

'Right from the Start': randomized trial comparing an attachment group intervention to supportive home visiting

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Background: Infant attachment security is a protective factor for future mental health, and may be promoted by individual interventions. Given service demands, it is important to determine if a group-based intervention for parents could be used to enhance infant attachment security. **Methods:** In a randomized trial involving 76 mothers, an 8-session attachment group called 'Right from the Start' (RFTS) was compared to home visiting (treatment as usual). **Results:** Intention-to-treat analyses indicated no significant differences between RFTS and home visiting, with both groups showing small improvements in infant attachment security and maternal sensitivity. RFTS cost significantly less and was more cost effective than home visiting, and was not significantly different in terms of participation ratings, client satisfaction, or follow-up service requests. There was differential compliance for the two interventions, with 89% and 58% attending 4 or more sessions of home visiting and RFTS, respectively. Secondary analyses considering non-attenders as a separate (nonrandomized) group indicated a significant advantage for those who attended RFTS on pre-test/post-test maternal sensitivity change scores ($d = .52$) and pre-test/6-month follow-up infant attachment security changes scores ($d = .55$). **Conclusions:** RFTS is as effective as home visiting in improving infant attachment security and maternal sensitivity. The effect sizes for RFTS were comparable to those of individual attachment interventions in this relatively inexpensive, community-based group intervention. **Keywords:** Attachment, intervention, infant, parent. **Abbreviations:** RFTS: Right from the Start; AQS: Attachment Q-set; MBQS: Maternal Behaviour Q-sort; HOME: Home Observation for Measurement of the Environment.

Ainsworth and her colleagues (Ainsworth, Blehar, Waters, & Wall, 1978) defined attachment as the affectional bond between an infant and his/her primary caregiver. Bowlby (1969) argued that infant attachment security increases the probability of future mental health. Researchers have documented the association between infant attachment security and later compliance, cognitive development, and social skills (e.g., Sroufe, Egeland, Carlson, & Collins, 2005). Insecure attachment has been related to later internalizing and externalizing behavior disorders (e.g., Carlson & Sroufe, 1995; Cicchetti, Toth, & Lynch, 1995; DeMulder, Denham, Schmidt, & Mitchell, 2000; Greenberg, DeKlyen, Speltz, & Endriga, 1997). A meta-analysis of studies involving 1584 North American infants indicated that approximately 33% have insecure attachment (van IJzendoorn, Goldberg, Kroonenberg, & Frenkel, 1992).

The cornerstone of attachment theory is that infant attachment security arises from a caregiving history that involves sensitive responding to infant cues and signals (Bowlby, 1969), and meta-analyses of studies of the prediction of infant attachment security from maternal sensitivity have provided empirical support for this notion (e.g., Atkinson et al., 2000). Attachment interventions aimed at increasing caregivers' sensitivity in perceiving,

interpreting, and responding to the cues of their infants promote infant attachment security (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003).

Attachment interventions

In their meta-analysis of 70 attachment interventions, Bakermans-Kranenburg et al. (2003) found that the most effective interventions involved 5–16 sessions and a clear behavioral focus on improving parental sensitivity (versus trying to change parents' mental representations of attachment). Despite the potential for effectiveness and cost efficiency offered by group interventions, only three of the studies in the Bakermans-Kranenburg et al. (2003) meta-analysis involved group interventions. These three studies revealed improvements in maternal sensitivity, but involved no examination of the impact on infant attachment security or long-term impact, and relatively small, homogeneous groups of parents (i.e., adolescents, middle class parents, and depressed mothers, respectively; Black & Teti, 1997; Dickie & Gerber, 1980; Onozawa, Glover, Adams, Modi, & Kumar, 2001). A recently developed, promising group attachment intervention (The Circle of Security; Cooper, Hoffman, Powell, & Marvin, 2005; Hoffman, Marvin, Cooper, & Powell, 2006; Marvin, Cooper, Hoffman, & Powell, 2002) was evaluated in a pre-test/post-test study of 65 dyads which showed

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reduced disorganized and insecure attachment in high-risk toddlers and preschoolers after their parents participated in the group. The Circle of Security involved relatively small groups of approximately six parents per group.

Evidence-based attachment interventions are available in few communities (Berlin, Ziv, Amaya-Jackson, & Greenberg, 2005). Furthermore, given resource limitations (due to restrictions in funding, increasing demand for early intervention services, and lack of easily implemented, empirically-based programs), individual or small, homogeneous group interventions may be less able to address insecure infant attachment in the population than large group, community-based interventions, and not able to take advantage of the potential benefits of mixed groups (Cunningham, Bremner, & Boyle, 1995).

