Maternal mentalization: do online and offline measures independently predict attachment security?

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Thesis declaration form

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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Overview

This thesis is presented in three parts; the literature review, empirical paper and critical appraisal. The literature review summarises the impact of video feedback interventions on the children involved. Evidence for a positive impact on attachment, behaviour, cognition, language and social functioning was found. Future research requirements included replications with robust research design and adequate power, a focus on consistent ways of conducting video feedback, measuring outcomes and identifying which child and parent populations benefit from this intervention.

The empirical paper also focusses on parent-infant interaction whereby maternal mentalization was explored, particularly the relationship between online and offline measures and whether these independently predict attachment security. Data collection was conducted as part of a joint research project with fellow trainee, Vivien Wong.

Following an analysis of the data it was found that online and offline measures may capture different aspects of mentalizing (explicit vs. implicit). Relationships between the measures of mentalization and infant attachment classification were not as predicted and further research is required.

The critical appraisal reflects on the research project as a whole, and considers issues relating to the literature and clinical paper including the vast variance in video feedback interventions in the literature review, joint working, the challenges in choosing appropriate measures and using pre-existing data, as well as the impact of the thesis upon clinical work.

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Part 1: Literature review

How do video feedback interventions impact the children involved?

Abstract

Aims: Video feedback interventions have been demonstrated to have a positive impact on the parents involved. This literature review examines the impact on children, as this has not been a focus of previous reviews.

Methods: 22 studies published between 1968 and 2013 were identified which had reported the outcomes of children involved in video feedback interventions. No restrictions were placed on the research method used.

Results: The majority of the studies reported positive impacts on children in terms of behaviour, attachment, cognition, language and social skills. This review identified a number of limitations including variations in outcome measures used, populations included, and methodology and design issues.

Conclusions: Video feedback interventions can positively impact children in many areas of their functioning. Future research requirements include replications with robust research design and adequate power, a focus on consistent ways of conducting video feedback, measuring outcomes and identifying which child and parent populations benefit from this intervention.

Introduction

The term "video feedback" is commonly used to encapsulate all interventions in which parents are filmed taking part in family interactions and then watch the recordings back with a therapist. This intervention allows parents to watch themselves, focussing on specific behaviour(s), and see the effect of these on their child.

When video feedback was first studied, the focus was mainly on the effect of watching oneself on the parents (Berger, 1978; Fuller & Manning, 1973; Hung & Rosenthal, 1981), whereby parents pay more attention and are more emotionally involved than they would be when watching videos of other parent-child dyads interacting for instructional purposes (Dorwick, 1999; Papoušek, 2000). Additionally the space for reflection video feedback offers may allow parents to experience, potentially for the first time, discrepancies in the image they had of their interactions with their child and the more objective reality as seen in the video (Fivaz-Depeursinge, Corboz-Warnery, & Keren, 2004; Papoušek, 2000). They may realise that they are already engaging in some positive interactions with their child.

As the technique has been developed protocols have been devised detailing the application of video feedback intervention including how the therapist works when filming, editing recordings and feeding these back to the parent (Dowrick, 1991; Wels, 2004). The situation to be filmed will be specified, which is usually a natural interaction between parent and child, for example during feeding or free-play. The therapist then reviews and edits the recordings by selecting certain clips to play back to the parent, based on the aim of the intervention. The duration of the selected clips is typically short, varying from 30-seconds (Schechter et al., 2006) to 15

minutes (Benoit, Madigan, Lecce, Shea, & Goldberg, 2001). During the feedback session the therapist then reviews these clips with the parent, focussing on specific behaviours, stimulating a discussion. The aim may be to help the parents recognise positive behaviours they are already using, to stimulate reflection about the parent's own or the child's state of mind during the clip, to gain insight into how the parent can improve interactions and to motivate them to do so. The use of positive feedback by the therapist whilst reviewing the clips is central to this intervention as it promotes engagement and the development of a trusting relationship between therapist and parents. It additionally meets the parent's need for support and gives them the confidence that they can (and already are, to some extent) engage in positive interactions with their infant.

There are two main approaches of video feedback interventions which can be extracted from the variety of methods used. Behaviour oriented approaches focus on the interactive behaviour between the parent and child. The video is used to facilitate the focus of attention on behavioural interaction (McDonough, 2005). Psychodynamic approaches also use the video to focus on the parent-child interactions. However, there is an additional focus on the parent's representations of themselves, their child and the relationship between them. The video can also facilitate the parent's access to their own childhood memories (Lieberman, 2004; Zelenko & Benham, 2000). Behavioural and psychodynamic approaches can also be combined within a single intervention (Beebe, 2003; Cramer, 1998; Egeland, Weinfeld, Bosquet, & Cheng, 2000).

Recent reviews and relevant research

Previous qualitative reviews of video feedback intervention outcomes have shown positive behavioural changes (Dowrick, 1999; Hitchcock, Dowrick, & Prater, 2003; Hung & Rosenthal, 1981; Mehard & Woltersdorf, 1990). More recently Bakermans-Kranenburg, van IJzendoorn, and Juffer (2003) conducted a meta-analysis of randomized and non-randomized quantitative studies focussing on the effects of video feedback interventions on parents' sensitivity. They found that video feedback interventions were superior to other interventions in terms of parents' sensitivity, and that there was a small but significant positive effect on the children's attachment security. However, the impact on the child was not the main focus of the review, and in fact only 41% (29/70) of the included studies aimed at attachment security. The combined effect size for attachment security was small but significant ($d = 0.19$, $p < .05$). In addition there was no investigation of the behavioural, cognitive or other social impacts on the children involved in the video feedback interventions.

A more recent review of the outcomes of video feedback intervention with parents was conducted by Fukkink (2008). This meta-analysis of 29 studies focussed on the behavioural and attitudinal outcomes of parents and behavioural outcomes for their children. It was found that parent's skills in interacting with their children, measured by their behaviour, increased following video feedback intervention. Parents also derived more pleasure from parenting, and the number of problems they encountered in parenting decreased. The development of the child also improved following the intervention, presumably due to the improvements in the skills of their parent. This review did not find any difference in the effectiveness of the behavioural oriented interventions in comparison to the psychodynamic approaches, although

Fukkink concluded that interventions which included both behavioural and psychodynamic elements would have superior outcomes. Again the impact of the interventions on the children involved was marginalised in this review. Fukkink states that "The effects (…) were also statistically significant for behaviour measures among the child population" (p. 9), with no further detail of these effects. Additionally Fukkink states that, due to the nature of the studies selected for the review, in which many combined video feedback with various other components of intervention, it is not possible to determine that the results are due to the unique contribution of video feedback.

Current review

In reviewing the literature it was noted that there are a wide variety of different types of video feedback interventions being used clinically at the present time. As there were no presumptions about what the key components of video feedback intervention are, the scope of the review was broadened to include all types of video feedback interventions.

Additionally, the present review aimed to examine the entire field of research on video feedback, rather than solely focus on quantitative studies as in Bakermans-Kranenburg, van IJzendoorn, and Juffer (2003) and Fukkink's (2008) meta-analyses. Therefore it will offer a different perspective on the outcomes of video feedback on children.

In light of the point discussed above, in the current review the focus will be on the impact on the children involved in video feedback interventions. Attachment and behaviour are useful child outcomes, though other outcomes such as cognition, language, and broader social skills are also crucial for children. Therefore the impact

of the intervention on all of these (in addition to any others investigated) will also be considered, where possible. Additionally, only studies in which the unique contribution of video feedback can be extracted from any other interventions will be selected. This should therefore provide a review of the literature concerning the unique impact of video feedback on the children involved.

This review summarises the outcomes of relevant studies and offers comments on their design, methodology, strengths and limitations. Conclusions, limitations and suggested future research will then be summarised.

Method

Search strategy

As discussed above, initial scoping searches identified a previous review of the outcomes of video feedback intervention by Fukkink (2008). This meta-analysis of 29 studies found that parent's skills in interacting with their children increased following video feedback intervention, as did their pleasure derived from parenting, and the number of problems they encountered in parenting decreased.

Studies to be included in the present review were identified by systematically searching 5 databases up to November 2013: Embase, Health and psychosocial instruments, Maternity and infant care, Ovid medline and psycINFO. Electronic searches were based on abstract, title and keywords. In order to capture papers where video feedback was used the search term *video** was combined using the *AND* command with the search terms *training* or *intervent** or *treat** or *playback* or *feedback* or *prevent** or *therap**. The results of this were then combined using the *AND* command with the following search terms, which were used to identify

techniques being used with parent(s) and child: *mother** or *child** or *infant** or *father** or *parent** or *family* or *families* or *toddler** or *baby* or *babies*.

Citation searches of all identified papers and the Fukkink (2008) review were also conducted in order to identify any articles that had potentially been missed during the database searches.

The main criterion was that the intervention video recorded the parent interacting with their biological or adopted child, and the parents then watched back selected clips of this interaction with the therapist. Those with childcare providers (e.g. teachers, child-minders) were excluded from the analysis. Studies using video instruction, where parents watch videos of others performing desired behaviours, rather than being filmed themselves and then watching tapes back (see Black & Teti, 1997; Webster-Stratton, 1994 for examples) were also not included.

Studies had to report on the impact of the video feedback intervention on children, but there was no criterion regarding what type of outcome measures were used (e.g. changes in child behaviour, attachment style etc.). The studies were required to be with humans, published in English, and a full text copy had to be available. The effects of video feedback must be extractable from any other interventions used. Therefore any studies which used a combination of interventions including video feedback, or in which video feedback was only a part of the chosen interaction, were excluded unless the unique impact of the video feedback element of the intervention could be determined.

Studies included in the review

A total of 15099 studies were found in the initial search. When limited to English language only there were 13859 studies remaining. When limited to only

studies with full text available there were 1941 studies remaining. After removing the duplications 1081 studies remained. The titles and abstracts of these articles were read to provisionally check for relevance. The main reasons for exclusion at this stage were that the papers did not describe the outcomes of video feedback interventions or that they described outcomes with childcare providers rather than parents. Following this 78 studies remained which were read in full and the remaining inclusion and exclusion criteria applied. The main reason for exclusion at this stage was that the articles did not discuss clear outcomes of video feedback intervention on children, or that the effects of video feedback could not be extracted from other interventions used in the study. This process left a total of 17 articles. Additional citation and reference list searches revealed 5 further studies for inclusion. Figure 1 details the process of study selection. Table 1 shows a summary of the articles included in this review, including their main findings.

Figure 1: Flow chart illustrating study selection process

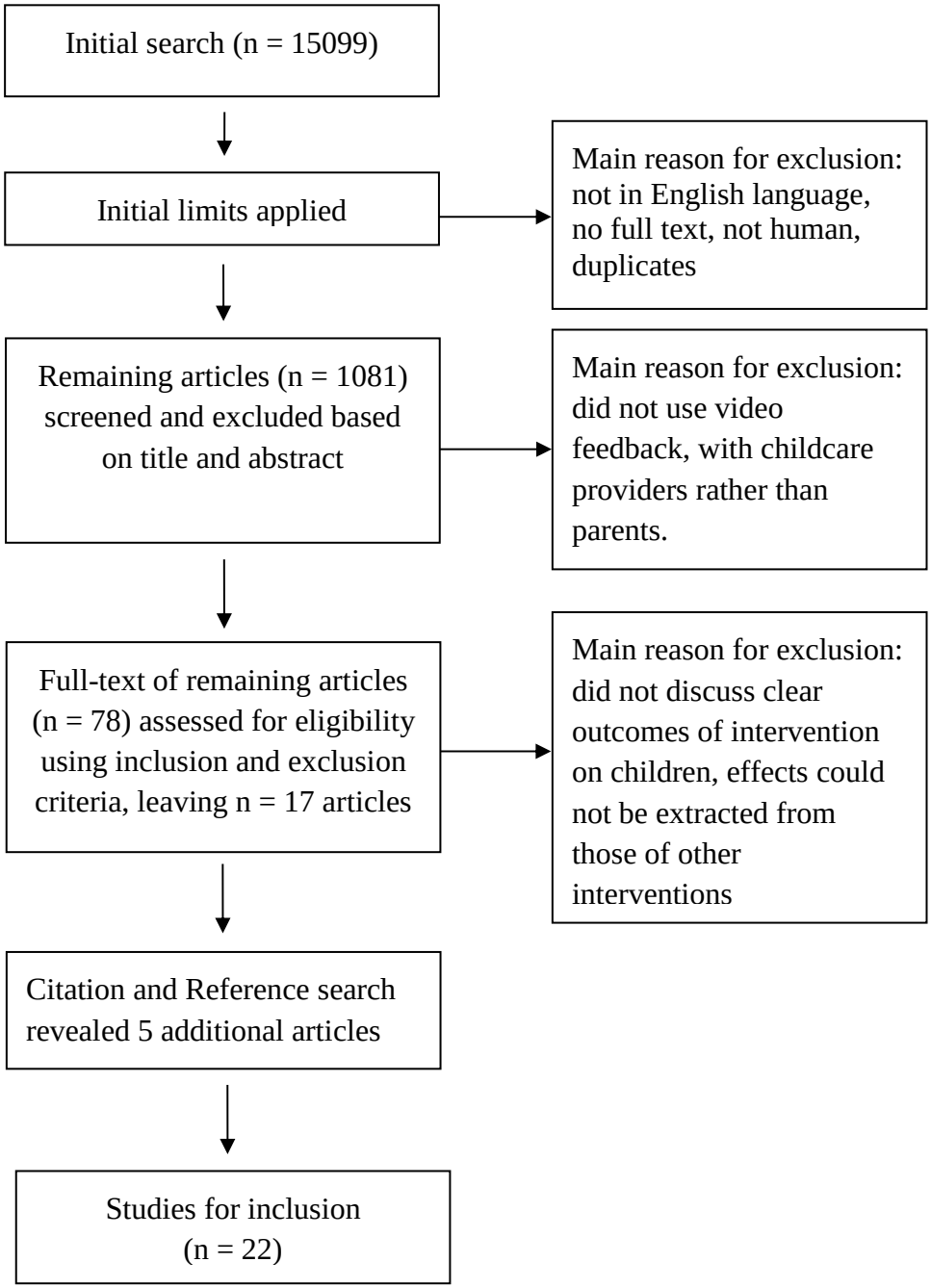


Table 1: Summary of studies included in this review

Authors (year)	Program name	Type of study	Child age (% male)	Sample risk factors	Control Group	Measures	Brief description of results	Limitations
Bakermans-Kranenburg et al. (2008)	VIPP-SD	RCT	1-3 years (55)	Child: Above 75th percentile on child Behaviour Checklist Externalising Problems scale (n=157). Parent: no known risk factors	Yes – telephone calls	Externalising behaviour checklist, DNA for DRD4 allele	Decrease of externalising behaviour (oppositional but not overactive or aggressive) for children with 7-repeat DRD4 allele. Not effective for children without. No significant decrease in control children	Externalising behaviour measured by questionnaire completed by mother, open to bias. Moderate power, so sample was too small to test for mediating factors. Results do not imply immediate practical implications - require more insight into the endophenotypes related to DRD4.
Bakermans-Kranenburg et al. (2008)	VIPP-SD	RCT	1-3 years (58)	Child: Above 75th percentile on child Behaviour Checklist Externalising Problems scale (n=130) Parent: no known risk factors	Yes – telephone calls	Child behaviour checklist, infant characteristics questionnaire, DNA for DRD4 allele, saliva for cortisol	Cortisol level lower after intervention for children with 7 repeat DRD4 allele	No behavioural outcomes, no measure of change in parenting or child rearing environment as mediator of change. Modest power. Only one day of sampling to record baseline cortisol level. Exact timing of recording of cortisol sampling not recorded.

Authors (year)	Program name	Type of study	Child age (% male)	Sample risk factors	Control Group	Measures	Brief description of results	Limitations
Bakermans-Kranenburg et al. (1998)	video & video + discussion	RCT	4 months (n/s)	Child: no diagnosis (n = 30). Parent: Insecure classification on AAI, 8-14 years education	Yes	Strange situation	No difference in proportion of securely attached infants in intervention groups and control	Preliminary results, small sample low power to detect significant interactions.
Beebe (2010)	Video feedback	Qualitative case study	9 months (100)	No known child or parent risk factors (n = 1)	No	Parent and therapist observations and interpretations	More eye contact, took more initiative, increased facial reactivity, more social, better bond with mother.	Single case study so limited generalisability, no formal measures.
Benzies et al. (2013)	Educational-behavioural intervention	RCT	4-8 months (57)	Child: born late pre-term (n = 111). Parent: no known risk factors	Yes – 4 home visits vs 2 home visits vs one home visit with information only	PCITS, PSI-3	No significant differences between intervention and control groups in change in behaviour, although a potential trend towards lower scores in the 4 home visits condition compared to the 2 home visit and control conditions. Although the PCITS Child Total scores increased across all conditions, no statistical analysis on these was reported.	Fathers who were satisfied with their parenting may have been more likely to participate in study. 54.1% had completed university or postgraduate studies. Recruitment was challenging so there was a smaller than planned sample size and so less power. Limited inter-rater reliability.

Authors (year)	Program name	Type of study	Child age (% male)	Sample risk factors	Control Group	Measures	Brief description of results	Limitations
Bernal (1968)	Video tapes reviewed	Single quantitative case study	8.5 years (100)	Child: temper tantrums, social problems (n = 1). Parent: marital difficulties reported	No	Incidents of abuse towards mother, number of commands ignored	In clinic: number of incidents of abuse reduced and number of commands obeyed increased. At home: frequency of general and physical abuse decreased. Stopped wetting himself. Other presenting complaints did not change.	Single case study so limited generalisability.
Colonnesi et al. (2012)	Basic trust	Quantitative	46 months (35)	Child: adopted children referred for conduct problems (n = 20). Parent: no known risk factors	No	Attachment insecurity screening inventory, SDQ, attachment q-sort	Insecurity rated by mothers (not fathers) was lower after intervention. Rate of disorganised attachment lower after intervention. Less conduct problems. Mothers but not fathers of children who spent more time with adoptive parents perceived significantly less peer problems after the intervention.	Positive changes only found using parent report, could be biased. Small sample size limits generalisability of findings and reduces power. Lack of control group means cannot conclude intervention responsible for positive changes. Did not test treatment fidelity.

Authors (year)	Program name	Type of study	Child age (% male)	Sample risk factors	Control Group	Measures	Brief description of results	Limitations
Cummings & Wittenberg (2008)	SET-PC	RCT	26-72 months (67)	Child: referred for externalising behaviour problems - met criteria for ODD or disruptive behaviour NOS (n = 37). Parent: no known risk factors	Yes – incredible years parenting programme	Child behaviour checklist 1.5-5 parent report, Eyberg child behaviour inventory, parent-child structured observation	No differences between the two conditions, both led to decreased externalising behaviour and severity of conduct disorder.	There was lack of adherence to SET-PC in 5 therapists, so it is difficult to separate effects of the treatment from effects of the therapist. IYPP fidelity was not assessed independently. High level of participant attrition led to reduced power, more disadvantaged families dropped out. Children had less severe cases of disruptive behaviour, unclear whether more severe cases would respond as well to SET-P. No wait list control, therefore cannot conclude that the results were caused by either treatment.

Authors (year)	Program name	Type of study	Child age (% male)	Sample risk factors	Control Group	Measures	Brief description of results	Limitations
Feltham-King (2010)	VIG	Qualitative	n/s (20)	Child: prospective adopted children (n = 6). Parent: no known risk factors	No	Parent interview and thematic analysis	Parents rated children as more confident learners and that use of language had been developed.	Results may have been due to getting to know child better - some had not met child at time of first session. No control group. No statistics. No objective measures. Selected sample by social workers. Small sample size.
Haggman-Laitila et al. (2010)	Video home training	Qualitative service evaluation	0-16 years (59)	Child: no diagnosis. Parent: families that need more support than can be offered by child welfare clinics but do not require corrective work (n = 66 family members)	No	Qualitative analysis, self-assessment	Improved condition, better possibilities for being admitted to rehabilitation. Improvement of interactive skills, increase of positive feedback from parents, decrease of defiant attitude, improvement of self-expression skills, improvement of relations between siblings.	Families themselves assessed progress which may be biased towards more positive conclusions than professional assessment. No viewpoint of children and youths - limitation when applying study results in practice.

