

A Randomized Controlled Trial of a Mother–Infant or Toddler Parenting Program: Demonstrating Effectiveness in Practice*

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Objective Describes outcomes of an intervention aimed to improve infant or toddler care and reduce parental distress. **Methods** A randomized controlled trial method was used with 118 mothers. Participants were allocated to an intervention group ($n = 65$) or an enhanced waitlist group ($n = 53$). Measures were taken at pre-, post-, and 6-weeks follow-up. **Results** Results demonstrated that mothers who attended the program reported improvement in depression, anxiety, stress, parental satisfaction, and decreases in problematic child behavior. Improvements were maintained at the 6-week follow up. Intention-to-treat analysis replicated the results, although with smaller effect sizes. **Conclusions** The results of this study demonstrate that delivery of a 1 day intervention for distressed mothers can contribute to lower levels of parental distress and child problem behavior. Given the importance of early mother–child relationships and the limited number of well-controlled studies on brief interventions this result is of significance to researchers and the service community.

Key words infant development; maternal distress; maternal psychoeducation; mother–infant relationships; parent-training.

A weight of evidence has demonstrated that parent-training programs for parents of children over 4 years of age have positive outcomes for the well-being of children and their parents. Recent reviews have demonstrated that these parenting programs can achieve positive long-term outcomes for parents and children (Lundahl, Risser, & Lovejoy, 2006; Moran, Ghate, & van der Merwe, 2004). In the US, the Webster-Stratton *Incredible Years* program has been evaluated on a range of diverse high-risk groups and has demonstrated long-term reductions in child-aversive behavior and increased positive interactions between parents and children (Webster-Stratton, 1998). While this program had previously focused on children over 4 years of age, a recent study demonstrated good results with children aged 2–3 years that were maintained 1 year later (Gross et al., 2003). In Australia, and recently many other countries, the *Triple P-Positive Parenting Program* has also demonstrated that long-term improvements in child behavior and increased positive interactions can be demonstrated through parent-training

delivered in a range of formats (Sanders, 1999; Sanders, Turner, & Markie-Dadds, 2002).

Problem child behavior is associated with maternal negative behavior and stress (Calkins, 2002). Problematic child behavior has also been identified as a precipitant of mothers' decreased self-esteem and lack of confidence (for a review of relevant literature see Hutchings, Appleton, Smith, Lane, & Nash, 2002). Furthermore, a substantial proportion of young children with significant behavioral problems continue to have these difficulties later in their childhood (Nixon, 2002). The importance of intervening early when problems first occur is acknowledged in the literature, with documented long-term cost benefits for service delivery as well as benefits for the children and parents involved (Károly et al., 1998; Reynolds, Temple, Robertson, & Mann, 2002). There is some evidence that as well as improving outcomes for young children, behaviorally based parenting programs can have positive effects on the psychosocial health of mothers in the short-term (Barlow, Coren, & Stewart-Brown, 2003;

*Further information on the program described in this study is available from the Queen Elizabeth Center, <http://www.qec.org.au/day-service.htm>.

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Barlow & Parsons, 2003; Sanders, 1999) and the evidence of the enduring benefits to mothers and infants has also been demonstrated in long-term studies (Kitzman et al., 2000; Olds et al., 1998). This breadth of parenting research is not evident with parents and infants in the first 2-years of life.

There is growing interest in beginning interventions in infancy, and even earlier into the antenatal period for high-risk mothers. This has been led by prominent researchers who contend there are 'sensitive periods' in the neurological development of infants (for a review see Fonagy, 1998), and failure to provide intervention for high-risk infants can lead to lifelong difficulties. More specifically, maltreatment in infancy has been found to have neuropsychological effects that are linked to long-term neuropsychological and behavioral disturbance (Cicchetti & Toth, 1995). Disturbed mother–infant interactions during the first year of life are predictive of increased neurological arousal (Bugental, 2004) and have predicted child behavior problems at 2 years of age (Laucht, Esser, & Schmidt, 1994). It seems clear that maternal reports of distress during the infancy period create a window of opportunity for intervention programs.

A common stressor reported by mothers is getting their infants to sleep but somewhat surprisingly few antenatal programs include education on the sleep habits of infants with effective results (Middlemiss, 2004). For example, Wolfson, Lacks, and Futterman (1992) used randomized controlled trial methodology with 60 mothers attending two antenatal and two postnatal sessions, while they found significant results for the treatment the results did not hold through to follow-up. Normative patterns of infant sleep are poorly understood by mothers, yet, socially, new mothers are often asked "is baby a good sleeper?" Sleep disturbance reportedly occurs in 15–35% of children aged 6–24 months and has been associated with maternal depression, parental sleep disturbance, and child behavior problems (France, Blampied, & Henderson, 2003). Sleep disturbance in children over 6-months of age is particularly distressing for parents as their infants sleep difficulties can seem to be intractable. Several reviews have established behavioral strategies, such as systematic checking and comforting, as the treatment of choice for sleep disturbance in infants and toddlers (France & Blampied, 1999; France et al., 2003; Kuhn & Weidinger, 2000; Owens, France, & Wiggs, 1999; Owens, Palermo, & Rosen, 2002). A recent review of sleep interventions argued that a variety of strategies are effective sleep interventions but the essential ingredient was providing a 'good fit' for each family,

and this requires flexibility in the program delivery (Middlemiss, 2004). Middlemiss argues that families need to identify their own goals for infant sleep and any intervention should be sensitive to this.

The format of parent–infant and parent–toddler services varies greatly. Programs range from educational information for all parents (such as that provided by routine maternal and child health checks), through to programs for high-risk families that involve a series of home visits over a substantial period of time (for example, *Pre-natal Infancy Project*, Olds, Henderson, & Kitzman, 1994; or the *Infant Health and Development Program*, Brooks-Gunn et al., 1994). The content of programs has also varied from presentation of narrowly focused information to active teaching of broadly focused parenting strategies (Barclay & Houts, 1995). Few studies have critically reported on short-term interventions using rigorous methodology as reported in this present work. Critical methodological questions are yet to be addressed for parent–infant programs and include: which intervention for whom, the length of the intervention, and the mechanisms of change. It is evident that research on the effectiveness of brief parent–infant or toddler programs delivered in real world settings is needed.

