

Randomized Controlled Trial of Parent–Infant Psychotherapy and Treatment as Usual for parents with mental health problems and young infants

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Abstract

There is a dearth of good-quality research investigating the outcomes of psychoanalytic parent–infant psychotherapy. This randomized controlled trial investigated the outcomes of parent–infant psychotherapy for parents with mental health problems who were also experiencing high levels of social adversity and their young infants (<12 months). Dyads were clinically referred and randomly allocated to psychoanalytic parent–infant psychotherapy or a control condition of standard secondary and specialist primary care treatment ($n = 38$ in each group). Outcomes were assessed at baseline and at 6-month and 12-month follow-ups. The primary outcome was infant development. Secondary outcomes included parent–infant interaction, maternal psychopathology, maternal representations, maternal reflective functioning, and infant attachment. There were no differential effects over time between the groups on measures of infant development, parent–infant interaction or maternal reflective functioning. Infant attachment classifications, measured only at the 12 month follow-up, did not differ between the groups. There were favorable outcomes over time for the parent–infant psychotherapy-treated dyads relative to the control group on several measures of maternal mental health, parenting stress and parental representations of the baby and their relationship. The findings indicate potential benefits of parent–infant psychotherapy for improving mothers' psychological wellbeing and their representations of their baby and the parent–infant relationship.

Introduction

Maternal mental illness in the perinatal period can have serious and significant effects on mothers and their infants (Oates, 2003). Postpartum depression, probably the most widely documented perinatal mental health problem, has been estimated to affect between 10 and 22% of women in the first year after the birth of a baby (Cox, Murray, & Chapman, 1993; Gress-Smith, Luecken, Lemery-Chalfant, & Howe, 2012; Liberto, 2012). Anxiety in the perinatal period has been found to affect around 4% of women, and 2 in every 1000 new mothers in the UK have been found to experience other significant mental illnesses such as bipolar disorder (Ban et al., 2012).

The detrimental effects of maternal mental health problems on the young child have been widely documented. A meta-analysis showed that maternal depression was significantly related to higher levels of internalizing, externalizing, general psychopathology and behavioral difficulties in the child (Goodman et al., 2011). Maternal mental health problems in the perinatal period have also been associated with impairments in the child's later neurodevelopment and in the quality of parent–infant interactions and infant attachment security (Hipwell, Goossens, Melhuish, & Kumar, 2000; Koutra et al., 2013). In turn, the quality of parent–infant interactions and infant attachment security have been identified as key predictors of a range of neurological, psychological, and social outcomes for the child in later life (Lyons-Ruth, 2008; Schore, 2001; Sroufe, 2005).

Socioeconomic disadvantage has been consistently associated with an elevated risk for the development of maternal mental health difficulties in the perinatal period (Ban, et al., 2012; Collins, Zimmerman, & Howard, 2011; Gress-Smith, et al., 2012). A UK study showed that women from socioeconomically disadvantaged backgrounds

were almost three times more likely to develop perinatal psychiatric problems as women from less deprived backgrounds (Ban, et al., 2012). The risk factors for non-psychotic perinatal mental health problems include socioeconomic disadvantage, being unpartnered, lower education, unemployment, social isolation, partner violence, and having a history of mental health problems (Fisher et al., 2012; Milgrom et al., 2008).

Socioeconomic risks are not only linked with a higher prevalence of maternal psychiatric illness; these risk factors also appear to compound the deleterious effects of maternal mental health difficulties on the attachment relationship, the quality of parenting, and the child's development (Cohn, Matias, Tronick, Connell, & Lyons-Ruth, 1986; Murray, 1992; Stein, Malmberg, Sylva, Barnes, & Leach, 2008; Teti, Gelfand, & Isabella, 1995). Thus, the treatment of maternal psychiatric difficulties, particularly in socially disadvantaged groups, has become a key priority in perinatal health and social care provision (National Institute for Health and Clinical Excellence, 2007, 2010).

Disruptions in the Parent-Infant Relationship

As highlighted above, the combination parental mental health problems and socioeconomic disadvantage can have deleterious effects on infant development (Murray, Fiori-Cowley, Hooper, & Cooper, 1996). Thus, rather than focusing on maternal psychological symptomology in isolation, clinical evaluations should investigate the impact of various interventions for these families directly for the infant. Furthermore, several aspects of the early parent-infant relationship may be key mediating factors in the link between familial risk and infant development, and changes in these should

also be carefully evaluated in clinical evaluations. One of the key protective factors is attachment security, which can buffer the effects of economic risk and parental psychopathology on the child (Graham & Easterbrooks, 2000).

Several parenting qualities have been identified as crucial for the development of secure attachment relationships, including parental sensitivity and reflective functioning. Maternal sensitivity, defined as the contingent and appropriate responsiveness of the mother to the infant's cues (Lohaus, Keller, Ball, Voelker, & Elben, 2004), has been shown to play an important role in the formation of positive and secure attachment relationships (De Wolff & van IJzendoorn, 1997) and may be a key mediating factor in the intergenerational transmission of attachment difficulties (van IJzendoorn, 1995). However, research has also shown that sensitivity cannot fully account for intergenerational transmission in more disrupted disorganized attachment relationships (van IJzendoorn, Scheungel, & Bakermanns-Kranenburg, 1999). Another factor that has been suggested to account for this so called "transmission gap" is the mother's capacity to mentalize, or reflective functioning (RF; Fonagy & Target, 2005). Parental RF is defined as the mother's capacity to make sense of her child and herself as a parent in terms of underlying mental states, such as thoughts, feelings, desires and beliefs (Slade, 2005). This capacity has been consistently shown to be related to both adult and infant attachment security (Fonagy, Steele, Steele, Moran, & Higgitt, 1991; Meins, Fernyhough, Fradley, & Tuckey, 2001; Oppenheim & Koren-Karie, 2002; Slade, Grienberger, Bernbach, Levy, & Locker, 2005), and is associated with disrupted maternal behaviors that are prevalent in disorganized attachment relationships (Grienberger, Kelly, & Slade, 2005).

This empirical support for the importance of infant attachment security, parental sensitivity and RF has informed clinical work with parents and infants and

provided a focus for how to intervene and promote positive early relationships (Bakermans-Kranenburg, Van IJzendoorn, & Juffer, 2003; Sadler, Slade, & Mayes, 2006). Furthermore, the measurement of these parenting capacities provides a useful method for evaluating the effectiveness of treatment and potential areas of change.

Relational Interventions for Parents and Infants

Given the impact of maternal psychopathology on the parent–infant relationship and developmental outcomes in the child, it is imperative that interventions aim to improve relational outcomes for the mother *and* baby when maternal mental health difficulties have been identified. It has been argued that, instead of addressing maternal symptoms alone, relational mother–infant therapies may be the most efficacious method of relieving the impact of maternal mental health problems on the child (Nylen, Moran, Franklin, & O'hara, 2006).

A number of relational interventions for infants and their caregivers have been developed over the past few decades (Sameroff, McDonough, & Rosenblum, 2004). Many of these innovative programs aim to intervene directly at the behavioral level, changing parenting patterns and promoting sensitive caregiving strategies that will, in turn, have positive effects on the infant (Knoche et al., 2012; Sanders, Markie-Dadds, Tully, & Bor, 2000; van IJzendoorn, Juffer, & Duyvesteyn, 1995). Others aim to challenge and alter the representational world of both parent and infant. The premise upon which these approaches have evolved is that the underlying unconscious processes that impinge upon the relationship need to be addressed in order to effectively promote positive parenting practices and attachment and developmental outcomes for the infant (Baradon et al., 2005; Fraiberg, Adelson, & Shapiro, 1975;

Frost, 2012; Lieberman & Pawl, 1993). In practice, many current attachment-based approaches to working with parents and babies aim to intervene at both the behavioral and representational level as current research has uncovered the importance of maternal sensitivity at the behavioral level and reflective functioning at the representational level.

