO). Due to a number of logistical barriers, however, some incarcerated teen fathers dropped out of the program before completion of the 10 sessions. Of the 64 fathers who joined the Baby Elmo program with an infant under the age of 15 months, 23 (35.9%) dropped out before Session 4. There was no difference in the proportion of early drop-outs and those completing more than four sessions as a function of site (see Table 1). The mean number of sessions completed for this group was 1.93 ($SD = .9$). Demographic and offense-related characteristics for fathers who dropped out early and those who completed four or more sessions were similar (see Table 2). The reasons given for noncompletion of the program were that fathers were released before the end of the intervention program ($n = 7$) or transferred to an adult facility ($n = 4$), technical issues ($n = 1$), no trainer at the facility ($n = 1$), and unknown reasons ($n = 10$). Future efforts will be made to understand barriers to completion of the program, although difficulties with bringing babies to a facility related to transportation and work obligations have been frequently reported to facility staff.

Completers. Forty-one incarcerated teen fathers and their infants completed at least four visits ($M = 6.75$, $SD = 1.95$) of the voluntary Baby Elmo program (see Table 2 for demographic information). Participants who did not complete all 10 sessions were either moved to another detention facility or released prior to completion of the intervention. One additional infant was not included in the final analysis due to a heart condition. On average, father–infant visits occurred every 1 to 2 weeks ($M = 11.59$ days, $SD = 6.15$).²

Intervention Protocol

Modification of juvenile detention facility. All participating juvenile detention facilities are required to set up a play context by converting one of their rooms to a more child-friendly atmosphere. Facilities obtain child-friendly materials, such as toys, games, books, comfortable chairs, and caregiving supplies, to help facilitate parent–child interactions.

Staff training. To ensure adherence to the standardized training manual across sites, four of the authors of the program (CS, RB, JR, and BR) visited each facility and conducted day-long training seminars with facility staff. Training included orientation to the program, planning and logistics for implementation of the program, and role-playing of training sessions. Frequent conference calls across sites were used to monitor progress at each site and addressed any ongoing concerns.

Parent training sessions. The Baby Elmo Program consists of 10 individual parent training sessions. Each session is designed to introduce incarcerated teen fathers to concepts and skills to improve their relationships with their infants. The first three training sessions introduce the concepts of separation anxiety, exploration of the environment, and following the child's lead. Sessions 4 through 6 emphasize the importance of praise, labels, descriptions, and questions to facilitate communication. Sessions 7 through 9 focus on socioemotional development, including concepts of affectionate touch, imitation, and pretend play. The last session provides participants with a review of concepts and skills presented throughout the program as a whole.

These parent training sessions are led by a staff member or volunteer within the juvenile detention facility. Facilitators were usually individuals working as line staff at the juvenile detention facility, whereas in Fresno, they were social work graduate student volunteers. A standardized manual guides the facilitator through each topic. Each lesson is accompanied by video segments from the *Sesame Beginnings* collection that model positive parent–child interactions. The incarcerated teen fathers plan activities for the upcoming visit with their child. For example, during the first session, the incarcerated teen father views a media clip showing parents playing peek-a-boo. These games act as a playful and developmentally appropriate way for fathers to begin to establish or reestablish a relationship with their child. After viewing the

¹ Fathers who met these criterion but whose children were older than 15 months also participated in the intervention but their data were not included in the analysis.

² 10 participants from Barr and colleagues (2011) were included and reanalyzed in this data analysis.

Table 2
Demographics for Early Dropout (EDO, n = 23) and Completers (n = 41) Groups