Home visiting

In many communities (including ours), the usual treatment for parent–infant dyads with attachment concerns involves broad-based early intervention programs, such as home visiting from a public health nurse or other clinician (Berlin et al., 2005). Early intervention home visiting programs vary, but usually emphasize the importance of the parent–child relationship to optimal child and family outcomes (Sweet & Appelbaum, 2004). Supportive home visiting models, such as the family-centered family support model of Dunst, Trivette, and Deal (1994), involve identifying family needs and strengths, providing instrumental and emotional support to the family, and empowering parents to meet their child’s needs. Positive outcomes for supportive home visiting include improvements in parent, family, and child behavior and development (Guralnick, 1997; Meisels, Dichtelmiller, & Liaw, 1993). While most home visiting programs emphasize the importance of positive parent–child interaction, their evaluations do not typically include assessments of maternal sensitivity or infant attachment security (Berlin et al., 2005).

Individual- versus group-based interventions

In this paper, we compare the impact of a community-based parent group to treatment-as-usual (home visiting) on infant attachment security. Group-based interventions may take advantage of potentially powerful mechanisms that could be missing in individual interventions, such as the opportunity for social networking with other parents, therapeutic group processes, and parental empowerment through helping others (Yalom, 2005). Further, individual treatment can be at least 250% more expensive than community group-based interventions (e.g., Cunningham et al., 1995), thereby potentially restricting its availability. Although it has

important implications for resource use and access, researchers rarely examine cost in attachment intervention studies.

The Coping Modeling Problem Solving Approach

Attachment intervention groups typically involve lectures, instructional videos, and/or didactic lessons (Black & Teti, 1997; Dickie & Gerber, 1980; Onozawa et al., 2001). This type of approach can increase participant knowledge, but research suggests difficulties with resistance, less than optimal understanding of the complex principles involved in parent–child relationships due to the lack of exploration of the consequences of both positive and negative approaches to parent–child interaction, and little maintenance of behavior changes (Cunningham, Davis, Bremner, Dunn, & Rzasas, 1993). The Coping Modeling Problem Solving Approach (Cunningham et al., 1995; Masters, Burish, Hollon, & Rimm, 1987), an active learning approach in which participants identify common parenting errors depicted by videotaped models, discuss their consequences, suggest alternatives, and identify the advantages of the alternative approaches, has proven more effective than didactic parent training (Cunningham et al., 1993). Although others have applied this approach to training parents of older children with behavior problems (Cunningham et al., 1995) and anxiety disorders (Kendall et al., 1991), it had not been used previously in parent groups focusing on infant attachment security.

Right from the Start

Using the Coping Modeling Problem Solving Approach as a format, we developed ‘Right from the Start’ (RFTS), an 8-session parent group to enhance caregiver skills in reading infant cues and responding sensitively, and conducted a pilot study (Niccols & Mohammed, 2000). The next step in evaluating RFTS was to investigate (a) the effectiveness of RFTS in improving infant attachment security (the primary outcome) and maternal sensitivity and (b) the cost effectiveness of RFTS.

Method

We compared RFTS to eight sessions of supportive home visiting, with the aim of evaluating an innovative attachment group intervention against ‘treatment as usual’ in order to see if this alternative approach was advantageous.

Participants

The Research Ethics Board approved this study. RFTS sessions were widely advertised and held at convenient locations with free parking, transportation assistance, incentives (food and prizes), and onsite childcare, in

order to minimize barriers to access and maximize participation. Research assistants recruited mothers as study participants between registration for RFTS and the start of the course. Mothers were eligible for the study if they were able to complete questionnaires in English and had not attended any portion of RFTS previously. Over 6 years (1999–2005), of the 178 eligible mothers, 126 were contacted in time to complete the pretest. Of the 126 mothers approached, 76 (60%) agreed to participate, signed consent forms, completed the pretest measures, and were randomly assigned to receive one of the two interventions. (Those who did not agree to participate in the study were free to participate in RFTS.)

Table 1 contains a description of the pre-test characteristics of the study participants. Mothers varied considerably in age (range 18 to 40 years), education (range 8 to 19 years), and socioeconomic status (Blishen range 23.70 to 101.74; Blishen, Carroll, & Moore, 1987). Their maternal sensitivity (MBQS) scores ranged from $-.45$ to $.81$ and, on average, were slightly lower and more variable than typical samples (e.g., $M = .73$, $SD = .18$, Pederson et al., 1990). Infants ranged from 1 to 24 months of age, 50% were male, 86% had no siblings, and most (87%) were intellectually typical. Infant attachment security scores ranged from $-.18$ to $.65$ and, on average, were slightly lower than typical samples (e.g., $M = .40$, $SD = .17$, Pederson et al., 1990). Most (73%) infants had no known diagnoses, 13% were

born prematurely, 4% had genetic syndromes, and 10% had other problems (motor, medical, feeding, seizures, speech and language problems). Number of family risks (demographic, child, and parent) ranged from 0 to 7, with the most common risks being low socioeconomic status (53%), single parent status (30%), and maternal stress (24%). Most (99%) of the families were receiving other services, most commonly from a family doctor (90%) or pediatrician (24%).