Authors (year)	Program name	Type of study	Child age (% male)	Sample risk factors	Control Group	Measures	Brief description of results	Limitations
James et al. (2013)	VIG	Case series design x3, quantitative outcomes	9 months – 3 years (66)	Child: profound hearing loss + one gule ear + 1 premature with motor delay, cerebral palsy, visual impairment, developmental delay (n = 3). Parent: no known risk factors	No	Tait assessment, Vineland adaptive behaviour scales, child emotional availability scale	Children were all more responsive and involved, which was maintained at follow-up. All showed eradication of non-responses after intervention, which was maintained at follow-up. There was also a trend for increased autonomy, especially verbal.	Tait measure is not theoretically closely aligned to the theoretical premise of the study. Repetition of Vineland at short intervals is not recommended, not a reliable indicator of development. Difficult to generalise - small sample, specific population. No statistics for statistically significant change.
Juffer et al. (2005)	Book + video feedback	RCT	5-6 months (50)	Child: adopted children (n = 130). Parent: no known risk factors	Yes – book with no video feedback	Strange situation, Dutch temperament questionnaire	Intervention with video feedback (but not book only) was effective at decreasing proportion with disorganised attachment.	May not be generalizable to non-adopted sample. Intervention is not designed to specifically target disorganised attachment.

Authors (year)	Program name	Type of study	Child age (% male)	Sample risk factors	Control Group	Measures	Brief description of results	Limitations
Kalinauskiene et al. (2009)	VIPP	RCT	7 months (52)	Child: no diagnosis (n = 54). Parent: evaluated as having insecure attachment style	Yes – telephone calls asking for information on child's development	Attachment Q sort	No effect on attachment security. No differential effect for more vs less reactive infants.	Selected sample restricts generalizability. Small sample so low power for detecting interactions. Normal range of attachment security. Did not measure disorganisation.
Klein Velderman et al. (2006)	VIPP and VIPP-R	RCT	6 months (n/s)	Child: no diagnosis (n = 81). Parent: Insecure mothers, 8-14 years education	Yes	Strange situation, Infant Behaviour Questionnaire	No difference in number of children who developed secure attachment in control vs. intervention. Number of secure in both intervention groups was not higher than in the control. Effectiveness of 2 interventions did not differ. Infants of intervention mothers who showed more increase in sensitivity were more securely attached. Findings were not due to differences in pre-test sensitivity between mothers of high and less reactive infants.	Inadequate power for some intervention effects. Infant Behaviour Questionnaire not as reliable and valid as an observational measure which would lead to stronger results and less error variance. Selection of mothers on basis of AAI audiotape may not be valid, meaning a lower possibility for improvement in maternal sensitivity and infant attachment security.

Authors (year)	Program name	Type of study	Child age (% male)	Sample risk factors	Control Group	Measures	Brief description of results	Limitations
Lawrence et al. (2013)	VIPP	Qualitative pilot study	6-15 months (40)	Child: no diagnosis (n = 5). Parent: no known risk factors	No	Infant characteristics questionnaire	Ratings of difficult temperament decreased.	Small sample so low power, fathers from non-clinical population might not generalise to clinical settings. Lack of control group. No observational measures.
Mendelsohn et al. (2005)	Video intervention project	RCT	2 weeks (n/s)	Child: no diagnosis (n = 93). Parent: low education	Yes	Bayley scales of infant development, Preschool Language Scale-3 + semi structured assessments	VIP had an effect on MDI in comparison to control but not on PSI-3. There was a group x maternal education effect for expressive language, but not for receptive. When stratified by maternal education:	33% loss to follow-up. No way to prove differential follow-up did not account for the results. may have been systematic differences in the characteristics of control and intervention children.
Mendelsohn et al. (2007)	Video intervention project	RCT	2 weeks (62)	Child: no diagnosis (n = 99). Parent: low education	Yes	MDI of Bayley scales of infant development-second edition, preschool language scale-3), Child behaviour checklist. Eligibility for EI services.	VIP children more likely to have normal cognitive development and less likely to have developmental delays after intervention. No differences for language, behaviour or EI eligibility. Differences more apparent for mothers with 7-11th grade education.	Limited power. 40% of children in each group had speech therapy, which may explain lack of effect on language. Differential loss at follow-up could account for the findings.

Authors (year)	Program name	Type of study	Child age (% male)	Sample risk factors	Control Group	Measures	Brief description of results	Limitations
Moran et al. (2005)	Krupka method	RCT	6 months (49)	Child: no diagnosis (n = 99). Parent: adolescent	Yes – one home visit rather than 8	Strange situation	More secure attachment in intervention group than control at 12 months. No impact on likelihood of developing disorganized attachment.	Small sample size leading to low power.
Sossin & Cohen (2011)	Video feedback	Qualitative case study	6 months + (n/s)	Child: no diagnosis, but father killed in Sept 11th (n = 1) Parent: partner killed in Sept 11th	No	Parent and therapist observations and interpretations	No longer insisted on sitting in fathers chair - found new sense of comfort	Single case study, low generalizability. No formal measures.
Van Zeijl et al. (2006)	VIPP-SD	RCT	1-3 years (56)	Child: above 75th percentile on Dutch Child behaviour Checklist for ages 1.5-5 externalising problems scale (n = 237). Parent: no known risk factors	Yes – telephone calls regarding general development of child	Infant characteristics questionnaire, Child behaviour Checklist for ages 1.5-5	Overactive child behaviour decreased, especially in families with more marital discord and daily hassles. Change in maternal attitudes and change in sensitive discipline behaviours did not mediate change in children's overactive problem behaviour.	Only 6 sessions so effectiveness may have been restricted to less severe problem behaviours. Larger sample needed to assess mediational processes. Age homogeneous sample hard to tell whether timing of intervention is important. High SES families, non-Caucasian excluded.

Authors (year)	Program name	Type of study	Child age (% male)	Sample risk factors	Control Group	Measures	Brief description of results	Limitations
Wadnerkar et al. (2012)	VIG	Quantitative case study	11 years (0)	Child: cerebral palsy, age appropriate cognitive skills (n = 1). Parent: no known risk factors	No	Unstructured interviews. Coded eye gaze pre and post. ACC, intelligibility of vocalisations, signing, nodding, pointing, looking at mum.	Parents viewed child as more confident and effective and explored responses of listener more. Increased flexibility at school. Eye gaze frequency did not change but duration increased. Increase in AAC communication and nodding. Slight increase in signing and pointing. Decrease in unintelligible vocalisations and intelligible communication.	Classifying utterances as intelligible or unintelligible is subjective, therefore less sure about interpretation of changes in these. Single case limits generalisability.
Weiner (1994)	Orion project	Quantitative	n/s (n/s)	Child: no diagnosis (n = 178). Parent: on welfare, disadvantaged neighbourhood, struggling to cope with children.	Yes	"Child well-being"	Reduction in miserable / unhappy looking children, which was sustained 6 months after program completion. Gain in overall index of child well-being for Orion, not in controls.	Participants not randomised. Control families functioning better at T1. Observers aware of group assignment, so observations biased and study design less rigorous.

Results

Results of the search

Twenty two relevant studies were found for this review; see Table 1 for the characteristics of the included studies. There were many variations of video feedback intervention used in these 22 studies, which are summarised in Table 2. Additionally there was a variety in age of the children included (2 weeks – 16 years) and child and parental risk factors, which will be considered in the discussion of the results below.

The critical appraisal tool used in the present review was by Downs and Black (1998). This helped to assess the quality of the articles and to synthesise the evidence in terms of overall study quality, external validity, study bias in the intervention and outcome measure(s), confounding and selection bias and power of the study. Critical appraisal scores are shown in Table 3.

Studies of behavioural outcomes

Study characteristics

Eight of the included studies investigated a behavioural outcome, using a variety of different video feedback interventions, see Table 2. A variety of measures of behavioural outcome were used by the studies included, see Table 1.

Two of the included studies reported outcomes on populations of children with no clinical or medical diagnoses and no reported problems (Mendelsohn et al., 2007; Sossin & Cohen, 2011). Five of the studies reported outcomes on children who had externalising behaviour or conduct problems (Bakermans-Kranenburg, Van IJzendoorn, Pijlman, Mesman, & Juffer, 2008; Bernal, Duryee, Pruett, & Burns, 1968; Colonnesi et al., 2012; Cummings & Wittenberg, 2008; Van Zeijl et al., 2006).

Table 2: Intervention specifications

Authors (year)	Intervention	Duration	Number of sessions	Session length (minutes)	Follow-up period	Brief overview	Mechanism of change
Bakermans-Kranenburg et al. (2008)	Video-feedback Intervention to promote Positive Parenting and Sensitive Discipline (VIPP-SD)	8 months	6	90	1 year	Video: mother-child interactions. Feedback: according to parental education themes to stimulate sensitive interaction skills + sensitive discipline.	Parental representations of attachment determine parental responsiveness which affects the parent-infant relationship. Restructuring thoughts and feelings about attachment through discussion and relationship with the therapist leads to change in attachment representations. Although sensitive parental responses were enhanced, there were no differences in infant attachment classification between groups.
Bakermans-Kranenburg et al. (2008)	VIPP-SD	8 months	6	90	n/a	Video: mother-child interactions. Feedback: according to parental education themes to stimulate sensitive interaction skills + sensitive discipline.	Caregiver sensitivity leads to hyporesponsive neuroendocrine stress system in child, especially for children with 7-repeat DRD4 allele who have less efficient reuptake of dopamine. Children with less adequate state regulation abilities profit most from sensitive structuring of their environment whereby the child experiences a more dependable parent. Intervention is effective because it is goal directed, well-defined and aims are modest (better parenting and discipline skills). Child behaviour change reinforces parental sensitivity, explaining long term effects despite it being a brief intervention.

Authors (year)	Intervention	Duration	Number of sessions	Session length (minutes)	Follow-up period	Brief overview	Mechanism of change
Bakermans-Kranenburg et al. (1998)	Video & Video + Discussion	3 months	4	90 - 180	n/a	Video: mother-infant interactions. Feedback: focus on promoting sensitivity via different themes. In video + discussion attachment discussions also followed.	Parental sensitivity is facilitated, with a focus on sensitive discipline, which leads to fewer behavioural problems. Gene-environment interactions: most effective for children with the 7-repeat DRD4 allele, particularly when mothers improved more in use of sensitive discipline strategies. Children who are genetically less sensitive to environmental stimuli gain most from experimentally enhanced parental sensitivity because the relation between child's actions and parent's response needs more emphasis.
Beebe (2010)	Video Feedback	6 months	4	Up to 150	1 month	Video: mother-infant and therapist-infant free play. Feedback: noticed how mother and infant respond to each other. Link with mothers childhood experiences.	Mothers' representations of and transference to the infant and the visible interaction patterns are addressed, allowing mothers to reflect. The parent's history facilitates understanding of present. Increased parental insight and awareness of own and infant's mind and understanding transference creases an opportunity for the parent to change and co-ordinate with the infant which facilitates infant's engagement. Also, seeing self on tape is a "shock", giving the technique emotional power.
Benzies et al. (2013)	Educational-behavioural Intervention	2 or 3 months	2 or 4	60	n/a	Video: infant instructed by father in performing play activity. Feedback: home visitor reinforced strengths and made suggestions. Also gave hand-out.	Paternal self-efficacy improves which means fathers input into interactions improve. The resulting reciprocal interactions facilitate child development.

Authors (year)	Intervention	Duration	Number of sessions	Session length (minutes)	Follow-up period	Brief overview	Mechanism of change
Bernal (1968)	Video Tapes Reviewed	13 weeks	7	45	23 weeks	Video: mother-child free interaction. Feedback: identify discrepancies between performance and instructions.	Advice and training to parents regarding techniques for reducing negative and strengthening positive child behaviours results in a reprogramming of the child's social environment which leads to child behavioural change. Additionally intervention is tailored to each specific parent-infant combination.
Colonnesi et al. (2012)	Basic trust	3 months	8	Not specified	6 months	Video: natural parent-child interactions. Feedback: highlight sensitive parental responses.	Video focusses parental attention on behavioural sequences from the perspective of sensitivity. Naming child behaviours, feelings, and wishes makes the sensitive responsiveness and mind-mindedness of parent concrete, which facilitates the child's ability to recognise own and others' thoughts, feelings, intentions and therefore promotes child's attachment security. However, there were no changes in parental sensitivity post-intervention, despite changes in child attachment, conduct problems and peer problems. It may have been changes in mind-mindedness and non-assessed aspects of sensitivity that led to child changes.
Cummings & Wittenberg (2008)	SET-PC	Not specified	20	70	1 year	Feedback: takes account of parent's countertransference. Observe influence of interaction on parent and child. Education about child development.	Improved parental support, structure and acceptance of child leads to child behavioural and emotional self-regulation. Parental internal representations, negative affects, expectations and attributions about the child and the self as well as recurrent behavioural cycles addressed via countertransference. Changes in recurring parental patterns lead to positive changes in the child.

Authors (year)	Intervention	Duration	Number of sessions	Session length (minutes)	Follow-up period	Brief overview	Mechanism of change
Feltham-King (2010)	Video interactive guidance (VIG)	Not specified	4	Not specified	n/a	Video: parent-infant play. Feedback: positive interactions reviewed and encouraged.	Parents identify, develop and apply inter-personal communication and attachment-enhancing skills during intervention. Parental behavioural and attitudinal changes correlate with improved behaviour and development of children. Children feel understood and therefore safe to trust caregivers and can develop secure attachments.
Haggman-Laitila et al. (2010)	Video Home Training	Not specified	2 to 10	90	6 months	Video: determined by family need. Feedback: counsellor pointed out how parents responded to infant initiative.	Parental analysis of parent-child interaction leads to increased instances of positive and successful interactions, which improve the health and development of all family members. Intervention is individualised for the family, who play an active role.
James et al. (2013)	VIG	7 months	7	60	8 weeks	Video: typical mother-child interaction. Feedback: focus on success and reflection on reasons for success.	Video draws attention to successful elements of communication. Improved parental responsiveness, attitude and behaviour create a better emotional connection between mother and child which scaffolds speech and language development in the child.
Juffer et al. (2005)	Video Feedback	6 months	3	60	6 months	Video: mother-infant interaction. Feedback: focussed on sensitive responsiveness.	As maternal sensitive responsiveness improved infant attachment disorganization decreased. Intervention was effective due to content and format: the video focusses the parent on child's actual behaviour. Focussing on the child in the here-and-now leads attention away from painful memories of the parent's past. Feedback serves to reinforce and encourage parental sensitivity.

Authors (year)	Intervention	Duration	Number of sessions	Session length (minutes)	Follow-up period	Brief overview	Mechanism of change
Kalinauskiene et al. (2009)	Video-feedback Intervention to promote Positive Parenting (VIPP)	5 months	5	90	n/a	Video: mother-child interactions. Feedback: reinforced mother's sensitive responsiveness. Corrective feedback. Brochures on sensitive parenting.	Maternal representations of attachment and their behaviour towards infant leads are addressed, leading to new ways of responding to infant's signals – mothers are aware of them and interpret them accurately. This would then lead to improvements in child's attachment security. However no change in infant security was observed. May be follow-up was too short term, may have effect in the long term.
Klein Velderman et al. (2006)	VIPP and VIPP with additional attachment discussions (VIPP-R)	3 months	4	90 - 180	n/a	Video: mother-infant standardised interactions. Feedback: structured around themes, focus on sensitive responsiveness. In VIPP-R additional attachment discussions followed.	Working with parental attachment representations improved parental sensitivity which contributed to increased secure attachment in the children.
Lawrence et al. (2013)	VIPP	4 weeks	4	Not specified	n/a	Video: range of caregiving situations. Feedback: therapist and parent think about meaning of child's communication.	Improving parenting capacity and sensitivity improves child outcomes. The video provides direct access to information. Individual tailoring of treatment, rather than videos of other fathers, is also helpful.
Mendelsohn et al. (2005)	Video Intervention Project	21 months	12	30 - 45	n/a	Video: parent-child interactions. Feedback: highlights strengths and suggests activities to practice. Discussion of child development + pamphlets.	Not discussed.

Authors (year)	Intervention	Duration	Number of sessions	Session length (minutes)	Follow-up period	Brief overview	Mechanism of change
Mendelsohn et al. (2007)	Video Intervention Project	33 months	Not specified	30 - 45	1 year	Video: parent-child interactions. Feedback: highlights strengths and suggests activities to practice. Discussion of child development + pamphlets.	Supporting parent-child relationship enhances cognitive, language and social-emotional child development. Parental activities (teaching, playing) improved, which are important for child development. Also reduced parenting stress, which is associated with difficulties in parent-infant relationships and long-term child adjustment.
Moran et al. (2005)	Krupka Method	6 months	8	60	1 year	Video: mother-infant free play. Feedback: focussed on positive features of interactions and mother's interpretation of infant behaviour.	Improving responsiveness and sensitivity of mother's interaction with the infant (positive reinforcement, reflection on infant's thoughts and feelings) improves security of infant attachment. Ability to interact effectively is also a function of the mother's representations of attachment, which are addressed through discussions.
Sossin & Cohen (2011)	Video Feedback	Not specified	2	Not specified	n/a	Video: mother-infant and therapist-infant free play. Feedback: discussed infant's emotions as revealed in play.	Mothers' ability to reflect on own and child's mind improves child's attachment security and capacity to reflect. Child is then able to let go of repetitive patterns he had previously held on to.
Van Zeijl et al. (2006)	VIPP-SD	8 months	6	90	n/a	Video: mother-child interactions. Feedback: information and tips focussed on sensitivity and discipline.	Video feedback enables positive reinforcement of sensitive behaviour and focusses parental attention on the child, which increases empathy. Sensitive discipline takes into account the child's perspective and signals. Parental attitudes towards sensitivity and actual use of sensitive discipline were enhanced and overactive behaviours in children decreased, though this was not causally mediated by change in parental attitudes and behaviour. So mechanism for change is unknown.

Authors (year)	Intervention	Duration	Number of sessions	Session length (minutes)	Follow-up period	Brief overview	Mechanism of change
Wadnerkar et al. (2012)	VIG	Not specified	8	Not specified	n/a	Video: child interacting with family members. Feedback: shared understanding of why communicative moment was successful.	Changing parental communication pattern leads to more opportunity for children to develop language and communication skills. Video enables identification and analysis of what leads up to positive interactions and insights into child's strengths. Improved communication between parent and child results in better trust and security in the child.
Weiner et al. (1994)	Orion Project	3-6 months	13-26	90	6 months	Video: natural family interaction. Feedback: positive interactions noticed and encouraged, nonverbal communication reflected upon, positive behaviour modelled.	Instant feedback to parents on verbal and non-verbal interactions enables them to see and hear exactly what happened. Parents learn to listen to children with sensitivity, strengthening positive communications, and understanding of child behaviour. This leads to more relaxed, happy children and improved child well-being.

Table 3: Downs and Black (1998) Critical Appraisal Tool Scores

Study	Reporting (/11)	External (/3)	Bias (/7)	Confounding (/6)	Power (/1)	Total Score (/28)
Bakermans-Kranenburg et al. (1998)	9	1	7	3	0	20
Bakermans-Kranenburg et al. (2008)	9	2	7	5	1	24
Bakermans-Kranenburg et al. (2008)	9	2	7	5	1	24
Beebe (2010)	5	0	3	3	0	11
Benzies et al. (2013)	10	0	6	4	0	20
Bernal et al. (1968)	8	0	4	4	0	16
Colonnesi et al. (2012)	9	1	5	3	1	19
Cummings & Wittenberg (2008)	10	2	6	5	1	24
Feltham King (2010)	6	1	4	4	0	15
Haggman-Laitila et al. (2010)	6	1	4	3	0	14
James et al. (2013)	7	1	6	1	0	15
Juffer et al. (2005)	8	1	7	3	1	20
Kalinauskiene et al. (2009)	9	1	7	5	1	23
Klein Velderman et al. (2006)	8	1	7	4	0	20
Lawrence et al. (2013)	7	1	5	2	0	15
Mendelsohn et al. (2005)	9	2	7	5	1	24
Mendelsohn et al. (2007)	9	2	7	5	1	24
Moran et al. (2005)	5	1	5	4	0	15
Sossin & Cohen (2011)	5	1	4	4	0	14
Van Zeijl et al. (2006)	9	2	7	5	1	24
Wadnerkar et al. (2012)	8	1	5	3	0	17
Weiner et al. (1994)	5	0	3	0	0	8

One of the studies reported outcomes on a population of children who were late preterm births (Benzies et al., 2013).