	Early dropout	Completers	Total
Length of stay (days, <i>SD</i>)	128.2 (95.8)	167.2 (124.6)	
Felony charge (%)	36.6%	52.38%	
Mean # sessions (<i>SD</i>)	2.04 (.71)	6.63 (1.96)	
Infant age at enrollment (months, <i>SD</i>)	5.11 (3.36)	6.88 (3.87)	6.24 (3.76)
Parent age (years, <i>SD</i>)	16.87 (.92)	16.90 (.86)	16.89 (.88)
Parent ethnicity % (n)			
Hispanic	60.87% (14)	70.73% (29)	66.19% (43)
White	4.35% (1)	0.00% (0)	1.59% (1)
Black	30.43% (7)	17.07% (7)	22.22% (14)
Mixed	4.35% (1)	12.20% (5)	9.52% (6)
Infant sex % (n)			
Male	39.13% (9)	36.60% (15)	37.50 (24)
Female	60.87% (14)	63.40% (25)	62.50 (40)
Caregiver (n)			
Child's mother	56.52% (13)	68.29% (28)	64.10% (41)
Grandmother	8.70% (2)	19.51% (8)	15.63% (10)
Mother and grandmother	13.04% (3)	4.88% (2)	7.81 (5)
Both grandmothers	0.0% (0)	2.44% (1)	1.56% (1)
Unknown	21.74% (5)	4.88% (2)	10.94% (7)

Note. Note that length of stay is calculated based on $n = 18$ for EDO and $n = 27$ for completers.

media clips, the facilitator and the incarcerated teen father discuss which of these games he will try with his child during the visit.

Parent-child visits. After each training session, the teen fathers practice the concepts and skills taught in the training session during a visit with their infant. These visits range from 20 to 60 minutes in length. Visits are composed of various parent-child interactions, such as caregiving, free play, dyadic play, physical play, book reading, and video watching. Prior to the introduction of the Baby Elmo program, some facilities had offered sporadic visitation, while others had had no system for visitation for incarcerated teen fathers other than court-ordered visitation.

Procedure

Incarcerated teen fathers, their legal guardians, and caregivers of participating infants sign informed consent prior to beginning the Baby Elmo program. Incarcerated teen fathers complete training sessions with a facilitator individually. During each training session, the facilitator recaps the prior training session and visit, introduces the target concept for the current training session, shows *Sesame Beginnings* videos to illustrate the concept, and works with the incarcerated teen father to plan activities and set goals for the upcoming visit. Trainers then arrange for caregivers and infants to visit the facility within 1 to 3 days of the training session, at a time that is convenient for the caregiver, and when the infant will most likely be awake and alert. The caregiver brings the infant to the Baby Elmo playroom for a visit with the incarcerated teen father. Caregivers are encouraged to stay in the room for as long as they felt it was necessary in order to calm the infant, because unfamiliarity with the father and the new environmental context could cause stress for the infant. Nonetheless, we ask the

caregivers to allow the incarcerated teen father to interact with the infant on his own as much as possible. The trainer also remains in the room during the visit, and we ask that trainers allow the incarcerated teen father the time to interact and engage with the infant and that they not intrude or train during the visit. After the visit, the facilitator and incarcerated teen father engage in a visit debrief, reflecting on what went well and what was challenging during the visit.

Results

Coding

All visits are video recorded for subsequent data analysis. The first 20 minutes of each visit are coded for time use and use of target skills. Activities defined during the time use analysis are then coded for parent-child interactional quality using the IGDI-IPCI coding scheme.

Time Use Analysis

Activities. Due to the unstructured nature of the parent-infant visits, time use analysis was used to identify which activities the fathers and their babies engaged in and which parenting skills the incarcerated teen fathers internalized and employed from the training sessions. The first 20 minutes of each parent-child session were coded for time use in 30-s blocks. All 30-s blocks were coded for one of six activities: caregiving, dyadic play, free play, physical play, book reading, and video viewing (see Table 3 for definitions). If the 30-s block could not be coded into one of these activities, it was coded as uncodeable. Only .5% of 30-s time blocks were coded as uncodeable. Interrater reliability on individual sessions coded for time use ranged from $\kappa = .70$ to $.95$ for six separate coders.

Target skills. Each 30-s block was coded for the presence or absence of praise and labeling, two essential target skills (see Table 3 for definitions).