This report describes the outcomes of a behaviorally based parenting intervention for parents with infants and toddlers, using an experimental design with random allocation of participants to either intervention or enhanced waitlist–control conditions. The intervention was an intensive 6 hr program, one of the regular suite of services offered at an early parenting center. The program aimed to assist distressed parents to learn new parenting strategies for early parenting, such as feeding, sleeping, and managing difficult behavior. It was delivered in group and individual format with modeling and practice activities included. In Australia, day-stay refers to center-based programs lasting for a single day, and the term is commonly used in midwifery and maternal health settings. Because the literature showed that maternal psychological distress increases with child sleep and behavioral disturbance, it was hypothesized that mothers' attendance at the program would have a positive effect on their psychosocial well-being and parenting satisfaction, while mothers who were in the waitlist control group would experience no change in maternal distress over the waiting period. It was also hypothesized that mothers participating in the program would report positive and meaningful changes in their child's behavior, while mothers in the waitlist control group would continue to report the same level of difficulties with their child's behavior. It was anticipated that any changes in

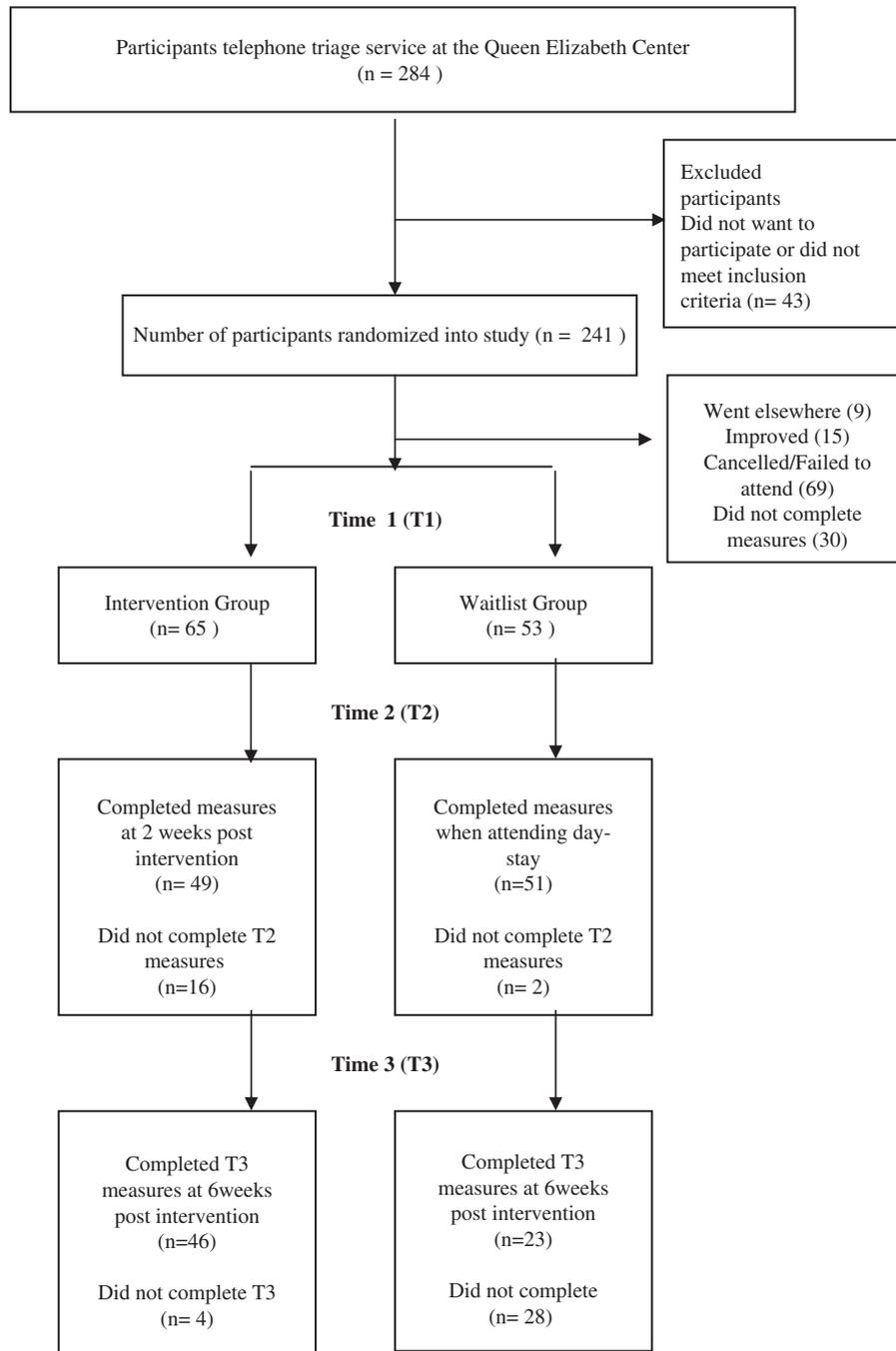


Figure 1 Procedure for triage and allocation into intervention and enhanced waitlist groups.

mothers or children following the intervention would be maintained over time, as measured at the 6-week follow-up.

Method
Participants

Participants were 118 mothers who had self-referred to the Queen Elizabeth Center in Victoria Australia,

after experiencing difficulty managing their infants or toddlers. A rigorous tracking method was used to account for participant selection using an adaptation of the CONSORT recommendations for participant tracking (Moher, Schulz, & Altman, 2001), and this process is mapped in Fig. 1. Initially, all mothers requesting attendance at the center were invited to participate in the study. Over the course of the 5-month data collection period 284

mothers made a booking to attend the program. From this total, 43 chose not to participate in the research or did not have sufficient English language skills to complete the measures, leaving 241 participants who were eligible for random allocation into either intervention or enhanced waitlist groups.