There were no reported parental risk factors in the populations included in five of the studies (Bakermans-Kranenburg, Van IJzendoorn, Pijlman, Mesman, & Juffer, 2008; Benzies et al., 2013; Colonnesi et al., 2012; Cummings & Wittenberg, 2008; Van Zeijl et al., 2006). One study reported that the mothers included had a "low education" but that there were no medical complications, psychosocial issues or other planned follow-up care (Mendelsohn et al., 2007). One single case study reported that the mother involved was experiencing "marital difficulties" (Bernal, Duryee, Pruett & Burns, 1968) and the other single case study reported that the father of the child involved was killed on September 11th in the World Trade Centre (Sossin & Cohen, 2011).

Outcomes

Out of the eight studies, six found that the video feedback intervention had a positive impact on the children's behaviour.

Van Zeijl et al. (2006) and Bakermans-Kranenburg, Van IJzendoorn, Pijlman, Mesman, & Juffer (2008) both used an RCT to compare scores on the Child Behavior Checklist (CBCL) Externalising Problems Scale (Achenbach & Rescorla, 2000) following the VIPP-SD intervention with a control group. Children were aged between 1 and 3 years and scored above 75th percentile on the CBCL externalising problems scale when referred. The intervention consisted of 6 sessions over an 8 month period. Van Zeijl et al. found a decrease in overactive behaviour for the children in the intervention condition compared to the control group, with a Cohen's *d* effect size of 0.45. It was the children who needed the most support (those from

families with higher levels of daily hassles and marital discord) who especially benefitted. There was no change in oppositional or aggressive behaviours. Van Zeijl et al. hypothesise that this may be because overactive behaviours are less severe than these and so the lack of effect may be due to the time limited (6-session) intervention. However, Bakermans-Kranenburg et al. found a decrease in oppositional behaviour for children in the VIPP-SD condition compared to the control group, with a Cohen's *d* effect size of 0.47, but no differences for overactive or aggressive behaviour, which was sustained at 1 year follow-up. Additionally, this effect was only found for children with the 7-repeat DRD4 allele. Bakermans-Kranenburg et al. hypothesise that children with the 7-repeat allele may benefit the most from experimentally enhanced parental sensitivity because they are genetically less sensitive to environmental stimuli (e.g. reward) and so need a greater emphasis on the reward value of parental responses.

Both of these studies were methodologically strong, scoring 24/28 on the critical appraisal tool. The main limitation of the Van Zeijl et al. study was the sample characteristics. Families from higher socio-economic backgrounds were overrepresented and non-Caucasian families were excluded. Therefore these findings may not be generalizable to families with a lower socio-economic status or from different cultural groups. A potential problem with the CBCL is that it is completed by mothers and so may be at risk of bias; however it has been extensively validated.

Mendelsohn et al. (2007) used an RCT to compare the outcomes of children receiving VIP with a control group. These children had no previous diagnosis or reported conduct problems, although the mothers were described as having "low education". There was no significant difference between the intervention and control groups for behaviour, as measured by the CBCL, despite sessions continuing from

age 2 weeks for up to 3 years. The critical appraisal tool showed that this study had sufficient power to detect an effect, and methodology also scored 24/28. These results could be explained by the lack of conduct problems at the start of the intervention, as change would be smaller.

Benzies et al. (2013) used an RCT to compare the outcomes for late preterm children aged 4-8 months of receiving an educational-behavioural intervention for 4 sessions and 2 sessions with a control group who received one home visit which provided information only. They found no significant differences between intervention and control groups in change in behaviour, as measured by the Parenting Stress Index (3rd ed.) (PSI-3; Abidin, 1995), although a potential trend towards lower scores in the 4 home visits condition compared to the 2 home visit and control conditions is suggested in the data. However, the score on the critical appraisal tool was 20/28, and the challenges recruiting first-time fathers of late preterms resulted in a small sample size and lack of power to detect effects. Additionally, these children were younger than those in the Van Zeijl et al. and Bakermans-Kranenburg et al. studies, which could indicate that interventions targeting behaviour are more successful for children aged over 1 year.

Two studies did not use a control group, meaning that it cannot be concluded that the intervention was responsible for the positive changes observed. However these results do support findings from more robust investigations. Again these studies include children aged over 1 year, adding support for the hypothesis above that children may benefit more behaviourally from interventions when they are over a year in age. Cummings and Wittenberg (2008) compared using SET-PC with IYPP for children aged 26-72 months diagnosed with Oppositional Defiant Disorder or Disruptive Behaviour Disorder Not Otherwise Specified. They found a significant

decrease in externalising behaviour (measured by the CBCL Externalising Problems Scale); with a Cohen's *d* within group effect size of 1.61for the SET-PC group. They also measured conduct problems using the Eyberg Child Behaviour Inventory Intensity Scale (Eyberg & Pincus, 1999) and found significant decrease in severity of these for children in both conditions. SET-PC did not have significantly different changes in behaviour compared to IYPP. Post-treatment the remission rate for SET-PC cases was 41%, indicating that a substantial proportion of children were still functioning in the clinical range post-treatment and at 1 year follow-up. A limitation of this study was the high level (35%) of attrition which reduced power, but also the disproportionate number of disadvantaged families who dropped out.

Colonnesi et al. (2012) used the Basic Trust intervention with adopted children ages 46 months referred for conduct problems. At 6 month follow-up they found significant decrease in children's conduct problems, as measured by the Strength and Difficulties Questionnaire (SDQ; Goodman, 2001), following the intervention, with a Cohen's *d* effect size of 0.71 for ratings by mothers and 0.54 for ratings by fathers. Additionally they found that mothers (but not fathers) of children who had been adopted into the family for a longer period of time perceived a significant decrease in peer problems after the intervention, with a Cohen's *d* effect size of -0.04. The critical appraisal tool score for the study was 19/28, indicating some methodological weaknesses. Another potential limitation is the reliance on parent report as this is open to bias; however the SDQ has been validated (Goodman, 2001; Muris, Meesters, & Van den Berg, 2003).

Using single case study designs, Bernal, Duryee, Pruett and Burns (1968) and Sossin and Cohen (2011) also reported decreases in targeted problem behaviours, as measured by parent and therapist observations, in children ages 8.5 years and 6

months. Although they had lower scores on the critical appraisal tool (16 and 14 respectively), these results do support other findings from more robust studies. Additionally, the findings from Bernal et al. were maintained when followed up 23 weeks after the intervention.

Summary of behavioural outcomes

From the studies described above, positive impacts on child behaviour were only observed when the children had challenging behaviour or behavioural problems prior to the intervention. This was found in robust RCT's and backed up by less methodologically sound studies. There was no impact of intervention on behaviour when the initial problems were parental. Additionally when there was a lack of power to detect differences between groups no impact on child behaviour was observed. There was some suggestion from the limited number of studies reviewed that children may be able to benefit more behaviourally when they are over a year in age, but additional research would be needed to examine this further.

Studies of attachment outcomes

Study characteristics

Six of the studies included looked at the children's attachment outcomes using a variety of different video feedback interventions, see Table 2.

Four of the included studies reported outcomes on populations of children with no clinical or medical diagnoses and no reported problems (Bakermans-Kranenburg, Juffer, & van IJzendoorn, 1998; Kalinauskiene et al., 2009; Klein Velderman, Bakermans-Kranenburg, Juffer, & van IJzendoorn, 2006; Moran et al., 2005). Two of the studies reported outcomes on children who were adopted, one on a

population with reported conduct problems (Colonnesi et al., 2012) and the other with a population of adopted children with no reported problems (Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2005).

There were no reported parental risk factors in the populations included in two of the studies (Colonnesi et al., 2012; Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2005). Two studies reported outcomes on mothers who were classified as having an insecure attachment type in addition to 8-14 years of education (Bakermans-Kranenburg, Juffer, & van IJzendoorn, 1998; Klein Velderman, Bakermans-Kranenburg, Juffer, & van IJzendoorn, 2006). One study reported that the mothers had been classified as "insensitive" prior to the intervention (Kalinauskiene et al., 2009). The final study reported on adolescent mothers (Moran et al., 2005).

Outcomes

Of the 6 studies, 3 found that the intervention had some positive impact on the children's attachment.

Moran et al. (2005) and Juffer, Bakermans-Kranenburg and van IJzendoorn (2005) used RCT's to compare the effect of video feedback (the "Krupka method" vs control group; and personal book only vs personal book + three sessions of video feedback vs control group, respectively) on attachment for children aged 5-6 months. Moran et al. found that infants in the intervention group were significantly more likely than those in the comparison group to be in a secure attachment relationship with their mother following intervention, with a Cohen's *w* effect size of 0.25. Using the categorical level (disorganised vs. non-disorganised) Juffer et al. found that the video feedback condition (with a Cohen's *d* effect size of 0.46) but not the book only

condition was effective in preventing disorganised attachment compared to the control group. Using continuous disorganisation ratings they found no significant difference between the two intervention groups, as both conditions resulted in significantly lower disorganisation scores than the control group (with a Cohen's *d* effect size of 0.62 for book plus video group). There was no significant effect on insecure avoidant and resistant attachment. These findings were maintained when followed up 6 months later.

In these studies the children did not have any diagnoses, but had adolescent mothers or were adopted. The critical appraisal tool demonstrated methodological weaknesses in both studies (Juffer et al. 20/28; Moran et al. 15/28). The overall effect found by Moran et al. was modest, potentially due to lack of power.

Colonnesi et al. (2012) used the Basic Trust intervention in a quantitative study with adopted children aged 46 months referred for conduct problems. Six months after the intervention they found that children's insecurity rated using the Attachment Insecurity Screening Inventory (AISI; Polderman et al., 2008; Wissink et al., 2012) by mothers (but not fathers) was significantly lower after the intervention, with a Cohen's *d* effect size of 0.76. Both parents rated disorganised attachment as lower after the intervention, with a Cohen's *d* effect size of 0.79 for mothers and 0.56 for fathers. No significant effect was found for ambivalent and avoidant attachment. No significant changes in security, as measured by the Attachment Q-sort (AQS; Waters & Deane, 1985), were found by ratings of either parent. The critical appraisal tool score for the study was 19/28, indicating some methodological weaknesses, and as there was no control group to compare these results to, it cannot be concluded that the intervention was responsible for the changes observed.

Three of the studies found no change in child attachment in the intervention groups compared to the control groups following the intervention. These were all RCT's conducted with non-clinical mothers who were selected for their low levels of sensitivity. Kalinauskiene et al. (2009) compared the effect of VIPP with 7 months olds on child attachment (measured by the AQS) with a control group who received telephone calls. Klein Velderman, Bakermans-Kranenburg, Juffer and van IJzendoorn (2006) compared the effect of VIPP and VIPP-R with 6 month olds on child attachment (measured by the strange situation) with a control group. Bakermans-Kranenburg, Juffer, and van IJzendoorn (1998) compared the effect of video and video plus discussion with 4 month olds on child attachment (measured by the strange situation) with a control group.

There were some methodological issues with these studies. In the study by Kalinauskiene et al. (2009) infants were already in the normal range on the AQS prior to the intervention, so change would have been difficult to detect. These were middle-class families, who may have had sufficient protective factors or a lack of additional risk factors. This may also limit the generalizability of these findings to other populations. The use of the observer AQS was also a limitation of this study. Although it has been proven to belong to a gold standard of attachment measures (Van Ijzendoorn, Vereijken, Bakermans-Kranenburg, & Marianne Riksen-Walraven, 2004), it does not assess disorganised attachment so there is no way of knowing whether the VIPP impacted positively on this, as in the findings of Juffer, Bakermans-Kranenburg and van IJzendoorn (2005) and Colonnesi (2012) above. Klein Velderman, Bakermans-Kranenburg, Juffer and van IJzendoorn (2006) had a small sample size, which meant that the power of the statistical analyses was inadequate. They speculate that with increased power they may have observed an

effect on attachment, as there was a trend towards greater increase in secure infants in the intervention groups compared to the control group, with a Cohen's *d* effect size of 0.22. Had the sample size been three times larger, a significant difference in proportions of secure attachment between control and intervention groups would have been found. The results of Bakermans-Kranenburg et al. should be interpreted as preliminary results due to the lack of power to detect significant changes. Additionally, none of these studies reported following up the participants, so it is not possible to determine whether any differences between groups would have emerged over time.

Summary of attachment outcomes

Robust RCT's did find significant effects on attachment following intervention for children with adolescent mothers, who were adopted and / or had conduct problems, in particular increasing security and decreasing disorganised. The studies which did not find any significant changes in attachment were all RCT's conducted with non-clinical mothers who were selected for their low levels of sensitivity. However, one of these studies did not measure disorganised attachment, which has been shown to be the most sensitive to change; and the other two did not have sufficient power to detect any effect of the intervention. Therefore these studies may not have been designed in a way to detect changes in attachment.

Studies of cognitive and language outcomes

Study characteristics

Six of the studies included investigated the cognitive and / or language outcomes for the children, using a variety of different video feedback interventions, see Table 2.

In terms of the populations of children included in the studies, three studies reported outcomes with children with no clinical or medical diagnoses and no reported problems (Häggman-Laitila, Seppänen, Vehviläinen-Julkunen, & Pietilä 2010; Mendelsohn et al., 2005; Mendelsohn et al., 2007). One study reported outcomes on a population of prospective adopted children (Feltham-King, 2010); one study reported outcomes on a child with a diagnosis of cerebral palsy but age appropriate cognitive skills (Wadnerkar, Pirinen, Haines-Bazrafshan, Rodgers, & James, 2012) and the final study reported outcomes on three children with profound hearing loss (James, Wadnerkar-Kamble, & Lam-Cassettari, 2013). One child had glue ear in addition, and one child was also premature with motor delay, cerebral palsy, visual impairment and developmental delay.

In terms of the parent populations, two of the studies reported outcomes of the children of mothers with low education, but no medical complications, psychosocial issues or other planned follow-up care (Mendelsohn et al., 2005; Mendelsohn et al., 2007). Another study reported outcomes of the children of families that need more support than can be offered by child welfare clinics but do not belong in the domain of child welfare and its corrective work (Häggman-Laitila, Seppänen, Vehviläinen-Julkunen, & Pietilä, 2010). The remaining three studies did not report any parental risk factors (Feltham-King, 2010; James, Wadnerkar-Kamble, & Lam-Cassettari, 2013; Wadnerkar, Pirinen, Haines-Bazrafshan, Rodgers, & James, 2012).

Outcomes

All of the 6 studies found that the intervention had some positive impact on children's cognitive and / or language development.

Mendelsohn et al. (2005; 2007) used an RCT with mothers with low education and their infants from 2 weeks old to compare the effect of VIP on child cognitive (measured by the Bayley Scales of Infant Development Mental Development Index (MDI), Bayley, 1993) and language (measured by the Preschool Language Scale–3; PLS-3, Zimmerman, Steiner, & Pond, 1992, and a semi-structured assessment) development with a control group at 21 and 33 months follow-up. Both studies found a significant main effect of VIP on cognitive development.

Mothers were separated by years of education into two groups: 1) less than 7 years education, and 2) 7 or more years of education. In 2005 specifically, the less than 7 years group VIP only impacted in comparison to the control condition on language development as measured by the semi-structured assessment. In the 7 or more years group VIP had a significantly positive impact (compared to the control) for cognitive development, expressive language and language development as measured by the semi-structured assessment. As with Mendelsohn et al. (2005), the effects of VIP in 2007 were most apparent in the subgroup of mothers with 7 or more years of education, although there were no differences for measures of language. Mendelsohn et al. speculated that there may have been no impact on receptive language because the focus of VIP was on interaction rather than vocabulary. In addition, 40% of the children in each of the groups had received early intervention services, including speech therapy, since the Mendelsohn et al. (2005) study where effects on language development were observed, which may have had the effect of

bringing VIP and control groups closer together for cognitive and language abilities. A limitation of these studies was the large loss to follow-up, as there may have been systematic differences in the characteristics of control and intervention children undergoing the assessment which could have biased the results.

Häggman-Laitila, Seppänen, Vehviläinen-Julkunen and Pietilä (2010) and Feltham-King (2010) conducted qualitative studies investigating the outcomes of video home training and VIG respectively. The children were aged 0-16 years in Häggman-Laitila et al.'s study, and the age of children was not specified by Feltham-King. The qualitative content analysis pulled out a positive impact for children's language skills in both studies, specifically self-expression (Häggman-Laitila et al.) and that child's use of language had been developed and children were more confident learners (Feltham-King). Findings were maintained at follow-up visits 6 months after the intervention in the study by Häggman-Laitila et al. Both of these studies had methodological issues (14/28 and 15/28 on the critical appraisal tool respectively). As there were no control groups to compare the outcomes to, it cannot be concluded that the interventions were responsible for the changes observed. Although the use of self-assessment by all members of the family used by Häggman-Laitila et al. prevents problems encountered when families are studied from the viewpoint of a single member (usually the mother; Coren, Barlow, & Stewart-Brown, 2003; Petersson, Petersson, & Hakansson, 2004) it also has certain limitations. For example self-assessment is thought to lead to more positive conclusions compared with assessments conducted by professionals. The lack of a standardised assessment tool or any quantitative outcomes also calls the findings of these studies into question, though the concepts extracted here could be used to develop a standardised instrument in the future. Objective, standardised measurement

of change in children's language and cognitive ability would add more weight to these findings.

James, Wadnerkar-Kamble and Lam-Cassettari (2013) used a case series design to investigate the impact of VIG on children's language development (measured by the Tait analysis framework; Tait, Nikolopoulos, & Lutman, 2007) in 3 children aged 9 months to 3 years with profound hearing loss (2 of which had additional disabilities as described above). The Vineland Adaptive Behaviour Scales (Sparrow, Balla, & Cicchetti, 2008) were also used, which includes the domain of communication. Although the results did not break down the Vineland into individual domains, each child's composite score on this did improve. In terms of the Tait analysis all 4 cases eradicated non-responses, increased vocal autonomy, were more involved with conversations and more likely to take a lead in conversations following the intervention. Additionally, all families reported reaching their goals for their child's language development, and results were maintained at follow-up 8 weeks later. Although it lends support to other findings, this study has several limitations, scoring 15/28 on the critical appraisal tool. The small number of cases presented means that the generalizability of the results to a wider population is uncertain. Additionally this limited the possibility of statistical analyses to determine the effect size of this intervention and meant relying on visually-based interpretations of results without knowing what counts as a significant change in an outcome measure. The repetition of the Vineland at short intervals is not recommended, and could have resulted in unplanned effects and mean that the results are not a reliable indicator of child development.

Wadnerkar, Pirinen, Haines-Bazrafshan, Rodgers and James (2012) reported a single case study with an 11 year old child with cerebral palsy and her family with

quantitative and qualitative outcomes following VIG. They found an increase in intelligible verbal communications and a decrease in unintelligible verbal communications. However, this classification is subjective and not a robust finding. Additionally, there were methodological problems as reflected in the critical appraisal score (17/28), for example a single case study design has limited generalizability.

Summary of cognitive and language outcomes

All studies found a positive impact on cognitive / language. This included a variety of ways of measuring language and cognition and a range of approaches, including RCTs, qualitative designs and single case studies. Interestingly, the RCTs pulled out a further finding, that the effects of video intervention were most apparent in the subgroup of children whose mothers had 7 or more years of education.

These studies demonstrate that video feedback interventions can have a positive impact on cognitive and language outcomes for children of a very large range of ages, from 2 weeks up to 16 years of age.

Studies of social interaction outcomes

Study characteristics

Five studies looked at outcomes for the children's social interaction. All of the studies used different video feedback designs; see Table 2. Details of the methodology, sample and limitations of Benzies et al. (2013), Colonnesi et al. (2012), Wadnerkar, Pirinen, Haines-Bazrafshan, Rodgers and James (2012) and Häggman-Laitila, Seppänen, Vehviläinen-Julkunen and Pietilä (2010) have already been described.

In terms of the populations of children included in the studies, two studies reported outcomes with children with no clinical or medical diagnoses and no reported problems (Beebe, 2010; Häggman-Laitila, Seppänen, Vehviläinen-Julkunen, & Pietilä, 2010). One study reported outcome on late preterm children (Benzies et al., 2013), one study was with adopted children referred for conduct problems (Colonnesi et al., 2012) and one of the case studies was with a child with cerebral palsy but age appropriate cognitive skills (Wadnerkar, Pirinen, Haines-Bazrafshan, Rodgers, & James, 2012).