Outcomes of Relational Parent–Infant Interventions

The evidence base for the effectiveness of several attachment-based interventions has grown in recent years. For example, video feedback has become widely used in parenting interventions for promoting maternal responsiveness to the infant and infant development. A meta-analysis of 29 studies of video feedback interventions demonstrated significant positive effects on parental behavior and attitudes toward the child and on child development outcomes (Fukkink, 2008). However, the effects on the child were smaller when the parents were considered high-risk (as indicated by depression, poverty, single parenting, teenage parenting, or adult attachment insecurity). Another meta-analysis of the effects of various interventions on maternal sensitivity and infant attachment showed that the most effective interventions had a clear-cut behavioral focus and were of moderate length (Bakermans-Kranenburg, et al., 2003). However, there was an over-representation of behaviorally focused interventions included in this review; only 16 (18%) of the 88 interventions reviewed included some element of representational focus, and only three (3%) of these were categorized as purely representational.

There is a paucity of good-quality randomized controlled trials investigating the outcomes of parent–infant psychotherapy (PIP) interventions that attend to the

representational aspects of the relationship. Indeed, most of the small number of studies of psychodynamic relational treatments (Cicchetti, Toth, & Rogosch, 1999; Cohen, Lojkasek, Muir, Muir, & Parker, 2002; Cohen et al., 1999; Cramer et al., 1990; Lieberman, Weston, & Pawl, 1991; Robert-Tissot et al., 1996) have been limited by small sample sizes, non-intent-to-treat designs, poor randomization methods, reporting biases, and broad heterogeneity in the samples, resulting in only weak empirical evidence for the effectiveness of such treatments (Barlow, Bennett, Midgley, Larkin, & Wei, 2015; Salomonsson, 2014). Some relatively good-quality trials of early interventions of this kind have been conducted (Cooper, Murray, Wilson, & Romaniuk, 2003; Murray, Cooper, Wilson, & Romaniuk, 2003; Salomonsson & Sandell, 2011), but these have recruited samples with relatively low levels of socioeconomic deprivation and have therefore not been able to examine treatment effects in the context of the complex familial pressures experienced by the most “hard to reach” populations.

The evidence base that is emerging in relation to psychodynamic PIP interventions has provided mixed results. A recent systematic review summarized the evidence from eight controlled studies of psychoanalytic PIP (Barlow, et al., 2015). Meta-analyses demonstrated no differences between PIP-treated dyads and controls on measures of maternal depression, parent–infant interactional quality, infant behavioral problems, or the child’s cognitive development. The only domain that showed favorable outcomes for the PIP-treated dyads was infant attachment; infants were more likely to be classified as securely attached and less likely to be classified as avoidant or disorganized following PIP treatment. It is important to note that the authors of the review rated the quality of this evidence as “low to very low” due to the high risk of bias in the design and reporting of the studies.

The present study addresses the paucity of good-quality research investigating the outcomes of psychoanalytic PIP for mothers with mental health problems and their infants when families are experiencing high levels of social adversity. The aim was to determine whether this model of working can lead to improved outcomes directly for the baby, in the quality of the parent-infant relationship, and for the mothers' mental health.

The following research questions were investigated:

1. Does PIP result in improved *infant development* relative to standard treatment for perinatal mental health difficulties?
2. Does PIP result in improved *parent-infant relational outcomes* relative to standard treatment for perinatal mental health difficulties?
3. Does PIP result in improved *maternal mental health* relative to standard treatment for perinatal mental health difficulties?

It was hypothesized that PIP would lead to more positive outcomes than standard treatment in all three of these domains. Infant development was selected as the primary outcome as the direct effect of PIP on the baby was considered to be the most critical factor for families with complex socio-economic, attachment and psychiatric difficulties.

Methods

This pragmatic randomized, open-label trial compared the outcomes of Parent–Infant Psychotherapy (PIP) and Secondary and Specialist Primary Care Treatment (SSPCT) for parents with mental health problems and their infants.

Ethical Approval and Trial Registration Number

The research protocol was approved by a National Health Service Research Ethics Committee (Reference 05-Q0511-47) and registered on the International Standard Randomized Controlled Trial Number Register (ISRCTN38741417).

Recruitment

The study took place at four sites in England; all identified as serving demographically diverse urban populations with areas of high levels of socioeconomic deprivation. The sites were three hospital-based perinatal psychiatry units and one community children’s center. Referrals to the study were made by health and social care professionals, such as health visitors, psychiatrists and children’s center workers, working within these areas.

Following referral, the research team carried out home visits to assess eligibility and seek informed consent. The inclusion criteria were that:

1. the parent had been independently identified by a professional as requiring mental health services;
2. the child was less than 12 months of age;
3. mothers met probable psychiatric case criteria based on the General Health Questionnaire (>4/5); and

4. mothers met at least one of the following indicators of social exclusion:
 - a. Low-income household (eligibility for income support)
 - b. Long-term unemployment (>2 years)
 - c. Temporary or overcrowded accommodation (more than 2 persons per room)
 - d. Unmarried and unpartnered
 - e. Presence of chronic physical illness or disability
 - f. Early childhood history of foster or institutional care
 - g. Social isolation associated with recent relocation
 - h. Less than 20 years of age
 - i. Previous diagnosis of non-psychotic psychiatric illness.

The exclusion criteria for the study were:

1. Non-English-speaking families
2. Current maternal psychosis
3. Substance abuse disorders/chronic drug dependence
4. Maternal IQ <70
5. Infants with any sensory or motor disability that would prevent their participation in a standard developmental assessment (e.g. blindness, hearing impairment, cerebral palsy).

The screening involved a semi-structured interview with the mother, administration of the General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988), and the Test of Nonverbal Intelligence (TONI-3; Brown, Sherbenou, & Johnsen, 1997).

Participants

A total of 76 dyads were included in this study. The demographic characteristics of the sample are presented in Table 1.

(Insert Table 1 here)

The reasons for referral, as indicated by the referring professionals, were: maternal mental health/emotional difficulties (99%), mother–baby bonding difficulties (29%), social problems/isolation (21%), domestic violence/abuse/marital problems (11%), maternal childhood abuse/difficult childhood relations (9%), recent bereavement/trauma (7%), and maternal physical health/addiction recovery (4%).

Sample size

The sample size was based on a pilot study of the PIP intervention and changes in children's developmental quotients using the BSID (Fonagy, Sadie, & Allison, 2002).

A change score of 8 points (approximately 0.85 sd) was assumed from findings of the pilot and the power analysis was based on a correlated test, i.e. assumption of zero group difference at t1, and $d = .35$ group difference at t2, and assumed correlation between t1 and t2 of 0.58. With these assumptions, a sample size of 35 should be sufficient to detect a medium effect size with conventional assumptions of power set at 80% and alpha at 0.05.

Procedure

Following referral to the study, potential participants were screened for eligibility. Informed consent was sought from all eligible participants and baseline assessments were carried out (prior to randomization, T1). Participants were randomly allocated to one of the two treatment conditions and follow-up assessments were carried out 6 and 12 months post-randomization (T2 and T3, respectively).