IGDI-IPCI. Dyads were coded for quality of parent-child interactions. For each participant, the quality of parent-infant interactions was coded for three distinct activity blocks (e.g., free play, caregiving, and physical play), each lasting at least 2 minutes, using an adaptation of the IGDI-IPCI (Baggett & Carta, 2006). IGDI-IPCI assesses the frequency of global parent-child interaction behaviors across two parent domains (support, interrupter) and two child domains (engagement, reactivity/stress) for children from 2 to 42 months. Each activity was coded using the IGDI growth metrics (see Table 4) based on observed frequency of target behaviors. The behavior received a 0 if it was never observed, 1 for rarely observed, 2 for sometimes, and 3 for always. Scores of nonapplicable were given when the parent or child did not have the opportunity to demonstrate the behavior, such as when a parent with a content child did not have the opportunity to soothe and reduce stress. Interrater reliability of three separate coders for IPCI based on a randomly selected 23.1% of sessions was $\kappa = .76$. A native Spanish speaker coded any sessions where the father and infant spoke Spanish. The parental support index was $\kappa = 0.67$. The child engagement index was $\kappa = 0.72$. Sessions were coded in random order. Coders were aware that participants

Table 3
Time Use Coding Definitions Coded as Present or Absent in 30-Second Blocks

Code	Definitions
Activity	
Book reading	When a teen father and infant are looking at books together. The teen father does not need to be reading to his or her infant, but the main focus of the interaction must be on a book or multiple books.
Caregiving	When a teen father and infant are engaging in any of the following activities: diaper changing, dressing, feeding, rocking and sleeping, safety issues (e.g., removing if infant is eating blocks).
Dyadic play	A type of face-to-face play where the teen father and infant interact without an outside object (e.g., peek-a-boo, lap games, funny faces, and playing with hands or feet).
Free play	Play that includes an outside object (triadic interactions; e.g., playing with rattles, blocks, and stuffed animals).
Physical play	Play where the infant is exploring with crawling or walking assisted by teen father. This may be initiated by infant or teen father.
Video	When a teen father and infant are watching <i>Sesame Beginnings</i> videos together.
Uncodeable	When a teen father and infant are engaging in an activity that does not fit into any of the previously identified categories (e.g., teen father is away from infant finding toys, while infant is sitting on the floor).
Target skills	
Praise	When teen father uses an enthusiastic voice, claps, and smiles to express acceptance over an infant's action (e.g., saying "Good job" or "Yay, you did it").
Labeling	When teen father provides infant with verbal identification of an object or action (e.g., "Look, that is a blue block").

were participating in an intervention but did not know when target skills were introduced during the parent training sessions.

Index scores. Four indices were calculated from the IGDI-IPCI codes.

Parental support index. This index was composed of five parent behaviors consistently associated with positive child socio-emotional development (Landry, Smith, Swank, Assel, & Vellet, 2001; Landry, Smith, Swank, & Guttentag, 2008; van den Boom,

Table 4
IGDI-IPCI Definitions

Target behavior	Definition
Parent support	
Conveys acceptance and warmth	Smiling at infant, making positive comment to or about infant, providing gentle affectionate touch, agreeing with infant, indicating infant's behavior is correct, thanking the infant, and praising infant's effort.
Uses descriptive language	Comments that both label and connect objects and actions or connect nouns and adjectives.
Follows child's lead	Noticing what interests the infant and either commenting on the infant's interest or joining in the same activity without interrupting the behavior.
Maintains or extends infant's focus	Introducing materials or interacting in a novel manner to maintain and/or extend the infant's focus without disrupting the infant's attention. Labeling objects or actions counts as an example of maintaining and extending infant's focus.
Uses stress reducing strategies	Using soothing behaviors such as providing a pacifier, cradling, or rocking with a distressed infant.
Infant engagement	
Follows through	Extent to which infant follows through and responds to the parent's attempt to engage the infant as seen in vocalization, gesturing, or attempting the requested action.
Positive feedback	Positive social signals directed toward caregiver, including smiling, laughing, eye contact, vocalizing, words, or gentle touch.
Sustained engagement	Active social or nonsocial engagement for at least 30 seconds of sustained visual attention to toys, materials, or face.
Parent interrupter	
Criticism/harsh voice	Name-calling, sarcastic tone of voice, yelling, raised voice, or critical statements about the infant.
Restrictions/intrusions	Verbal statements such as "No, don't, stop, quit," or physical restrictions such as taking things away unnecessarily, controlling infant's movement unnecessarily, using physical discipline, or pushing objects in front of an infant's face.
Rejects child's bid	Using words or gestures (specifically in response to an infant's search for support, help, or attention from the parent) that explicitly convey that the infant is not to interrupt the parent or seek the parent's attention or physical support.
Child reactivity/distress	
Irritable/fuss/cry	Clear signals of fussiness or unclear, difficult-to-read signals. Includes fussing, whining, crying, or signals that change quickly and may be difficult to understand.
External distress	Engaging in a tantrum, or aggressive behavior (hitting, biting, kicking, throwing objects, spitting, head-banging, screaming, verbal or nonverbal rejection, name-calling, derogatory language, or threats).
Frozen/watchful/withdrawn	Startling, flinching, or pulling away from the parent or engaging in frozen, watchful behavior without joining in the interaction.