In terms of the parent populations, 4 of the studies did not report any parental risk factors (Beebe, 2010; Benzies et al., 2013; Colonnesi et al., 2012; Wadnerkar, Pirinen, Haines-Bazrafshan, Rodgers, & James, 2012). The remaining study was with families that need more support than can be offered by child welfare clinics but do not belong in the domain of child welfare and its corrective work (Häggman-Laitila, Seppänen, Vehviläinen-Julkunen, & Pietilä, 2010).

Outcomes

All of the 5 studies found that the intervention had some positive impact on children's social interaction.

Benzies et al. (2013) used an RCT to compare the outcomes for late preterm children aged 4-8 months of receiving an educational-behavioural intervention for 4 sessions and 2 sessions with a control group who received one home visit which provided information only. The skills the child brings to the interaction (measured by the Parent-Child Interaction Teaching Manual, PCITS, Sumner & Speitz, 1994) increased in all 3 conditions; however no statistical tests were reported to investigate whether there were significant changes or differences between groups. The 2 home

visit and control groups' average scores remained below the mean for full term infants.

Colonnesi et al. (2012) used the Basic Trust intervention with adopted children aged 46 months referred for conduct problems. They found that children who lived longer with their adoptive families were seen as more problematic in peer relationships by the adoptive mothers. Mothers, but not fathers, of children who had spent more time with their adoptive parents perceived significantly less peer problems 6 months after the intervention. There was no significant change in prosocial behaviour.

Häggman-Laitila, Seppänen, Vehviläinen-Julkunen and Pietilä (2010) conducted a qualitative study investigating the outcomes of video home training with children aged 0-16 years. The families reported improved interactive skills and improved relationships between siblings following the intervention which were retained at the 6 month follow-up.

Wadnerkar, Pirinen, Haines-Bazrafshan, Rodgers and James (2012) found no change in the frequency of times the child looked at her mother, but there was an increased duration. There was a significant increase in nodding, Augmentative and Alternative Communication (ACC; which is an umbrella term of methods and technologies used to compensate for spoken language difficulties) and sign communication. The parents also reported that she now explores the responses of the listener, and is more confident and flexible.

Beebe (2010) reported a single case study with a 9 month old child with qualitative outcomes. Therapist and parent observations reported that overall the child was more social and had a better bond with the mother. Specifically there was an increase in eye contact which was more sustained, increased facial reactivity and

the child took more initiative. These gains were retained when followed-up a month later.

Summary of social interaction outcomes

All of the studies reported some positive impact on social interactions following the intervention. Similarly to the cognitive / language outcomes, these studies indicate that video feedback interventions can have a positive impact on social interaction for children of a very large range of ages, from 2 weeks up to 16 years.

However, all studies had significant methodological problems. For example, no statistical analyses, lack of power, no control group and use of a single case study method. Therefore these results should be interpreted with caution until supported using more robust RCT designs.

Studies reporting other outcomes

Study characteristics and outcomes

Six studies reported alternative or additional outcomes that did not fit neatly into the categories above. Details of the methodology, sample and limitations of Benzies et al. (2013), Häggman-Laitila, Seppänen, Vehviläinen-Julkunen and Pietilä (2010) and James, Wadnerkar-Kamble and Lam-Cassettari (2013) have already been described.

In a randomised controlled trial, Bakermans-Kranenburg, Van IJzendoorn, Mesman, Alink and Juffer (2008) investigated whether VIPP-SD would impact child cortisol levels. The children included were aged 1-3 years and above the 75th percentile on the Child Behaviour Checklist Externalising Problems scale, with no

parental risk factors. They found that cortisol levels were lower after the intervention for children with the seven repeat DRD4 allele only. However, there were some methodological issues, with a score of 20/28 on the critical appraisal tool. For example, no behavioural outcomes were reported and there was no measure of change in parenting or child rearing environment as a possible mediator of change in cortisol. There was only one day of sampling to record baseline cortisol level, and the exact timings of recordings were not recorded. Additionally there was a lack of sufficient power.

The PSI-3 child domain measure used by Benzies et al. (2013) describes child stress, defined in terms of temperament as well as behaviour. They found no significant differences between intervention and control groups in change in behaviour, as measured by the PSI-3, although a potential trend towards lower scores in the 4 home visits condition compared to the 2 home visit and control conditions is suggested in the data. However, the score on the critical appraisal tool was 20/28, and the challenges recruiting first-time fathers of late preterms resulted in a small sample size and lack of power to detect effects. Lawrence, Davies and Ramchandani (2013) also investigated the impact of child temperament, as measured by the Infant Characteristics Questionnaire (ICQ; Bates, Freeland, & Lounsbury, 1979). They used a qualitative pilot study to investigate the effects of VIPP with children aged 6-15 months. No child diagnoses or parental risk factors were reported in the participants included in the study. They found that ratings of difficult temperament decreased, although there were no statistical analyses. This is presumably because this was a small sample with a lack of power to detect differences. There were other methodological weaknesses, with the study scoring 15/28 on the critical appraisal tool. For example, there was no control group and no observational measures were

used. These fathers were from a non-clinical population, so the authors cannot comment on the transferability of findings to fathers experiencing psychological distress or to fathers of infants at risk of diverse developmental outcomes.

In addition to the outcomes described above, Häggman-Laitila, Seppänen, Vehviläinen-Julkunen and Pietilä (2010) also found that video home training positively impacted on child health and attitude, which was maintained at 6 month follow-up.

James, Wadnerkar-Kamble and Lam-Cassettari (2013) also investigated whether VIG would impact children's emotional availability (EA), as measured by the Child Emotional Availability Scale Infancy/Early Childhood version, 4th edition (Biringen, 2008). There were no parental risk factors reported. The children involved had profound hearing loss. One child had glue ear in addition, and one child was also born prematurely and had motor delay, cerebral palsy, visual impairment and developmental delay. They found that child EA improved and all children were more responsive and involved, which was maintained at 8 week follow-up.

Using a quantitative design, Weiner, Kuppermintz and Guttmann (1994) investigated the impact of the Orion Project on children in comparison to a control condition. The age of the children involve was not specified. The children did not have a specific diagnosis, but were from families on welfare, living in disadvantaged neighbourhoods, struggling to raise young and cope with children in difficult circumstances. They found that there was a significant decrease in the number of miserable / unhappy looking children and an increase in the overall index of child well-being for the Orion Project children but not the controls, which was maintained at 6 month follow-up. However, this study scores the lowest on the critical appraisal tool (8/28), indicating severe methodological problems. The participants were not

randomised to condition, and the control families were functioning better and showed less negative interaction at baseline. In addition, the observers knew which families had participated in the Orion Project and so observations were somewhat biased and study design less rigorous.

Summary of other outcomes

There are some preliminary findings which suggest that video feedback interventions may have impact on other child factors, such as cortisol levels, temperament / attitude, emotional availability and health and well-being. However, all studies have significant methodological limitation and all results require more robust investigations in the future.

Discussion

The aim of this review was to investigate the impact of video feedback intervention on the children involved. The 22 studies reviewed varied considerably in their intervention, methodology and design. The findings reported were generally positive in terms of the impact of video feedback interventions on the children involved. There was support for improvements in behaviour (Bakermans-Kranenburg, Van IJzendoorn, Pijlman, Mesman, & Juffer, 2008; Bernal, Duryee, Pruett & Burns, 1968; Colonnesi et al., 2012; Cummings & Wittenberg, 2008; Sossin & Cohen, 2011; Van Zeijl et al., 2006), attachment (Colonnesi et al., 2012; Juffer, Bakermans-Kranenburg, & van IJzendoorn, 2005; Moran et al., 2005), cognition and language abilities (Feltham-King, 2010; Häggman-Laitila, Seppänen, Vehviläinen-Julkunen, & Pietilä, 2010; James, Wadnerkar-Kamble, & Lam-Cassettari, 2013;

Mendelsohn et al., 2005; Mendelsohn et al., 2007; Wadnerkar, Pirinen, Haines-Bazrafshan, Rodgers, & James, 2012) and social skills (Beebe, 2010; Benzies et al., 2013; Colonnesi et al., 2012; Häggman-Laitila et al., 2010; Wadnerkar et al., 2012). In addition there was some preliminary evidence for other improvements such as cortisol levels (Bakermans-Kranenburg, Van IJzendoorn, Mesman, Alink, & Juffer, 2008), temperament / attitude (Häggman-Laitila et al., 2010; Lawrence, Davies, & Ramchandani, 2013), emotional availability (James et al., 2013) and health and well-being (Häggman-Laitila et al., 2010; Weiner, Kuppermintz, & Guttmann, 1994).

However, some studies also failed to find an impact of video feedback interventions. The possible reasons for this in addition to more detailed summaries of findings, proposed mechanisms of change, conclusions, limitations of the review and considerations for future research are discussed below.

Summary of findings

Studies of behavioural outcomes

Six out of the eight studies which investigated this found that video feedback interventions can have a positive impact on child behaviour. Van Zeijl et al. (2006) and Bakermans-Kranenburg, Van IJzendoorn, Pijlman, Mesman and Juffer (2008) found an impact using robust RCTs, and the impact was still observed at 1 year follow-up for Bakermans-Kranenburg et al. Data from two quantitative studies lacking a control group (Colonnesi et al., 2012; Cummings & Wittenberg, 2008) supported these findings, which remained at 6 months and 1 year follow-ups respectively. Two single case study designs (Bernal, Duryee, Pruett & Burns, 1968; Sossin & Cohen, 2011) also supported these findings. Two studies found no impact of intervention on child behaviour (Benzies et al., 2013; Mendelsohn et al., 2007).

Both of these studies used an RCT design and were relatively methodologically strong (scoring 20/28 and 24/28 respectively on the critical appraisal measure). However, these two studies were the only ones conducted with children who did not have previous recorded behavioural problems prior to the intervention, which indicates that for behavioural interventions to result in measurable effects, children may require measurable behavioural problems prior to intervention. Also, Benzies et al. (2013) did not have sufficient power required to detect a significant difference between groups. Additionally, these children were younger than those in the Van Zeijl et al. and Bakermans-Kranenburg et al. studies, which could indicate that interventions targeting behaviour are more successful for children when they are over a year in age. Additionally they did not have any long-term follow-up data and so may have missed changes which took a greater period of time to be measurable. However, a limited number of studies were reviewed here, and further research would be needed to examine this.

Mechanisms of change

The results of the studies reviewed indicate that child behaviour may be impacted via the effect of video feedback on the parent involved. One hypothesis could be that during video feedback parental attention is focussed on the child, sensitivity is reinforced, and parental internal representations, affect, expectations and attributions about the child and the self may also be addressed. This may then lead to improved parental empathy, mind-mindedness and sensitivity. Changes in the child's environment as a result of these changes in the parent could then lead to increased child security and ability to recognise own and others' thoughts, feelings, intentions and therefore decrease the need for behavioural problems.

Studies of attachment outcomes

There was also evidence demonstrating that video feedback interventions can have a positive impact on children's attachment style, with 3 of the 6 studies investigating attachment showing this. Moran et al. (2005) and Juffer, Bakermans-Kranenburg, and van IJzendoorn (2005) used RCT's to investigate the impact of video feedback. Moran found an increase in secure attachment in comparison to the control group, and Juffer et al. found a reduced likelihood of disorganised attachment in comparison to the control group, which was maintained at 6 month follow-up. The children did not have any recorded diagnoses, but the mothers in the Moran study were adolescent and the children in the Juffer et al. study had been adopted. This was supported by a quantitative study without a control group (Colonnesi et al., 2012); investigating children who had been adopted and were referred for conduct problems, which also found a decrease in disorganised attachment following the intervention which was maintained at 6 month follow-up.

The studies which did not find any significant changes in attachment were all RCT's conducted with non-clinical mothers who were selected for their low levels of sensitivity. However, one of these studies did not measure disorganised attachment (Kalinauskiene et al., 2009), which has been shown to be most sensitive to change; and the other two did not have sufficient power to detect an effect of the intervention (Bakermans-Kranenburg, Juffer, & van IJzendoorn, 1998; Klein Velderman, Bakermans-Kranenburg, Juffer, & van IJzendoorn, 2006). Therefore these studies may not have been designed in a way to detect an impact on child attachment following intervention. Additionally none of these studies followed participants up over time to investigate whether there were any changes in child attachment security after longer periods of time spent living in an environment with a more sensitive and

responsive parent (see Mechanisms of change, below) which were not immediately measurable.

Mechanisms of change

The content and format of video feedback intervention is hypothesised to be important in achieving change: the video focusses the parent on their child's actual behaviour in the here-and-now, which may serve to direct attention away from painful memories of the parent's past. Feedback serves to reinforce and encourage parental sensitivity, which improves the responsiveness and sensitivity of the mother's interaction with the infant. Change in the mother may also be achieved via addressing her representations of attachment through discussions and the relationship with the therapist. It is hypothesised that such changes in the mother may then lead to improved infant attachment security as parent's gain new ways of responding to their infant's signals, with increased sensitivity and accuracy.

Studies of cognitive and language outcomes

Despite the variety of ways of measuring language and cognition and a range of approaches, including RCTs, qualitative designs and single case studies, all of the 6 studies found that the intervention had some positive impact on children's cognitive and / or language development. Mendelsohn et al. (2005; 2007) used an RCT with mothers with low education to compare the effect of video feedback on child cognitive and language development with a control group. The effects were most apparent in the subgroup of mothers with 7 or more years of education. Häggman-Laitila, Seppänen, Vehviläinen-Julkunen and Pietilä (2010) and Feltham-King (2010) conducted qualitative studies and both found a positive impact on child

language, which was maintained at 6 month follow-up in the Häggman-Laitila et al. study. Although both of these studies had methodological issues (14/28 and 15/28 on the critical appraisal tool respectively), the results support those of the more robust RCTs. A case series design (James, Wadnerkar-Kamble, & Lam-Cassettari, 2013) with an 8 week follow-up, and a single case study (Wadnerkar, Pirinen, Haines-Bazrafshan, Rodgers, & James, 2012) also supported these findings.

These studies demonstrate that video feedback interventions can have a positive impact on cognitive and language outcomes for children of a very large range of ages, from 2 weeks up to 16 years of age. This has implications for practitioners when selecting interventions, demonstrating that video feedback interventions for parents and children should not be discounted when aiming to improve cognitive and linguistic skills even when the child is in their teenage years.

Mechanisms of change

Supporting the parent-child relationship during the intervention is hypothesised to lead to an improvement in parental activities (parents identify, develop and apply inter-personal communication and attachment-enhancing skills e.g. teaching, playing) which are important for child development. These parental behavioural and attitudinal changes are hypothesised to enhance child cognitive, language and social-emotional development via a better emotional connection between parent and child. In addition, the video feedback intervention also reduced parenting stress, which is associated with difficulties in parent-infant relationships and long-term child adjustment.

Studies of social interaction outcomes

All of the 5 studies that investigated it found that video feedback intervention had some positive impact on children's social interaction. Benzies et al. (2013) used an RCT, Colonnesi et al. (2012) used a quantitative study with a 6 month follow-up, Häggman-Laitila, Seppänen, Vehviläinen-Julkunen and Pietilä (2010) conducted a qualitative study with a 6 month follow-up and Wadnerkar, Pirinen, Haines-Bazrafshan, Rodgers and James (2012) and Beebe (2010) reported the outcomes of single case studies. Similarly to the cognitive / language outcomes, these studies indicate that video feedback interventions can have a positive impact on social interaction for children of a very large range of ages, from 2 weeks up to 16 years.

However, the conclusions are not as clear cut as this suggests. Although Benzies et al. conducted at RCT, there were still methodological limitations (20/28 on the critical appraisal checklist). The skills children brought to the interaction intervention increased in all 3 conditions; however no statistical tests were reported to investigate whether there were significant changes or differences between groups. This could be due to the lack of power in this study. Colonnesi et al. (2012) found that mothers, but not fathers, of children who had spent more time with their adoptive parents perceived significantly less peer problems following the intervention. There was no significant change in prosocial behaviour. Additionally the lack of control group means that it is impossible to conclude that the intervention was responsible for observed changes. Häggman-Laitila et al. (2010) found that families reported improved interactive skills and relationships between siblings following the intervention. However, self-report measures are vulnerable to bias, and there were no statistical analyses conducted. It is also not possible to generalise from single case studies, such as Wadnerkar et al. (2012) and Beebe (2010). Therefore

these results should be interpreted with caution until supported using more robust RCT designs.

Mechanisms of change

Video feedback interventions are hypothesised to improve paternal self-efficacy via parental analysis of parent-child interaction which enables identification and analysis of what leads up to positive interactions and insights into child's strengths as well as an increase in sensitive responsiveness and mind-mindedness of parent. This is hypothesised to lead to an improvement in parental input into interactions as well as improved communication between parent and child. This facilitates the infant's engagement resulting in improved reciprocal interactions, leading to improved trust and security in the child which facilitates the development of social and communication skills.

Studies of other outcomes

Six studies provided preliminary findings that video feedback interventions may have a positive impact upon other areas for the children involved, such as cortisol levels, temperament / attitude, emotional availability and health and well-being. However, all studies have significant methodological limitations and all results require more robust investigations in the future. In addition, findings should be replicated.

Comparison to previous reviews

Bakermans-Kranenburg, van IJzendoorn, and Juffer (2003) conducted a meta-analysis of randomized and non-randomized quantitative studies. The impact

on the child was not the main focus of the review, and in fact only 41% (29/70) of the included studies aimed at improving attachment security. There was no investigation of the behavioural, cognitive or other social impacts on the children involved in the video feedback interventions. The combined effect size for attachment security was small but significant ($d = 0.19$, $p < .05$). Therefore the findings from the current review regarding attachment lend further support to this finding. Studies with sufficient power to detect an effect report that video feedback interventions result in an increase in secure attachment classification and/or a decrease in disorganised attachment style classification in the children involved.

Fukkink (2008) also conducted a meta-analysis of 29 studies. Again, the impact on the child was not the main focus of the review. Fukkink states that "The effects (…) were also statistically significant for behaviour measures among the child population" (p. 9), with no further detail of these effects. Additionally Fukkink states that due to the nature of the studies selected for the review, in which many combined video feedback with various other components of intervention, it is not possible to determine that the results are due to the unique contribution of video feedback. These limited findings reported are supported by the current review, whereby all studies involving children who had a previous diagnosis of behavioural problems found a positive influence on child behaviour following video feedback intervention.

Therefore the results of this review do support the limited findings from previous reviews regarding the impact of video feedback interventions on the children involved in terms of attachment and behaviour.

Significance of this review

In comparison to the focus of the reviews described above, the current review focussed on the impact of the children involved in video feedback interventions. Therefore the impact of the intervention on cognition, language, and broader social skills in addition to attachment and behaviour were considered. Additionally, only studies in which the unique contribution of video feedback can be extracted from any other interventions were selected, providing a review of the literature concerning the unique impact of video feedback for the children involved. Additionally, the present review examined the entire field of research on video feedback, rather than solely focus on quantitative studies as in the reviews described above. Therefore it offers a different perspective on the outcomes of video feedback for children.

Therefore this review concludes that video feedback intervention has a significant positive impact on the behaviour, attachment, cognitive / language ability and social skills of the children involved. Additionally, preliminary evidence was identified indicating that video feedback interventions can positively impact child cortisol levels, temperament / attitude, emotional availability and health and well-being. These results are due to the impact of video feedback, and not due to other co-occurring interventions. Evidence to date confirms that this is an intervention that both parents and their children can expect to benefit from, in as little as 2 sessions.

The inclusion of the entire field of research, rather than solely quantitative studies, enabled a fuller and more detailed picture of the impact of video feedback to be captured. These studies demonstrated that video feedback not only has a positive impact on the children involved in regards to psychometric measures, but also in the opinions and experiences of families and therapists. This finding suggests that

families may be less likely to drop out of treatment, as they are observing the benefits in their children themselves.

The findings of this review also suggest that video feedback interventions could be offered to parents and their children when children have difficulties with behaviour, attachment, language, cognitive ability and/or social skills, especially as the potentially limited number of sessions that could be required makes it efficient and cost effective.

Limitations of this review

A clear limitation of this review is the attempt to integrate and sometimes compare directly the results of an intervention which is not standardised between studies. For example, there were 15 differently names interventions in the 22 studies reviewed, with the type of interactions which were videotaped and the content and focus of the feedback given varying between these. The duration of intervention ranged from two to 26 sessions and the length of sessions varied from 30 to 180 minutes.

