University of Pittsburgh

Office of
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Development

Project Description

The Effects of Improving Caregiving on Early Development

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Summary

This project has implemented two interventions in an orphanage for children birth to 4 years in St. Petersburg, Russia: 1) Training to promote more warm, sensitive, responsive caregiving, and 2) structural changes to promote positive relationships between children and caregivers, predominantly to increase the consistency of fewer caregivers in the lives of the children. These two early experiences, thought to be crucial to all aspects of development, have been implemented in one orphanage, training-only in a second, and no treatment in a third. Caregivers are assessed for job satisfaction, attitudes toward children, anxiety, and depression; children are assessed for physical, mental, language, and social-emotional development; families of children adopted to the USA are comprehensively assessed for adjustment, social-emotional development, problem behavior, and mental health.

As of May, 2003, preliminary data are available only from the Baby Home receiving both interventions. They show that 1) the interventions were successfully implemented and caregivers changed their behaviors on the wards, 2) caregivers have adjusted to the interventions and are in better psychological condition than before the interventions, 3) children's mental, social-emotional, and physical development has improved, and 4) even the relatively mild pre-intervention social-emotional conditions of these otherwise adequate Baby Homes are sufficient to produce a greater than expected number of children adopted after 12 months of age to the USA who have persistent multiple extreme behaviors.

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The Effects of Improving Caregiving on Early Development

Two essential components of the care and development of infants and young children regardless of whether they are typically developing or have disabilities and whether the care is in their homes, of early attachment; early and later physical, mental, social, emotional development; and long-term child care facilities, or institutions, are *1) a stable, consistent, and small set of caretakers over a prolonged period of time and 2) caregivers who provide socially-responsive, developmentally-appropriate caregiving behaviors*. These characteristics are thought to be crucial for the development mental health. However, despite their theoretical importance and the substantial correlational evidence supporting them, little experimental evidence is available demonstrating that these two specific characteristics play *causal* roles in producing these outcomes or when during early development such experiences are needed.

This project takes advantage of a highly unusual set of orphanages for children birth to 4 years of age in St. Petersburg, Russia, which 1) *provide adequate care* by American standards with respect to medicine, nutrition, safety, hygiene, toys and play equipment, specialized equipment for children with disabilities, adult contact hours, and staff:child ratios, but 2) *could be improved* with respect to stable, consistent caregivers delivering socially-responsive, developmentally-appropriate caregiving behaviors.

The Baby Homes Before Interventions

Russian historical, cultural, scholarly, practical context for this project. The orphanage system in the Russian Federation has operated in essentially the same way for many decades under the local Ministries of Health, which emphasize medical and health aspects of care to a greater extent than psychosocial characteristics. Many of the practices (e.g., adult-directed caregiver behavior, conformity) have existed for decades in orphanages and preschools, and until very recently there were no educational programs for caregiving professionals emphasizing children birth to four years old. Recently, however, scholars in the Russian Federation have called for changes in the care environment, especially in ways that match the interventions of this project, but the system is difficult to change and resources are scare in general and orphanages are not a social-political priority. This project represents a demonstration of what many scholars in the Russian Federation who are knowledgeable about current practices in Europe and the USA have urged. More specifically, the St. Petersburg Team had implemented many aspects of this projects' interventions in a nongovernment preschool, the Center for Inclusion, which as been recognized for excellence by the Russian government, and they wanted to change the orphanage system in similar ways. Therefore, there is a Russian Federation scholarly and advocacy context urging the kind of interventions implemented in this project, the St. Petersburg Team was experienced in promoting and implementing such changes in a nongovernmental preschool environment, and the project has been planned and operated as a true St. Petersburg/USA partnership for nearly a decade.

Participants. ***Children*** typically come to the BHs from their birth hospital (although some come from their families) in the first few months of life, but they may arrive at any age until 4 years. The children immediately become wards of the Home, although legal termination of parental rights takes a few months. Approximately 50%-60% are considered *at risk* but do not display atypical symptomatology. The remaining children have some *disability*, including infants of very low birth weight (less than 1200 grams), with genetic disorders (e.g., Down Syndrome), and with diagnosed medical and physical disorders (e.g., CNS damage, cerebral palsy, fetal alcohol syndrome, microcephaly, hydrocephaly, hearing and vision impairments, and other kinds of pathology). More than approximately 70% of all children are physically or mentally delayed according to standardized Russian neurological tests administered by the Homes.

Caregivers fall into two categories. *Professionals* include medical doctors (e.g., the Director of the Home, pediatricians, neuropathologists), "Special Teachers" (locally called "Defectologists," analogous to special education teachers but their training is likely aimed at older children), and other specialists who provide focused services (massage, physical education, music, etc.). Prior to the interventions, *caregivers* consisted of those staff who spend all their time on the wards with the children. They include "Assistant Teachers" responsible for the behavioral and educational development of the children, "Medical Nurses" responsible for the physical care and health of the children, and sometimes "Nursery Nurses" who are aides. These individuals receive 8 to 10 years of general education, plus 2-4 years of specialized training (i.e., akin to USA high school graduates with some having certificates or associate-level training). However, even the content of the "specialized training" typically pertains to older children, not those between birth and 3-4 years, so *the direct care staff has essentially no pre-service training specific to infants and toddlers.*

Staffing pattern. Prior to any interventions, most staff worked part-time and/or long shifts (up to 24+ hours in a stretch), because the pay is low and they can moonlight for more money, they prefer whole days off, and they want to minimize transportation expenses. Further, children were routinely "graduated" from one set of caregivers to another at approximately 3, 9, 12, and 24 months, staff are given 56-63 vacation days per year, and staff turnover averages 30% per year. *A single group of 12-14 children might be assigned 9 different caregivers per week plus substitutes, and an infant could be exposed to 60-100 different caregivers in the first two years and likely no caregiver today who was present yesterday or will be there tomorrow.*

Environment. Without the interventions, children are housed in groups of 12-16 in two-room suites (bedroom, eating/play room) plus bathroom, food preparation room, and hall/cloak room. Children are typically placed in homogenous groups by age and disability status. Minimum supportive or adaptive equipment is available for children with disabilities, and while substantial numbers of toys and educational materials are present, they are more likely sitting on shelves (sometimes neatly labeled) than on the floor or within reach of the children. Children are typically pulled out to special rooms for music, swimming, exercise, special education activities, and the infirmary. Each BH has an outdoor play area, which provides limited to moderate amounts of play space and equipment.