1994). It was calculated by averaging scores of acceptance and warmth toward child, use of descriptive language, efforts to follow the child's lead, ability to maintain and extend child's focus, and soothing and reduction of stress.

Parent interrupter index. This index was composed of three parent behaviors associated with poor child outcomes. It was calculated by averaging scores of criticism and harsh voice, restrictions and intrusions, and rejection of the child's bid (Apple- yard, Egeland, van Dulmen, & Sroufe, 2005; Chang, 2003).

Child engagement index. This index was based on behaviors associated with positive child outcomes, calculated by averaging child scores of positive feedback toward parent, sustained engagement in an activity, and extent to which the child followed through on parental requests.

Child reactivity/stress index. This index was based on behaviors associated with later socioemotional and behavioral problems. It was calculated by averaging scores on child's display of irritability, fussiness, and crying; external distress; and frozen, watchful, or withdrawn behaviors (Carta et al., 2010; see Table 4).

Early Drop-Out Analysis

To assess whether there were any differences between those who started but did not complete more than three sessions of the program (early drop-out dyads, $n = 23$) and those who completed four or more sessions of the program (completers dyads, $n = 41$), we compared Session 1 time use, target skills usage, and IGDI-IPCI measures between early drop-out dyads and those who completed the program (see Table 5). Using this early drop-out group, we tested for selection bias in intervention completion due to initial differences in paternal skill level, paternal support, and infant engagement. Independent samples t tests were run to compare groups on each of these dimensions, and there were no significant between-groups differences on any of the variables except for the initial level of praise. Although praise was found to be very low in both groups, its occurrence was significantly lower for incarcerated teen fathers who did not continue in the program (see Table 5).

Time Use Analysis

As shown in Figure 1, fathers engaged in more dyadic play and caregiving with younger infants and increasing amounts of free play and physical play with older infants. No differences in book reading and video viewing were found. A repeated-measures analysis of variance (ANOVA) across sessions indicated that there

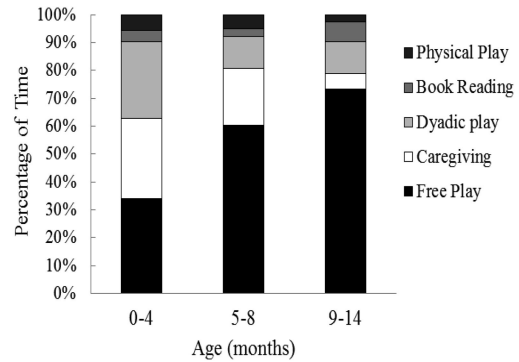


Figure 1. Proportion of time spent on different activities during the sessions as a function of infant age.

were no differences in the proportion of time spent on each activity as a function of session, and therefore, the data were collapsed across session. A multivariate analysis (MANOVA) was performed with age and sex of the infant as the independent variables and proportion of time spent on different activities in each session (caregiving, dyadic play, free play, book reading, video viewing, and physical play) as the dependent variables, and the overall model was significant. There were no main effects of sex of the infant, but there were significant main effects of infant age on dyadic play, $F(1, 41) = 3.96, p = .03$, and free play, $F(1, 41) = 4.47, p = .02$. There was also a trend on caregiving $F(1, 41) = 3.00, p = .06$. These findings are consistent with those of Belsky, Gilstrap, and Rovine (1984), who found in a longitudinal study that mothers and fathers decreased the amount of time spent on caregiving activities and increased time spent on cognitively stimulating play from 1 to 9 months of age.