Randomization

Random allocation was carried out by an external researcher who was independent of the study and not involved in the assessment procedure. Randomization was accomplished using the method of minimization using a logistic regression-based algorithm. The mother's age group, the child's gender, and the mother's marital status were entered into the algorithm and assignment was made to either the treatment or control group, keeping the two groups balanced on these variables as far as possible (Pocock & Simon, 1975; Treasure & MacRae, 1998). The researcher carrying out the randomization informed the research team, who then informed the participants of the allocation. All data coding was carried out by blind raters; interviewers and patients could not be blind to treatment arm.

Participant Adherence

The flow of participants through the trial is presented in Figure 1. A total of 128 mother–infant dyads were referred to the study; of these, 35 parents declined participation and 17 did not meet the inclusion criteria. Seventy-six families met the criteria and consented to participate. These dyads were randomly allocated to each

group ($n = 38$ in each group). Four dyads in the PIP group did not attend any sessions with the PIP therapist. Twelve dyads in the control group and seven dyads in the PIP group were lost to follow-up by T3. There were no significant differences between the dyads who were lost to follow-up and those who were followed-up in terms of maternal education, employment, marital status, ethnicity, social exclusion criteria, nonverbal IQ, GHQ score, referral reason, or child age. However, mothers who were lost to follow-up were significantly younger than those who were followed up, $t(74) = 3.114, p = .003$.

Treatment groups

A constructive treatment strategy was adopted in the selection of the comparison condition (Kazdin, 2002): all participants received standard treatment and the intervention group families were also offered PIP treatment.

Control: Secondary and Specialist Primary Care Treatment

The treatment of mothers and babies in the units that provided the referrals is governed by guidance from the UK National Institute for Health and Clinical Excellence (National Institute for Health and Clinical Excellence, 2007) that prescribes evidence-based interventions for the treatment of maternal depression and related conditions diagnosed in the sample. The treatments received, described as number of contacts, are shown in Table 2. All participants received significant input from secondary or specialist primary care. Families who were allocated to the PIP treatment group also continued to receive these standard services. There were no

significant differences between the two groups in the number of contacts with health, social care, and mental health services that families used during the study period, apart from a slightly higher number of General Practitioner contacts for mothers in the PIP group at the 6 month follow-up relative to controls.

(Insert Table 2 here)

Intervention: Parent–Infant Psychotherapy

In addition to routine care, as described above, dyads in the PIP group were invited to attend appointments with a parent–infant psychotherapist. The model of intervention was manualized (Baradon, et al., 2005), and provided by six experienced parent–infant psychotherapists. The clinicians implementing the intervention were amongst those who developed the model and in its manualization, so were familiar with the nuances of implementation. The team had fortnightly group supervision so that clinical practice was discussed in depth and shared amongst the clinicians to ensure model adherence. It is not a model that follows prescribed sessional topics or patterns, so adherence could not be measured explicitly.

In the sessions, parent/s, infant and therapist sit on the floor to enable transactions with the infant to take place smoothly. The parents raise any matter on their mind concerning their own mental/feeling state, factors that are affecting it, their relationship with their infant and issues to do with the infant. The therapist will focus on observing interactions in the room and trying to understand and make meaning of them in light of the parent’s preoccupation in the room, and her/his knowledge of

current and past experiences and relational models. Interactions that support infant development are noted and reinforced, and affective and behavioral impingements are addressed. Particular attention is given to non-verbal communications and communication errors (Beebe et al., 2012; Beebe & Steele, 2013; Lyons-Ruth, 1999) which are associated with disorganized attachments. The baby is a subject in the intervention, with the aim of addressing precocious defensive behaviors, such as avoidance, inhibition and dissociation, which are associated with negative developmental outcomes (Koulomzin et al., 2002). For example, a very passive infant may appear temperamentally fragile, or inhibited by maternal indifference or hostility. The relationship with the therapist is also considered a central part of the work and potentially an agent of change (Fonagy, 1999). Both mother and baby are exposed to repeated experiences of predictable responsiveness on the part of the therapist. These are directed to provide emotional regulation and a safe environment for the baby to relate and explore, and in which mothers can become more aware of the infant's signals and the moments where her response (or lack of it) needs to be re-considered.

The PIP intervention was offered in three locations that covered the geographical areas of the recruitment sites and were therefore local and accessible to the families. Appointments were usually offered on a weekly basis in the first instance, and in some cases changed to fortnightly as the intervention progressed. The intervention continued until a mutually agreed ending was planned. For those families who attended at least one PIP session, the mean number of sessions attended during the 1-year study period was 16 (range 1–49), and 41% of them had completed therapy by the 6-month follow-up at T2. Some families continued to attend PIP sessions after the final 12-month follow-up.

Measures

The research assessments took place in the families' homes and in the local clinics from where they were referred. During each assessment, semi-structured interviews were carried out with the mothers, the mothers were asked to complete a number of questionnaires, developmental and attachment assessments were carried out with the babies, and 10 minute video recordings were made of parent–infant free play interactions. For the video-recorded interactions, mothers were asked to “spend time with your baby as you usually would”. All measures were administered at T1, T2 and T3, apart from the Parent Development Interview (administered at T1 and T3 only) and the Strange Situation Procedure (administered at T3 only).

Primary Outcome:

The pre-specified primary outcome of interest was infant development. This was measured using the *Bayley Scales of Infant Development, 3rd edition* (BSID) (Bayley, 2006), an assessment-based measure that evaluates a child's cognitive, language, and motor functioning. The test yields composite scores for each domain, which are standardized by age with norms from a large sample (mean 100, *SD* 15).

Secondary Outcomes:

1) Parent-Infant Interaction: The video-recorded interactions were coded on two ratings scales.

a) *Emotional Availability Scales, 2nd edition* (EA; Biringen, Robinson, & Emde, 1993; 2000)

The EA is a widely used measure of sensitivity that has shown excellent psychometric properties, particularly concurrent validity with infant attachment security (Koren-Karie, Oppenheim, Dolev, Sher, & Etzion-Carasso, 2002; Swanson, 1998; Ziv, Aviezer, Gini, Sagi, & Koren-Karie, 2000). There are six dimensions: parental sensitivity, structuring, non-intrusiveness, and non-hostility, and child responsiveness and involvement. As a preliminary analysis of the subscales revealed a single latent factor, as has been found in other studies (Wain, 2010; Wiefel et al., 2005), an EA summary score was computed as the sum of the subscales.

b) *Coding Interactive Behavior* (CIB; Feldman, 1998)

The CIB is a detailed rating system for assessing multiple aspects of parent-child interactions that has been shown to have good concurrent and discriminant validity and sensitivity to treatment change (Feldman & Eidelman, 2003; Feldman, Eidelman, Sirota, & Weller, 2002; Feldman, Eidelman, & Rotenberg, 2004; Ferber & Feldman, 2005; Ferber et al., 2005). It is comprised of 45 discrete items based on parent, child and dyadic behavior, which are rated on a five-point scale. Three subscales, based on a factor analysis of data from a larger scale study in our laboratory, were computed: dyadic attunement, parental positive engagement, and child involvement (Sleed, Baradon & Fonagy, 2013).

The EA and CIB coding was carried out by researchers who were trained to reliable standards on the coding systems and who were blind to all information about the dyads (treatment group and time point). A subset of 12-14% of the videos was double-rated by pairs of coders (Osborne, 2008). For the EA summary score, the

inter-rater reliability was good (ICC = .726 for 12% of the videos). For the CIB, the inter-rater reliability was good for all three subscales (ICC between .756 and .872 for 14% of the videos).