Caregiver behavior. Without the interventions, caregiver behavior is governed by three underlying themes that have characterized an "institutional culture" in orphanages from many countries over the last 60 years (Tharp-Taylor, 2003): 1) caregivers do not get emotionally attached to children and remain affectively disengaged and aloof (because they believe children will be less able to adapt to harsher subsequent orphanages and the caregivers want to avoid the pain of inevitable separation), 2) caregivers minimize the amount of their work, and 3) caregivers are highly directive and require child conformity. Thus caregiving chores are conducted in a business-like, perfunctory manner with little talking, minimum *en face* and eye contact, and limited social interaction and affective expression. In a three-hour observation, Muhamedrahimov (2000) of the St. Petersburg Team, observed that caregivers initiated free interaction for only 16.8 minutes with infants under 3 months of age and 19 minutes with infants 3-10 months of age, and they responded to an infant's behavior only 2.3 or 1.1 minutes, respectively. Crying was unanswered for 10-12 minutes. No talking or even face-to-face interaction occurs during feeding, which lasts 4.5-11.5 minutes. Caregivers talk to children only 12.6 minutes in 3 hours. The caregivers rarely respond to a baby's emotions, change of facial expression, attempts to initiate eye contact, vocalization, burping, or crying. Caregiving is conducted as rapidly and efficiently as possible with no talking. When caregivers do interact with children, it is exclusively in an adult-directed mode, instructing the child what to do or modeling how to use a toy "correctly;" child creativity and initiative is neither encouraged nor rewarded. Because of the age segregation, all children in a group are fed, taken outdoors, bathed, toileted, attend music or swimming, and put to bed on a schedule. Therefore, caregivers are harried at certain times and idle at other times.

Child behavior. The pre-intervention behavior of the children is also similar to that described above for children in other institutions (Tharp-Taylor, 2003). Children are put to bed whether tired or not for fairly long periods of time and often lay in their cribs quietly awake or engaging in self-stimulating behavior. Older children play in solitary or parallel fashion with limited constructive interaction. Aggression is common and often effective; while it is typically stopped when observed, there may be no reprimand for the aggressor. Little affect is expressed by either children or caregivers, there is minimal crying among typically developing children, and smiling and laughter in either children or caregivers is unusual. Infants examine strangers visually without emotion, while older ones may be indiscriminantly and aggressively friendly or withdrawn. On the playground, 6-8 children may stand idle all within 10 feet of a similarly idle caregiver.

The Interventions

The project consists of two interventions: *Training,* intended to teach caregivers warm, sensitive, socially-responsive caregiving and related skills, and *structural changes,* a set of employment, physical, and procedural changes designed to promote social-emotional relationships and attachments between children and a smaller set of more consistent caregivers.

Training. The ***purpose of training*** was to provide information on child development and practical aspects of the care and education of young children as well as to change the "institutional culture" to encourage caregivers to behave socially and emotionally more like birth parents (which most of them are). They were urged to be more affectionate, warm, and sensitively responsive to children's overtures; promote independence and creativity rather than obedience and conformity, and engage children with a variety of disabilities so that they may more fully participate in the activities of the day and establish relationships with caregivers and peers.

Training was guided by an American training specialist, Dr. Jackie Dempsey, President of Early Childhood International in Pittsburgh, ***using a train-the-trainer strategy implemented in several phases***.

- In *Phase I*, the American Trainer spent two weeks observing in a BH to provide the basis for matching the curriculum with the specific character and needs of the staff in that BH.

- *Phase II* consisted of training the professionals in the BH over approximately 25 work days using a written curriculum and visual aids. The professionals learned the material, adjusted it to fit cultural norms and the specific needs of caregivers in that BH, and prepared lessons they in turn would teach the caregivers. Thus, while the training started with a single specified curriculum, the details of the training subsequently provided to the caregivers differed between BHs. However, this approach makes the material culturally sensitive and maximally appropriate for the strengths and needs of a particular BH, it more faithfully reflects principles of effective adult training, it prepares local professionals to train new staff on an on-going basis, and it lays the foundation to potentially train staff from additional institutions in the future (see "Renewal").

- In *Phase III*, the professionals gave the caregivers 25 work days spread over 12-15 weeks of classroom lecture, discussion, and demonstrations.

- *Phase IV* consisted of supervision training, in which the Special Teacher assigned to a specific group of children would observe with the American Trainer each caregiver on at least three separate occasions for approximately one hour each and she provided constructive feedback to help the caregiver apply what she had learned, and the trainer showed the Special Teachers how to supervise (because supervision was not common in the BHs and training without supervision is less likely to actually be implemented; Kelly, 1999).

- *Phase V* was policy development, in which various written policies on how caregivers should behave in various circumstances were created and given to the Special Teachers to implement with the caregivers.