Additionally, the variation between studies in the outcome measurements used within the same outcome category (for example, in the impact on attachment section, use of attachment insecurity screening inventory vs. attachment Q-sort vs. strange situation) is potentially problematic. These may be measuring slightly different constructs and changes in one may not be directly comparable to changes in another. When reviewing the studies this variation was taken into account to some extent when using the critical appraisal tool, but this was mainly limited to the reliability and validity of the measures used (e.g. parent observations would be less

valid in comparison to a psychometric measure) and not the consequences of comparing different, but equally valid, measures.

In addition, there was variation in the characteristics of the sample between studies. For example, there was large variation in child age, from two weeks to 16 years of age. Comparing outcomes in children of such a large variation of ages, and therefore abilities and developmental stage, may not be valid. Additionally whether or not the children involved in the intervention had a diagnosis or were referred for any specific concern was not consistent between studies, and neither was the presence of absence of parental risk factors. Although these differences were considered when comparing the results and coming to conclusions regarding which population may benefit from video feedback interventions, this variation does potentially make it problematic to amalgamate findings from the different studies for each outcome section to come to reliable conclusions.

Although focussing in this review on the impact of video feedback for the children involved offered a different perspective from previous reviews, not discussing the impact on the parents involved did result in some difficulties, especially when attempting to disentangle the mechanisms of change for the children. When investigating what these may be it became clear that it was not possible to separate the impact of the intervention on the children from the impact on the parent, as this was often cited as the mechanism by which children were benefitting, i.e. hypothetically it was change in parental attitude and/or behaviour which led to a change in child environment which then led to a change in child attachment, behaviour etc.

Additionally, it is possible that some articles that would have been relevant to the current review could have been missed. One reason for this could be due to the

implementation of inclusion/exclusion criteria (e.g. published in English, full text available only). To counter this possibility, reference and citation lists were searched in an attempt to identify articles that were not identified in the initial search. However, it is still possible that some studies were missed due to human error.

Future research

The 22 studies reviewed here revealed encouraging and supportive results regarding the positive impact of video feedback interventions on the children involved, which supports the continued use of this technique. Further research would be useful however, in particular replications of previous studies using robust RCT designs with adequate power. Additionally, reporting on the results of video feedback interventions when used with a variety of child and parent populations would be beneficial before another systematic review of this topic would be justified, due to the current scarcity of primary studies. Once there is a large enough sample of primary studies on the different populations a systematic literature review could then be conducted which could provide insight into which populations would most benefit.

Similarly, given the variety of child outcomes used in the studies reviewed, further studies would be warranted, using consistent ways of measuring outcomes for children to allow for more direct comparison of results. Once sufficient numbers have been reported, a systematic literature review which incorporates a network meta-analysis could then be conducted for each outcome separately in order to produce a more detailed and reliable conclusion of the potential benefit of video feedback interventions for the children involved. The results of this would be more

specific and informative, and could aid clinicians when deciding upon which intervention would be appropriate to address particular concerns about the child.

Another topic which could be further explored in a subsequent review would be regarding the content of the interventions, in order to determine what the optimal approach to conducting video feedback is. As mentioned earlier, there were 15 named interventions in the 22 studies reviewed here, each with slightly different focusses in terms of style and content of feedback, lengths of sessions and time scale. Determining a standardised best practice model could not only ensure that individuals receive the most appropriate intervention, but could also be more economically viable if less sessions are required than are currently offered, as suggested by the work of Bakermans-Kranenburg, van IJzendoorn and Juffer (2003).

As described above, focussing on the impact of video feedback for the children involved and not discussing the impact on the parents did result in some difficulties when attempting to disentangle the mechanisms of change for the children. When investigating these it became clear that it was not possible to separate out the impact of the intervention on the children from the impact on the parent, as parental change was often cited as the mechanism by which children were benefitting from the intervention, i.e. hypothetically it was change in parental attitude and/or behaviour which led to a change in child environment which then led to a change in child attachment, behaviour etc. Therefore, reviews of the video feedback literature with greater scope to investigate the impact on both parents and their children would be required in the future in order to attempt to delineate the mechanisms of change for the children further.

Additionally, there is a growing research on the use of video feedback interventions with other populations, such as teachers and child-minders. The field

would benefit from further studies investigating these outcomes, so that a future systematic literature review could indicate whether similar conclusions could be made on the benefits to children.

References

Abidin, R. R. (1995). *The Parenting Stress Index (3rd ed.)*. Professional manual. Odessa, FL: Psychological Assessment Resources, Inc.

Achenbach, T. M., & Rescorla, L. A. (2000). *Manual for the ASEBA Preschool Forms & Profiles.* Burlington, VT: University of Vermont, Research Center for Children, Youth, & Families.

Bakermans-Kranenburg, M. J., Juffer, F., & van IJzendoorn, M. H. (1998). Interventions with video feedback and attachment discussions: Does type of maternal insecurity make a difference? *Infant Mental Health Journal, 19,* 202−219.

Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., & Juffer, F. (2003). Less is more: Meta-analyses of sensitivity and attachment interventions in early childhood. *Psychological Bulletin, 129,* 195−215.

Bakermans-Kranenburg, M. J., Van IJzendoorn, M. H., Mesman, J., Alink, L. R., & Juffer, F. (2008). Effects of an attachment-based intervention on daily cortisol moderated by dopamine receptor D4: A randomized control trial on 1-to 3-year-olds screened for externalizing behavior. *Development and psychopathology*, *20,* 805-820.

Bakermans-Kranenburg, M. J., Van IJzendoorn, M. H., Pijlman, F. T., Mesman, J., & Juffer, F. (2008). Experimental evidence for differential susceptibility: dopamine D4 receptor polymorphism (DRD4 VNTR) moderates intervention

effects on toddlers' externalizing behavior in a randomized controlled trial. *Developmental psychology*, *44*, 293.

Bates, J. E., Freeland, C. A. B., & Lounsbury, M. L. (1979). Measurement of infant difficultness. *Child Development, 50*, 794–803.

Bayley, N. (1993). *Bayley Scales of Infant Development, 2nd Edition*. San Antonio, TX: Psychological Corporation, Harcourt Brace.

Beebe, B. (2003). Brief mother–infant treatment: Psychoanalytically informed video feedback. *Infant Mental Health Journal, 24*, 24−52.

Beebe, B. (2010). Mother–Infant Research Informs Mother–Infant Treatment. *Clinical Social Work Journal, 38,* 17-36.

Bernal, M. E., Duryee, J. S., & Pruett, H. L. (1968). Behavior modification and the brat syndrome. *Journal of consulting and clinical psychology*, *32*, 447.

Benoit, D., Madigan, S., Lecce, S., Shea, B., & Goldberg, S. (2001). A typical maternal behavior toward feeding-disordered infants before and after intervention. *Infant Mental Health Journal, 22*, 611−626.

Benzies, K. M., Magill-Evans, J., Kurilova, J., Nettel-Aguirre, A., Blahitka, L., & Lacaze-Masmonteil, T. (2013). Effects of Video-Modeling on the Interaction Skills of First-Time Fathers of Late Preterm Infants. *Infants & Young Children*, *26*, 333-348.

Berger, M. M. (1978). *Videotape techniques in psychiatric training and treatment, (rev. ed.)* New York, NY: Brunner/Mazel Publishers.

Biringen, Z. (2008). *The Emotional Availability (EA) Scales, 4th edn*. Fort Collins, CO: Colorado State University.

Black, M. M., & Teti, L. O. (1997). Promoting mealtime communication between adolescent mothers and their infants through videotape. *Pediatrics, 99,* 432−437.

Colonnesi, C., Wissink, I. B., Noom, M. J., Asscher, J. J., Hoeve, M., Stams, G. J. J., Polderman, N., & Kellaert-Knol, M. G. (2012). Basic trust: An attachment-oriented intervention based on mind-mindedness in adoptive families. *Research on Social Work Practice, 23,* 179-188.

Coren, E., Barlow, J., & Stewart-Brown, S. (2003). The effectiveness of individual and group-based parenting programmes in improving outcomes for teenage mothers and their children: a systematic review. *Journal of Adolescence, 26,* 79–103.

Cramer, B. (1998). Mother–infant psychotherapies: A widening scope in technique. *Infant Mental Health Journal, 19,* 151−167.

Cummings, J. G., & Wittenberg, J. V. (2008). Supportive expressive therapy--Parent child version: An exploratory study. *Psychotherapy: Theory, Research, Practice, Training, 45,* 148.

Downs, S. H. & Black, N. (1998). The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *J Epidemiol Community Health, 52,* 377-84.

Dowrick, P. W. (1991). *Practical guide to using video in the behavioral sciences.* New York, NY: John Wiley & Sons.

Dowrick, P. W. (1999). A review of self modelling and related interventions. *Applied & Prevention Psychology, 8,* 23−39.

Egeland, B., Weinfeld, N. S., Bosquet, M., & Cheng, V. K. (2000). Remembering, repeating, and working through: Lessons from attachment-based interventions. In J.D. Osofsky & H.E. Fitzgerald (Eds.),*WAIM Hhandbook of infant mental health, vol. 4* (pp. 38−89). New York, NY: John Wiley & Sons.

Eyberg, S., & Pincus, D. (1999). *Eyberg Child Behavior Inventory & Sutter-Eyberg Student Behavior Inventory-Revised: Professional Manual.* Odessa, FL: Psychological Assessment Resources.

Feltham-King, C. (2010). What are the perceived benefits of an adoption support package using video interaction guidance with prospective adopters? An exploratory study.

Fivaz-Depeursinge, E., Corboz-Warnery, A., & Keren, M. (2004). The primary triangle: Treating infants in their families. In A.J. Sameroff, S.C. McDonough, & K.L. Rosenblum (Eds.), *Treating parent–infant relationship problems* (pp. 123−151). New York, NY: The Guilford Press.

Fukkink, R. G. (2008). Video feedback in widescreen: A meta-analysis of family programs. *Clinical Psychology Review, 28,* 904-916.

Fuller, F. F. & Manning, B. A. (1973). Self-confrontation reviewed: A conceptualization for video playback in teacher education. *Review of Educational Research, 43,* 469−528.

Goodman, R. (2001). Psychometric properties of the strengths and difficulties questionnaire. *Journal of the American Academy of Child & Adolescent Psychiatry, 40,* 1337-1345.

Häggman-Laitila, A., Seppänen, R., Vehviläinen-Julkunen, K., & Pietilä, A. M. (2010). Benefits of video home training on families' health and interaction: evaluation based on follow-up visits. *Journal of clinical nursing, 19,* 3504-3515.

Hitchcock, C. H., Dowrick, P.W., & Prater, M. A. (2003). Video self-modeling intervention in school-based settings: A review. *Remedial and Special Education, 24,* 36−45.

Hung, J.H.,&Rosenthal, T. L. (1981). Therapeutic videotaped playback. In J.L. Fryrear & B. Fleshman (Eds.), *Videotherapy in mental health* (pp. 5−46). Springfield, IL: Charles C. Thomas.

James, D. M., Wadnerkar-Kamble, M. B., & Lam-Cassettari, C. (2013). Video feedback intervention: a case series in the context of childhood hearing impairment. *International Journal of Language & Communication Disorders, 48,* 666-678.

Juffer, F., Bakermans-Kranenburg, M. J., & van IJzendoorn, M. H. (2005). The importance of parenting in the development of disorganized attachment:

Evidence from a preventive intervention study in adoptive families. *Journal of Child Psychology and Psychiatry, 46*, 263−274.

Kalinauskiene, L., Cekuoliene, D., Van IJzendoorn, M. H., Bakermans-Kranenburg, M. J., Juffer, F., & Kusakovskaja, I. (2009). Supporting insensitive mothers: the Vilnius randomized control trial of video-feedback intervention to promote maternal sensitivity and infant attachment security. *Child: Care, Health and Development*, *35*, 613-623.

Klein Velderman, M., Bakermans-Kranenburg, M. J., Juffer, F., & van IJzendoorn, M. H. (2006). Effects of attachment-based interventions on maternal sensitivity and infant attachment: differential susceptibility of highly reactive infants. *Journal of Family Psychology*, *20*, 266.

Lawrence, P. J., Davies, B., & Ramchandani, P. G. (2013). Using video feedback to improve early father–infant interaction: A pilot study. *Clinical child psychology and psychiatry*, *18*, 61-71.

Lieberman, A. F. (2004). Child–parent psychotherapy: A relationship-based approach to the treatment of mental health disorders in infancy and early childhood. In A.J. Sameroff, S.C. McDonough, & K.L. Rosenblum (Eds.), *Treating parent–infant relationship problems* (pp. 97−122). New York: The Guilford Press.

McDonough, S. C. (2005). Interaction Guidance: An approach for difficult-to-engage families. In C.H. Zeanah (Ed.), *Handbook of infant mental health (2nd. Ed.)* (pp. 485−493). New York, NY: Guilford Press.

Meharg, S. S., & Woltersdorf, M. A. (1990). Therapeutic use of videotape self-modeling: A review. *Advanced Behavioral Research Therapy, 2,* 85−99.

Mendelsohn, A. L., Dreyer, B. P., Flynn, V., Tomopoulos, S., Rovira, I., Tineo, W., Pebenito, C., Torres, C, Torres, H., & Nixon, A. F. (2005). Use of videotaped interactions during pediatric well-child care to promote child development: A randomized, controlled trial. *Developmental and Behavioral Pediatrics, 26,* 34−41.

Mendelsohn, A. L., Valdez, P. T., Flynn, V., Foley, G. M., Berkule, S. B., Tomopoulos, S., Fierman, A. H., Tineo, W., & Dreyer, B. P. (2007). Use of videotaped interactions during pediatric well-child care: impact at 33 months on parenting and on child development. *Journal of developmental and behavioral pediatrics: JDBP*, *28,* 206.

Moran, G., Pederson, D. R., & Krupka, A. (2005). Maternal unresolved attachment status impedes the effectiveness of interventions with adolescent mothers. *Infant Mental Health Journal, 26,* 231−249.

Muris, P., Meesters, C., & van den Berg, F. (2003). The strengths and difficulties questionnaire (SDQ). *European child & adolescent psychiatry*, *12,* 1-8.

Papousek, M. (2000). Einsatz von Video in der Eltern-Säuglings-Beratung und-Psychotherapie [Use of video-feedback in parent–infant counselling and parent–infant psychotherapy]. *Praxis der Kinderpsychologie und Kinderpsychiatrie*, *49,* 611−627.

Petersson, K., Petersson, C., & Hakansson, A. (2004). What is good parental education? Interviews with parents who have attended parental education sessions. *Scandinavian Journal of Caring Sciences, 18,* 82–89.

Polderman, N., Kellaert-Knoll, M. G., Storsbergen, H., Bongaerts, W. B., Corts, M., & De Pagter, J. N. (2008). *Manual of the attachment difficulties screening inventory 2–5 years (AISI 2–5 years).* Haarlem, The Netherlands: Basic Trust.

Schechter, D. S., Myers, M. M., Brunelli, S. A., Coates, S.W., Zeanah, C. H., Davies, M., Grienenberger, J. F., Marshall, R. D., McCaw, J. E., Trabka, K. A., & Liebowitz, M. R. (2006). Traumatized mothers can change their minds about their toddlers: Understanding how a novel use of videofeedback supports positive change of maternal attributions. *Infant Mental Health Journal, 27,* 429−447.

Sossin, K. M., & Cohen, P. (2011). Children's Play in the Wake of Loss and Trauma. *Journal of Infant, Child, and Adolescent Psychotherapy*, *10*, 255-272.

Sparrow, S., Balla, D., & Cicchetti, D. (2008). *Vineland Adaptive Behavior Scales.* New York, NY: NCS Pearson.

Sumner, G., & Speitz, A. (1994). *NCAST Caregiver / Parent-Child Interaction Teaching Manual.* Seattle, WA: NCAST Publications, University of Washington, School of nursing.

Tait, M., Nikolopoulos, T. P., & Lutman, M. E. (2007). Age at implantation and development of vocal and auditory pre-verbal skills in implanted deaf children. *International Journal of Pediatric Otorhinolaryngology, 71,* 603–610.

Van IJzendoorn, M. H., Vereijken, C. M., Bakermans-Kranenburg, M. J., & Marianne Riksen-Walraven, J. (2004). Assessing attachment security with the attachment Q sort: Meta-analytic evidence for the validity of the observer AQS. *Child development*, *75*, 1188-1213.

van Zeijl, J. (2006). *Externalizing problems in 1- to 3-year-old children: screening, intervention, and the role of child temperament.* Rotterdam: Optima Grafische Communicatie.

Wadnerkar, M. B., Pirinen, T., Haines-Bazrafshan, R., Rodgers, J., & James, D. (2012). A single case study of a family-centred intervention with a young girl with cerebral palsy who is a multimodal communicator. *Child: care, health and development*, *38*, 87-97.

Waters, E., & Deane, K. E. (1985). Defining and assessing individual differences in attachment relationships: Q-methodology and the organization of behavior in infancy and early childhood. *Monographs of the society for research in child development*, 41-65.

Webster-Stratton, C. (1994). Advancing videotape parent training: A comparison study. *Journal of Consulting and Clinical Psychology, 62,* 583−593.

Weiner, A., Kuppermintz, H., & Guttmann, D. (1994). Video Home Training (the Orion Project): A short-term preventive and treatment intervention for families with young children. *Family Process, 33,* 441−453.

Wels, P. M. A. (2004). *Helping with a camera: the use of video for family intervention.* Nijmegen: Nijmegen University Press.

Wissink, I. B., Colonnesi, C., Stams, G. J. J. M., Hoeve, M., Asscher, J. J., Noom, M. J., ... Kellaert-Knol, M. G. (2012). Validation of the attachment difficulties screening inventory 2–5 years (AISI 2–5 years). *Manuscript submitted for publication.*

Zelenko, M., & Benham, A. (2000). Videotaping as a therapeutic tool in psychodynamic infant–parent therapy. *Infant Mental Health Journal, 21*,192−203.

Zimmerman, L., Steiner, V., & Pond, R. (1992). *Preschool Language Scale–3.* San Antonio, TX: The Psychological Corporation.

Part 2: Empirical Paper

Maternal mentalization: do online and offline measures independently predict attachment security?

Abstract

Aims: It has been demonstrated that online and offline measures of maternal mentalization use relatively distinct neurological systems. As the unique influence of each on infant attachment classification has not yet been investigated, this study aims to compare the two.

Method: A combined sample of "referred" and "non-referred" mother-infant pairs were coded for reflective functioning and representational risk at time one, and reflective functioning, representational risk, infant attachment style and mind-mindedness at time two, 12 months later. The relationships between these measures were investigated using correlation and regression analyses.

Results: Reflective function and mind-mindedness were concurrently and predictively related, but with a shared variance of only 6%. Reflective function was not associated with attachment classification and mind-mindedness was associated with attachment security, but in the opposite direction than predicted.

Conclusion: Reflective function and mind-mindedness may capture different aspects of mentalizing (explicit vs. implicit). Relationships between the measures of mentalization and infant attachment classification were not as predicted.

Introduction

Attachment

Relationships between mother and infant have been recognised for many years as developmentally key for the growing child. Attachment theory was originally founded by Bowlby (1969). In attachment theory, interactions with the caregiver within the first year of life are aggregated to form the child's internal working models of the self and others, which Bowlby (1973) proposed establish the prototypes of all subsequent relationships.

Developments of theories regarding determinants of attachment

The concept of an attachment relationship evolved from initially being solely about promoting the child's physical protection to purporting that attachment relationships have a key role in developing the child's capacity to regulate emotional experience (Sroufe, 1996). The concept of a need for the regulation of an infant's state of arousal has linked together biological and psychological developmental theories. Attachment theory states that it is the desire to regulate the infant's internal mental state which drives both the child's instinctive protection promoting behaviours and the caregiver's reciprocal behaviours towards the child (Mikulincer, Shaver, & Pereg, 2003). Research in the field of neuroscience has supported this, alleging that the regulation of infants' mental states is central to the adaptive function of the developing brain (Schore, 1994; 2001). The development of the various theories and research regarding the key determinants of attachment will be briefly summarised below.