From the 241 mothers who agreed to participate, 123 did not commence the study. Their reasons were recorded and include: receiving services elsewhere, did not require the service and cancelled, or were not able to complete Time 1 measures due to parental characteristics. This nonparticipation rate is a product of the center's telephone triage process, which provides a 'warm line' for mothers and reduces the final numbers attending the center. The triage service includes: (a) instructional advice for managing the presenting problem, (b) allows mothers to call triage if more advice is needed while they are on the waitlist, (c) advises mothers of other services, and (d) recommends that mothers should book into more than one early parenting center and that they should accept the first available place. As shown in Fig. 1, up to 50% from the initial intake list no longer required the service when they were finally offered a place. The final number of participants included in the study was 118 and this comprised 65 in the intervention group and 53 in the enhanced waitlist group (Fig. 1). Intention-to-treat analysis has been completed using the last observation carried forward method for the missing data from the 13 participants, all from the treatment group, who did not complete T2 measures, and also for the five participants who were removed because parental distress was too acute to remain in the data collection.

Procedure

A randomized controlled trial methodology was used, with preintervention, postintervention, and follow-up measurement points. To maintain consistency in the recruitment phase, triage personnel were provided with a recruitment script, a flow chart instructing them on the procedures for allocation of participants into the intervention and waitlist groups, and a client booking form with pre-allocated numbering system. When parents contacted the center, triage staff read the script to all eligible mothers and invited them to participate in the evaluation of the day-stay program. Consenting participants were then randomly assigned into either the intervention or the enhanced waitlist group using the prepared allocation forms. Participants in the intervention group were booked to attend the center as soon as possible. Participants allocated to the waitlist group

were required to wait at least 21 days after booking. The mean waiting time from booking to attendance was 13.73 ($SD = 8.83$) days for the intervention group and 27.12 ($SD = 6.35$) days for the waitlist group. Triage staff also continued to provide telephone advice as necessary prior to parents' attendance at the day-stay program.

Program Content

The day-stay service provides a 6 hr intensive skills-based intervention, with six families per day booked into the program. The Queen Elizabeth Center team has a staff-parent ratio of 1 : 2 and includes one maternal and child health nurse and two early childhood workers. Parents arrived at the center in the morning and were allocated their own 'bedroom' with a bed for their child. At the beginning of the day a staff member worked through a care-plan with the mother, identifying areas of competence, and areas of need that could be addressed throughout the day. The care-plan included domains of parental well-being, parent-child interactions, child development, child behavior, play, safety, feeding/diet, settling/sleep, and daily routine. The program used a two-stage model of group work and individual work. The center has a common room, where lectures and group discussions took place. Throughout the day the program rotated through group lessons, which were periodically interrupted when practitioners' modeled and coached parental attention to infant cues. The group work included maternal health nurse led discussions on: settling (includes poor sleep routines and difficulties getting their infant off to sleep) and sleeping difficulties (includes night waking and night-time disturbance), lactation and breastfeeding, infant formula, weaning, first solids, reading child's cues, understanding difficult behavior, and looking after yourself. The sleeping intervention comprised settling strategies and systematic checking and comforting but this was adapted to incorporate individual family needs and sleep goals. During individual practice sessions a staff member worked with each parent in their 'bedroom' using behavioral coaching strategies including, reading infant cues, repeated practice, prompting, modeling, feedback, and reinforcement. Full details of the program and care-plan are available from the Queen Elizabeth Center (see Correspondence section).

Measures

All measures were parent-reported and both groups were assessed at three time points. For the intervention group and enhanced waitlist group, preintervention

measures were completed at the time of booking into the center (T1). Therefore, T1 represents the situation applying for all parents before any intervention occurred. The T1 measures and consent forms were mailed to all participants (intervention and waitlist groups) immediately after the booking was taken, along with informed consent forms for the study. The second time period represented a different stage of the study for the intervention and the waitlist groups. T2 for the intervention group was a posttest measure taken 2 weeks after the intervention, whereas T2 for the waitlist group was a second pretest measure taken at the start of their stay at the center. The time period between T1 and T2 was approximately the same for intervention and waitlist groups. Finally, the follow-up measure (T3) was the same for both groups and was taken 6 weeks after attending the center. At T3, both groups had received the intervention and no group comparisons were possible. The follow-up assessment was designed to indicate whether behavior change was maintained 6 weeks after intervention.

There were two self-reported parental measures: the Depression Anxiety Stress Scale (DASS, S. H. Lovibond & P. F. Lovibond, 1995), which is a measure of parental distress; and the Parenting Sense of Competence Scale (PSOC, Johnston & Mash, 1989), which is a measure of parental self-efficacy. Parents also reported on their child's behavior using the Goal Achievement Scale (Hudson, 1998) and the Difficult Behavior Assessment form (Matthews, 2003). A description of each measure follows.

Depression Anxiety Stress Scale

The Depression Anxiety Stress Scale (P. F. Lovibond & S. H. Lovibond, 1995) is a 42 item self-report scale that measures the respondent's current state level of anxiety, depression, and situational stress. The DASS is comprised of three sub scales, Depression, Anxiety, and Stress. Each item is scored using a 4-point Likert scale ranging from 0—did not apply to me at all through to 4—applied to me very much or most of the time. The Depression scale provides a measure of current situational negative affect including dysphoria, hopelessness, devaluation of life, and self-deprecation. The Anxiety scale is a measure of current situational autonomic arousal, situational anxiety, and anxious affect. The Stress scale is a measure of situational arousal including, difficulty relaxing, nervous arousal, agitation, irritability, and impatience. Higher scores indicate greater severity in depression, anxiety, or stress. The psychometric properties of the DASS have been repeatedly established in clinical (Brown, Chorpita, Korotitschm, & Barlow, 1997) and nonclinical

populations (P. F. Lovibond & S. H. Lovibond, 1995). Satisfactory internal consistency has been reported with α -coefficients for each subscale of .91, .81, and .89, respectively (P. F. Lovibond & S. H. Lovibond, 1995).