Infant Growth and Development Indicator—Parent Child Interaction (IGDI-IPCI)

As shown in Figure 2, there were increases in parent support and infant engagement indices as a function of session. Two subcomponents of the parent support index (maintains and extends and follows child's lead) are also plotted because they mapped directly onto target skills introduced in the program. To evaluate whether these increases in parent support and infant engagement were significant, we used individual growth curve analysis (Singer & Willett, 2003) with time centered at zero at Session 1, the intervention baseline. First, the between variance estimates were significantly different for both models at $p < .05$, indicating individual differences in parent support and infant engagement levels at baseline and change rates across the course of the intervention. Second, the estimated slopes for parent support and infant engagement across time were positive and statistically significant, showing significant increases in both indices across sessions (see Table 6). Overall, these findings suggest that as participants completed more sessions, parent support and infant engagement increased significantly. Additional models were run to examine whether parental, infant, or juvenile justice site factors influenced outcomes. Parental factors included parental age, ethnicity (categorically coded as Hispanic or not), and length of stay at the juvenile detention site. Infant factors included sex of the infant, age (cate-

Table 5

Parenting Behavior Comparisons Between Early Dropout ($n = 23$) and Completers ($n = 41$) Groups at Session 1

Parenting behaviors	Early dropout		Completers		t -test
	Mean	SD	Mean	SD	
Praise	0.20%	1.00%	1.40%	3.20%	*
Labeling	0.15%	0.26%	3.38%	7.33%	<i>ns</i>
Parent support	0.77	0.62	0.82	0.45	<i>ns</i>
Infant engagement	0.74	0.41	0.83	0.51	<i>ns</i>

* Significant at $p < .05$.

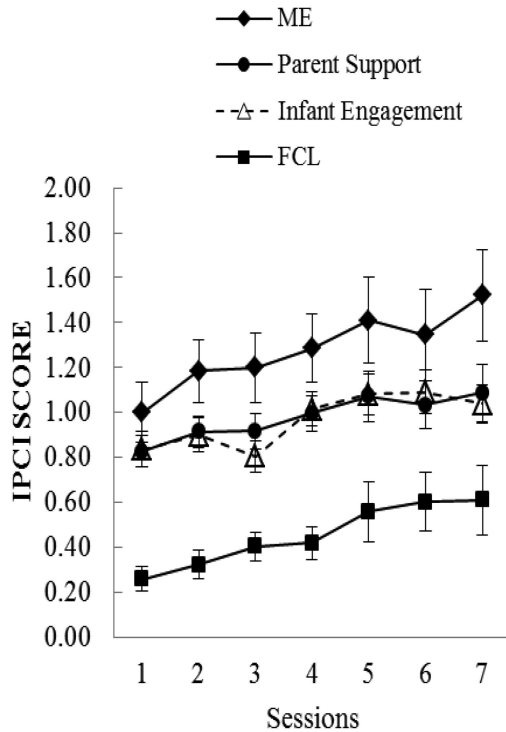


Figure 2. Individual Growth and Development Index: Parent Child Interactions (IGDI-IPCI) ratings of parent support and infant engagement composite scores and follow child’s lead (FCL) and maintains and extends (ME) subcomponents of parent support as a function of session.

gorically coded as under or over 6 months old), level of activity (low, medium, and high) and locomotion of the infant (categorically coded as crawling, walking with support, and walking unassisted). Parent age, ethnicity, and length of stay in facility and child age, activity, and locomotion were not associated with parent support. The juvenile detention site was not a significant covariate. Point estimates were relatively unaltered when the covariates were entered, and therefore, we report only the overall model.