2) *The Parent Development Interview* (PDI; Slade, Aber, Bresgi, Berger, & Kaplan, 2004) was used to assess parental representations. The PDI is a semi-structured clinical interview which taps the parent's experience of motherhood, and her representations of her child and the relationship between them. The verbatim transcripts were coded on two coding systems:

a) *Parental Reflective Functioning* (RF; Slade, Bernbach, Grienenberger, Levy, & Locker, 2004)

Parental RF refers to the essential human capacity to understand behavior in light of underlying mental states and intentions (also termed mentalizing). Coding yields an overall score ranging from -1 to 9. The interviews were coded by four blind coders who had been trained to reliable standards on the measure. A subset of 17 transcripts was rated by all coders and the inter-rater reliability was adequate (ICC = .762).

b) *The Assessment of Representational Risk* (ARR; Slead, 2013)

The ARR assesses the content of parents' representations of their child and the parenting role. It comprises 10 items, which constitute three subscales: Hostile, Helpless, and Narcissistic representations. The interviews were coded by three blind coders who had been trained to reliable standards on the measure. A subset of 20 transcripts was rated by all coders and the inter-rater reliability was acceptable (ICC = .865, .700 and .705 for the Hostile, Helpless, and Narcissistic subscales, respectively).

3) The *Mother's Object Relations Scales* (MORS; Oates & Gervai, 2003) is a self-report measure for quantitatively assessing core features of mothers' internal working models of their infants. It yields two subscales for the mothers' representations of their infant: Warmth (the extent to which the mother feels po and Invasion.

4) The *Center for Epidemiological Studies Depression Scale* (CES-D) (Radloff, 1977) was used to assess maternal depression. This measure yields scale scores as well as a binary measure of likely impairment (cutoff score >16).

5) The *Brief Symptom Inventory* (BSI) (Derogatis, 1993) was used to assess maternal self-reported psychological symptomology. The questionnaire provides subscale scores on nine symptom dimensions and three overall scores: the Global Severity Index (GSI), the Positive Symptom Total (PST), and the Positive Symptom Distress Index (PSDI). Global and subscale scores were converted to T scores based on norms for psychiatric outpatient females.

6) The *Parenting Stress Inventory Short Form* (PSI:SF) (Abidin, 1995) was used to assess the mothers' stress levels experienced within the parenting role. It yields a total score and three subscales pertaining to parenting stress: Difficult Child (DC), Parent-Child Dysfunctional Interaction (P-CDI) and Parental Distress (PD).

7) The *Self-Mastery Scale* (Pearlin & Schooler, 1978) was used to assess the mothers' sense of mastery over their life's chances.

8) The *Ages and Stages Questionnaire: Social-Emotional* (ASQ:SE) (Squires, Bricker, Heo, & Twombly, 2002) was used to assess the parents' reports of the infants' social and emotional functioning. Different versions of the measure exist for

different infant age groups. To facilitate comparisons between babies of different ages, the standardized z scores were used.

9) The *Strange Situation Procedure* (SSP) (Ainsworth, Blehar, Waters, & Wall, 1978) was carried out to assess the child's attachment behavior to his/her mother at T3. This could not be assessed longitudinally as the infants entered the study when they were younger than 12 months (the lower age limit for this assessment). The infant's attachment behavior was rated and classified on three primary (secure, insecure-avoidant, insecure-resistant), and one secondary (disorganized) classification. The procedure was videotaped and coded by two trained and reliable coders who were independent of the project and blind to treatment assignment. A subset of 16 SSP videos was rated by both coders; the inter-rater agreement for the three-way classification was 81%, Kappa = .692. For the classification of disorganization, the agreement was 81%, Kappa = .226.

Statistical Analysis

The analysis was intent-to-treat, including all participants in the statistical models. A sensitive analysis was performed to examine whether the four cases who failed to attend any PIP sessions impacted on the results. As there were no material differences in the results after excluding these cases, only the results of the full sample are reported here.

Samples were compared using appropriate parametric and non-parametric statistics. Where significant differences emerged these were included as covariates in all subsequent statistical models. All analyses were carried out using Stata Statistical

Software release 12. Treatment differences and changes over time were analyzed using the XTMIXED procedure for continuous variables or XTMELOGIT for binary variables. Some variables were highly positively skewed, and a log-transformation was applied to these. A linear random intercept model best fitted the data.

Coefficients were obtained for change over time combining the two groups, and for the difference in rate of change of the PIP group relative to the control group. Only those primary model parameters which were directly relevant to the study objectives are presented here. Service use data were analyzed for three 6-month periods: preceding baseline and the first and the second 6 months of treatment. The differential rate of change from baseline to 12 months was the primary outcome indicating whether the rate of improvement or deterioration in the PIP group was significantly different from that in the control group. All model parameters for continuous outcome measures are displayed as partial standardized effects. Categorical measures are presented as conditional odds ratios. Complete tables of all modelling results are available on request from the authors.

Results

Baseline Comparisons

On the whole, the intervention and control groups were well-matched on most baseline characteristics (see Table 1). The only exceptions were that more families in the PIP group than in the control group were living in temporary or overcrowded accommodation, $\chi^2(1) = 5.33, p = .021$, and overall the families in the PIP group were experiencing a greater number of social difficulties than those in the control group, $t(74) = -2.07, p = .042$. All analyses controlled for this asymmetry by including the total number of social exclusion criteria as a covariate in the models. The age of the infant was also included as a covariate to eliminate any confounding influence of infant age on the outcome variables.

Primary Outcome: Infant Development

Analyses of all outcomes were based on the sample of 76 dyads. The mean scores for the BSID, the primary outcome measure, for all time points are displayed in Table 3 and the results of the analysis are presented in Table 4. Coefficients for the best-fitting model include random intercept and linear slope, group and time \times group interaction. There was a marginal effect of time on the Cognitive scale ($p = .07$), with infants performing slightly better on this scale at the end of the trial. However, there were no other significant main or interaction effects on any of the subscales.

(Insert Tables 3 and 4 here)

Secondary Outcomes

Parent–Infant Interaction:

As shown in Tables 3 and 4, none of the measures of parent–infant interaction demonstrated any treatment group effects. Neither the time nor the time \times group interaction was statistically significant. None of the individual EA subscales, which are not shown, yielded any time or time \times group interactions greater than chance.

Infant Attachment:

The results of the SSP classifications by group at the 12 month follow-up are presented in Table 3. Although there were proportionally more infants in the PIP group who were classified as secure at T3 compared to the control group, the difference on the three-way classifications was not statistically significant, $\chi^2(2) = .993, p = .609$. Similar proportions of infants in both groups were classified as disorganized, and the difference between groups was not significant, $\chi^2(2) = .052, p = .820$.

Parental Representations:

Table 3 also displays the mean ratings of the PDI on the RF and ARR rating scales, and the results of the analyses are presented in Table 4. Although maternal RF increased slightly over time, this did not reach statistical significance and there was no indication of interaction with group effects. The PDI scored on the ARR scale indicated a significant reduction of representational risk in the PIP group but not in

the control group ($p = .005$). The primary contributors to this effect were the Helplessness and, to a lesser extent, Hostile subscales, which showed differential rates of reduction between the groups, favoring the PIP-treated group ($p = .001$ and $p = .051$, respectively).

Two parent-reported questionnaires captured the mothers' representations of the baby and their relationship: the PSI:SF and the MORS (see Tables 5 and 6). For the PSI:SF, mothers in the PIP group reported lower levels of parenting stress over time relative to the mothers in the control group ($p = .018$). The subscale for which this effect was most pronounced was the Parent-Child Dysfunctional Interaction scale ($p = .031$), indicating substantial reductions in perceived relational difficulties between the PIP-treated mothers and babies. The MORS comprises two subscales and the group \times time interaction effects were marginally significant for both of these: Invasion ($p = .051$) and Warmth ($p = .095$). The trend on this measure was that mothers in the PIP treatment group felt less of a sense of invasion and more feelings of warmth towards their babies over time and relative to the control group.