Parent Sense of Competence Scale

The Parenting Sense of Competence Scale (Johnston & Mash, 1989) is a widely used parenting scale that provides a measure of parental self-efficacy. The scale has 16 self-report items, each rated on a 6-point Likert scale, ranging from 1—strongly agree to 6—strongly disagree. The psychometric properties of the PSOC have been previously established (Johnston & Mash, 1989). For this study, a three-factor approach was used comprising sub-scales for Satisfaction, Efficacy, and Interest (Rogers & Matthews, 2004). This new three-factor structure has recent norms derived from a large sample of Australian mothers (Rogers & Matthews, 2004). The Satisfaction sub-scale consists of seven items and reflects parenting frustration, anxiety, and motivation. The Efficacy sub-scale also has seven items, and reflects parenting competence, problem-solving ability, and capability in the parenting role. The Interest sub-scale is a two-item factor, and provides a measure of parental interest in the parenting role. Higher scores on each sub-scale are indicative of greater perceived competence. Reliability estimates using the new three-factor structure were .77 for the Satisfaction sub-scale, .78 for Efficacy, and .58 for the Interest sub-scale (Rogers & Matthews, 2004). The Interest scale was subsequently deleted from further analysis in this study given its low reliability and inspection of responses which revealed a ceiling effect, with the majority of participants in both groups reporting maximum interest scores.

Goal Achievement Scale

The Goal Achievement Scale (GAS, Hudson, 1998) is a measure of success in clinical interventions and provides an estimate of the percentage of success that has been achieved for nominated problem behaviors. As such, the GAS can be conceptualized as an index of one aspect of social validity (Wolf, 1978). For the GAS, parents were asked to set an individual goal for a targeted child problem behavior and this was done in consultation with the day-stay staff. These goals were based on the current rate (baseline) of child behavior and reflected behaviors that could reasonably be expected to change within a 2-week period. The targeted behaviors were recorded by parents at home for 7 consecutive days at each time point. That is, the intervention group recording three times for 7 days each time (T1, T2, and T3) and the

waitlist group recording twice (T1 and T3). Parents were provided with a 7-day GAS recording chart for each time point. They also received written instructions on how to identify and label the specific behavior being targeted and also how to measure behaviors using either frequency or duration of occurrence. Parents were requested to keep this chart in a prominent place for 7 days and record the selected behavior whenever it occurred.

The GAS score is calculated using a simple formula (Hudson, 1998) that provides an index of the magnitude of change by comparing (a) the baseline occurrence of behavior, (b) the targeted occurrence of behavior, and (c) the postintervention occurrence of behavior. These scores were used to calculate a percentage success score. The following example using a toddler's night waking will clarify how the GAS works.

(1) Seven day *baseline* shows the frequency of night waking is 35 times per week.

(2) The parent identifies a *target* of acceptable night-waking as seven times per week and achieving this goal would equate to 100% success on the GAS.

(3) The behavior is measured immediately following the intervention and the *obtained* night waking rate is 14 times over 7 days.

(4) The GAS score is calculated using a formula, where the sum of the *baseline* minus the *obtained* rate is divided by the *baseline* minus the *target* rate. In the present example, the calculation would be $(35-14)/(35-7) = 75\%$, therefore the parent achieves 75% success in meeting their goal.

Difficult Behavior Assessment Form

The Difficult Behavior Assessment Form (Matthews, 2003) was developed using the format of items in the Scales of Independent Behavior—Revised (Bruininks, Woodcock, Weatherman, & Hill, 1996) and is a two-item measure in which parents nominate two problem behaviors for their child. Each behavior is then rated twice on a five-point scale showing (a) how frequently the behavior occurs and (b) how serious it is to the parents. Higher scores indicate higher frequency and increased seriousness.

Results

Data Screening and Data Analyses Strategy

Data were screened to ensure the assumptions necessary for inferential statistical analysis and normal distribution assumptions were met. Missing data were minimal (<2% of cases). Multivariate analysis of covariance (MANCOVA) were conducted for the parent well-being measures with

Table I. Demographic Characteristics of Mothers and Children by Group

Variable	Intervention (n = 65)	Enhanced waitlist (n = 53)	Total
Mother characteristics			
Age (M, SD) ^a	32.17 (4.59)	31.45 (5.01)	31.84 (4.77)
Australian-born (%) ^b	81.5	75.5	78.9
Education—Secondary (%) ^b	47.6	60.4	53.5
Tertiary ^b	50.8	43.4	47.5
Living with partner and children (%) ^b	90.8	77.4	84.7
Sole parents ^b	6.2	20.8	12.7
Primiparous (%) ^b	66.2	58.5	62.7
Full-term pregnancy (%) ^b	93.8	98.1	95.8
Child Characteristics			
Child's sex (% female) ^b	35.4	47.2	39.7
Child's age in months (M, SD) ^a	7.81 (6.04)	9.81(7.10)	8.70 (6.58)

Note: ^aIntervention and enhanced waitlist group comparisons using *t*-test, $p < 0.05$ (two-sided).

^bIntervention and enhanced waitlist comparisons using χ^2 , $p < 0.05$.

child's age as the covariate and measures of DASS (condition: depression, anxiety, stress) \times (time: 1, 2) and PSOC (condition: satisfaction, efficacy) \times (time: 1, 2). Analysis on the measure of child behavior also used MANCOVA with the Difficult Behavior Assessment Form (condition: frequency severity) \times (time: 1, 2) again with child age as the covariate. For all scales, the score at T1 and T2 comprised the within-subjects factor, and the group to which participants were allocated (intervention or enhanced waitlist) was the between-subjects factor. In all analyses, child age was tested as a covariate and was not significant on any of the measures. Where significant main effects or interactions were found, paired *t*-tests used to locate the source of the significance. Bonferroni adjustments were made to the significance level to reduce the chance of a Type 1 error, with a significance level of 0.017 adopted.

Demographic Characteristics of Mothers and Children

Demographic characteristics of the mothers and their children are shown in Table I. The average age of mothers was 31.84 years ($SD = 4.77$), the majority were Australian-born and were living with a partner. Chi-squared comparisons on the categorical demographic data shown in Table I found no significant difference between the intervention and waitlist groups. There was also no

significant difference between the groups on mother's age and or child's age using *t*-tests to compare means. The mean age of the children was 8.7 months ($SD = 6.58$), with the youngest child aged 1.4 months and the oldest child aged 40.5 months. Although the child age range is large, it is important to note that 50% of the sample was under 7-months, and 90% of the sample was under 18-months. In addition, the majority of participants ($n = 104$, 88.1%) were attending the center for similar difficulties, having experienced settling problems and sleeping difficulties with their children, irrespective of their child's age. It was anticipated that older children with sleeping difficulties may have more entrenched behaviors, and therefore these were kept in the analyses. In all analyses, child age was tested as a covariate and was not significant in all comparisons.