Caregiver behaviour

Initially, an infant's security of attachment was theorised to be related to the behaviour of the caregiver. For example, caregivers of infants with a secure attachment classification consistently respond to their child, therefore the child feels secure that their needs and communications will be responded to in a timely and appropriate manner (Aronoff, 2012; Schacter, Gilbert, & Wegner, 2009). In contrast, anxious attachment classifications are correlated with unpredictable caregiving (Anxious-resistant insecure (ambivalent) attachment; Crittenden, 1999; Solomon, George, & De Jong, 1995) or rejection by caregivers (Anxious-avoidant insecure attachment; Main, 1977; 1979).

Disorganised/disoriented attachment (Main & Solomon, 1990) is correlated with both "frightening" and "frightened" parental behaviour (Bronfman, Parsons, & Lyons-Ruth, 1999; Hesse & Main, 2006; Main & Hesse, 2005). As early attachment relationships serve a protective function (Bowlby, 1982), perceived threats within the environment are thought to activate infants' attachment systems and the infant seeks out proximity, comfort and protection from the attachment figure. However, if it is this attachment figure that behaves in a frightening way towards the infant, or is unable to regulate their own fearful affect, this results in the paradoxical position of the infant seeking comfort from the cause of the environmental threat (Hesse & Main, 2006; Main & Hesse, 1990). The attachment system then becomes disorganised (Abrams, Rifkin, & Hesse, 2006; Dutra, Bureau, Holmes, Lyubchik, & Lyons-Ruth, 2008; Hesse & Main, 2006; Madigan, Moran, & Pederson, 2006; Main & Hesse, 1990), which is a strong predictor of future adverse outcomes for the child, such as aggression towards peers, raised cortisol secretion, controlling attachment behaviours towards parents and psychopathology (Carlson, 1998; Dutra et al., 2008;

Dutra & Lyons-Ruth, 2005; Lyons-Ruth, Alpern, & Repacholi, 1993; Lyons-Ruth, Dutra, Schuder, & Bianchi, 2006; Lyons-Ruth, Easterbrooks, & Cibelli, 1997; Spangler & Grossman, 1993; Wartner, Grossman, Fremmer-Bombrik, & Suess, 1994).

The role of maternal attachment

A mother's recollection of and ability to reflect on her own early experiences seems also to be related to the security of the current attachment relationship between mother and child. This is investigated by eliciting a story about the mother's own childhood attachment experiences which captures representations of past relationships and their perceptions of how these experiences have impacted upon their current relationships. Main, Kaplan and Cassidy (1985) documented strong links between a mother's state of mind in relation to attachment and the quality of her child's attachment. These findings have been replicated numerous times, confirming that a mother's ability to regulate and organise her own thoughts and feelings about past relationships with her own caregivers is linked to her capacity to regulate, organise and sensitively respond to her own child's needs (see Carlson & Sroufe, 1995; Main, 1995, 2000; van IJzendoorn, 1995 for reviews).

Maternal sensitivity

Maternal sensitivity is defined as the ability to perceive signals from the infant, interpret these correctly and then to respond promptly and appropriately (Ainsworth, Blehar, Waters & Walls, 1978; Leerkes, Blankson & O'Brien, 2009). Researchers have emphasised that that the capacity to accurately interpret the infant's subjective mental states (emotions, thoughts) and the resulting accuracy of the

response to the infant's signals are crucial (Fonagy, Gergely, Jurist & Target, 2002; Gottman, Katz & Hooven, 1996; Meins, Fernyhough, Fradley & Tuckey, 2001). Several studies have found that mothers' sensitivity towards their infants was associated with the mothers' own attachment style, as measured by the Adult Attachment Interview (AAI; Main & Goldwyn, 1990). Mothers classified as securely attached were likely to demonstrate greater sensitivity towards their child(ren) (e.g. Crowell & Feldman, 1988; Crowell, O'Connor, Wollmers, Sprafkin, & Rao, 1991; Grossman, Fremmer-Bombik, Rudolph, & Grossmann, 1988; Ward & Carlson, 1995). Therefore this implies that sensitivity may be mediating the parental state of mind in relation to attachment.

Mentalization

The mechanisms underlying the intergenerational transmission of attachment were traditionally hard to pin down (Main, Kaplan, & Cassidy, 1985; Slade, Grienenberger, Bernbach, Levy, & Locker, 2005; Van IJzendoorn, 1995). Fonagy and Target (2005) proposed that it may be the capacity for mentalization which explains this empirical gap between mother and infant attachment. 'Mentalization' is the capacity to understand that the behaviours of others are linked in meaningful ways to their underlying mental states, such as feelings, wishes, thoughts and desires (Fonagy et al., 1995; Fonagy, Gergely, Jurist, & Target, 2002; Fonagy & Target, 1998). In terms of parent-infant interactions, mentalization is the parents' capacity to treat the child as a psychological agent, with the ability to reason about the goals, intentions and beliefs of themselves and others (Davies, 1994; Perner, 1991). It has been suggested that mentalizing is the capacity which allows mothers to show accurate sensitivity by understanding the intentionality of the infant. High sensitivity

leads to secure infant attachment, and therefore impairments in the capacity for mentalization may play a role in mediating how and why various psychopathologies develop (Bateman & Fonagy, 2004; Fonagy & Bateman, 2006, 2008; Fonagy & Target, 2006; Luyten, Fonagy, Mayes, & Van Houdenhove, 2009; Sharp, Fonagy, & Goodyer, 2008; Slade, 2005).

Explicit vs. implicit mentalization

Mentalization is a multidimensional construct. Luyten, Fonagy, Mayes and Van Houdenhove (2009) proposed four polarities that mentalization can be organised along: automatic/controlled, cognitive/affective, internal/external-based, and self/other focused. The first of these polarities captures aspects of the others and is based on Lieberman's neuroscientific analysis of the mentalization construct (Spunt & Lieberman, 2013) which showed that mentalizing can be categorised into two broad types. The first is explicit or online, which is controlled, verbal, reflective and aware. It is a slow, sequential process that requires attention, intention and effort. In the present context we would suggest that the parent has a model of the child's mind in their mind and cognitively computes the child's mental state and identifies significant aspects of the world from the child's perspective. The second category is implicit or offline, which is automatic, unconscious and nonverbal. In the context of parenting this involves extracting the child's intention implicitly from their behaviour, body movements and facial expression. Implicit mentalizing presumes parallel and therefore more rapid processing. It is reflexive, requiring little effort, without the need of focussed attention or intention (Satpute & Lieberman, 2006).

Lieberman's review demonstrated that these two dimensions of mentalization are impacted by two relatively distinct neurological systems (Lieberman, 2007).

Implicit mentalizing involves phylogenetically older brain circuits that depend on sensory information; such as the amygdala, basal ganglia, ventromedial prefrontal cortex (VMPFC), lateral temporal cortex, and the dorsal anterior cingulate cortex (ACC). In contrast, explicit mentalizing relies on phylogenetically newer brain circuits which are involved in the processing of linguistic and symbolic material; such as the lateral prefrontal cortex (LPFC), medial prefrontal cortex (mPFC), lateral parietal cortex (LPAC), medial parietal cortex (mPAC), medial temporal lobe (mTL), and rostral ACC (rACC) (Lieberman, 2007; Mayes, 2006)

Implicit and explicit measures may therefore capture different elements of parental mentalization and so independently predict child attachment security. If this is the case it would be important to investigate which measure may be more strongly related to child attachment security. Alternatively, if they are not independently predictive, these measures could be linked whereby one measure moderates the relationship between attachment style and the other measure; for example, parental implicit measures predict parental explicit measures which then predict child attachment security.

Measuring mentalization

Explicit measures

Parent Development Interview

The Parent Development Interview (PDI; Slade, Aber, Bresgi, Berger, & Kaplan, 2004) was developed due to the theory that caregiving behaviours are guided at a cognitive level by mental representations which determine how the mother thinks and feels about her child, herself as a parent, and her relationship with her child (Slade, Belsky, Aber, & Phelps, 1999). It is these, rather than representations of

past relationships (as in measures such as the AAI; Main & Goldwyn, 1990), that the PDI attempts to detect. The PDI is primarily designed to capture parents' understanding of their own and their infant's internal experiences during times of high emotional arousal through discussion of the infant's behaviours, thoughts and feelings. Questions about the parents' own experiences of being parented are also included, along with a discussion about how these experiences may have impacted on their current relationship with their child.

The PDI measures reflective function (RF; Fonagy, Target, Steele, & Steele, 1998) using an adaptation of the AAI RF coding system (Fonagy, Steele, Steele & Target, 1997). RF can be defined as parents' ability to non-defensively consider their infant's mental states, emotions, and behavioural intentions. Fonagy and colleagues hypothesised that RF provides the basis for parents' emotionally containing responses (Bion, 1962), which facilitate the development of secure infant attachment (Fonagy, et.al., 1995; Fonagy, Steele, Moran, Steele, & Higgitt, 1991).

Coding of overall RF is, in part, based on responses to 15 specific demand questions from the PDI interview (the mother is asked to describe a time when she clicked with the child; a time the mother felt she and her child were not clicking; how the mother's relationship with the child affects the child's personality; a time the mother felt joy; pain; guilty; angry; needy; how the mother felt having a child had changed her; how her child behaves when upset; whether the child ever feels rejected; the mother's family history; how mother and infant experience separation from each other; a time she felt like she was losing her child). This score indicates how much the parent is able to mentalize about each concept. From these demand questions, four stand out as most clearly tapping into the relationship between mother and child: a time when the mother clicked with the child; a time the mother felt she

and her child were not clicking; how the mother experiences separation from her child; and how the mother's family history impacts her parenting.

Research has demonstrated a relationship between RF and both concurrent and subsequent infant attachment security (Fonagy, Steele & Steele, 1991; Schechter et al., 2005). For example, Slade, Grienenberger, Bernbach, Levy and Locker (2005) found that PDI RF mediates the relationship between adult and infant attachment classification. After this was taken into account there remained no association between adult (measured by the AAI) and child attachment status, thereby demonstrating that it is the parent's capacity to understand the nature and function of their own and their child's mental states that promotes infant attachment security.

Assessment of Representational Risk

The Assessment of Representational Risk (ARR; Sleed & Wain, 2013) is a relatively new coding system which was developed as an alternative coding system that could be applied to parental narratives from the PDI. It is tailored to access the parental representations that tend to occur in less optimal parent-infant relationships using three broad subscales: Hostile, helpless and narcissistic. The ARR was designed to capture the content of caregiver cognitions and affect in relation to their infants and themselves as caregivers.

Sleed (2013) investigated the reliability and validity of the ARR when compared to the PDI RF and measures of attachment security. The ARR score discriminated between normative and high-risk (clinical and prison) samples, and the high risk mothers also had lower levels of RF. Additionally the ARR score was negatively correlated with optimal concurrent mother-infant interactions, whereas RF was positively correlated with this, and both correlations were equally strong. The

ARR demonstrated better concurrent validity with self-reported maternal attachment than maternal RF did. In addition, ARR and RF scores when infants were under 12 months of age predicted parental and behavioural interaction ratings conducted one year later equally well. The relationship between RF score in the first year of infant's life and later mother-infant interactions was found to be moderated by total ARR score. In addition, the Hostile subscale of the ARR mediated the effect of RF on the quality of mother-infant interactions one year later.

Implicit measure

Mind-Mindedness

Mind-Mindedness (MM; Meins, 1997) captures an individual's tendency to consider intentionality in their interactions with and representations of others (Dennett, 1987). It refers to the regularity with which caregivers interact with the infant as an individual with a mind and intentionality (Meins, 1997), "rather than merely a creature with needs that must be satisfied" (Meins, Fernyghough, Fradley, & Tuckey, 2001, p. 638). Meins et al. (2001) proposed that MM investigates sensitivity with a more specific focus than previous methods used since the concept of maternal sensitivity (Ainsworth, Bell, & Stayton, 1971; 1974) was operationalised.

In order to be mind-minded, caregivers form an internal representation of the infant's internal state which they then use to inform their behavioural response to the infant's cues. Meins and Fernyhough (1999) state that it is this capacity to respond to the infant as an intentional being which enables the caregiver to attribute meaning to the infant's behaviour, which in turn increases the likelihood of the caregiver then responding quickly and accurately to the infant's underlying need.

Meins et al. (2001) operationalised MM as the propensity to comment appropriately on the infants' internal states during interactions. Therefore, assessment of parental MM is conducted by analysing caregiver comments on the infant's assumed internal state during online parent-infant interactions. These comments can then be classified as attuned or non-attuned by assessors according to the MM coding manual (Meins & Fernyhough, 2010).

Meins (1998) used an interview to assess MM and found that mothers of securely attached infants were more likely than those of insecurely attached infants to focus on the child's mental attributes when describing them. Meins, Fernyhough, Fradley and Tuckey (2001) investigated MM during mother-infant interactions using behavioural and linguistic measures. They found that the number of MM comments was positively correlated with maternal sensitivity, and that MM was a better predictor of infant attachment security than observer ratings of maternal sensitivity. However it was only the linguistic measure of MM which was significantly related to infant attachment security at 12 months.

Rationale of the current study

The concept of MM does appear to overlap with the concept of RF, as both emphasise the importance of the parent's capacity to think about the child's internal state and are trying to measure the same concept. However, referring back to the work of Lieberman (2007) and Luyten, Fonagy, Mayes and Van Houdenhove (2009) it is clear that MM and RF reflect the coding of two distinct different categories of mentalizing, which are therefore impacted by relatively distinct neurological systems. RF captures the explicit category. It is controlled, cognitive, internal-based and self-focussed. The parent has a model of the child's mind in their mind and

cognitively computes the child's perspective, meaning the responses are controlled, verbal, reflective and aware. RF is measured by parent's tapping memories of interactions with the child and is therefore likely to reflect an aggregate of experiences.

In contrast, MM captures the implicit category. It is automatic, affective, external-based and other-focussed. The parent extracts the child's intention implicitly from their behaviour, body movements and facial expression, meaning the response is automatic, unconscious and often nonverbal (although in coding MM it is verbal responses which are captured, and whether or not these are mind-related and appropriate). MM is very much in the here and now, tied to the current parent-child interaction, and taps the person's currently available capacities. Therefore it is possible that the two measures call on different aspects of mentalizing capacity and may not be as related as one may first imagine and may be independently predictive of attachment security. It is also interesting to note that these two methods of measuring mentalization have not, as yet, both been measured in the same study, and so the exact relationship between them remains somewhat unclear.

The aim of this study is to explore whether scores on the PDI RF scale are concurrently and/or predictively related to a linguistic measure of MM. A link between MM and another new way of coding the PDI, the ARR, will also be investigated. In addition, the relationship between each of these measures and infant's attachment classification (as measured using the Strange Situation Procedure) will be investigated, including whether any of the measures are independently predictive of attachment classification or not.

Aims and hypotheses

This study aims to establish whether PDI RF and MM assess the same capacity, and to validate the MM measure in this context. The association between both maternal measures of mentalization and the attachment classification of the children will also be explored. In addition, the validity of the newly developed ARR coding system for the PDI will be further examined.

The following predictions are made:

- It is predicted that PDI RF will concurrently correlate strongly and positively with MM, as these are both measures of mentalization.
- It is expected that RF score at recruitment will predict MM score 12 months later, and that this prediction will be almost as strong as RF and MM concurrently. This is based on the assumption that a mother's mentalizing capacity in relation to a particular child is considered to be an enduring capacity that characterises a particular mother-infant pair.
- It is predicted that the RF scale subcategories which are most strongly associated with maternal representations of the interactions between infant and mother will principally account for any correlations between these measures.

As summarised above, mentalizing has been proposed as the capacity which underpins mothers' manifest accurate sensitivity, and we know that high sensitivity predicts secure infant attachment. In contrast, poor mentalizing and lack of accurate sensitivity may lead to insecurity and most particularly, disorganisation of infant attachment. Therefore, the following additional predictions were made:

- It is predicted that there will be a significant correlation between explicit mentalizing and attachment classification, where higher RF scores increase the likelihood of secure attachment classification and lower RF scores would increase the likelihood of disorganised attachment, and vice versa.
- It is also predicted that there will be a significant correlation between implicit mentalizing and attachment classification, where mothers with higher overall MM would be more likely to have securely attached children and those with lower overall MM would be more likely to have children with a disorganised attachment classification, and vice versa.
- Further, it is hypothesised that attuned MM scores will be largely responsible for the relationship between higher MM and secure attachment classification and that non-attuned MM scores will be related to disorganised attachment classification.

As ARR quantifies the representations of negative constructs about the infant, it is predicted that ARR will correlate strongly and negatively with both RF and attuned MM scores, as these capture mothers' mentalization ability. Therefore as ability to mentalize the child increases, negative representations about the infant are predicted to decrease. However, it is predicted that ARR will correlate positively with non-attuned MM score, as both of these measures capture a sub-optimal aspect of mother-infant interaction.

Method

This study is in part a joint project with a fellow trainee on the UCL doctorate in clinical psychology course, Vivien Wong (Wong, 2014). The dataset was shared between trainees who each approached it with a different research question. The details of each trainee's specific contributions are outlined in Appendix 1.

Participants

Participants were recruited from previous research into mother-infant interactions which was conducted at the same centre where the present research took place. A "non-referred" sample of participants was combined with two "referred" samples in this research; those offered parent-infant psychotherapy and those who had treatment as usual.

Sample 1

The first sample consisted of non-referred mothers and their infants, defined in this case by having no known mental health related problems. Participants were recruited from mother and baby groups and children's centres, where researchers gave information to mothers whose infants were under 12 months of age.

Sample 2+ 3

Participants in the second two samples, "referred" mothers, were independently identified (for example, by their GP, health visitor, practice nurse, Sure Start worker, psychiatrist) as requiring a formal intervention. Inclusion criteria included 'probable psychiatric caseness' based on a screening instrument, the

General Health Questionnaire 28 (GHQ-12; Goldberg & Williams, 1988), on which they were required to score at least 4 out of 5. Referred mothers were then assigned to one of two groups, Parent-Infant Psychotherapy (PIP) or treatment as usual (TAU).

Randomisation

Random allocation of participants in the referred sample to PIP or TAU was carried out by an external researcher, independent of the study and not involved in the assessment procedure. Randomisation 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 treatment or control group, keeping the two groups as balanced on these variables as possible. The researcher carrying out the randomisation informed the research team, who then informed the participants of the allocation. All data coding was carried out by blind raters; although interviewers and mothers could not be blind to treatment arm.

TAU group

The mothers and infants in the TAU group continued to receive the standard health and social care services available to them. These included (in parentheses is percent of TAU families using this service during the study period): health visitors (60%), GP's (25%), psychiatrists (25%), counsellors (18%), psychologists (18%), family support workers (8%), community mental health teams (7%), child psychologists (7%), and psychotherapists (7%). Almost half (46%) of the TAU

sample had not used any mental health services during the 12 month follow-up period of the study.

PIP group

Those allocated to the PIP group also continued to receive the standard services available. There were no significant differences in the number of contacts with health, social care, and mental health services used between groups during the study period. In addition to routine care, mother-infant pairs in the PIP group were invited to attend appointments with one of six experienced parent-infant psychotherapists. The model of intervention was manualised (Baradon et al., 2005) and regular supervision ensured adherence to the PIP protocol. Appointments were initially offered on a weekly basis, and could be moved to fortnightly as the intervention progressed. The intervention continued until a mutually agreed ending between mother and therapist was planned. For those who attended at least one PIP session, the mean number of sessions attended during the one year study period was 16 (range 1 to 49), and 41% of them had completed therapy by 6 months, although some families continued to attend PIP sessions after the final follow-up (T2, which data is reported from below).

Participant inclusion criteria

All infants were less than 12 months of age at baseline. Both samples of participants were from inner city areas identified as experiencing 'socio-economic deprivation'. In addition they met at least one of the following criteria for social exclusion: (1) low income households (eligibility for family credit or income support); (2) long term unemployment (> 2 years); (3) temporary or overcrowded

accommodations (> 2 persons per room); (4) single; (5) presence of chronic physical illness or disability; (6) early childhood history of foster or institutional care; (7) social isolation associated with recent relocation; (8) less than 20 years of age; or (9) previous diagnosis of non-psychotic psychiatric illness. The average number of these criteria met by the sample was 2.55 (range 1-6).

Participant exclusion criteria

Exclusion criteria for mothers were (1) non-English speaking; (2) current psychosis; (3) substance abuse disorders/chronic drug dependence; (4) IQ below 70. These criteria were included because they may have limited their ability to participate in psychological treatments.

Exclusion criteria for infants were any sensory or motoric disability that prohibited the child's participation in standard developmental assessments (e.g. blindness, hearing impairment, cerebral palsy).