Maternal Mental Health:

There were several significant time \times group interaction effects on the measures of maternal emotional wellbeing. The mean scores for the CES-D, Mastery Scale, and BSI are shown in Table 5, and the results of the analyses of these outcome measures are shown in Table 6. Relative to mothers in the control group, mothers in the PIP group reported superior improvements over time in terms of their depressive symptoms on the CES-D ($p = .002$) and their overall sense of mastery ($p = .006$).

There was a marginally significant group \times time interaction for maternal general psychological wellbeing as indicated by the GSI of the BSI ($p = .059$).

Parent-Reported Child Social-Emotional Functioning:

The mean ASQ:SE scores and the results of the analysis of this measure are presented in Tables 5 and 6, respectively. The results indicated no main or interaction effects on this measure, indicating no significant changes over time or between the groups over time.

Discussion

This study provided new insights into the outcomes of PIP for mothers and infants with complex mental health, social, and relational difficulties.

There were no significant improvements, nor was there a more rapid rate of improvement in the group assigned to PIP in terms of child development and parent-child interaction. Contrary to prediction, the PDI did not reveal more rapid improvements in parental reflective functioning associated with the PIP intervention, although there was some improvement in RF in both groups. However, maternal representations did improve in the PIP group. These mothers demonstrated less helpless and hostile representations in relation to the child over time- an improvement that was not found for the mothers in the control group.

Parent-report measures also suggested a significant change in maternal representation of the child, favoring the group receiving PIP. The sense of being invaded by the infant decreased somewhat more rapidly for mothers in the PIP group than those in the control group. The mothers in the PIP group also tended to report a greater sense of warmth toward their babies. The general level of parenting stress decreased significantly in the PIP group, associated with a decrease in parent-reported dysfunctional interactions.

Several measures indicated that the mothers attending PIP were reporting improved emotional functioning at the end of treatment and at follow-up. This was highly significant for depression and maternal sense of mastery and marginally significant for global psychological functioning as measured by the GSI of the BSI. Thus, there appears to be a clear impact of the PIP treatment on the mothers' emotional wellbeing.

There were no significant changes over time or between groups in the primary outcome domain, infant development. However, there were highly convincing treatment effects on the mothers' mental health. The combined effects of social adversity and maternal depression have been shown to impinge on child development (Murray, et al., 1996). For this particular sample, the alleviation of maternal emotional distress may provide some buffer for later cognitive and language impairments. It may be that the follow-up period was too short to detect such an effect.

The lack of significant treatment effects on the infants' attachment behavior in the SSP was contrary to the results of a recent meta-analysis of psychoanalytic parent-infant psychotherapy (Barlow, et al., 2015), which suggested likely treatment benefits in this domain. However, it is important to emphasize that in the current study infant attachment was only assessed cross-sectionally at the 12 month follow-up. Causality in relation to the treatment cannot be inferred since we have no pre-treatment measure. Since we were unable to control for pre-treatment differences in infant attachment classification, the results are less trustworthy than evidence provided by the other measures in this trial.

The meta-analysis by Barlow and colleagues (2015) did not find any treatment effects of PIP on the quality of parent–infant interactions. This finding was confirmed by the current study. Indeed, even when studies have reported some positive PIP treatment effects on parent–infant interactive behavior, these effects are modest and tend to relate to only some aspects of the behavioral interactions (Salomonsson & Sandell, 2011). By contrast, studies evaluating more active behavioral interventions or combinations of video guidance and psychological therapies have tended to find clear benefits in terms of child attachment behavior and parent–child interactions

(Bakermans-Kranenburg, et al., 2003), although even these effects are smaller in socially disadvantaged samples such as this one (Fukkink, 2008).

The success of video feedback interventions in targeting parental behavior and of PIP in changing maternal mood and representations of the child suggests that a mixed method may be more effective in addressing behavioral and representational levels in tandem. Some PIPs already use video feedback alongside the standard psychoanalytic/attachment methods (Jones, 2006; Woodhead, Bland, & Baradon, 2006), although have not yet been a subject of investigation.

The absence of any treatment impact on the RF scale of the PDI is surprising, given that the therapy focuses a great deal on the mothers' capacity for mentalizing. The lack of a substantial impact on RF suggests that the current implementation of PIP may not generate measurable improvements in RF for this group. It is possible that this is due to an insensitivity of the measure. Similar non-significant RF findings for other mentalizing-focused parenting treatments have been reported from other recent research, despite treatment effects on other measures (Sadler et al., 2013). The baseline level of RF was surprisingly high in the current sample and most narratives reflected the mothers' concern for the children's psychological states and an awareness of the impact of their own psychological wellbeing on the children. The RF coding pays attention to the use of mental state language in narratives (Slade, Bernbach, et al., 2004) and, for this particular sample of distressed mothers, the interviews were laden with affective state language. Although the use of many mental state words without demonstrating the ability to reflect on these would not qualify for the highest RF ratings, these sorts of interviews would also not qualify for very low RF scores. Thus, the RF measure may be insensitive to treatment change in samples of distressed mothers seeking emotional support, in contrast to high-risk samples of

mothers who idealize their baby and the mother–infant relationship and tend to have very concrete representations (Sleed, Baradon, & Fonagy, 2013).

Although the overall level of RF did not increase significantly, there were qualitative changes, which the RF instrument currently does not measure. The ARR coding of the same interview material indicated a real shift in how the mothers in the PIP group, relative to the control group, talked about their babies. PIP appeared to selectively benefit mothers' representations of the child, particularly creating a reduced sense of helplessness and hostility in relation to their babies. Parental hostility has, unsurprisingly, consistently been associated with poor long-term outcomes for children in a number of longitudinal studies (Cote, Vaillancourt, LeBlanc, Nagin, & Tremblay, 2006; Franz, McClelland, & Weinberger, 1991; Franz, McClelland, Weinberger, & Peterson, 1994; Sears, Maccoby, & Levin, 1957; Tremblay et al., 2004). Similarly, helplessness has been described by several theorists as a correlate of inadequate attachment relationships (George & Solomon, 2008; Lyons-Ruth & Jacobvitz, 2008; Lyons-Ruth, Yellin, Melnick, & Atwood, 2005). Feelings of helplessness may stem from the parent's own attachment history, or they might evolve out of a cycle of repeatedly ineffective interactions between the parent and infant, whereby each dyadic partner's responses to the other do not result in any satisfaction of their respective attachment and caregiving needs (Goldberg, 1977). At more extreme levels, helplessness has been implicated in child maltreatment (Bugental, Blue, & Cruzcosa, 1989). Thus, the findings in relation to the content of the mothers' narratives about their babies may indicate encouragingly positive outcomes of the PIP treatment. The therapy may be particularly effective in validating the mother's sense of competence in her caregiving role and in shifting her attributions of negative intent in the baby to a more benign understanding of his/her

behavior. The level of narcissistic representations was not impacted by PIP, although baseline levels of such representations were low for this sample of mothers.

Overall, outcomes on several measures provide evidence for the value of PIP in changing the maternal experience of the child. Mothers receiving PIP felt less helpless, less intruded upon, more in control, and generally less stressed by their childcare responsibilities. PIP seemed to be effective in reducing depression and psychological distress. Given the level of psychiatric and psychological attention received by the control group, the greater change observed in the PIP group may be linked to the presence of the baby in the treatment setting. It has been argued for postpartum depression that the centrality of the baby in the etiology of the disorder can mean that treating the mother and baby together amplifies the value of psychotherapy (Nylen, et al., 2006).