We also calculated the parent interrupter index. For this index, scores are reverse coded so that high scores reflect the absence of negative behaviors. A growth linear model analysis showed no change across time (see Table 6). The scores on this index ($M = 2.90, SD = .23$) indicate very low and unchanging levels of negative parental behavior across the sessions. The infant stress index was not calculated due to the lack of observed external distress and frozen, watchful, and withdrawn behavior. Levels of

Table 6
Estimated Intercepts and Slopes for the Model of Time for IPCI Indices

Fixed effects		Intercept	Slope
Parent support	Time	0.85	0.04**
Infant engagement	Time	0.82	0.48**
Parent interrupter	Time	2.92	-.005
Infant fuss and cry	Time	.47	.02

** Model is significant at the 0.01 level (2-tailed).

fussing and crying were low ($M = .50, SD = .77$), and a growth linear model showed that fussing and crying did not change as a function of the session (see Table 6). There was no correlation between parent support and infant fussing and crying, $r(233) = -.02, p = .75$. Belsky and colleagues (1984) also found no correlations between parental engagement and infant fussing and crying at 1, 3, and 9 months. We conclude that the low levels of fussing and crying observed are a typical infant response.

Efficacy of Program Components

In order to examine the efficacy of the Baby Elmo curriculum, three variables were chosen from the program and directly measured either as a proportion of time use or as an IGDI-IPCI code. Session 3 targeted following the child’s lead and was indexed via the “follows child lead” (FCL) IGDI-IPCI code. Session 4 targeted praise and was indexed by the proportion of praise in time use coding. Labeling, introduced in Session 5, was indexed by the “maintains and extends” (ME) IGDI-IPCI code, which included points for each time the father labeled an object for his child, and by proportion of labeling in time use coding.

Planned paired *t* tests examined whether there were significant increases in the target behaviors relative to baseline in the sessions where these targets were emphasized (see Figures 2 and 3). Analysis of the IGDI-IPCI FCL code showed that there were no significant differences between Sessions 1 and 3, but there were between Sessions 1 and 4 and between Sessions 1 and 5. These results suggest that FCL may be a difficult concept for incarcerated teen fathers to learn and demonstrate in practice with their babies. There was a significant increase in proportion of praise from Sessions 1 to 4. There was a significant trend ($p = .07$) for an increase in labeling from Sessions 1 to 5. There was a significant increase in ME from Sessions 1 to 4 and Sessions 1 to 5. In addition, target skills of praise and labeling were correlated with IGDI-IPCI subcomponents FCL and ME, and overall parent support and infant engagement indices (see Table 7). Taken together, this pattern of results indicates that incarcerated teen fathers ad-

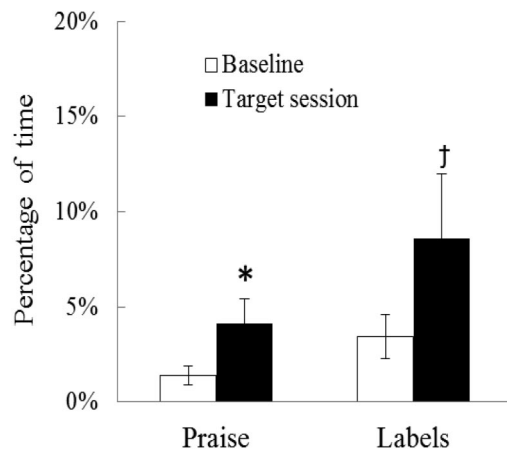


Figure 3. Proportion of time spent in interactions ($\pm 1SE$) with the infant involving praise of the infant and labeling of objects at Session 1 (baseline) and session where target skill was introduced. An asterisk indicates that the paired *t* test was significant at $p < .05$ and † that the difference is significant at $p < .10$.

Table 7
Correlations Between Skill Observed and Subcomponents of Parent Support (FCL and ME) and Parent Support Index and Infant Engagement Index

	Parent support	Engagement	FCL	ME	Praise
Labeling	.35**	.25**	.20**	.35**	.36**
Praise	.35**	.21**	.23**	.28**	—
Maintain and extend (ME)	.83**	.26**	.47**	—	—
Follow child lead (FCL)	.58**	.28**	—	—	—
Infant engagement	.22**	—	—	—	—

Note. *N* Based on 234 to 237 sessions.