The random number table was used for random assignment (i.e., those with numbers 0, 1, 2, 3, 4, or 5 were assigned to RFTS, and those with numbers 6, 7, 8, or 9 were assigned to home visiting). We designed the study to have more study participants assigned to RFTS than home visiting, in anticipation of differential compliance (cf. Bunting, 2004). Of the 76 mothers who were randomized, 73 (96%) completed post-test measures, and 64 (84%) completed 6-month follow-up measures. Those who withdrew from the study prior to follow-up did not differ from the rest of the study participants in terms of pre-test demographic variables (maternal age, infant age, infant intellectual ability, family risk factors, number of other services used, socioeconomic status, marital status, infant gender, or family size), as determined by nonsignificant t -test and X^2 test results; however, these study dropouts were less educated, $t(74) = 2.41$, $p < .05$.

Of the 28 mothers randomly assigned to home visiting, 3 (11%) were considered 'non-attenders' (i.e., they participated in 3 or fewer sessions). Of the 48 mothers randomly assigned to RFTS, 20 (42%) were non-attenders (as expected and reported in studies of other parent training groups, e.g., Bunting, 2004). Non-attenders did not attend for practical reasons ($n = 15$; e.g., illness, new job schedule conflict) or unknown reasons ($n = 8$). Non-attenders continued to participate in the study by completing post-test and 6-month follow-up measures.

Table 1 Pre-test characteristics of study participants ($N = 76$)

	M (SD)	%	Absolute range
Maternal age (years)	28.8 (6.2)		
Education (% completed high school)		84.2	
SES (% low) ^a		52.6	
% married/cohabiting		69.7	
Maternal sensitivity ^b	.51 (.34)		-1.00 to 1.00
Maternal sensitivity ^c	9.6 (1.4)		0 to 11
Infant age (months)	8.4 (5.4)		
% infants male		50	
Infant MDI ^d	94.8 (14.5)		
% no siblings		85.5	
Infant attachment ^e	.31 (.24)		-1.00 to 1.00
Family risks ^f	1.7 (1.5)		
# other services ^g	1.6 (1.0)		

^aBased on scores less than 42.74 on the Socioeconomic Index for Occupations in Canada (Blishen et al., 1987; absolute range 18 to 102).

^bMaternal Behaviour Q-sort (Pederson & Moran, 1995) score, higher scores indicate more sensitivity.

^cHOME Responsivity Scale (Caldwell & Bradley, 1984) score, higher scores indicate more sensitivity.

^dBased on Bayley Scales of Infant Development Second Edition Mental Development Index (Bayley, 1993), standardization sample mean = 100, $SD = 15$.

^eAttachment Q-sort (Waters, 1995) score, higher scores indicate more security, $N = 28$.

^fNumber of demographic risks (e.g., low socioeconomic status), child risks (e.g., medical, developmental or behavioral difficulties), and parental risks (e.g., maternal mental health, single parent, marital discord).

^gnumber of other services (e.g., family doctor, public health nurse, child protection).

Measures and procedures

Participants completed outcome measures in home visits within two weeks prior to group assignment, after the 8-week intervention, and after the 6-month follow-up. The research assistants who conducted all the research assessments were blinded to group assignment and the method of randomization. Figure 1 demonstrates the flow of participants through the study.

Research assistants completed one infant attachment security and two maternal sensitivity measures based on two 2-hour live observations of mothers and infants interacting in their homes. Observations included a 'divided attention' paradigm (i.e., research assistants conducted observations while the mother was asked to complete a questionnaire, with her infant unoccupied and potentially in need of attention; cf. Atkinson et al., 2000).