There are important limitations to the current study that suggest caution in terms of drawing conclusions about the effectiveness of PIP. First, the sample was small and the trial was powered to detect medium effect sizes between the groups. There was some attrition from both arms of the trial, particularly the control group (18% and 32% in the PIP and control groups, respectively). Attrition was selective, with younger mothers more likely to fail to remain in the study. The findings are inconclusive in relation to the acceptability of PIP to this group, which places a question mark over the generalizability of the findings to this particular group of parents. A significant proportion of the participants randomized to the PIP arm of the trial attended only one or no sessions ($n = 7$, 18%) and more than one-third of the dyads assigned to PIP attended fewer than five sessions ($n = 14$, 37%). When the individuals who did not attend any sessions were excluded from the analysis, the results were not materially different from those reported when following the intent-to-

treat approach to the analysis. Nonetheless, the fact that many dyads in the treatment arm received very little therapeutic input may dilute the treatment effects for those mothers and babies who engaged successfully in the treatment. Further research is needed to examine the findings for different subgroups of participants in the sample to disentangle treatment effects at a more individual level. Additional mixed-methods analyses of the data from this study are planned to investigate this further.

The measures of mother–child interaction, although valid and reliable, may not have offered the clinical sensitivity required to show the impact of PIP. Measures such as overall ratings of sensitivity may not be able to capture subtle changes in parent–child interaction that are restricted to particular interactional contexts that are the focus of PIP. Video interaction guidance, by contrast, which directly addresses the parents’ behavior, is likely to have a more direct impact and be more reactive to intervention effects and measurement with global ratings. The assessment of infant development, using the BSID, failed to capture significant developmental delays, although the variability of children across the sample was surprisingly high, with precocious development in some and marked delay in others. Thus, treatment effects may have been masked by this variability.

A further major limitation was the absence of blind assessments. Whilst all recordings were coded blind to treatment allocation, the personnel collecting the data could not be adequately blinded and this could have biased the way in which data were collected. However, given that findings on the observational measures were negative, this appeared not to be a major source of concern. The significant improvements emerged from mothers’ reports and, as is the case with all other trials of this kind (Barlow, et al., 2015), those participating could not be blinded to treatment allocation.

Many psychotherapeutic interventions require relatively long follow-up periods to show substantial treatment effects because the termination of a treatment evokes attachment feelings, which can negatively impact upon wellbeing and social adjustment. The present trial had a 1-year follow-up, which may have been too short to generate the so-called “sleeper effects” observed in some studies (Sandell, 2012). In particular, it could be argued that the improved mood of the mothers observed in the trial will take time to feed through to their infants and to the development of the young children. More time may be necessary before the effect of a less depressed mother can translate to improved infant development and infant–parent interaction.

Although this trial did not find evidence that PIP could change maternal behavior towards the child or the child’s development and interactive and attachment behavior, there was considerable evidence that PIP is a successful means of improving maternal mood and maternal representations of the child, which may have positive long-term consequences for infant development. However, further evidence will need to be gathered from future investigations to confirm these findings.

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Table 1. Demographic data for the intervention and control samples

	Control Group			Intervention Group			Intervention vs. Controls	
	N = 38			N = 38				
	Range	Mean	sd	Range	Mean	sd	t (df)	p
Maternal Age (years)	19-41	31.2	5.9	21-41	31	6.2	.429 (74)	.669
Infant Age (months)	0.6-10	3.8	3.0	0.5-11	3.9	3.2	-.119 (74)	.905
	N	%		N	%			
							X ² (df)	p
Infant gender: Male	23	61%		25	66%		.226 (1)	.634
Maternal ethnicity: White	22	58%		26	68%		.905 (1)	.342
Maternal parity: First time mother	24	63%		26	68%		.234 (1)	.629
Maternal education: Higher education	21	55%		14	37%		2.60 (1)	.107
Maternal social exclusion criteria:								
Low income household	15	40%		23	61%		3.37 (1)	.066
Long-term unemployed	10	26%		10	26%		.000 (1)	1.00
Temporary/crowded accommodation	6	16%		15	40%		5.33 (1)	.021
Single parent household	14	37%		14	37%		.000 (1)	1.00
Chronic illness or physical disability	2	5%		4	11%		.724 (1)	.395
Childhood foster/institutional care	0	0%		1	3%		1.04 (1)	.308
Social isolation (recent relocation)	11	29%		16	42%		1.44 (1)	.231
Less than 20 years of age	2	5%		0	0%		2.05 (1)	.152
Previous diagnosis of psychiatric illness	25	66%		26	68%		.060 (1)	.807
	Mean	sd		Mean	sd			
Number of social exclusion criteria met	2.2	1.3		2.9	1.4		-2.07 (74)	.042
	Mean	sd		Mean	sd		t (df)	p
Maternal nonverbal IQ	106.3	11.7		102.0	10.3		.641 (57)	.524
Maternal GHQ score	13.9	5.9		12.5	6.3		1.014 (74)	.314

Table 2. Service use by PIP and control parents and infants prior to randomisation and during the study period

Service	Baseline (6 months prior to randomisation)			6 month follow-up (first 6 months of treatment)			12 month follow-up (second 6 months of treatment)		
	PIP	Control	t value	PIP	Control	t value	PIP	Control	t value
Health services: Mean (sd) appointments									
General Practitioner	4.6 (3.3)	4.6 (5.3)	.02 (ns)	5.2 (4.0)	2.9 (2.7)	-2.50*	4.1 (3.4)	3.2 (4.1)	-.87 (ns)
Health visitor (clinic)	2.7 (3.0)	2.5 (4.3)	-.22 (ns)	2.1 (2.0)	2.4 (3.4)	.32 (ns)	1.1 (1.8)	0.6 (0.9)	-1.31 (ns)
Health visitor (home)	1.8 (1.2)	1.7 (2.8)	-.15 (ns)	0.6 (1.1)	0.9 (2.4)	.59 (ns)	1.5 (6.2)	0.4 (1.0)	-.87 (ns)
Paediatrician	0.8 (1.0)	0.5 (1.2)	-.97 (ns)	0.2 (0.5)	0.3 (0.6)	.19 (ns)	0.2 (0.5)	0.1 (0.5)	-.31 (ns)
Midwife	3.9 (4.9)	3.3 (3.5)	-.57 (ns)	0.5 (2.1)	0.1 (0.3)	-1.02 (ns)	0.0 (0.0)	0.1 (0.3)	1.45 (ns)
Mental health services: Mean (sd)									
Counsellor	2.7 (6.2)	3.8 (9.6)	.57 (ns)	2.4 (6.5)	2.1 (6.0)	-.13 (ns)	1.6 (6.0)	3.6 (8.5)	.95 (ns)
Psychiatrist	1.6 (3.2)	3.8 (9.2)	1.27 (ns)	1.4 (2.1)	1.0 (2.0)	-.73 (ns)	0.3 (0.9)	2.5 (5.8)	1.75 (ns)
Community mental health team	2.3 (5.5)	2.8 (10)	.22 (ns)	1.4 (5.0)	0.6 (2.9)	-.80 (ns)	0.2 (0.8)	1.5 (5.5)	1.06 (ns)
Psychologist	0.4 (1.8)	2.0 (9.1)	1.00 (ns)	3.1 (7.8)	0.9 (2.5)	-1.39 (ns)	0.5 (2.3)	1.1 (5.3)	.57 (ns)
Psychotherapist	0.3 (1.1)	1.8 (9.1)	.97 (ns)	4.9 (7.4)	0.8 (3.8)	-2.54*	6.1 (15.1)	1.1 (5.3)	-1.62 (ns)
Social Support services: Mean (sd)									
Social worker	1.8 (4.4)	2.4 (9.2)	.30 (ns)	0.9 (2.0)	0.5 (1.4)	-1.00 (ns)	1.0 (3.4)	1.0 (2.4)	-.05 (ns)
Housing Officer	1.7 (4.8)	0.3 (1.3)	-1.59 (ns)	0.4 (1.0)	0.3 (0.7)	-.69 (ns)	0.4 (1.3)	0.3 (0.8)	-.34 (ns)
Citizen's Advice Bureau	0.4 (0.9)	0.2 (0.7)	-1.25 (ns)	0.4 (0.8)	0.2 (0.5)	-1.05 (ns)	.04 (.19)	.18 (.50)	1.30 (ns)
Family Support Worker	0.8 (3.6)	0.3 (1.1)	-.67 (ns)	0.1 (0.4)	0.2 (0.5)	.82 (ns)	1.3 (4.9)	0.0 (0)	-1.35 (ns)
Community support group	6.3 (31.3)	0.1 (.04)	-1.1 (ns)	0.0 (0)	1.8 (5.5)	1.74 (ns)	0.3 (1.5)	1.2 (5.1)	.88 (ns)
Home visiting volunteer/ voluntary organisation	0.8 (4.1)	0.6 (2.2)	-.31 (ns)	1.1 (4.9)	0.9 (2.9)	-.17 (ns)	3.0 (12.0)	0.05 (0.2)	-1.31 (ns)
Telephone helpline	0.1 (0.4)	0.3 (1.0)	1.06 (ns)	0.1 (0.3)	0.1 (0.4)	.35 (ns)	0.1 (0.4)	0.1 (0.4)	.20 (ns)