Baseline Scores for Intervention and Control Groups

All baseline dependent measures were compared for the intervention and waitlist groups. There were no significant differences found on the measures using one-way ANOVA for the Depression, Anxiety, Stress Scale (DASS), the Parent Sense of Competence Scale (PSOC), or the Difficult Behavior Assessment Form (DBA).

Changes to Mothers' Depression, Anxiety, and Stress

The primary comparisons to determine the outcomes of this program on mothers' self-reported depression, anxiety, and stress is at Time 2, where the intervention group had attended the day-stay program, while the enhanced waitlist group had not. Multivariate analysis of group (intervention, enhanced waitlist) \times time (pre T1, post T2) revealed a significant interaction, Wilks' $\Lambda = .85$, $F(3, 84) = 5.04$, $p = .003$, partial $\eta^2 = .15$, and a significant main effect between the groups, Wilks' $\Lambda = .88$, $F(3, 84) = 3.75$, $p = .014$, $\eta^2 = .12$ (Table II). Thus, the intervention was associated with a reduction in overall levels of depression, anxiety, and stress in this group of mothers. A plot of the measures across time is shown in Fig. 2.

To examine the effect over time on the groups, paired samples *t*-tests were performed using a conservative Bonferroni corrected α of .017. The results are also shown in Table II. For the intervention group there were significant differences between pre- and post- intervention on Depression, $t(50) = 2.55$, $p = .014$; Anxiety, $t(50) = 3.30$, $p = .002$; and Stress $t(49) = 4.12$, $p < .001$. As anticipated, the waitlist group did not

significantly change on any scale between T1 and T2. Comparing the intervention effect sizes (Fig. 4) revealed moderate to large effects: Depression, $d = 0.61$, 95%CI (0.21, 1.00); Anxiety $d = 0.95$, 95%CI (0.94, 1.36); and Stress $d = 0.99$, 95%CI (0.56, 1.42).

To examine if the intervention effect was maintained over time, the intervention data were compared at T1 (pre) and T3 (follow-up) and significant differences again were found on all three subscales Depression, $t(44) = 4.29$, $p < .001$; Anxiety, $t(44) = 3.23$, $p = .002$; and Stress $t(43) = 4.58$, $p < .001$. By T3 the waitlist group had also received the intervention, and analysis of pre (T1) and post (T3) data were conducted, again using paired samples *t*-tests. Significant differences were found on Depression, $t(22) = 3.38$, $p = .003$ but comparisons for Anxiety and Stress were not significant (although the difference in Stress was approaching significance, $p = .03$). This nonsignificant result will be explored in the Discussion section.

Changes in Mothers' Sense of Competence

For the Parent Sense of Competence scale there were significant changes to mother's self-reported measures of satisfaction and efficacy in their parenting role. Repeated MANCOVA analysis of group (intervention, enhanced waitlist) \times time (pre T1, post T2) was conducted on the Satisfaction and Efficacy measures, with child age again a nonsignificant covariate. This revealed a significant interaction, Wilks' $\Lambda = .90$, $F(2, 79) = 4.26$, $p < .017$, partial $\eta^2 = .10$, and there was also a significant main effect between the groups, Wilks' $\Lambda = .84$, $F(2, 79) = 7.45$, $p = .001$, $\eta^2 = .16$. This suggested that overall there was a significant improvement in parents' sense of competence. The change in scores over time can be seen in Fig. 3.

To examine the effect over time on the groups paired samples *t*-tests were performed using a conservative Bonferroni corrected α of .017. The results are shown in Table II. For the intervention group, there were significant differences between pre- and post- intervention on Satisfaction, $t(47) = 4.23$, $p < .001$, and on Efficacy, $t(43) = 4.10$, $p < .001$. The waitlist group did not significantly change on either scale between T1 and T2. Intervention effect sizes as shown in Fig. 4 revealed a large effect for Satisfaction $d = 1.05$, 95%CI (0.62, 1.47); and a small effect for Efficacy, $d = 0.31$, 95%CI (0.11, 0.73). These results show that the intervention group was reporting higher competence with their parenting after they had attended the program. Further analysis shows that the intervention maintained its benefits. At follow-up the intervention group data were compared at T1 (pre)

Table II. Comparisons of Mothers Well-being, Competence and Child Difficult Behavior over Time by Completers and Intention-to-treat Analysis

Measure	Pre-Time 1 <i>M (SD)</i>	Post-Time 2 <i>M (SD)</i>	Time 3 ^a <i>M (SD)</i>	MANCOVA T1 v. T2 Completer (Intention-to-treat Analysis)		Paired <i>t</i> -test for time Completer (Intention-to-treat Analysis)	
				Group	Interaction	T1 vs. T2	T1 vs. T3
Depression, Anxiety Stress Scale				3.75** (.77)	5.04** (4.20**)		
Depression							
Intervention	4.35 (5.78)	2.37 (3.45)	2.05 (3.72)			2.55** (2.52**)	4.29*** (3.53***)
Enhanced waitlist	6.60 (6.10)	5.2 (5.60)	2.95 (3.72)			1.37 (1.39**)	3.38** (2.39*)
Anxiety							
Intervention	1.62 (2.61)	0.50 (0.93)	0.60 (1.45)			3.30*** (3.23**)	3.23** (3.52***)
Enhanced waitlist	2.15 (2.74)	2.75 (3.66)	1.25 (2.38)			1.38 (1.38)	1.72 (.61)
Stress							
Intervention	9.05 (6.86)	4.40 (4.56)	4.93 (4.27)			4.12*** (3.97***)	4.58*** 4.72***
Enhanced waitlist	10.25 (5.35)	9.55 (5.97)	7.50 (4.88)			.11 (.11)	2.38 (.95)
Parent sense of competence satisfaction and efficacy				7.45*** (4.91**)	4.26* (2.88)		
Satisfaction							
Intervention	26.89 (5.98)	30.97 (5.63)	31.40 (5.56)			4.23*** (4.05***)	5.45*** (4.05***)
Enhanced waitlist	23.41 (5.64)	24.58 (5.35)	26.76 (5.85)			.60 (.60)	4.11*** (2.65**)
Efficacy							
Intervention	27.67 (5.25)	30.72 (5.60)	31.37 (5.13)			4.10*** (3.92***)	5.71*** (4.76***)
Enhanced waitlist	25.70 (5.51)	27.00 (4.38)	29.58 (5.25)			.65 (.65)	2.97** (2.29*)
Child difficult behavior assessment form				18.24*** (5.73**)	26.37*** (16.72***)		
Frequency							
Intervention	3.92 (0.64)	3.05 (0.81)	2.81 (1.12)			6.53*** (5.92***)	6.15*** (6.46***)
Enhanced waitlist	4.04 (0.57)	3.97(0.54)	3.06 (1.13)			.88 (.72)	3.90*** (3.47***)
Severity							
Intervention	3.86 (0.63)	2.16 (1.01)	2.27 (1.14)			8.15*** (7.05***)	7.85*** (7.10***)
Enhanced waitlist	3.93 (0.72)	4.00 (0.75)	2.29 (1.14)			.18 (-.26)	6.76*** (4.14***)