** Correlation is significant at the 0.01 level (2-tailed).

opted a follow-the-lead strategy and used praise more frequently after their introduction in Session 4 and used labeling strategies more frequently after their introduction in Session 5. These findings suggest that fathers incorporated the skill-based training into the parent–infant visits and that these strategies were related to changes in father–child interactional quality.

Discussion

The present study showed that among dyads with infants, father–child interactional quality changed as a function of participation in the Baby Elmo program, and change in interactional quality was associated with the incorporation of targeted parenting skills. Growth linear modeling showed that father–infant interactions became increasingly positive over time. Other factors, such as sex and age of the infant, paternal ethnicity, and facility, did not change the pattern of results. This finding suggests that the program might be effective across different types of facilities for infants ranging from 1 to 15 months of age. Incarcerated teen fathers adopted the key target behaviors after specific training sessions, demonstrating trainer adherence to the standardized program and adoption of techniques by incarcerated teen fathers. These findings suggest that a training model that includes video clips demonstrating specific parent–infant interaction skills may be effective for the target population. Although there was clearly some selection bias, infant engagement, parent support, proportion of time spent on different activities, and baseline levels of labeling did not differ at Session 1 between those who dropped out early from the program and those who did not. Barriers to participation need to be better identified and resolved in order to enhance the delivery of this service.

These findings replicate and extend the Barr and colleagues (2011) finding demonstrating program efficacy indexed by interactional quality change for fathers of neonates and young infants, as well as toddlers. Narrowing the focus to younger babies and using a new, more standardized measure to assess parent–child interaction provides a strong and necessary replication of the previous study. Examining the current IGDI parent support and infant engagement scores relative to those previously found for at-risk mothers and children (Baggett & Carta, 2010), the two samples had similar means (means at risk community sample for both support and engagement indices ≈ 1). Although dyads in the present study are still considered at risk even after completion of the intervention, an ≈ 0.5 *SD* increase in both support and engagement across only a seven-session intervention is nonetheless a

promising effect size. To contextualize these results, we examined randomized control studies of parenting interventions for at-risk mother–infant dyads that used comparable ratings of parent–child interactions. In these studies, over a similar intervention time period, control groups did not change and treatment effect sizes were comparable or less than the effect size observed in the present study (Akai, Guttentag, Baggett, Willard-Noria, & the Centers for the Prevention of Child Neglect, 2008; Baggett & Carta, 2010; Baggett et al., 2010). The current study also examined potential factors that might be associated with success in the program and added them into the model as covariates, finding that these factors were not significantly associated. Therefore, this program is likely to be widely generalizable to teen fathers in the juvenile justice system.

Limitations

Although this exploratory study shows positive outcomes in terms of changes in incarcerated teen-father–infant interactional quality, there are a number of limitations. Specifically, as is also apparent in other studies involving nonresident fathers (e.g., Carlson & McLanahan, 2010), there are problems of selection bias. Participants self-identified as fathers, and only those with caregivers who were able and willing to bring the child to the facility were able to continue beyond four sessions. There is also selection bias in community samples, where 50% of nonresident fathers are not in contact with their children (Tamis-LeMonda & McFadden, 2010). Future studies will attempt to more proactively identify fathers and overcome potential barriers to participation.

Second, despite high levels of motivation to participate and significant improvements in father–infant interactional quality, these gains were modest, and not all participants adopted the program's target skills or sustained them throughout the intervention. Although the pattern of results suggest that these behaviors increased immediately after the corresponding session (e.g., praise was introduced in Session 4 and levels increased in the subsequent visit), elevated levels of the target behaviors were not sustained. An analysis of the number of days between sessions and parent–child visits showed that some participants experience a considerable delay between different lessons. These findings suggest the need to incorporate more repetition into the training sessions, especially for participants who experience longer gaps between training sessions and visits with their child. In addition, analysis showed that incarcerated teen fathers did not adopt the skill of following the child's lead, a more challenging interactional skill, when it was introduced in Session 3. However, implementation of this skill increased in both Sessions 4 and 5. Following the child's lead is critical for effective praise and narration to ensure that the incarcerated teen parent is responsive to the ongoing interest of his child. Therefore, future program efforts should further support the learning and implementation of this skill in the parent–child sessions. We are now also systematically examining trainer fidelity and adherence to the program by recording and analyzing the parent training sessions and examining how trainer quality influences incarcerated teen-father–infant interactions.