Table 3. Outcomes by treatment assignment for the externally rated measures

	Baseline		6 Month follow-up		12 Month follow-up	
	Control	PIP	Control	PIP	Control	PIP
Bayley Scales: Mean (SD)	n = 38	n = 38	n = 30	n = 31	n = 25	n = 28
Cognitive scale	104.3 (11.0)	102.8 (9.0)	102.8 (11.4)	103.5 (11.9)	110.8 (15.0)	104.6 (12.2)
Language scale	96.3 (9.8)	96.1 (10.2)	91.2 (14.4)	95.1 (13.0)	93.4 (16.8)	92.6 (11.5)
Motor scale	100.8 (11.3)	98.8 (13.3)	98.5 (14.6)	96.5 (13.3)	106.9 (15.8)	107.0 (14.2)
Parent-Infant Interaction: Mean (SD)	n = 28	n = 32	n = 21	n = 27	n = 20	n = 26
CIB dyadic attunement	44.6 (6.1)	44.2 (6.4)	46.7 (5.5)	45.1 (7.5)	47.7 (5.6)	47.4 (6.9)
CIB parent positive engagement	19.9 (3.7)	20.7 (3.9)	20.4 (3.4)	20.3 (4.0)	21.3 (2.9)	21.5 (3.5)
CIB child involvement	16.8 (5.0)	17.1 (4.8)	22.1 (3.0)	21.8 (2.4)	24.1 (3.0)	24.4 (3.1)
EA Summary	25.0 (5.8)	24.7 (5.9)	26.1 (5.9)	25.6 (5.1)	28.1 (5.6)	27.3 (5.7)
PDI ratings: Mean (SD)	n = 38	n = 37			n = 26	n = 32
Parental RF	3.8 (1.1)	4.2 (1.5)			4.3 (1.4)	4.8 (1.6)
ARR Total	22.1 (6.4)	24.9 (6.7)			22.4 (5.5)	21.2 (4.9)
ARR Hostile	10.7 (4.4)	11.1 (4.1)			10.9 (3.6)	9.7 (3.4)
ARR Helpless	6.5 (2.3)	7.9 (2.7)			6.6 (2.4)	6.0 (1.9)
ARR Narcissistic	3.1 (1.1)	3.5 (1.8)			3.2 (1.2)	3.6 (1.4)
SSP Infant Attachment						
Secure: n (%)					17 (68%)	22 (76%)
Insecure-resistant: n (%)					4 (16%)	3 (10%)
Insecure-avoidant: n (%)					3 (12%)	4 (14%)
Disorganized: n (%)					4 (16%)	4 (14%)
Insecure and/or disorganized: n (%)					9 (36%)	10 (35%)

Table 4. Results of multilevel random linear regression for the externally assessed outcome measures

	Wald Statistic		Rate of change (slope) of individual trajectory ($\exp\beta_k$) for pre vs. post tests			
			Change over time (95% CI)		Group effect over time (95% CI)	
	χ^2 (DF = 6)	p <	Coefficient	p <	Coefficient	p <
Bayley Scales of Infant Development						
Cognitive Scale	14.93	.011	4.34 (-0.2; 8.9)	.064	-2.00 (-5.8; 1.8)	.308
Language Scale	9.20	.101	.06 (-5.0; 5.1)	.980	-.01 (-3.8; 3.8)	.994
Motor Scale	10.74	.057	2.54 (-3.2; 8.3)	.385	.77 (-3.5; 5.0)	.722
Parent-Infant Interaction						
CIB dyadic attunement	17.03	.004	2.41 (-0.5; 5.3)	.101	.01 (-1.9; 2.0)	.996
CIB parent positive engagement	10.47	.063	.34 (-1.3; 1.9)	.679	-.28 (-1.3; 0.7)	.569
CIB child involvement	138.74	.000	1.24 (-0.4; 2.9)	.142	.14 (-1.2; 1.5)	.833
EA Summary	13.44	.020	1.84 (-0.7; 4.4)	.162	-.31 (-2.2; 1.5)	.744
PDI ratings						
Parental RF	15.95	.003	.23 (-.05; 0.5)	.109	.06 (-0.3; 0.4)	.755
ARR Total	14.47	.000	.39 (-2.1; 0.7)	.755	-2.17 (-3.7; -0.7)	.005
ARR Hostile	24.05	.013	.60 (-1.1; 2.3)	.478	-.96 (-2.0; .004)	.051
ARR Helpless	18.42	.000	.22 (-0.8; 1.2)	.666	-1.03 (-1.7; -0.4)	.001
ARR Narcissistic	30.08	.003	.09 (-0.7; 0.5)	.753	.02 (-0.4; 0.4)	.908