The ***written curriculum*** consisted of existing training materials modified for this purpose (e.g., the Northeastern Regional Higher Education Institute, FFEIS modules) plus new material designed to be consistent with NAEYC and Division of Early Childhood of the Council on Exceptional Children Guidelines and Standards. The modules covered administration and supervision; adult learning (given professionals only), expected caregiver behaviors; Carolina Curriculum (given professionals only); consultation and conflict management; risk categories and disabling conditions; feeding and adaptive behavior; touch therapy and infant massage; naturally occurring teaching strategies; play; signs of possible problems in young children; team building; primary and secondary caregiver roles (only BH13, see below); and separate modules on handling/positioning and stimulating cognitive, emotional, language, and motor development. Although the emphasis was on promoting child development and warm sensitively-responsive caregiving, the other topics were needed to support those primary goals. For example, professionals had nearly no background in adult learning or supervision, and there was little team work and some antagonism between administrators, professionals, and caregivers that needed to be rectified to change the "institutional culture."

Structural changes. The ***purpose of structural changes*** was to reduce the number of different caregivers, increase their stability in the lives of the children, and make several other employment, physical, and procedural changes that would promote caregiver-child social-emotional relationships and attachments and create a "family" rather than "institutional" culture.

Structural changes consisted of several ***components***:

- *Group size was reduced* by dividing each *group* of 12-14 children into two *subgroups* of 6-7 children, consistent with correlational evidence in the child care literature that smaller group size allows caregivers to individualize treatment of children and is associated with better child outcomes (Love, Schochet, & Meckstroth, 1996). While all 12-14 children in a group still slept in one room, the former eating/play room was divided into two, providing each subgroup with its own living/dining room.

- *Fewer and more stable caregivers were provided,* again consistent with the literature on quality early childhood programming (e.g., Dunn, 1993; Kontos & Fiene, 1987; NICHD, 2000). A new position was created, *Primary Caregiver,* and two Primary Caregivers were assigned exclusively to each subgroup. Primary Caregivers worked seven hours on each of four days and 12 hours on a fifth day every week in staggered shifts, for example:

Hours Per Day Worked By Primary Caregivers in a Subgroup (*N*=5-7)

	Sun	***Mon***	***Tu***	***Wed***	***Thur***	***Fri***	***Sat***
Primary A:	12	-	-	7	7	7	7
Primary B:	-	7	12	7	7	7	-

This meant that subgroups of 5-7 children saw one or both of their Primary Caregivers everyday, often for most of their waking hours, thereby providing stability of two caregivers in the children's lives. The staffing patterns of the other caregivers, now called *Secondary Caregivers,* and the professionals in the BH were not changed, except four Secondary Caregivers were assigned to serve both subgroups of a group simultaneously (there were not enough staff to assign Secondary Caregivers exclusively to each subgroup). Nevertheless, this meant that children experienced approximately six instead of nine different caregivers during a week, a 33% reduction (plus substitutes).

• *Caregiver substitutions remained within the group.* A "fifth" Primary Caregiver was assigned to a group who substituted for the two Primaries assigned to each subgroup. When a Secondary Caregiver was absent, her substitute was selected first from four other Secondaries assigned to that group, or second, from a small group of caregivers from other groups designated to be substitutes for that particular group. Permanent replacement for staff who terminated employment were selected similarly, when possible. This meant that there were fewer and more consistent substitutes for children than previously, again a reduction in the number of caregivers and an increase in the stability and consistency of caregivers experienced by individual children.

• *Periodic "graduations" to new caregivers during the first two years of life were stopped.* The new procedure, in which caregivers stay with children as they age, is called "looping" in early childhood practice (Edwards & Raikes, 2002). It reduced by approximately 60-80% the number of different caregivers a child would experience over the first two years of life.

• *Subgroups were integrated by age and disability status through attrition*. Since children arrive at young ages but depart irregularly from the BH (approximately 40% turnover per year), it was impossible procedurally to maintain group size over two years without integrating groups and subgroups by age and disability status. Moreover, such integration was likely to improve the development of children with disabilities without impeding the development of other children (e.g., Guralnick & Groom, 1987; Holahan & Costenbader, 2000; Lamorey & Bricker, 1993; Odom & McEvoy, 1988). Also caregivers could provide individual children in heterogeneous groups with more personal attention to create closer social-emotional relationships, for example by playing with older children while infants slept or taking more time feeding infants while older children played by themselves. Since this component was implemented by attrition to avoid imposing another change of caregivers, peers, and rooms, it took longer than the other components to completely establish.

• *Additional furniture and equipment were allocated to each subgroup*. Large group cribs and play pens in which children had been placed and often ignored by caregivers were eliminated, so it was necessary to provide a similar set of other facilities for each subgroup and to minimize the need for children and caregivers to visit the other rooms for equipment This consisted of adding chairs and tables for dining, some stuffed furniture to create a living room atmosphere, additional toys, rugs so that caregivers and children could play together on the floor, and support and adaptive equipment as needed by children with disabilities.

• *Family Hour was established.* It was difficult to keep children and caregivers in the room assigned to their subgroup, because people often had to go through one room to get to the toilet, kitchen, and outdoors, and because children frequently would sneak into the other room to get a toy, see what was happening, etc. Therefore, to insure that Primary Caregivers and children spent as much quality time with each other and to further establish the subgroup as the "family unit," Family Hour was established in which children and Primary Caregivers remained in the room assigned to their subgroup to play with each other daily for one hour in both the morning and afternoon without visitors.