Research design

Data was collected from participants on two occasions, Time 1 (T1), which began at the appointment when mothers consented to participate and was concluded approximately a week later, and again 12 months later at Time 2 (T2). On both occasions participants completed the Parental Development Interview (PDI; Slade, Aber, Bresgi, Berger, & Kaplan, 2004). The PDI was scored in two different ways, using the Reflective Function scale (RF; Fonagy, Target, Steele, & Steele, 1998) and the Assessment of Representational Risk (ARR; Sleed & Wain, 2013). The scores on these measures were the independent variables; details on each are presented below.

The dependent variable was mind-mindedness (MM) score based on ratings of video play interactions between mother and child. Videos were only coded at T2, at this point free-play interactions between mother and infant were videotaped and the conversation between mother and infant was transcribed and scored using the method described below. Participant videos were randomised, using a computerised random number generator, for the purpose of transcription and coding to ensure that coders were blind to participant sample. Additionally at T2 participants completed the Strange Situation Procedure (SSP; Ainsworth et al., 1978)

Measures

1) The **Parental Development Interview Revised, Short Version** (PDI-S; Slade, Aber, Berger, Bresgi, & Kaplan, 2010; see Appendix 2):

The PDI is a semi-structured clinical interview designed to capture maternal representations in relation to a specific parent-child relationship. The PDI is conducted with a parent without the child present. It typically takes 1 ½ to 2 hours to administer and contains 40 questions about their child and the relationship between parent and child, resulting in autobiographical narratives. The PDI is designed to capture parents' understanding of their own and their infant's internal experiences during times of high emotional arousal through discussion of the infant's behaviours, thoughts and feelings. Questions about the parents' own experiences of being parented are also included, along with a discussion about how these experiences may have impacted on their current relationship with their child. The PDI consists of questions which are categorised as either "permit" or "demand" questions. The demand questions are identified as ones which encourage the parent to mentalize.

The permit questions tap into parental representations, and may also provide insight into the parent's capacity to mentalize.

Coding systems for the PDI:

- **Parental Reflective Functioning** (RF; Fonagy, Target, Steele, & Steele, 1998; see Appendix 2): The RF coding system used for the PDI is an adaptation of the RF coding system which was originally developed by Fonagy, Steele, Steele and Target (1997) for use on the Adult Attachment Interview (AAI; Slade, Bernbach, Grienenberger, Levy, & Locker 2004). RF refers to the parent's capacity to hold the child in mind, and to consider the child accurately as an intentional being. Higher scores indicate a greater degree of insight into the typical mental function of the infant in addition to a greater understanding of the interaction between the mother's mental states and her understanding of the child's experience. Coding of the PDI using this system is currently the way recommended by the PDI authors. The use of the RF coding system for scoring the PDI was validated by Fonagy, Target, Steele and Steele (1998) who reported adequate inter-rater reliability and construct, discriminant and predictive validity.
- **Assessment of Representational Risk** (ARR; Sleed & Wain, 2013; see Appendix 2): The ARR coding manual was developed to be applied to parental narratives from the PDI (Slade et al, 2004). It is tailored to access parental representations which tend to occur in less optimal parent-infant relationships. The ARR was developed in order to address several drawbacks of current methods of measuring parental representations that are likely to be linked with subsequent child attachment disorganisation (e.g. Crawford & Benoit, 2009; George & Solomon, 2008; Oppenheim & Koren-Karie, 2002)

which tend to be very complex and require extensive training and knowledge of attachment theory. There are 10 dimensions of risk and resilience in the coding system: Hostility (parent's experience); Hostile/frightening parent behaviour; Fearful affect; Helplessness; Emotional distress; Idealisation; Enmeshment/Role reversal; Incoherence; Supportive presence; and Mutual enjoyment. Exploratory factor analysis revealed three broad subscales: Hostile (comprised of Hostility (experience), Hostility (behaviour), Supportive presence and Mutual enjoyment), helpless (comprised of Fearful affect, Helplessness and Emotional distress) and narcissistic (comprised of Idealisation and Enmeshment). The reliability and validity of the ARR have been demonstrated by Sleed (2013).

2) **Mind-Mindedness** (MM; Meins & Fernyhough, 2010; see Appendix 2): The Mind-Mindedness manual is for an on-line, interaction based coding scheme, where mother-infant pairs are filmed during free-play. Following this the video is viewed and transcribed verbatim. The percentage of Mind-related comments out of the total number of comments a mother makes is then calculated. This total score is then split between the percentage of attuned and non-attuned mind-related comments. Mind-mindedness captures an individual's tendency to consider intentionality in their interactions with, and representations of, others (Dennett, 1987). In terms of infants and caregivers it refers to the regularity that caregivers interact with the infant as an individual with a mind and intentionality (Meins, 1997). The reliability of the mind-mindedness coding scheme has been reported in several studies (e.g. Laranjo, Bernier, & Meins, 2008; Lundy, 2003; Meins et al., 2001).

3) **Strange Situation Procedure** (SSP; Ainsworth et al., 1978):

In this procedure mother, infant, and stranger are videotaped interacting in eight episodes in a clinic room containing age-appropriate toys. Two separations and reunions between the mother and infant occur which are designed to invoke mild fear in the infant so that their attachment system is activated. The subsequent goal of infant behaviour at reunion is to elicit protection, care and comfort from the caregiver in order to achieve a feeling of safety (George & Solomon, 2008).The SSP is considered the "gold standard" against which many other measures of attachment have subsequently been validated (Farnfield, Hautamäki, Nørbech, & Sahhar, N., 2010).

Recruitment Procedure

"Non-referred" mothers were recruited from mother and baby groups and children's centres. Participation was on a voluntary basis. Families who were potentially interested in taking part gave their contact details to the researcher. These mothers were then contacted by telephone and, if they agreed, an appointment was made. They chose to see the researcher either in their own homes, the clinic or in the local children's centre from which they were recruited. A small financial incentive was offered as part of the invitation to participate.

"Referred" mothers were independently identified (for example, by their GP, health visitor, practice nurse, Sure Start worker, psychiatrist) as requiring formal intervention and potentially meeting the inclusion criteria described above. The research team then contacted mothers and provided them with information about the study. If mothers consented they then met with a researcher who assessed whether they met the inclusion criteria using a semi-structured interview, the General Health

Questionnaire 28 (GHQ-12; Goldberg & Williams, 1988), and the Test of Nonverbal Intelligence (TONI-3; Brown, Sherbenou, & Johnsen, 1997).

Following screening eligible families were invited to take part in the study. Mothers gave informed consent (Appendix 3) at the first appointment, after having time to read the information sheet (Appendix 4) and ask questions.

Testing Procedure

Following recruitment, all participants completed a battery of tests at baseline (T1), including the PDI. After 12 months the baseline battery of tests were repeated (T2). Additionally, the SSP was conducted and video clips of mothers and their infants in "free play" were recorded. This recording could either take place in the clinic, the local children's centre from which they were recruited or their own homes, depending on the mother's preference. Age appropriate toys were provided and mothers were given one instruction: *"Please play with your baby as you would if you had some free time together at home"*. The parent and infant must be free to interact without any other distractions, therefore other children, friends or family members must not be present. The researcher recording the videos should aim to remain as unobtrusive during filming as possible, though at the same time attempting to maintain a clear view of mother and child. The researcher completing the recording was not involved in the transcribing, coding or scoring of Mind-Mindedness, to ensure that coders were blind to participant sample.

Coding Procedure

Mind-Mindedness

Prior to transcription and coding the videos were assigned an identification number and then randomised, using a computerised random number generator, to ensure that coders were blind to participant sample. Videos were transcribed verbatim and then coded for mind-mindedness using the Mind-Mindedness Coding Manual Version 2.0 (Meins & Fernyhough, 2010), an on-line, interaction based coding scheme which allows MM to be coded when mother-infant pairs are engaging in free-play. This involved identifying all comments which relate to the infant's internal state. Meins and Fernyhough defined mind related (MR) comments as any comments which "(a) uses an explicit internal state term to comment on what the infant may be thinking, experiencing, or feeling; or (b) 'puts words into the infant's mouth' with the caregiver talking on the infant's behalf". The percentage of MR comments out of the total number of comments a mother makes whilst interacting with the infant is then calculated.

Once all MR comments are identified, coders must then decide whether each comment is attuned or non-attuned, which have been found to be separate aspects of behaviour which are unrelated to each another (Arnott & Meins, 2007; Meins et al., 2001; Meins et al. 2010). This is achieved by watching the video and using the coder's impression of the infant's mental state to decide whether or not they agree with the mother's interpretation. Scores, as a percentage of the transcript, are then calculated for total mind-mindedness, attuned mind-mindedness and non-attuned mind-mindedness. This enables coding to control for mothers' differences in verbosity.

In this study, there were two coders. In order to ensure that results were reliable, coders coded an overlapping 25% of the videos. A minimum inter-rater reliability level of 80% was required, which was achieved.

Reflective Functioning

Overall RF score is computed by coding the level of parental RF in the 15 specific demand questions from the PDI interview (a time when the mother clicked with the child; a time the mother felt she and her child were not clicking; how the mother's relationship with the child affects the child's personality; a time the mother felt joy; pain; guilty; angry; needy; how the mother felt having a child had changed her; how her child behaves when upset; whether the child ever feels rejected; the mother's family history; and how mother and infant experience separation from each other; a time she felt like she was losing her child). This score indicates how much the parent is able to mentalize about each concept. As the demand questions may also indicate mentalizing capabilities, coders will also consider the transcript as a whole when assigning an overall RF score. Total scores range from -1 (negative or bizarre RF) to 9 (marked RF). Scores of 3 or below are considered low, scores between 4 and 6 are moderate and scores of 7 or above are high (Fonagy, Target, Steele, & Steele, 1998; Slade, Bernbach, Grienenberger, Levy, & Locker, 2004). Coding usually takes 1 to 2 hours per transcript.

Assessment of Representational Risk

To calculate ARR scores verbatim transcripts from the PDI interview are coded on the 10 dimensions on a 5 point Likert scale from 1 to 5. Coders read through the transcript and identify areas of text where content relevant to specific dimensions are present. Instances where the dimension is instantiated are then read and compared to descriptions within the manual in order for them to be scored. Scores are based on both frequency and intensity of occurrences whereby a higher score indicates more frequent and/or extreme examples of a theme. Child's age is

always taken into account, so that scoring can be developmentally appropriate. Coding usually takes 1 to 2 hours per transcript.

Strange Situation Procedure

Trained coders review the video recordings of the infant in each of the eight episodes and, using an assessment protocol, classify the infant into an attachment categories (secure, avoidant, resistant, disorganised; Ainsworth, Blehar, Waters & Wall, 1978; Main & Solomon, 1986, 1990) based on their attachment behaviour patterns, in particular upon reunion with the mother. For the purpose of this study two dichotomous categories of classification were of investigated: "disorganised" either yes or no, and "secure (not disorganised)" either yes or no. These categories were most of interest in this study because disorganised attachment has widely been found to be a predictor of later psychopathology in comparison to non-disorganised attachment (e.g. Carlson, 1998; Dutra et al., 2008; Dutra & Lyons-Ruth, 2005; Lyons-Ruth, Dutra, Schuder, & Bianchi, 2006).

Ethical considerations

Ethical approval was granted by Camden and Islington community local Research Ethics Committee (REC) (Reference: 05/Q0511/47), see Appendix 5.

Participation was voluntary and written informed consent was obtained from all participating mothers. All data collected for the research was confidential within the research team, unless the researchers felt that participants were at risk of harm to themselves or others. Research data was kept very securely, with individual information identifiable only by ID numbers, rather than names, to protect anonymity.

Data analysis

Statistical analysis was conducted using the Statistical Package for the Social Sciences Version 22 (SPSS).

As the scores from the different samples of participants (non-referred, referred-PIP and referred-TAU) were combined and treated as one group for the analyses it was investigated whether the scores on each outcome variable differed significantly between samples. Where appropriate, sample/participant group was included as a confounding variable in the analysis and the results were compared to those of the analysis without including this as a confound.

The MM, RF, ARR and SSP scores were tested to see if they met parametric assumptions of normality. Skewness and kurtosis values within the range +/-2(*SE*) are generally considered normal. There were no violations of the assumption of a normal distribution for RF, ARR or SSP on the basis of the observed skewness and kurtosis of the scores. However, the MM scores violated these assumptions of normality. Additionally the histograms demonstrated that the data were positively skewed. In order to use parametric analyses a square root transformation was used to correct this.

The percentage of non-attuned mind related comments was very small because the majority of the mothers do not make many non-attuned comments. This violation of normality could not be addressed by transformation. Therefore, in order to investigate non-attuned comments further, this measure was converted into a binary variable indicating whether or not the mother said <u>any</u> non-attuned comments during the video clip.

Bivariate correlations were conducted to investigate whether any confounding variables existed for the dependent variable, MM. We tested whether

mothers' age, mothers' IQ, mothers' ethnicity, children's gender, the family's total social exclusion score, the number of children in the household or children's age correlated significantly with any of the mind-mindedness scores. The only significant correlation observed concerned total social exclusion score which negatively correlated with the binary variable for attuned percent of mind-related comments, point by serial $r(76) = -.26$, $p = .024$. However, as this is a very small correlation and only with one binary variable it could not account for account for a substantial amount of variance pertinent to the predictions. Therefore the decision was made not to control for confounding demographic variables in the subsequent analyses even if there were differences in terms of demographics between subgroups analysed in the study.

To test the hypotheses outlined in the Introduction, Pearson's correlations will be used to investigate whether there are significant relationships between the various measures concurrently and between the two time points, T1 and T2. If significant correlations are found between MM (the dependent variable) and any of the independent variables, then linear regressions will be conducted to investigate the amount of variance in MM explained by the other variable. In addition, significant correlations will be further investigated to determine which of the subscales may be responsible for the observed association, using linear and logistic regressions as appropriate. Although multiple correlations will be performed, as the comparisons examined were part of the hypotheses of the study (i.e. laid out a priori ahead of testing) adjustments for multiple comparisons (such as the Bonferoni) are not necessary (Field, 2009). However, these will be made to investigate any significant associations that were not hypothesised.

Results

Participant characteristics

Demographic information for the 127 participants is presented in Table 1.

Table 1: Demographic Variables of Mothers and Children

Measure	Referred (PIP)	Referred (TAU)	Non-referred
Mother age at baseline			
Years (SD)	30.90 (6.07)	31.21 (5.87)	33.17 (4.45)
Mother education N (%)			
None	3 (7.9)	2 (5.7)	0 (0)
GCSE	7 (18.4)	6 (17.1)	4 (7.4)
A level	5 (13.2)	7 (20.0)	5 (9.3)
Diploma	2 (5.3)	8 (22.9)	4 (7.4)
Degree	18 (47.4)	11 (31.4)	20 (37.0)
Post graduate	3 (7.9)	1 (2.9)	21 (38.9)
Mother ethnicity N (%)			
White	22 (57.9)	24 (686)	41 (75.9)
Black	6 (15.8)	4 (11.4)	0 (0)
Asian	6 (15.8)	4 (11.4)	6 (11.1)
Mixed race	3 (7.9)	1 (2.9)	5 (9.3)
Arabic/Middle Eastern	1 (2.6)	2 (5.7)	2 (3.7)
Child age at baseline			
Months (SD)	4.06 (3.24)	3.77 (3.03)	7.41 (2.64)
Boys N (%)	23 (60.5)	24 (68.6)	27 (50)

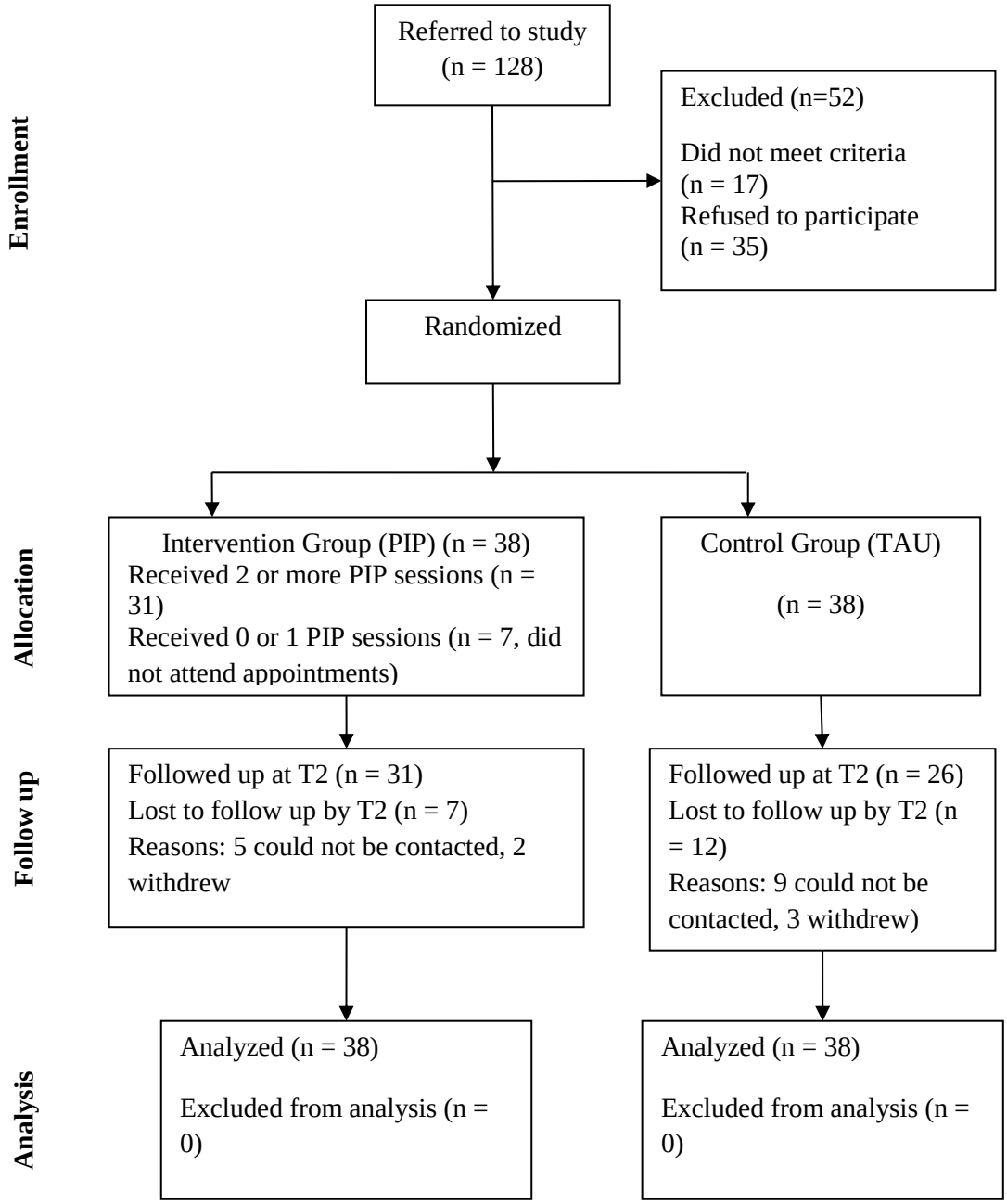
Participants

It was not possible to collect information about non-participants in the non-referred sample as they were self-selected. The flow of referred participants through the trial is presented in the consort diagram (Figure 1). A total of 128 mother-infant dyads were referred to the study and, of these, 76 met the criteria and consented to participate. These dyads were randomly allocated as described above: 38 to each group. Four dyads in the PIP group failed to attend any sessions with the PIP therapist.

Of the 127 participant pairs recruited in total, 26 dropped out before T2. Of these 10 (18.52%) were from the non-referred group and 16 (21.92%) were from the referred group. The participants who dropped out did not differ from those who continued in terms of total socio-economic disadvantage score ($t(125) = .95$, $p = .34$), gender of child ($t(125) = 1.65$, $p = .10$), child age ($t(125) = .01$, $p = .99$), or ethnicity ($t(125) = 1.16$, $p = .25$). There was a significant difference between groups in terms of mothers age, $t(125) = 3.36$, $p = .001$, where mothers who dropped out (mean age 28.95 years, SD 5.51) were younger that those who continued (mean age 32.77, SD 5.16). The differences between groups on education level was approaching significance, $t(125) = 1.95$, $p = .054$, with mothers who dropped out having less education on average. In addition the differences between groups on RF value was also approaching significance, $t(102) = 1.67$, $p = .097$, with participants who dropped out (mean RF 3.69, SD 1.08) having lower scores than those who did not (mean RF 4.28, SD 1.35). This implies that there were possible differences between those that continued and those that did not.