Infant attachment security (primary outcome). For all infants who were at least 9 months old ($N = 28$), infant attachment security was assessed using the Attachment Q-set (AQS; Waters, 1995), which consists of 90 statements regarding an infant's behavior with his or her mother (e.g., 'child shows a pattern of using

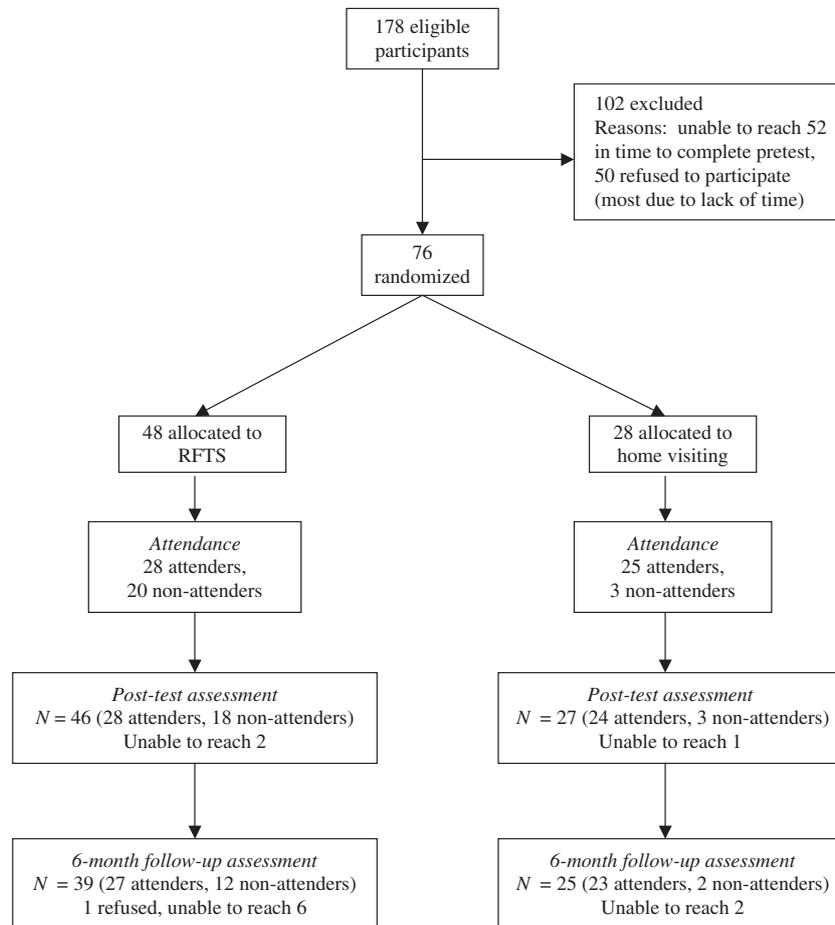


Figure 1 Diagram of the flow of participants actively followed throughout the study

mother as a base from which to explore'). Two trained and reliable observers independently sorted each of 90 items into 9 piles according to the degree to which they describe the child. The instrument yields a continuous score in the form of an item-by-item correlation between the sort for a particular child and the sort of the prototypically secure child. This measure has proven reliable and valid (van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). Inter-rater reliability for pre-test, post-test, and follow-up q-sorts ranged from .89 to .91. We averaged the scores of the two observers.

Maternal sensitivity. We used the Maternal Behaviour Q-sort (MBQS; Pederson & Moran, 1995) as one measure of maternal sensitivity. The MBQS consists of 90 statements regarding a mother's behavior with her infant (e.g., 'interactions revolve around baby's tempo and current state'). The MBQS has proven reliable and valid (Atkinson et al., 2000). Two trained and reliable observers performed the MBQS using procedures described above for the AQS. Inter-rater reliability ranged from .89 to .94.

Research assistants also used the Infant/Toddler Home Observation for Measurement of the Environment (HOME) Responsivity scale (Caldwell & Bradley, 1984) to assess maternal sensitivity. The scale measures emotional and verbal responsivity of the mother

and consists of 11 maternal behavior items rated as either observed or not observed (e.g., 'parent responds verbally to child's vocalizations or verbalizations'). Internal consistency (K-R-20) for the HOME Responsivity scale is .72, stability (r) over one year is .55, and inter-rater agreement (Kappa) on the items is .80 (Allen, Affleck, McGrade, & McQueeney, 1983; Caldwell & Bradley, 1984). Many research studies have demonstrated validity for the HOME.

Cost. Group facilitators tracked time to prepare and lead sessions, administration, supervision time, travel time, and travel costs. Participants also tracked travel time and travel costs.

Participation, client satisfaction, and follow-up service requests. We assessed participation (level of cooperation, involvement, likeability, and valence rated on 5-point scales by home visitors and group facilitators at the end of intervention; cf. Chamberlain, Patterson, Reid, Kavanagh, & Forgatch, 1984). At the end of intervention, study participants completed a client satisfaction questionnaire and were asked to choose from a menu of follow-up service requests including non-active (no further service, mailing list) and active service options (RFTS or home visiting), using questionnaires we developed and used previously (Niccols & Mohammed, 2000).