• *Pull-out practices were minimized*. Specialized services were delivered in the subgroup, rather than in pull-out style, to the extent possible. Infant massage (a very common practice in the BHs), some special education activities, and some music lessons, for example, were conducted in the subgroup room so that caregivers could see the specialized activity and repeat it themselves on future occasions and so that children remained in their subgroup as much as possible. At the same time, because subgroups were integrated by age, some pull-out activities (e.g., swimming) were conducted outside of the subgroup with children of similar ages and sometimes disability status to provide children with additional experience with peers similar in age and other characteristics.

Design and Measurements

Basic Design. Each of the three BHs began with *baseline assessments* in which every child was given an assessment battery (see Table 2 below), which subsequently was repeated on *an assessment schedule*: At intake (for new children), 3, 6, 9, 12, 18, 24, 36, 48, and departure (extra intake and departure assessments were conducted only if the child entered or left between a scheduled assessment age). Caregivers were also given a *questionnaire battery*, and the *HOME Scale* was administered to all

Primary and approximately four Secondary Caregivers in each group during baseline.

One Baby Home ("BH13") received both the training and the structural change interventions implemented over 13 months. Caregivers were assessed during baseline, in the middle of the implementation of interventions, after both interventions were completely implemented, and annually thereafter. Professionals and caregivers were paid $50 and received certificates if they completed all parts of the training, and they were compensated at their hourly rate for attending assessments with a child, conducting some measurements, and filling in dataforms which were done on extra time. New replacement caregivers were assessed 1-2 weeks after beginning employment, given two weeks of "orientation" training, and then put on the same assessment schedule. Near the end of implementing the interventions in BH13, baseline was initiated in a second Home (BH3) followed by training only. Subsequently, baseline and scheduled assessments were begun in the third no-treatment Home (BH12).

Design features. Although apparently a simple three-group design, this approach permitted examination and control of a variety of methodological issues common to longitudinal intervention studies conducted in applied contexts:

- The effects of *repeated testing* can be assessed by comparing scores during baseline, when assessments were administered to children of all ages for the first time, with subsequent assessments at the same ages of children before interventions and in the no-treatment BH.

- Possible *initial differences* between BHs can be examined by comparing baseline data between the BHs; changes *within* a BH can be assessed relative to its baseline performance in addition to comparing the treatment conditions between BHs. Moreover, scores from baseline assessments are distributed across age and can be used to construct a prediction equation for expected no-treatment scores at different ages separately for children with different levels of disability within a single BH (or across BHs). A child's actual baseline or intake score plus the age regression can be used to predict a no-treatment score at the age of a specific "outcome" assessment, which can be compared with that child's actual post-treatment score. This strategy allows one to adjust for initial differences between BHs and children, deal with children who come and go at different ages from a treatment, and assess whether the treatment has a differential effect at different ages and for children with different levels of disability (McCall, Ryan, & Green, 1999).

- *Secular change or sample drift* can be assessed by comparing baseline data in the different BHs, because baseline was staggered over a three-year period, and within BHs by comparing scores taken during baseline with intake scores of children arriving in subsequent years.

- The *Hawthorne effect* was minimized because some degree of special treatment was given to each BH shortly after baseline, specifically a treatment in BH13 and BH3 and videotaping in BH12. In addition, the Directress of the no-treatment BH12 believes the traditional procedures followed in her Home will be better for children than the new.

- *Children are assessed for their functional abilities* (see below), which was deemed a more relevant and valid assessment of disability status than Russian medical diagnoses (Johnson, 2000). Children then can be analyzed by separate functional groups (e.g., typically developing, moderate, severe disability) or specific medical syndromes.

These data analytic procedures and a comparison showing that this design covered all the major features of the prototype longitudinal intervention study (e.g., Solomon & Leesac, 1968) were thoroughly documented in the original grant application.

Follow-up of children adopted to the United States. This project is being conducted in collaboration with the International Assistance Group (IAG), an adoption agency based in Pittsburgh, that has arranged adoptions for the last decade of children from the Russian Federation, primarily from five BHs in St. Petersburg including the three participating in this project. IAG provided their entire mailing list, and an extensive questionnaire was mailed to all of their adoptive parents in the Spring, 2001, which we propose to repeat in Spring 2003, and periodically thereafter. The questionnaire is designed to assess, at least through parent report (common in such studies; direct observations exceed our resources), most aspects of child, parent, and family functioning (see assessments below). All children assessed on the first round left the BHs before any interventions were introduced, providing a no treatment adoption comparison of the three BHs in this study plus two other BHs. Some assessment questionnaires within the battery are taken from Megan Gunnar and Dana Johnson's study of all foreign adoptions in the State of Minnesota (who come from a wide range of countries with relatively limited information on their early experiences). Some questionnaires have normative information on American non-adopted home-reared children. This follow-up permits identifying areas of persistent problems presumably as a consequence of the relative social and emotional neglect of children in these BHs as well as the possibility of assessing the longer-term effects of the interventions in children who are subsequently adopted.

Assessments

This project includes one of the most comprehensive sets of assessments on caregivers, children in the BHs, and children adopted into the USA in the literature. Assessments were selected to 1) tap each major domain of development, 2) be culturally appropriate, 3) be as familiar as possible to the St. Petersburg Research Team, 4) be assessed reliably by semi-trained assessors and coders, 5) be appropriate for children with disabilities, and 6) reflect behaviors known to be related to early social-emotional neglect. Table 1 lists the domains and specific assessments that are used and how they were administered.

For those assessments requiring subjective scoring and coding, one or two of the St. Petersburg Team were either trained in the United States or an author of an assessment, and these individuals became the "standards" who then trained the actual assessors and coders. Reliabilities were established between coders and the standard as well as pairwise among coders on samples of children from another institution (not the BHs), and additional assessors and coders as well as veterans were assessed for reliability in the third year of the project. Most subjective ratings were on 4- to 6-point scales, and more than 90% of the interobserver pair-wise ratings were within one point.