Note: MANCOVA performed separately for Depression, Anxiety, Stress Scale; Parenting Sense of Competence Scale; and Difficult Behavior Assessment Form; child's age as covariate.

^aTime 3 represents follow-up for the intervention group and post-intervention for the enhanced waitlist group.

p* < .05, *p* < .01, ****p* < .001, adjusted α of .017 used for *t*-tests.

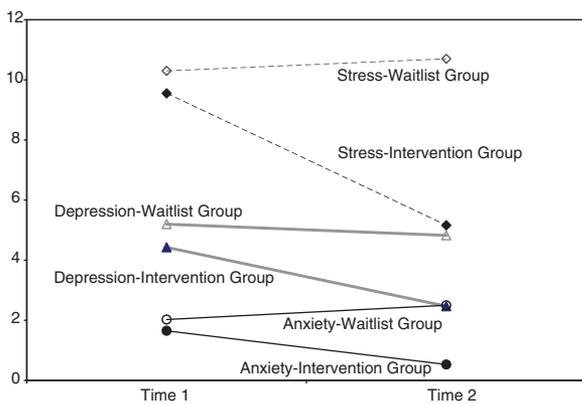


Figure 2 Interaction plots over time on mother's Depression Anxiety Stress Scale scores.

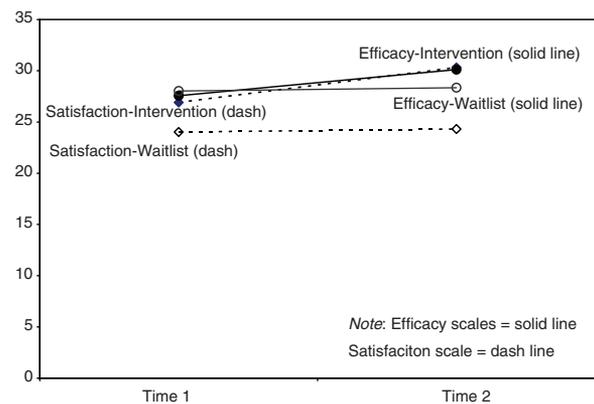


Figure 3 Interaction plots over time on mother's parenting sense of competency subscales of satisfaction and efficacy.

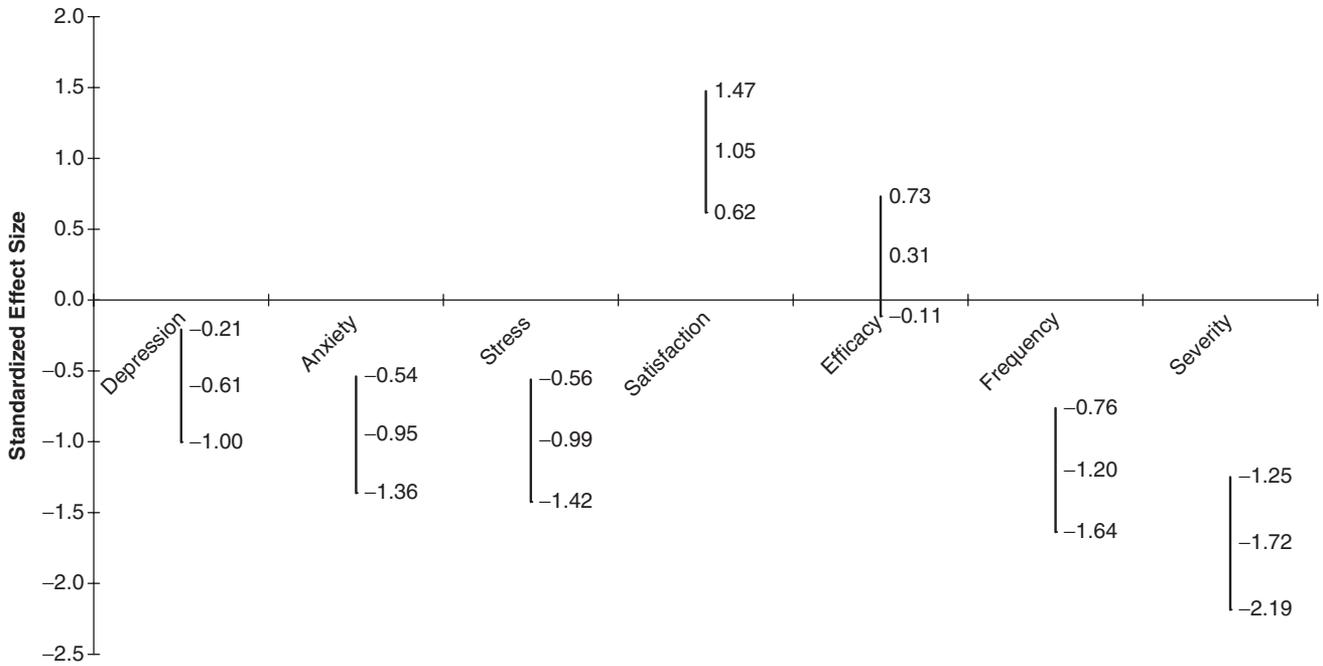


Figure 4 Standardized effect sizes *d*, and 95% confidence interval for upper and lower limit for intervention measures: Depression Anxiety and Stress subscales, Parent Sense of Competency Satisfaction and Efficacy subscales, and Difficult Behavior Assessment Form Frequency and Severity subscales.