Interventions

RFTS. We designed RFTS to enhance parental sensitivity. Session topics include attachment security ('What is it and why is it important?'), parent-child interaction ('How do you show me you love me?'), the impact of parent and child temperament on interaction, disengage ('I don't like it') cues, approach ('I like it' and 'I need you') cues, following the child's lead, and building a healthy relationship (see Niccols et al., 1999 or Niccols & Mohammed, 2000 for more information on content). In RFTS, large groups of parents (12–40) sit at tables of 4–6 parents each and watch video clips of confederate parents making exaggerated errors in common parent-child interaction situations. They discuss in their small groups (i.e., at their tables) the errors and the impact of the errors, as well as alternatives and the benefits of the alternatives. Large group discussion follows each small group discussion. Parents practice skills in structured homework assignments and, in the following session, discuss their home practice and get peer support for their efforts. Each of the eight weekly sessions of RFTS is two hours long. We advertise sessions widely and hold them at convenient locations with free parking and onsite childcare.

RFTS group facilitators are infant development specialists with educational backgrounds in psychology, early childhood education, and/or social work, and additional training and experience in parent education and intervention with families of infants at risk. To ensure intervention fidelity, RFTS group facilitators attended 20 hours of training, implemented the course according to procedures described in the facilitators' manual (Niccols et al., 1999), attended weekly supervision meetings with the originator, and completed Self-Monitoring Checklists (cf. Moncher & Prinz, 1991; 96% average fidelity achieved).

Study participants randomly assigned to RFTS attended an average of 4.5 of the 8 sessions ($SD = 3.2$). Considered separately from non-attenders (i.e., those who attended 3 or fewer sessions), RFTS group participants attended an average of 7.1 of the 8 sessions ($SD = 1.2$) and reported completing an average of 4.9 of the 7 home practice assignments ($SD = 2.1$). Non-attenders attended an average of 1.2 sessions ($SD = 1.2$).

Home visiting. Infant development specialists conducted the home visits. These clinicians were trained in the Dunst et al. (1994) family-centered family support model, attended supervision, and completed Self-Monitoring Checklists (94% average fidelity achieved). As reported on a standard self-report form, on average, home visitors spent 42% of the intervention time on parent-child interaction, 18% on child issues, 16% on parent issues, 14% on community resources, 4% on home environment issues, 2% on sibling issues, and 2% on other issues. Study participants randomly assigned to home visiting participated in an average of 6.8 home visits ($SD = 1.7$).

Statistical analyses

Preliminary analyses included *t*-tests (for continuous variables) and chi-square tests (for categorical variables)

on demographic and outcome variables to check for adequate randomization of the two groups. Statistical analyses for short-term intervention effects involved *t*-tests to compare the two intervention groups' pre-test/post-test change scores for infant attachment security and maternal sensitivity. Long-term intervention effects were analyzed using *t*-tests of pre-test/6-month follow-up change scores for infant attachment security and maternal sensitivity. These analyses used an intent-to-treat approach whereby analyses included all mothers and infants randomized, regardless of intervention attendance. We assessed the impact of the intervention using two criteria. The first was the statistical significance of any differences between groups. The second criterion was effect size estimation, to assess the size of the intervention impact (Cohen, 1988).

Cost effectiveness. We calculated Incremental Cost Effectiveness for each intervention for pre-test/post-test and pre-test/6-month follow-up change scores in infant attachment security. For each intervention, the ratio of the mean cost to the mean change score was converted to cost per unit change in the attachment measure. We also computed Return on Investment for pre-test/post-test and pre-test/6-month follow-up change scores in infant attachment security for each intervention. The ratio of the mean cost to the mean change score was converted to unit change in the attachment measure per \$100 investment.

Secondary analyses. Due to differential compliance, secondary subgroup analyses comparing three (nonrandomized) groups (RFTS, home visiting, non-attenders) were conducted. Preliminary analyses on demographic and outcome variables of the three groups included analyses of variance (ANOVAs) and chi-square tests. In ANOVAs, the effect of group on pre-test/post-test change scores were examined for infant attachment security and maternal sensitivity, with Tukey post-hoc tests.

Power. For the intent-to-treat analyses of maternal sensitivity, with an alpha level of .05 and an estimated effect size of one half of a standard deviation ($d = .50$; medium-sized difference between the two groups), adequate power (.77) was achieved (Cohen, 1988). (The effect size was estimated based on pilot study results; Niccols & Mohammed, 2000.) For the analyses of infant attachment security in the subsample ($N = 28$), power was .31.

For the secondary, three-group analyses of maternal sensitivity, with an alpha level of .05 and $d = .50$, power was .58 (Cohen, 1988). For the secondary, three-group analyses of infant attachment security in the subsample ($N = 28$), power was .24.