Table 1. Assessments in St. Petersburg and Follow-Up Projects

Domain	Assessment	Origin	Administration
Implementation of Interventions:			
Training-Knowledge	Pre/Post Test on course content	Project	Self-test; Pre/post training
Behavior	HOME	Caldwell & Bradley	Indep.assessor;baseline,post-intervention, annual
Structural Changes – Primary Careg. Stability group size, staff:child, age & disability integr.	Consecutive days worked,	Employment records, staff, child assignments	Continuous
Outcomes-Caregivers			
Biogr., educ., training, etc.	Questionnaire	Project	Self; annual
Caregiver behavior	HOME	Caldwell & Bradley	Indep. assessor; annual
Caregiver, affect, dyadic	PCERA	Clark	Indep. assessor; continuous
	Infant Affect Manual	Osofsky et al.	Indep. assessor; continuous
Attitudes toward job			
Job stress, coping style	Sick days, absences, turnover, COPE Inventory.	BH records Carver et al	Continuous, self Self, annual
Work problems	Questionnaire	Begley	Self, annual
Social support	Questionnaire	Begley & Czajka	Self, annual
Attitudes toward children			
Caring for children	Questionnaire	NICHD SECC	Self, annual
Parent attitudes	Parent Modernity Scale	Schaefer & Emerson	Self, annual
Type of interaction	Questionnaire	Muhamedrahimov	Self, annual
Emotion Recognition	IFEEL	Emde et al.	Self, annual
Own values	Ratings	Begley & Czajka	Self, annual
Childhood relationships	Semantic Differential		Self, annual
Anxiety/depression			
Anxiety	Current, persistent	Spielberger-Hanin	Self, annual
Depression	Questionnaire	Zung	Self, annual
	Questionnaire	Becks Depression Inventory	Self, annual
Outcomes-Children			
Physical growth/Medical	Perinatal Info	Hospital records	Intake
	Chronic, acute disorders	BH pediatricians	Continuous
	Growth (ht., wt., head circumf., chest circumf.)	BH pediatricians	Continuous
	Functional Abilities Index	Simeonsson & Bailey	Pediatr., Assist. Teach.,cont.
Motor, adaptation	Battelle subscale		Indep. assess., continuous
Mental, language	Battelle subscale		Indep. assess., continuous
Personal-social	Battelle subscale		Indep. assess., continuous
	PCERA (child, dyadic scales)	Clark	Indep. assess., continuous
	Infant Affect Manual	Emde et al.	Indep. assess., continuous
Followup of adoptive families			
Parent-child relationship	Adult-child Relationship Scale (ACRS)	Pianta & Steinberg	Parent, biannual
Attachment	Q-Sort	Waters & Deanne	Parent, biannual
Indiscriminant friendliness	Questionnaire	Chisholm	Parent, biannual
Social-emotional development	Infant-Toddler Social Emotional Assessment (ITSEA)	Carter	Parent, biannual
	Social Skills Rating Scale (SSRS)	Gresham & Elliott	Parent,biannual
Behavior problems	Child Behavior Checklist	Achenbach & Rescorla	Parent, biannual
Mental, language	Child Development Index	Ireton	Parent, biannual
Background, educ., health	Minn. Adoption Study Quest.	Gunnar	Parent, biannual

HOME Scale was administered by independent assessors prior to training and after both the training and structural change interventions were implemented in BH13. Caregiver HOME scores improved on all six subscales, including responsiveness, a major component of the training and a scale related to motor, social, and mental competence in home-reared American samples, the latter into adolescence (Bradley, Burchinal, McAdoo, & Coll, 2001; Pettit, Bates, & Dodge, 1997).

Clearly, the interventions taught the caregivers new content and changed their behaviors on the wards with the children. This occurred for the caregivers serving nearly all groups of children and was not linked with the particular assessor.

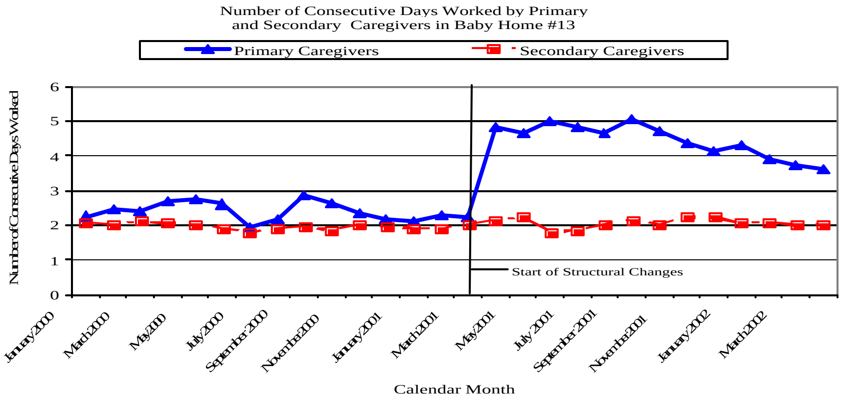
BH13 Scores on HOME Subscales (*N*=47)

	Responsivity	**Acceptance**	**Organization**	**Learning Materials**	**Involvement**	**Variety**	**Total**
Pre-Intervention	8.66	5.51	3.70	7.23	4.09	1.87	31.06
Post-Interventions	9.26	6.17	4.09	8.60	4.68	3.17	35.96
Difference	+.60**	+.66**	+.38**	1.36***	+.60*	+1.30***	+4.89***
% Change	+7%	+12%	+11%	+19%	+14%	+70%	+16%