Table 5. Outcomes by treatment assignment for the parent-report measures

	Baseline		6 Month follow-up		12 Month follow-up	
	Control	Intervention	Control	Intervention	Control	Intervention
CES-D	n = 31	n = 34	n = 28	n = 28	n = 24	n = 28
Total: Mean (SD)	24.8 (12.9)	26.9 (11.1)	19.8 (13.1)	17.2 (12.6)	22.4 (15.0)	15.1 (8.5)
Caseness: N (%)	23 (74%)	28 (82%)	16 (57%)	14 (50%)	14 (58%)	13 (46%)
BSI Mean (SD)	n = 28	n = 34	n = 26	n = 28	n = 23	n = 28
Positive Symptom Total	49.0 (10.9)	49.1 (10.7)	44.5 (14.3)	42.9 (11.8)	48.0 (13.4)	42.1 (9.9)
Positive Symptom Distress Index	44.9 (11.7)	45.6 (10.9)	40.2 (12.8)	40.3 (12.1)	42.4 (10.7)	37.7 (9.5)
General Severity Index	47.5 (11.5)	47.8 (11.1)	42.2 (13.0)	41.8 (12.7)	45.6 (12.6)	39.7 (9.3)
Mastery Scale: Mean (SD)	n = 27	n = 34	n = 26	n = 28	n = 23	n = 28
MMS Total	30.9 (8.6)	27.8 (5.8)	30.1 (8.9)	30.4 (8.5)	29.0 (8.3)	32.2 (6.6)
Parenting Stress Index: Mean (SD)	n = 30	n = 34	n = 27	n = 28	n = 23	n = 28
Total Stress	86.4 (19.0)	90.4 (18.9)	83.3 (20.3)	79.1 (19.8)	79.1 (18.9)	88.2 (25.5)
Parental Distress	36.8 (9.5)	39.8 (8.8)	34.9 (9.7)	34.1 (7.8)	35.6 (10.8)	34.4 (8.7)
Parent-Child Dysfunctional Interaction	23.0 (6.8)	22.8 (6.3)	21.1 (7.7)	19.3 (6.1)	22.6 (8.5)	18.2 (5.6)
Difficult Child	26.7 (7.8)	27.7 (9.0)	27.3 (9.2)	25.8 (8.9)	30.1 (10.4)	26.5 (8.1)
MORS: Mean (SD)	n = 28	n = 34	n = 27	n = 28	n = 24	n = 27
Warmth	24.9 (5.7)	24.0 (7.1)	28.2 (3.7)	29.2 (3.7)	27.5 (3.9)	28.9 (4.5)
Invasion	11.0 (5.9)	11.9 (6.1)	11.0 (5.4)	11.5 (5.7)	12.9 (6.9)	11.5 (3.6)
ASQ:SE: Mean (SD)	n = 21	n = 24	n = 21	n = 17	n = 20	n = 26
Z-score	-.11 (.93)	.10 (1.04)	.23 (1.05)	-.29 (.80)	.04 (.89)	-.03 (1.08)

Table 6. Results of multilevel random linear regression for the parent-reported outcome measures

	Wald Statistic		Rate of change (slope) of individual trajectory (exp β k) for pre vs. post tests			
			Change over time (95% CI)		Group effect over time (95% CI)	
	χ^2 (DF = 6)	p <	Coefficient	p <	Coefficient	p <
CESD	61.08	.000	-2.37 (-7.2; 2.5)	.337	-4.79 (-7.9; -1.7)	.002
Mastery Scale	20.60	.001	.60 (-2.6; 3.8)	.715	2.60 (0.8; 4.4)	.006
BSI						
Positive Symptom Total	37.28	.000	-2.28 (-7.0; 2.5)	.348	-2.62 (-5.5; 0.3)	.074
Positive Symptom Distress Index	33.70	.000	-2.09 (-6.8; 2.6)	.381	-2.58 (-5.5; 0.3)	.081
General Severity Index	41.16	.000	-3.43 (-8.2; 1.3)	.157	-2.88 (-5.9; 0.1)	.059
Parenting Stress Index						
Total Stress	20.93	.001	1.32 (-7.1; 9.8)	.759	-6.16 (-11.3; -1.1)	.018
Parental Distress	21.50	.001	-1.11 (-5.0; 2.8)	.574	-2.22 (-4.7; 0.2)	.076
Parent-Child Dysfunctional Interaction	23.79	.000	.59 (-2.3; 3.5)	.688	-2.11 (-4.0; -0.2)	.031
Difficult Child	5.21	.391	1.93 (-1.9; 5.7)	.319	-1.76 (-3.9; 0.4)	.115
MORS						
Warmth	38.40	.000	-1.70 (-3.8; 0.4)	.121	1.39 (-0.2; 3.0)	.095
Invasion	7.87	.164	.04 (-2.4; 2.5)	.974	-1.46 (-2.9; .01)	.051
ASQ:SE	4.03	.545	.23 (-0.2; 0.7)	.328	-.12 (-0.5; 0.2)	.526

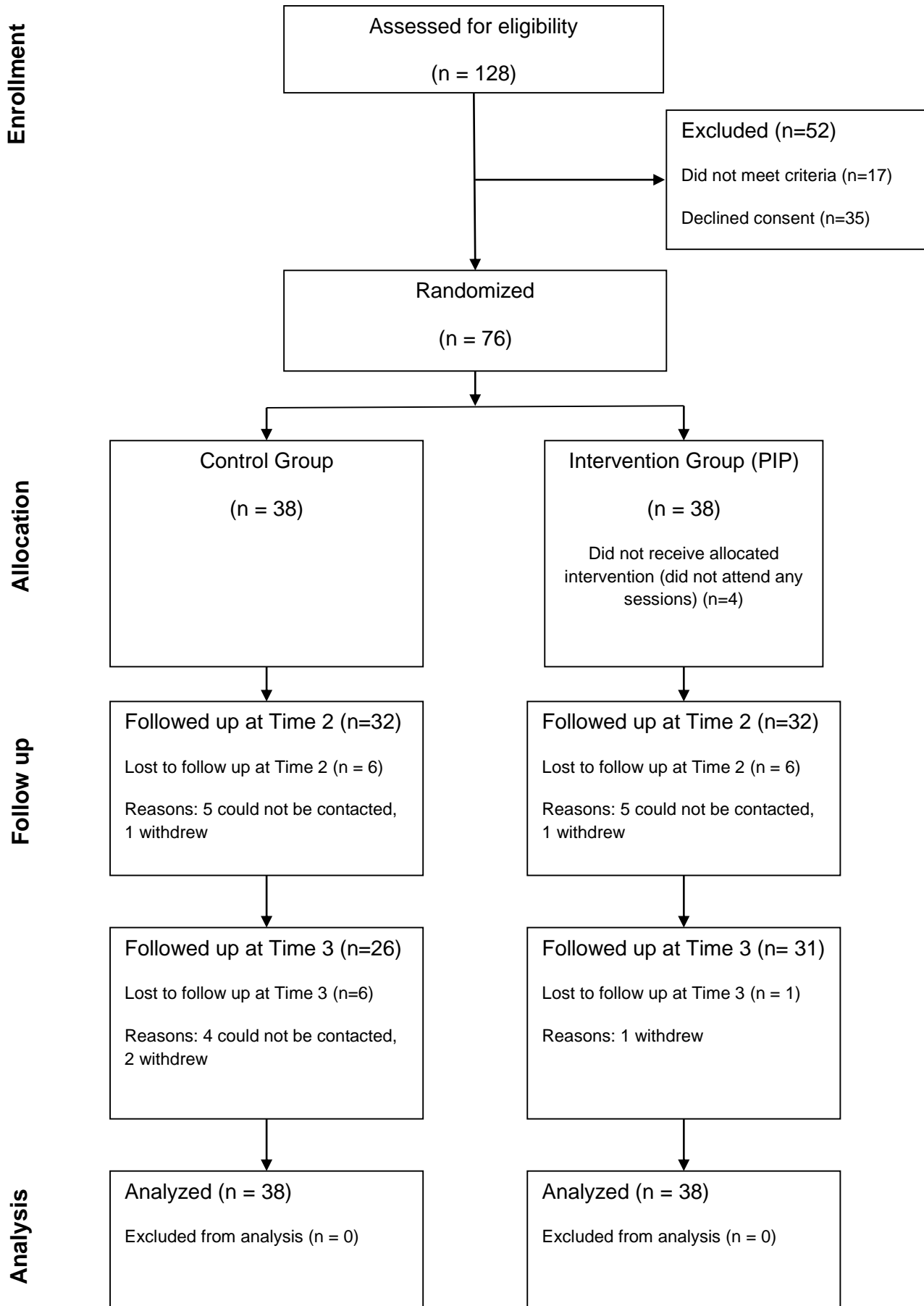


Figure 1. Consort diagram showing flow of participants through trial