Results

Preliminary analyses

The two intervention groups (as randomly assigned) did not differ significantly on pre-test demographic or outcome variables (maternal age, education, infant

age, infant intellectual ability, family risk factors, number of other services used, infant attachment score, maternal sensitivity score, socioeconomic status, marital status, infant gender, or family size).

Group differences in infant attachment security (primary outcome)

In intent-to-treat analyses, *t*-tests revealed no significant differences between those who were assigned to home visiting and those who were assigned to RFTS on AQS pre-test/post-test (T1–T2) change scores or AQS pre-test/6-month follow-up (T1–T3) change scores. The effect sizes for short- and long-term changes in infant attachment security were small and positive for those infants whose mothers participated in RFTS and for those whose mothers received home visiting (cf. Cohen, 1988).

Group differences in maternal sensitivity

In intent-to-treat analyses, *t*-tests revealed no significant differences between those who were assigned to home visiting and those who were assigned to RFTS on MBQS or HOME Responsivity pre-test/post-test (T1–T2) change scores or pre-test/6-month follow-up (T1–T3) change scores. Most effect sizes were small and positive for those who participated in RFTS and for those who received home visiting.

Relations between infant attachment security and maternal sensitivity

MBQS and HOME Responsivity scores were significantly related to AQS scores at pre-test, post-test, and 6-month follow-up (*r*s range from .43 to .64, all *p*s < .05). Long-term improvements in infant attachment security (T1–T3 AQS change scores) were correlated at trend levels of significance with MBQS and HOME Responsivity T1–T3 change scores, *r*s(22) = .39 and .35, *p*s = .07 and .10, respectively.

Cost and cost effectiveness

Table 2 presents information on cost, incremental cost effectiveness, and return on investment (cf. Romeo, Byford, & Knapp, 2005; Warfield, 1994). On average, RFTS cost significantly less than home visiting, $t(36.46) = 7.03$, $p < .001$. RFTS also appeared to be more cost effective than home visiting. For example, in order to improve AQS scores by 1.0, it would cost three to eight times more in the context of home visiting than in RFTS.

Participation, client satisfaction, and follow-up service requests

T-tests showed no significant differences between the two intervention groups in average participation

Table 2 Cost, incremental cost effectiveness, and return on investment for each intervention

	RFTS	Home visiting
Cost ^a	\$44.04 (\$16.44)*	\$91.26 (\$29.75)
Short-term ICE ^b	\$620.28	\$5,070.00
Longer-term ICE ^c	\$430.08	\$1,283.54
Short-term ROI ^d	.16	.02
Longer-term ROI ^e	.23	.08

^aMean (and standard deviation) per participant per session.

^bIncremental Cost Effectiveness (ratio of the mean cost for intervention to the mean T1–T2 AQS change score converted to cost per unit change in AQS).

^cIncremental Cost Effectiveness (ratio of the mean cost for intervention to the mean T1–T3 AQS change score converted to cost per unit change in AQS).

^dReturn on Investment (ratio of the mean cost for intervention to the mean T1–T2 AQS change score converted to unit change in AQS per \$100 investment).

^eReturn on Investment (ratio of the mean cost for intervention to the mean T1–T3 AQS change score converted to unit change in AQS per \$100 investment).

*significantly less than home visiting, $t(36.46) = 7.03$, $p < .001$.

ratings (*M*s = 16.7 and 16.6, *SD*s = 2.2 and 2.5, for RFTS and home visiting, respectively). On the client satisfaction questionnaire, home visiting and RFTS participants reported that they highly valued the intervention and many (86–93%) reported being more confident in reading their baby's cues, having better interactions with their baby, and enjoying their baby more. Client satisfaction ratings for RFTS and home visiting were not significantly different, except that many RFTS participants (86%) also reported having made new friends (0% for home visiting). There were no group differences in post-test follow-up service requests.

Secondary analyses

When we divided the sample into three groups (RFTS, home visiting, non-attenders), groups did not differ significantly on any pre-test demographic or outcome variables (despite the fact that these subgroups were nonrandomized).

Subgroup differences in infant attachment security (primary outcome). A one-way ANOVA of the effect of group on AQS pre-test/post-test change scores revealed no significant group differences. There were significant group differences in AQS pre-test/6-month follow-up change scores, $F(2,20) = 4.13$, $p < .05$, with Tukey post hoc tests showing that change scores were significantly greater for the RFTS group than the home visiting group or non-attenders, $p < .05$. The effect sizes for long-term changes in infant attachment security were medium for those infants whose mothers participated in RFTS, small for those whose mothers received home visiting, and medium and inverse (indicating a decrease in infant

attachment security) for infants of non-attenders (see Table 3).

Subgroup differences in maternal sensitivity.