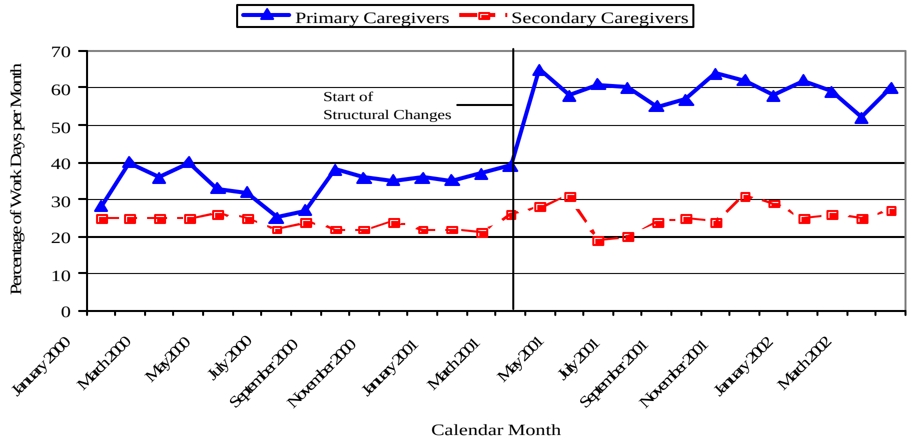
* *p* <.05, ** *p* <.01, *** *p* <.001.

- ***Each aspect of structural changes has been successfully implemented in BH13***.

?*The groups were divided into subgroups and Primary Caregivers increased the number of consecutive days and the percentage of days per month they worked.* The first figure below shows an immediate rise after structural changes in the number of consecutive days worked per week (from 2-3 to 4-5) for Primary but not Secondary Caregivers as intended. The second figure shows Primaries also increased the percentage of days worked per month from 30%-40% to approximately 60%, whereas Secondaries did not, again as planned. These are only two of numerous measures of caregiver employment patterns, including the number of caregivers experienced by individual children, that ultimately can be derived from the official caregiver and child assignment and work records kept by the BHs and entered into the Project's database.



Rate of Work Days (Number of Work Days/ Number of Days that Month)
for Primary and Secondary Caregivers in BabyHome #13



? *Periodic graduations were stopped, integration by age and disability status was begun by attrition, and Family Hour is being consistently carried out***.** Introducing Primary Caregivers, “looping” (i.e., stopping periodic “graduation” to new staff), and selective caregiver substitutions have reduced dramatically the number of different caregivers experienced by children in a week, month, and over their entire residence in BH13, which we will be able to show by analyzing BH staff employment and child group assignment records. Similarly, after 15 months, groups and subgroups are now integrated by age (e.g., infants a few months old are in the same subgroup with 3-4 year olds) and disability status, which provides caregivers more opportunity for one-on-one interactions with children. Family Hour occurs twice per day, which provides two hours each day for caregivers and children to play together in groups of 5-7.

Improved caregiver attitudes. Before interventions, Muhamedrahimov (2000) found on a questionnaire of caregivers in BH13 relatively high rates of contemporary and usual anxiety, a few caregivers who were seriously depressed, and negative attitudes toward work. Moreover, before the interventions caregivers voiced concern that the changes would represent more work and they could not cope with mixed age and disability groups of children. In contrast, it was hypothesized that the interventions, both of which encouraged caregivers to develop relationships with the children, ultimately would reduce caregiver anxiety and depression and improve job satisfaction and attitudes toward children.

- **BH13 caregivers showed decreases in anxiety and depression**. Multivariate analysis of 63 of BH13 caregivers on usual and current anxiety (Spielberger) and depression (Zung, Becks) before and after the interventions showed a multivariate reduction in anxiety and depression (F=2.32, df=8,55, p=.03) with a univariate decrease in usual anxiety (F=4.86, df=2, 62, p= .01). Caregivers became less traditional ($p <$ .05) on the Schaefer and Emerson Parental Attitude Modernity Scale (i.e., less adult-dominated, less emphasis of children’s conformity and obedience) and reduced their inflexibility and rigidity (p=.027) on another scale as one would expect from the interventions.

Improvement in children

? *Children improved on the Battelle as expected*. Following McCall et al. (1999), baseline and intake raw scores were regressed on age separately for each subtest of the Battelle and separately for typically developing, moderate disability, and severe disability groups of children as classified using the Functional Abilities Index. These regressions plus each child's baseline/intake score were used to predict individually for each child an expected no-treatment score at the age at which the child was administered the most recent assessment at least 4 months after all training and structural changes were completed. The differences between actual post-intervention score and the expected no-treatment score are presented below (positive differences reflect improvement over that expected by increased age). As expected, typically developing and children with moderate disabilities improved on the personal-social, communication, and cognitive subscales, consistent with the socially-responsive intervention. Less improvement in motor or adaptive behaviors (e.g., dressing, eating independently) occurred, because these skills were not emphasized as much for them and because caregivers had taught these skills before the interventions. Children with severe disabilities, however, who had been the most neglected in every respect, improved the most (35%-63%) and in all domains. Also, the correlation between months exposed to the completed interventions and the difference between actual post-intervention minus expect no-treatment Battelle total score was .29 (*p*=.004) after controlling for age, disability status, and gender, indicating a "dose-response" association even when the range of exposure to the treatments was a very limited 4-13 months.