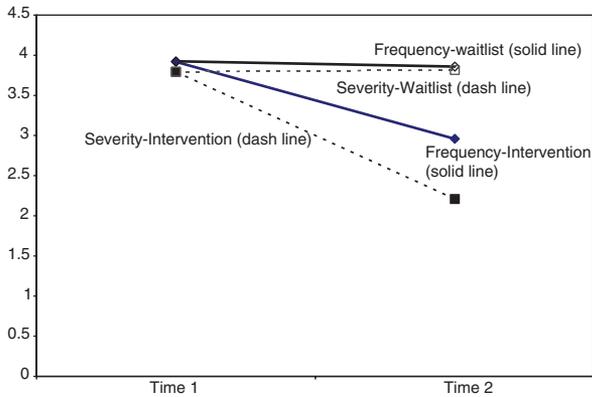


Figure 5 Interaction plots over time of Parent Rating on Child Behavior Assessment Form, Frequency and Severity.

and T3 (follow-up), with significant differences on Satisfaction, $t(45) = 5.45, p < .001$, and on Efficacy, $t(40) = 5.71, p < .001$. Comparisons of T1 and T3 (post-) for the waitlist group also show the waitlist group benefited once they received the intervention Satisfaction, $t(22) = 4.11, p < .001$, Efficacy $t(20) = 2.97, p = .008$.

Changes in Child Behavior

For the Difficult Behavior Assessment (DBA) form, participants rated the Frequency and Severity of the nominated problem child behaviors, with higher scores

indicating increased frequency and severity. The majority of participants reported their most troublesome problem behavior was: frequent night-waking (27.3%), sleeping during the day (28.2%), or difficulty settling their child (29.1%). As shown in Table II and Fig. 5 repeated measures MANCOVA were again conducted for both Frequency and Severity across T1, and T2. A significant interaction effect for the groups over time was found, Wilks' $\Lambda = .63, F(2, 90) = 26.37, p < .001$, partial $\eta^2 = .37$, and significant main effects, Wilks' $\Lambda = .71, F(2, 90) = 18.24, p < .001$, partial $\eta^2 = .29$.

Post hoc paired *t*-tests were conducted to examine the effect for the intervention and enhanced waitlist group using a conservative Bonferroni corrected α of .017. For the intervention group, there were significant differences between pre- and post- intervention on Frequency, $t(48) = 6.53, p < .001$, and Severity, $t(48) = 8.15, p < .001$. There were no significant changes for the waitlist group from T1 to T2. The intervention effect sizes were strong (Fig. 4); Frequency, $d = 1.20, 95\%CI (0.76, 1.63)$; and Severity $d = 1.72, 95\%CI (1.25, 2.19)$. The intervention effects were maintained over time for the intervention group T1 (pre) and T3 (follow-up), Frequency, $t(41) = 6.15, p < .001$, and Severity, $t(40) = 7.85, p < .001$. At T3 the waitlist group had also received the intervention and significant differences between T1 and T3 were found on Frequency, $t(23) = 3.90, p = .001$,

and Severity, $t(23) = 6.76, p < .001$. These results strongly support that the intervention has improved child behavior, albeit within parental perceptions.

A more objective measure of behavior change was represented by the GAS, with percentage improvement scores in observed child problematic behavior. To establish a baseline, mothers kept a 7-day tally of one behavior before attending the center (for example, recording every morning, how many times the child woke up on the previous evening). During the intervention, the center staff facilitated an achievable goal for the behavior, with the goal set at appropriate developmental levels. At postintervention parents again kept a daily record of the problem behavior over 7-days. To reduce social desirability the GAS is recorded in daily tally form and no provision is made for parents to calculate baseline comparisons or ongoing scores. A score was then calculated using baseline, goal, and achieved rates; a score of 100% indicating that the targeted goal has been achieved in full. At postintervention (T2 for intervention and T3 for enhanced waitlist) the total number of participants who reported achieving better than 80% of their goal was 30 (47.6%). This includes 38.1% who achieved 100% of their targeted goal and 9.5% who achieved between 80% and 99% of their goal. Deterioration in behavior was reported by 9.5% ($n = 4$) in the intervention group, and 28.6% ($n = 6$) of the waitlist group. Although this difference appears large, chi-squared analysis of expected frequencies found there was no significant difference in percentage goal achievement for the intervention and waitlist groups following the intervention.

Attrition and Intention-to-treat Analysis

Of the 118 participants who had agreed to participate in the study, 13 participants (11% of $N = 118$) failed to complete the T2 measures (all from the intervention group) and 5 (4.2%) participants were assessed by staff as too stressed to continue in the study and in need of more services than the day-stay program. Analyses of scores at T1 for these drop-outs showed the DASS mean scores were higher on Depression (drop-outs $M = 7.23$; completers $M = 5.36$), Anxiety (drop-outs $M = 5.50$; completers $M = 2.14$), and Stress (drop-outs $M = 14.92$; completers $M = 10.53$). These differences were significant for Anxiety, $F(1, 113) = 13.23, p < .001, \eta^2 = .11$, and also for Stress $F(1, 107) = 4.15, p = .04, \eta^2 = .04$, but not for Depression (using one-way ANOVA). Comparisons of the PSOC mean scores also showed lower scores for the drop-outs on Satisfaction (drop-outs $M = 23.15$; completer $M = 25.26$),

and Efficacy (drop-outs $M = 25.00$; completer $M = 27.71$), however these differences were not significant. These results suggest that the clients who dropped out were significantly more distressed than those who completed the study.