One-way ANOVAs of the effect of group on MBQS pre-test/post-test change scores and MBQS and HOME Responsivity pre-test/6-month follow-up change scores were not significant. There were significant group differences in HOME Responsivity pre-test/post-test change scores, $F(2,70) = 3.60$, $p < .05$, with Tukey post hoc tests showing that RFTS change scores were significantly greater than non-attenders' change scores, $p < .05$. Effect sizes were medium for those who participated in RFTS and small and inverse for non-attenders (see Table 3).

Follow-up service requests. There were group differences in post-test follow-up service requests, $X^2(2) = 10.66$, $p < .05$, with the majority (88%) of non-attenders requesting active service options (RFTS and/or home visiting), which was significantly different from the other two groups, $p < .05$. Only 25% of the RFTS group mothers subsequently requested active (home visiting) follow-up service and 39% of the home visiting group subsequently requested active service (25% requested more home visiting and 14% requested RFTS).

Discussion

The effectiveness of RFTS

Intent-to-treat analyses revealed no significant differences in infant attachment or maternal sensitivity improvements between the intervention groups as randomly assigned. Thus, the most cautious interpretation of the findings is that there is no significant difference between RFTS and home visiting, with participants in each intervention showing small improvements in infant attachment security and maternal sensitivity at post-test and follow-up. In their meta-analysis of individual attachment-based interventions, Bakermans-Kranenburg et al. (2003)

found combined effect sizes that were similar to those reported here for RFTS. Thus, findings from this study replicate those for individual attachment interventions and extend the evidence for small, positive effects to a large group, community-based intervention.

Cost, participation, client satisfaction, and follow-up service requests

RFTS cost significantly less and was, in fact, half the cost of home visiting. RFTS also appeared to be more cost effective than home visiting: for an investment of \$100, the impact of RFTS on infant attachment security was three to eight times that of home visiting. Other studies also have found parent groups to be cost-effective (Barlow & Stewart-Brown, 2000; NICE, 2006). Participation and client satisfaction ratings were not significantly different for RFTS and home visiting, suggesting that clients may not perceive differences in the potential effectiveness of these interventions. Further, few parents who attended RFTS perceived active follow-up service options as necessary to meet their needs, as has been found for other group interventions (e.g., 20%, Tamm et al., 2005).

Differential compliance

There was differential compliance for the two interventions, with 89% and 58% attending 4 or more sessions of home visiting and RFTS, respectively. Other studies have reported high dropout rates for parent groups (Bunting, 2004), and that parents attribute nonparticipation to busy personal schedules, inconvenience of group time, and logistical difficulties (Cunningham et al., 2000).

Results of secondary analyses

Some limitations of intent-to-treat analyses are that the estimate of treatment effects is generally conservative because of dilution due to non-compliance,

Table 3 Effect sizes (*d*) for change scores from pre-test to post-test (T1-T2) and from pre-test to 6-month follow-up (T1-T3) for infant attachment and maternal sensitivity for each group

	RFTS ^a		Home visiting ^b		Non-attenders ^c	
	T1-T2	T1-T3	T1-T2	T1-T3	T1-T2	T1-T3
Infant attachment ^d	.35	.55**	.10	.23	-.21	-.61
Maternal sensitivity ^e	.11	-.04	.19	.17	-.05	-.56
Maternal sensitivity ^f	.52*	.34	.04	.70	-.24	.10

^aMothers randomly assigned to RFTS and attended 4 or more sessions.

^bMothers randomly assigned to home visiting and attended 4 or more sessions.

^cMothers who attended 3 or fewer intervention sessions.

^dAQS for each group respectively $ns = 7, 11, 9$ for T1-T2, $ns = 7, 10, 6$ for T1-T3.

^eMBQS for each group respectively $ns = 28, 24, 20$ for T1-T2, $ns = 27, 23, 13$ for T1-T3.

^fHOME Responsivity scale, for each group respectively $ns = 28, 24, 21$ for T1-T2, $ns = 27, 23, 14$ for T1-T3.

*Mean change score significantly greater than the non-attenders, $p < .05$.

**Mean change score significantly greater than the other two groups, $p < .05$.

and that it favors the conclusion of equality of treatments (i.e., susceptible to type II error; Fergusson, Aaron, Guyatt, & Hebert, 2002; Heritier, Geb-ski, & Keech, 2003). Because there was not full compliance with the randomized treatment, this study does not meet the requirements for an ideal intent-to-treat analysis (Heritier et al., 2003). Many non-attenders failed to attend for practical reasons, so results of secondary analyses comparing the three groups (RFTS, home visiting, and non-attenders) may be informative (albeit potentially overly optimistic, i.e., susceptible to type I error; Fergusson et al., 2002). In secondary analyses comparing the three groups, pre-test/6-month follow-up infant attachment security change scores revealed larger improvements for infants whose mothers attended RFTS than the other two groups, despite power limitations.