A further limitation to the study is the lack of a randomized control group. In this concern, our program is not alone. In an evaluation of 12 parenting intervention programs—10 programs in the United Kingdom and two in the United States—researchers

found that none of these had a true experimental design with a control group (Buston et al., 2012). The lack of a randomized control group makes it difficult to assert with confidence that observed positive effects can be attributed to the program, rather than to other contextual factors influencing the parenting capacity of the incarcerated teen fathers. Therefore, the next logical step is to conduct a randomized control trial comparing a traditional parent education program to the Baby Elmo program.

Furthermore, the present study reports only immediate outcomes, and future studies need to longitudinally track incarcerated teen fathers after release. Such a longitudinal study will allow researchers to examine whether incarcerated teen-father-child contact continues, if positive interactional quality is maintained, and if patterns of recidivism decline for participants. The effectiveness of adding modules to address coparenting after release should also be assessed (Pruett, Cowan, Cowan, & Pruett, 2009).

Implications for Psychological Services

This study contributes to the broader literature on nonresident fathers in a number of ways. The findings suggest that despite high levels of risk inherent in these dyads due to both the age of the fathers and the paternal incarceration, fathers were motivated to participate in the program. The incarcerated teen fathers incorporated program target skills known to promote child social competence and positive cognitive outcomes into their parent-child visits. Incarcerated teen fathers increased their level of sensitivity and responsiveness across time, as has been demonstrated in other interventions (e.g., van den Boom, 1994). The lack of intrusiveness and negativity by the incarcerated teen fathers, a very high-risk population, is also important to underscore. It is possible that this finding may be attributed to the Baby Elmo curriculum's focus on the concept of following the child's lead throughout the intervention. The focus on the child's needs is stressed from the outset of the program, potentially resulting in lower-than-expected levels of intrusiveness. An alternative explanation is that given low levels of prior contact, these fathers have not had the opportunity to establish negative interaction patterns, and intervention may result in an increase in positive outcomes unaccompanied by a need to reduce already established negative outcomes. Overall, these findings suggest that the timing of the intervention might be particularly important, capitalizing on early, high levels of paternal motivation and initial low levels of negative interactions. Additional empirical investigation is needed, however, to replicate this finding and to clarify this pattern of results.

The Baby Elmo program is a brief, cost-effective, and sustainable intervention. Short-term gains were shown for fathers and their young infants, replicating and extending previous positive preliminary findings with toddlers and preschoolers (Barr et al., 2011). Taken together, the present study and that of Barr and colleagues (2011) show that the program could be implemented across multiple facilities with positive gains for both fathers and their children ranging in age from 1 to 36 months. The generalizability of the Baby Elmo program could be tested by expanding it to broader contexts. For example, this parenting program is designed for nonresident parents and could be extended to biological parents who have children placed in the welfare system but who want to continue visitation with the aim of eventual reunification.

In conclusion, the present study shows promising preliminary results for incarcerated teen fathers who participated in the Baby Elmo program. Despite the fact that up to 30% of incarcerated juvenile males are fathers (Nurse, 2002), little research currently exists on how to improve the outcomes of incarcerated teen-father-child dyads, and there are very few published evaluations of parent training programs for incarcerated fathers in general, especially incarcerated teen fathers. The Baby Elmo program teaches important relationship-building parenting skills and provides participants with the opportunity to practice those skills during visits with their children. Overall, this intervention structure has been shown to foster an increase in the quality of incarcerated teen-father-child interactions as a function of the implementation of target parenting skills over time.

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