Intention-to-treat analysis (ITT) was then conducted using the last observation carried forward method and replacing missing values at Time 2 and Time 3. The results are shown in Table II in brackets. All multivariate group effects and interactions remained significant, with the exception of one comparison, the group main effect for the DASS scale was not significant. Inspection of scores shows that DASS Anxiety and Stress from Time 1 to Time 2 increased for the enhanced waitlist group, rather than remaining stable as expected. ITT paired comparisons on the DASS replicated the previous analysis, showing that Time 1 and Time 2 comparisons remained significant for the treatment group and not significant for the enhanced waitlist group. Similarly, ITT paired comparisons for the DASS at Time 1 versus Time 3 continued to show the same pattern of significance reported for the completer analysis, with nonsignificant results for the waitlist group on Anxiety and Stress and all other comparisons significant. The intervention effect sizes were reduced for this ITT analysis: DASS Depression, $d = .23$, Anxiety $d = .27$, and Stress, $d = .40$; PSOC Satisfaction, $d = .62$, and Efficacy, $d = .06$, DBA, Frequency, $d = .79$, and Severity, $d = .99$. This intention-to-treat analysis shows that the intervention effects are lost on the measures of parental efficacy and are small for depression and anxiety.

Discussion

The results demonstrated that attendance at the day-stay program had a positive effect on mothers' reported well-being and parenting competence. It also allowed five highly distressed mothers to be identified and referred for more intensive services. The positive results show large effect sizes between the intervention group and enhanced waitlist group at time two in the Depression, Anxiety and Stress scale (DASS) and also the Parenting Sense of Competence scale Satisfaction and Efficacy scores (PSOC). Participants in the intervention group were experiencing lower levels of distress and higher levels of parenting satisfaction and efficacy following their attendance at the program. Furthermore, the effects were maintained at the 6-week follow-up for the intervention group.

The enhanced waitlist group showed similar positive gains at postintervention (T3) on maternal Depression,

Parental Satisfaction, and Parental Efficacy. For the waitlist group DASS Anxiety and Stress scores were not significant, though gains were seen in the mean scores. This nonsignificant result is attributed to low power from a small sample (anxiety $n=22$, stress $n=20$), furthermore the conservative Bonferroni adjusted α put the stress scale results in the nonsignificant range ($\alpha=.03$). An alternative explanation could be that the longer waiting time may have had some unmeasured impact on infant behavior or maternal distress. This question would need to be addressed in future replications.

The results also demonstrated that mothers' participation in the program was associated with perceived reductions in child problem behavior as recorded with the Difficult Behavior Assessment Form (DBA). The results were very promising in the intervention–waitlist comparisons with large effect sizes seen. Furthermore, parents continued to rate the behavior as less problematic at the 6-week follow-up and similar gains were seen in the waitlist group at postintervention. The GAS also showed positive effects of the program on child behavior. This GAS measure showed that 81% of parents receiving the intervention reported some improvement in the one behavior nominated as most severe. It is not surprising that the GAS results were positive given that parents were asked to focus on this behavior by keeping a daily tally, which increases parental attention on the behavior. Although not measured in this study, it is possible that parental perceptions of the difficult behavior were shaped by these detailed observations.

Limitations and Strengths of the Research

A particular strength of this study was the use of CONSORT recommendations (Moher et al., 2001) to provide detailed tracking of participant attrition from the recruitment phase through to the follow-up phase. Flow diagrams were produced for all staff involved in recruitment and retention, and the ensuing analysis illustrated the importance of keeping such records of client service delivery, specifically because the outcomes for the parents who completed the program were known. The intention-to-treat analysis replicated the pattern of significant results across all the measures, however, with smaller effect sizes. The data analysis on drop-outs revealed they were significantly more distressed. While one could propose that they dropped-out because another service was found (but no data are available to support this), an alternative possibility is these mothers perceived the barriers to attendance were too great. This is a key area for future work.

The randomized methodology used for the recruitment and group allocation enabled clear comparisons to be made of the advantages to mothers in attending an intervention program to help them manage their infant or toddler's sleeping and settling behavior. Nevertheless, some limitations on the conclusions were evident. The study was limited by having a smaller enhanced waitlist group than intervention group. This was because the waitlist group had a higher drop-out rate prior to attending the center and was most likely a consequence of (a) the triage process, (b) spontaneous recovery, or (c) mothers' obtaining alternative services. A future study may need to look at the outcomes for those mothers who do no longer need the center after a waiting period.

A second limitation is the inability to explain the mechanism of change in the intervention. It is unclear if the results are a product of the behavioral strategies for infant care, the lowered maternal distress, the care from a professional, or a combination of all these factors. No direct observational data is available on actual behavior change. Finally, a long-term follow-up would have determined the extent to which program gains were maintained. These are areas to be considered for future exploration.

There are further limitations from programmatic elements. No measures of parental adherence to the program were taken. Although the program did use established social learning content, no program integrity measures were taken and there is no information about the degree to which the parent educators adhered to program requirements. Taken together, measures of parental and staff adherence to the program would have provided important information to assist with interpretation of the findings, particularly where individual parents did not progress as well as others. Subsequent to this study, the Queen Elizabeth Center manualized this program, in order to ensure program integrity was monitored. Finally, no data were available on the costs of the program and future replications should report conduct costs-benefit analysis.

Conclusion and Implications

The results of this study clearly demonstrate that mothers who attended a brief 1-day intervention showed significant improvement in their psychosocial well-being. In addition, mothers reported significant improvement in their child's behavior. In contrast, mothers who were waitlisted for the day-stay service continued to experience the same degree of parenting difficulty that prompted

their referral to the program. These results lend further support to the established literature that demonstrates behaviorally based programs can have positive effects on mothers and their children (Barlow et al., 2003; Sanders, 1999). Programs such as this are likely to benefit the mother–infant attachment relationship with mother’s reporting greater well-being. The relationship demonstrated in this study between infant sleep disturbance and higher maternal distress confirms the literature (France et al., 2003) that improvements in maternal well-being are evident with child behavior change. Importantly, this project demonstrates that a systematic scientific evaluation of program effectiveness can be conducted during routine service delivery.

In future research, comparison across different modes of intervention using randomized controlled methodology would be beneficial. Specifically, studies that compare interventions of different intensity, including; single day-stay programs, telephone triage, home visiting, residential programs, and self-directed parenting programs; and also compare parents’ capacity to generalize from the intervention. Finally, there is a need to incorporate measures of the extent to which practitioners and parents adhere to program protocols and principles. This will assist with understanding of differential outcomes and will inform efforts for program improvement. Given the scarcity of public resources for supporting families there is a need to research the cost-effectiveness of different methods of service delivery and support. To this end, a comparison of this type of brief intervention with other types of family support and intervention programs is indicated.

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