Actual Post-Intervention Minus Expected No-Treatment BH13 Battelle Scores

	Typically Developing (*N*=59)				**Moderate Disability (*N*=23)**				**Severe Disability (*N*=27)**			
Subscale	**Post**	**Expect**	**Diff.**	**%**	**Post**	**Expect**	**Diff.**	**%**	**Post**	**Expect**	**Diff.**	**%**
Personal-Social	58.3	51.2	7.1***	13.9	65.1	56.5	8.6*	15.2	36.6	24.1	12.5**	51.9
-Gross Motor	40.6	39.3	1.3	3.3	41.0	39.5	1.5	3.8	27.2	20.5	6.7**	32.7
-Fine Motor	24.8	22.9	1.9**	8.3	25.0	22.1	2.9	13.1	16.1	10.8	5.3**	49.1
Total Motor	65.4	62.2	3.2*	5.1	66.0	63.6	2.4	3.8	41.1	31.2	9.9**	31.7
Adaptive	44.4	42.7	1.7	4.0	47.3	44.8	2.5	5.6	30.8	23.7	7.1***	30.0
Communication	32.0	27.8	4.2***	15.1	35.3	27.5	7.8*	28.4	19.3	14.6	4.7**	32.2
Cognitive	28.5	24.0	4.5***	18.8	31.0	22.5	8.5**	37.8	16.7	13.2	3.5**	26.5
Battelle Total	228.3	207.9	20.4***	9.8	244.9	212.9	32.0**	15.0	148.9	106.7	42.2***	39.6

? *Caregivers and children improved in affect and dyadic interaction.* Scores on items loading highly on the eight factors derived from a factor analysis (Clark, 1999) of the Parent-Child Early Relational Assessment (Clark, 1985) were added (i.e., not weighted by Clark's coefficients) to create 3 subscales for caregivers, 3 for children, and 2 for the caregiver-child dyad. These subscales were analyzed as described above for the Battelle (no age adjustment was made for subscales that did not have a significant regression on age and there were no differences for disability status), and the results are presented below. Positive differences reflect improvement, even on variables defined negatively (i.e., positive differences reflect on "Absence of Negative Affect" less negative affect). Caregivers (one of the Primaries for each child) improved substantially on all three subscales for all three groups, children increased on two of their three subscales, and dyadic interactions between caregivers and children improved. The only dimension not showing significant improvement (but in that direction) was child positive affect, perhaps because children displayed increased stranger wariness (the examiner was a stranger and children may have been more wary after the intervention) or because more experience with the intervention was necessary. There were no differences between typical, moderate, and severe disability groups. Again, correlations between length of exposure to the interventions and the difference between actual post-intervention and expected no-treatment scores were moderate (median *r*=.24, with a high of *r*=.51) but significant for 6 of the 8 scales, again indicating a dose-response association.

Actual Post-Intervention Minus Expected No-Treatment BH13 PCERA Subscales (*N*=46)

PCERA Subscales	***Post-Treat***	***Expected***	***Diff.***	***%***
Caregiver Positive Affect, Involvement, Scaffolding	40.70	37.07	3.62**	10%
Caregiver Absence of Negative Affect and Behavior	20.85	19.02	1.83**	10%
Caregiver Absence of Insensitivity, Inconsistency, Anxiety	30.13	27.33	2.80**	10%
Child Positive Affect, Communication, Social Skills	26.30	25.47	0.83	3%
Child Quality of Play, Interest, Attention	37.98	35.21	2.77**	8%
Child Absence of Dysregulation, Irritability	25.48	21.36	4.12***	19%
Dyadic Mutuality, Reciprocity	12.80	11.67	1.13*	10%
Dyadic Absence of Disorganization, Tension	18.07	16.61	1.46**	9%

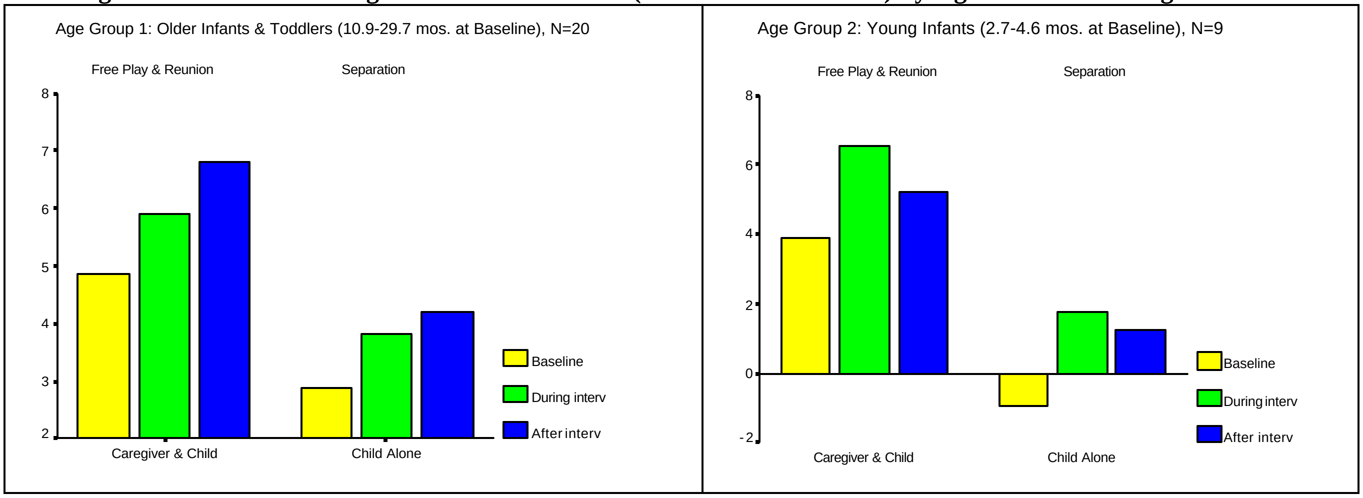
p*.<05, ***p*.<01,**p*.<001

? *Children's affect scores improved on the Infant Affect Manual*. Children are assessed with a modified strange situation procedure. The Infant Affect Manual scoring system is used to rate the emotions of the child, the caregiver, and the dyad for each 30 seconds of each of five episodes: free play, and two consecutive separation/reunion episodes of three minutes each. The highest ratings for positive emotions (joy, interest, excitement, surprise) minus the highest ratings for negative emotions (distress, sadness, anger, fear) for children is reported below as a single index of emotional tone separately over episodes in which the caregiver and child are together (free play and reunion) and when the child is alone (separation). Assessments are reported at three time points--baseline, during the implementation of the interventions, and shortly after the interventions were completely implemented--and for two age groups determined at baseline: 10.9-29.7 months (*N*=20) and under 4.6 months (*N*=9). There were no obvious differences between disability groups for this preliminary analysis.