With regard to maternal sensitivity, mothers who attended RFTS had average pre-test/post-test change scores for maternal sensitivity (as measured by the HOME Responsivity scale) that were significantly larger than those who did not attend RFTS. Surprisingly, the HOME Responsivity scale appeared to be more sensitive to change than the MBQS, findings for which were not significant in this study. Perhaps the items on the HOME Responsivity scale are more behaviorally concrete, more easily observable, and more closely reflect 'the basics' of verbal and emotional responsiveness targeted in RFTS than the MBQS.

Most mean change scores for non-attenders indicated small to medium effect size decreases in maternal sensitivity and infant attachment security. We did not randomly assign these study participants to a 'no treatment' condition, so interpretations must be made cautiously as their outcomes, had they attended intervention, are unknown. However, they did not differ from other study participants on demographic variables, or pre-test maternal sensitivity or infant attachment security scores and, at post-test, 88% requested active follow-up services (home visiting and/or RFTS), so they may be representative of the sample. If so, their results suggest a possible shift in risk status (from willingness to attend an attachment parenting course to difficulties in attachment), and RFTS may not only improve infant attachment security in dyads involving mothers who attend an attachment parenting course, but also prevent escalation to difficulties over time without intervention.

Sustained impact or a sleeper effect. It appeared that significant changes in maternal sensitivity detected by post-test for those who attended RFTS took some time to result in significant improvements in infant attachment security. In a skill-building program, the entire repertoire of skills is not available until the end of the program and it is possible that infant attachment improved over time as mothers

who attended RFTS practiced newly acquired (or enhanced) skills at home. However, average pre-test/post-test infant attachment security change scores were medium in effect size, and the infant attachment analyses were underpowered to detect significant group differences. Meta-analysis of attachment intervention studies including assessments of both maternal sensitivity and infant attachment security revealed that, when interventions were successful in improving maternal sensitivity, there was a parallel but smaller positive change in infant attachment security at post-test (Bakermans-Kranenburg et al., 2003), as was found in this study of RFTS. Thus, in the present study, long-term follow-up provided important information, which indicated either sustained impact or a potential sleeper effect of RFTS. The study findings add to the body of evidence in support of the theory that infant attachment security arises from sensitive, responsive care.

Generalizability

The study involved a self-referred and heterogeneous population and infants were not screened for insecure attachment. At pre-test, average maternal sensitivity and infant attachment security scores were only slightly lower than those of typical samples, suggesting that most study participants were not 'clinical.' Attachment interventions targeted to clinically referred samples have larger effects than interventions with other groups (Bakermans-Kranenburg et al., 2003), and studies of universal programs may have limited generalizability to clinical families. However, 38% of the mothers had low maternal sensitivity scores (more than one standard deviation below the mean of a typical sample), 18% of the infants had low infant attachment security scores (more than one standard deviation below the mean of a typical sample), and the sample included those at clinical risk due to a variety of factors (e.g., low socioeconomic status, single parent status, maternal stress). Because the study involved a 'real world' sample of children whose mothers registered for the course, it may have greater external validity than intervention studies conducted in research laboratories with recruited homogeneous populations (Chambless & Hollon, 1998; Weisz, Donenberg, Han, & Weiss, 1995).

Limitations

There were several limitations to this study. First, the generalizability of the findings is limited to mothers who are willing to attend an attachment parenting course. Due to sample size and measure limitations, we were unable to examine the impact of RFTS on different types of mothers and infants (e.g. those with insecure attachment or those with disorganized

attachment, an important type of attachment relationship associated with the greatest risk for psychopathology; van IJzendoorn, Schuengel, & Bakermans-Kranenburg, 1999). Second, we did not have a randomly assigned no-treatment control group, hampering interpretation of the findings for non-attenders. Third, information on attachment security was available only for a subset of infants (due to their age), thus limiting power and restricting generalizability of findings to infants over 9 months. Further research with larger samples of infants over 9 months and other randomly assigned comparison groups (e.g., no treatment, individual attachment intervention) would be informative, and studies of clinical samples would address the efficacy of RFTS as a treatment program (versus a population-based prevention program).

Conclusions

In this trial, RFTS was as effective as home visiting in improving infant attachment security and maternal sensitivity. Effect sizes for RFTS were comparable to those of individual attachment interventions, and extend the evidence for effectiveness to a relatively inexpensive, large group, community-based intervention. Incorporation of parent groups such as RFTS as part of a community strategy to promote children's mental health warrants further exploration and investigation (Bunting, 2004), as the implications of their widespread implementation may include reduced costs to the social service system, increased access, and more positive outcomes for children.

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