As can be seen from the figure below, the older children at the left showed progressive significant increases in positive relative to negative affect in both types of episodes, when the child was with a caregiver and when the child was alone. Younger children at the right showed a similar increase during the intervention over baseline but not thereafter (non-significant declines from during to after intervention; in the child-alone condition, the increase from baseline to after intervention was also statistically significant). The younger children showed less positive emotional tone than the older children when alone (separation), possibly associated with slight wariness. Since there are no correlations between age and positive-minus-negative emotional tone for the baseline data, one may suppose that the significant changes are more likely associated with the intervention than with maturation.

These very preliminary results seem to indicate that the improved psychosocial environment has produced substantial increases in positive emotions for the older children, whether they are with their caregiver or not (we note that most of these children would be older than the ages at which separation distress would be most prominent), and among the younger children when they are with their caregiver. The fact that younger children do not show as much increase in positive emotional tone as older children during separation may foreshadow separation distress once these children have a greater exposure to the fully implemented intervention. It should be noted that the "after" assessment in this analysis was made soon after the interventions were completely implemented, so exposure to the full intervention was quite minimal (0-3 mos.) for this preliminary analysis (versus 4-16 months for the Battelle).

Change in Positive-minus-Negative Emotional Tone (Infant Affect Manual) by Age Level and Caregiver Presence



? ***Physical growth improved.*** Preliminary data indicate that the children receiving the double intervention also improved in their physical stature as a function of the psychosocial interventions of this project. The table below shows the observed post-intervention minus expected no-treatment physical growth measures (in kilograms and centimeters) for the three groups of children in Baby Home 13. Ignoring disability group, children significantly improved over expected no-treatment levels on each of the four physical growth measures. Typically developing children and children with moderate disabilities improved on each of the four measures, while children with severe disabilities improved significantly in weight and chest circumference but not in height and head circumference (these two growth measures typically take longer to improve). Therefore, it is reasonable to conclude that the double intervention has improved the physical growth of children. This constitutes one of the few quasi-experimental demonstrations of psychosocial short stature syndrome and a more precise demonstration that growth can be increased specifically by increased psychosocial experience. An analysis of the pre-intervention diets of children in Baby Home 13 showed that they are adequate on common measures (Dana Johnson, personal communication), further suggesting that psychosocial factors, not diet, are playing a crucial role in these results. Differences in the amount of improvement for the different disability groups may be associated with age differences between these groups.

Table A2. Actual Post-Intervention Minus Expected No-Treatment Physical Measures for BH13

	Typically Developing (*N*=57)				**Moderate Disability (*N*=21)**				**Severe Disability (*N*=27)**			
Measure	**Post**	**Expect**	**Diff.**	**%**	**Post**	**Expect**	**Diff.**	**%**	**Post**	**Expect**	**Diff.**	**%**
Weight	10.9	10.1	0.8*	7.9	10.9	9.3	1.6**	17.2	10.5	9.2	1.3**	14.1
Height	83.2	79.7	3.5***	4.4	85.7	75.8	9.9**	13.1	83.6	83.0	0.6	0.7
Head circ.	46.6	45.8	0.8*	1.7	46.7	43.6	3.1**	7.1	45.7	45.4	0.3	0.7
Chest circ.	49.8	48.0	1.8**	3.7	49.1	45.4	3.7**	8.1	50.2	47.7	2.5**	5.2

**p*<.05. ***p*<.01, ****p*<.001 Measures are in kilograms (weight) or centimeters (all others).

- **Most adoptees do well, but problems persist in a few, especially those who were adopted after 12 months**. Although only a small part of the data from questionnaires given to American parents who adopted children from these Homes prior to the intervention have been analyzed, most children ages 8 months to 16 years at assessment are doing as well or better than norms for American parents and their non-adopted children on the Infant-Toddler Social Emotional Assessment, the Social Skills Rating Scale, and the Child Behavior Problem Checklist, likely because of the high SES of our adoptive parents (similar to Tizard & Rees, 1974, 1975). Nevertheless, consistent with the literature on foreign adopted children (e.g., Ames, Chisholm, Fisher, Morison, Thompson, Mainemer, 1997; Chisholm, Carter, Ames, & Morison, 1995; Fisher, Ames, Chisholm, & Savoie, 1997; Verhulst, Althaus, Verslui-Den Bieman,1990,1992), *more adopted children older than 3 years of age at assessment have borderline or clinical levels of internality, externality, hyperactivity, and poor social responsibility and self-control than in the American standardization samples. Among those children adopted after 12 months of age, these rates are even higher and there is a larger number of children with multiple extreme behavior*. These results tentatively show that the relative social and emotional neglect present in the BHs prior to the interventions, while generally less severe than in Romania, is sufficient to be associated with an increased frequency of extreme persistent behaviors in children exposed to the BH for a year or more. This means that long-term improvements as a consequence of the interventions are at least possible.

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