Of the 101 participants remaining, 78 mother-infant participant pairs consented to filming a free-play video at 12-month follow-up. There were 33 out of pairs from the non-referred sample (76.74%) and 45 pairs out of the remaining 57 pairs from the referred sample (78.95%). Mothers who did and did not consent did not differ in terms of total socio-economic score ($t(99) = 1.29$, $p = .199$), child gender ($t(99) = 1.52$, $p = .131$, child age ($t(99) = .88$, $p = .38$), mother age ($t(99) = .43$, $p = .67$), ethnicity, $t(99) = .60$, $p = .55$, or mother education ($t(99) = .51$, $p = .61$). However, there were significant differences between those who did and did not consent to be videoed in terms of RF score at T1, $t(86) = 2.44$, $p = .017$, where

Figure 1: The flow of referred participants through the trial



participants who did not consent (mean RF 3.50, SD 1.45) had lower scores than those who did consent (mean RF 4.43, SD 1.28). Differences in RF scores between groups at T2 was approaching significance, $t(97) = 1.80$, $p = .075$, where again participants who did not consent (mean RF 3.85, SD 1.40) had lower scores than those who did consent (mean RF 4.45, SD 1.46). The number of participants with scores for each variable at each time is shown in Table 2. For a more comprehensive description of the overlaps between which participants have which scores, see Appendix 6.

Table 2: Available data for each outcome measure at two time points

Measure	T1 N (%)	T2 N (%)
RF	104 (82)	99 (98)
ARR	67 (53)	56 (55)
SSP	n/a	79 (62)
MM	n/a	78 (77)

Relationship between PDI RF and MM

In order to establish that RF and MM assess the same capacity, and to validate the MM measure in this context, it was predicted that RF will correlate strongly and positively with MM. Further, if mentalizing capacity is an enduring capacity that characterises a particular mother-infant pair, it was predicted that mother's capacity to reflect on the infant will predict MM almost as well from the time of recruitment as at 12 months concurrently. Descriptive statistics for MM and PDI RF are show in Table 3 and Table 4 respectively.

Table 3: Descriptive statistics for MM

	Sample	N	Mean	Std. Deviation	Std. Error
Total % of mind-related comments in transcript	PIP	19	7.35	6.49	1.49
	TAU	26	10.22	7.22	1.41
	Non-referred	33	8.77	6.72	1.17
	Total	78	8.91	6.84	0.77
Attuned total as % of transcript	PIP	19	7.11	6.60	1.51
	TAU	26	9.39	7.37	1.45
	Non-referred	33	10.40	9.68	1.69
	Total	78	9.26	8.28	0.94
Non-attuned total as % of transcript	PIP	19	0.16	0.37	0.09
	TAU	26	0.27	0.45	0.09
	Non-referred	33	0.15	0.36	0.06
	Total	78	0.19	0.40	0.04

An analysis of variance (ANOVA) demonstrated that there were no significant differences between groups for any of the MM scales.

Table 4: Descriptive statistics for PDI RF

	Sample	N	Mean	Std. Deviation	Std. Error
Overall PDI RF score	PIP	38	3.82	1.09	0.18
	TAU	34	4.15	1.42	0.24
	Non-referred	32	4.67	1.39	0.25
	Total	104	4.19	1.33	0.13

An ANOVA demonstrated that RF score differed significantly between groups, $F(2, 101) = 3.18$, $p = .025$. LSD post hoc tests showed that the non-referred group had significantly higher RF scores than the PIP group, $p = .007$. No other differences were significant.

In order to investigate the concurrent relationship between total RF and MM scores, Pearson's correlation was conducted between both of these measures at T2

(see Table 5). There was a small yet significant correlation, $r(74) = .252$, $p = .028$ which remained significant when partial correlations were conducted controlling for participant group as a potential confound, $r(74) = .259$, $p = .025$. When separated out, the correlations between RF and percent of attuned MR comments ($r(74) = .208$, $p = .072$) and non-attuned MR comments ($r(74) = -.146$, $p = .208$) in the transcript respectively were not significant. However, the correlation for attuned MR comments also approached significance, and when partial correlations were conducted controlling for participant group as a potential confound, this became significant, $r(74) = .242$, $p = 0.37$. Therefore, it is likely that the proportion of attuned MR comments largely accounts for the association between RF and MM.

Table 5: Correlation between RF and MM

		Total % of MR comments	Attuned as % of transcript	Binary non-attuned as % of transcript
RF T1	Pearson Correlation	.071 (.075)	.095 (.072)	-.075 (-.056)
	Sig. (2-tailed)	.545 (.529)	.423 (.544)	.524 (.641)
	N	74	74	74
RF T2	Pearson Correlation	.252 (.259)	.208 (.242)	-.146 (-.174)
	Sig. (2-tailed)	.028 (.025)	.072 (.037)	.208 (.135)
	N	76	76	76

Note: Numbers in parentheses represent correction for potential confound of groups

A linear regression indicated that RF value at T2 significantly predicts MM score at T2, $\beta = .25$, $t(74) = 2.24$, $p = .028$. As RF score increased so did MM score, which supports the hypothesis that RF and MM assess an overlapping capacity. RF accounted for 6% of the variance in MM score, $R^2 = .06$, $F(1, 74) = 5.04$, $p = .028$, which was significant. However, when participant group was added into the regression as a potential confound, the linear regression was no longer significant, $\beta = .07$, $t(74) = .596$, $p = .076$.

There were no significant correlations between RF at T1 and any MM measure at T2 (see Table 5). This contradicts the hypothesis that, as mentalizing capacity is an enduring capacity that characterises a particular mother-infant pair, the mother's capacity to reflect on the infant will predict MM almost as well from T1 as it does concurrently at T2.

As it was predicted that the subcategories of the RF scale which pertain to the representations of interactions between infant and mother will account principally for the observed correlations between RF and MM, the individual subcategories of RF at T2 which were related to the relationship between mother and child were investigated. These were: a time when the mother clicked with the child; a time the mother felt she and her child were not clicking; how the mother experiences separation from her child; how the mother's family history impacts her parenting. Table 6 summarises RF subcategory correlations with MM variables.

Subcategories "Parent" and "Mother separation" did significantly correlate with total MR comments subscales. Subcategories "Clicked" and "Not clicked" did not correlate significantly with any MM variables, although at least one correlation between each of these subscales and an MM subscale did approach significance in the original correlation, and then reach significance when conducting partial correlations controlling for participant group (see Table 6). Therefore these results do indicate a relationship between MM and the RF subcategories related to the mother-child relationship.

Table 6: Correlations between MM and RF subscales

RF subcategories		Total MR comments	Attuned MR comments	Binary non-attuned MR comments
Clicked	Pearson Correlation	.192 (.200)	.206 (.186)	-.067 (-.046)
	Sig. (2-tailed)	.097 (.086)	.075 (.110)	.564 (.698)
	N	76	76	76
Not clicked	Pearson Correlation	.086 (.093)	.102 (.162)	-.198 (-.262)
	Sig. (2-tailed)	.460 (.427)	.380 (.166)	.086 (.023)
	N	76	76	76
Parent	Pearson Correlation	.286 (.304)	.208 (.263)	.039 (.008)
	Sig. (2-tailed)	.012 (.008)	.071 (.022)	.740 (.949)
	N	76	76	76
Mother separation	Pearson Correlation	.264 (.272)	.188 (.221)	.076 (.055)
	Sig. (2-tailed)	.023 (.020)	.109 (.060)	.522 (.641)
	N	74	74	74

Note: Numbers in parentheses represent correction for potential confound of groups

In order to investigate this further a linear regression was conducted to discover how much of the variance in total MR comments these 4 subcategories of the RF predict. The RF subcategories significantly predicted total MR comments scores, $b = 1.414$, $t(69) = 2.580$, $p = .043$. The RF subcategories also explained a significant proportion of variance (13.1%) in total MR comments, $R^2 = .131$, $F(4, 69) = 2.609$, $p < .043$. However, when participant group was included in the regression analysis as a confound, the RF subcategories no longer significantly predicted total MR comments scores, $b = 1.275$, $t(68) = 2.133$, $p = .071$.

As the correlation between "not clicked" and binary non-attuned MR comments was approaching significance, it was also investigated whether the RF scales related to the mother-child relationship might predict whether or not mothers make any non-attuned comments. A logistic regression analysis was conducted (as the dependent variable "binary non-attuned MR comments" is discrete and not

continuous) to predict whether mothers made non-attuned comments using the RF subcategories "clicked", "not clicked", "mother separation" and "parent" as predictors. A test of the full model against a constant only model was not statistically significant, indicating that the predictors as a set do not reliably distinguished between mothers who did and did not make non-attuned comments ($\chi^2(4) = 3.792$, $p = .435$). Prediction success overall was 79.5% (98.3% for lack of non-attuned comments and 0% for presence of non-attuned comments). The Wald criterion demonstrated that only the "not clicked" subscale was approaching making a significant contribution to the prediction ($p = .069$). None of the other subcategories were significant predictors.

SSP

Attachment classification using the SSP was carried out with 53 out of 73 participants at T2. All participants were in the referred sample, therefore the inclusion of participant group in the analysis as a potential confound was not necessary. A simplified binary coding system was used to measure child attachment: disorganised (yes/no) and secure – not disorganised (yes/no). Frequencies are shown in Table 7.

Despite this being a sample of mothers who had been identified and referred by clinicians as requiring formal intervention, the proportion of children with a disorganised classification was surprisingly low and the majority of children had a secure attachment style classification.

Table 7: Frequency and Percentage of Children by attachment classification

	Frequency			Percentage		
	PIP	TAU	Total	PIP	TAU	Total
Not disorganised	24	21	45	85.7	84.0	84.9
Disorganised	4	4	8	14.3	16.0	15.1
Total	28	25	53	100	100	100
Insecure and/or disorganised	10	9	19	35.7	36.0	35.8
Secure, not disorganised	18	16	34	64.3	64.0	64.2
Total	28	25	53	100	100	100

Relationship between RF, MM and SSP classification

Contrary to the hypotheses, Pearson's correlations showed that RF at T1 or T2 was not significantly correlated with either measure of attachment security (Table 8).

Table 8: Point by serial correlations between RF and SSP classification

		Disorganised yes/no	Secure (not disorganised) yes/no
RF at T1	Pearson Correlation	.048	.106
	Sig. (2-tailed)	.737	.455
	N	52	52
RF at T2	Pearson Correlation	.082	.179
	Sig. (2-tailed)	.560	.201
	N	53	53

The total percentage of mind related comments was positively correlated with attachment being disorganised, $r(43) = .44$, $p = .003$, as was the percentage of attuned mind related comments, $r(43) = .48$, $p = .001$. None of the MM measures were significantly correlated with secure attachment (see Table 9).

Table 9: Correlations between MM and SSP classification

		Disorganised yes/no	Secure (not disorganised) yes/no
Total MR comments	Point by serial correlation	.439	-.119
	Sig. (2-tailed)	.003	.436
	N	45	45
Attuned MR comments	Point by serial correlation	.478	-.120
	Sig. (2-tailed)	.001	.434
	N	45	45
Binary non-attuned MR comments	Point by serial correlation	-.249	-.024
	Sig. (2-tailed)	.100	.873
	N	45	45

ARR

Descriptive statistics for ARR by group are shown in Table 10. All ARR scores were gathered from participants in the referred sample, therefore the inclusion of participant group in the analysis as a potential confound was not necessary.

Relationship between ARR and PDI RF

An ANOVA demonstrated that only ARR Helpless subscale scores differed significantly between PIP and TAU groups at T1, $F(1, 65) = 5.37$, $p = .024$, where the TAU group had significantly higher scores than the PIP group. There were no significant differences in any ARR subscale scores between groups at T2.

In order to examine the validity of the ARR, its association with RF was investigated, see Table 11. As ARR quantifies the representations of negative constructs about the baby it was predicted that it would be significantly negatively correlated with RF. However, Pearson's correlations showed that ARR Total at T1 was not significantly correlated with RF at T1 or T2, although the correlation with RF at T1 was approaching significance. ARR Total at T2 was only significantly negatively correlated with RF at T1.

Table 10: Descriptive statistics for ARR

		N		Mean		Std. Deviation		Std. Error	
	Sample	T1	T2	T1	T2	T1	T2	T1	T2
Overall ARR	PIP	34	26	22.09	22.42	6.38	5.51	1.09	1.08
	TAU	33	30	24.73	21.23	7.02	5.02	1.22	0.92
	Total	67	56	23.39	21.79	6.78	5.24	0.83	0.70
ARR Hostile representations	PIP	34	26	10.68	10.85	4.43	3.55	0.76	0.70
	TAU	33	30	10.79	9.53	3.92	3.29	0.68	0.60
	Total	67	56	10.73	10.14	4.16	3.45	0.51	0.46
ARR Helpless representations	PIP	34	26	6.46	6.58	2.27	2.37	0.39	0.47
	TAU	33	30	7.88	6.03	2.69	1.94	0.47	0.35
	Total	67	56	7.16	6.29	2.57	2.15	0.31	0.29
ARR Narcissistic representations	PIP	34	26	3.09	3.19	1.14	1.20	0.20	0.24
	TAU	33	30	3.61	3.67	1.85	1.37	0.32	0.25
	Total	67	56	3.34	3.45	1.54	1.31	0.19	0.18

Table 11: Pearson product moment correlations between RF and ARR

		ARR Total		ARR Hostile		ARR Helpless		ARR Narcissistic	
		T1	T2	T1	T2	T1	T2	T1	T2
RF at T2	Pearson Correlation	-.054	-.122	-.218	-.272	.307	.226	.080	.013
	Sig. (2-tailed)	.698	.371	.110	.043	.023	.093	.562	.925
	N	55	56	55	56	55	56	55	56
RF at T1	Pearson Correlation	-.224	-.303	-.335	-.405	.108	.155	-.061	-.140
	Sig. (2-tailed)	.068	.025	.006	.002	.385	.259	.624	.308
	N	67	55	67	55	67	55	67	55

In order to investigate the unexpected relationship further, ARR subscales were examined. RF at T1 was significantly negatively correlated with ARR hostile representations at T1 ($r(65) = -.34$, $p = .006$) and T2 ($r(53) = -.41$, $p = .002$). RF at T2 was significantly positively correlated with ARR helpless representations at T1 ($r(53) = .31$, $p = .023$) and significantly negatively correlated with ARR hostile representations at T2 ($r(54) = -.27$, $p = .043$), see Table 9.

However, as there were multiple correlations conducted, the alpha level must be adjusted to .05 divided by the number of correlations conducted per prediction (4). Therefore, the p value would have to be $\leq .0125$ for each correlation to reach significance, resulting in only the correlations between RF at T1 and ARR Hostile representations at T1 and T2 remaining significant.

Relationship between ARR and MM

As ARR quantifies the representations of negative constructs about the baby, it was predicted that ARR would be negatively correlated with MM. In contradiction to the hypothesis, overall ARR is not significantly correlated with any measure of MM at T1 or T2 (see Table 12).

In order to investigate whether there were any significant relationships between the variables, ARR subscales were examined. For ARR at T1 the only significant correlation is between non-attuned MR comments (at T2) and ARR narcissism representations at T1, $r(41) = -.32$, $p = .034$. There are no significant correlations between MM and any of the ARR subscales at T2 (see Table 12). However, the correlations between ARR helpless representations and the total percent of MR comments and the total percent of attuned MR comments are approaching significance.

Table 12: Correlations between MM and ARR

		ARR Total		ARR Hostile		ARR Helpless		ARR Narcissistic	
		T1	T2	T1	T2	T1	T2	T1	T2
Total MR comments	Pearson Correlation	.085	.065	.002	-.150	.199	.286	.153	.146
	Sig. (2-tailed)	.588	.677	.991	.331	.200	.060	.329	.345
	N	43	44	43	44	43	44	43	44
Attuned MR comments	Pearson Correlation	.026	.016	-.046	-.174	.182	.272	.080	.057
	Sig. (2-tailed)	.867	.917	.768	.260	.243	.074	.610	.715
	N	43	44	43	44	43	44	43	44
Binary non-attuned MR comments	Pearson Correlation	.195	.138	.160	.133	-.005	-.060	.324	.149
	Sig. (2-tailed)	.210	.371	.306	.389	.976	.697	.034	.334
	N	43	44	43	44	43	44	43	44

However, as there were multiple correlations conducted, the alpha level must be adjusted to .05 divided by the number of correlations conducted (4). Therefore the *p* value would have to be ≤. 0125 for each correlation to reach significance, resulting in no significant correlation remaining.

Discussion

Relationship between RF and MM

The first aim of the current study was to establish whether RF and MM assess the same capacity. It was found that RF and MM significantly positively correlate concurrently at T2. However, this was a small correlation rather than the high correlation that was predicted, with RF accounting for no more than 6% of the variance in MM score. Additionally, when controlling for participant group in the analysis, the linear regression was no longer significant. Thus, although the measures

are probably linked in some way that cannot be attributed to method covariance, they are essentially independent of one another as a measure of mentalization.

This finding lends some support to previous hypotheses presented by Luyten, Fonagy, Mayes and Van Houdenhove (2009), who proposed that the four polarities that mentalization can be organised along (automatic/controlled, cognitive/affective, internal/external-based, and self/other focused) can be divided into two broad categories of mentalizing, implicit and explicit. In line with Lieberman's (2007) claim that these two dimensions are impacted by two relatively distinct neurological systems, the present findings of low correlation could be tentatively interpreted to support the hypothesis that RF is an explicit measure of controlled, verbal, reflective and conscious mentalizing while MM may be more likely to be a measure of implicit mentalizing, which is automatic, unconscious and nonverbal. The mother would have used a mental model of her child's mind in her mind during the PDI-RF interview, and cognitively imputed her child's perspective. During the recorded free-play interaction, mothers were extracting the child's intention implicitly from their behaviour, body movements and facial expression and commenting on this. However, these speculations remain tentative at present, and further research is required to replicate this finding with larger and better selected samples.

It was predicted that the RF subcategories which pertain to the representations of interactions between infant and mother would account principally for the observed correlations between RF and MM. These subcategories were: a time when the mother clicked with the child; a time the mother felt she and her child were not clicking; how the mother experiences separation from her child; how the mother's family history impacts her parenting. These subcategories did significantly predict total MM score, and accounted for 13.1% of the variance in MM. However,

when participant group was included in the regression analysis as a confound, the RF subcategories no longer significantly predicted total MR comments scores, although this was approaching significance, and therefore this prediction was not supported. As the prediction was based on the content of the question that the mother was asked (face validity), it is not clear if the prediction was unsupported because the items were not true reflections of interactions as may be observed or if the interactional roots of mentalising cannot be retraced via personal historical narratives.

These RF subcategories did not distinguish between mothers who did and did not make non-attuned MR comments during the free-play interaction. Only the mothers' ability to reflect on and understand times when she and her infant had not clicked was even approaching significance following a large number of tests performed. If this were to reach significance, it would have potentially indicated that the more able mothers are to reflect on negative experiences with their child, the less likely they are to comment inappropriately on the child's mental state. This may be because, by definition, scoring highly on an RF item implies that the mother is able to understand and make sense of this situation (Fonagy, Target, Steele, & Steele, 1998). Therefore if the mother can understand and make sense of why she and her infant have not clicked in the past, it may be that she is more likely to learn from these experiences and click more with her infant in the future.

Future research on the specific nature of the relationship between MM and RF may be beneficial. There are good theoretical reasons for suggesting that the immediate apperception of the infant's behaviour (which drives MM scores) reflects the substantive capacity to mentalize the child explicitly. The low correlations observed here are likely to reflect limitations of the methodology of the study rather than offer clear evidence for the independence of two forms of neurologically

distinct mentalizing. In particular, the lack of specific prediction from verbal interactional prompts in interview may not be the way of deriving of what may be priming interactions between mother and child.

We hoped that the inherent causal ambiguity of explicit mentalizing driving implicit mentalising or the other way round would be resolved by taking a longitudinal perspective. RF at T1, however, did not significantly correlate with MM score 12 months later. This finding is inconsistent with what was expected. If mentalizing capacity is considered to be an enduring capacity that characterises a particular mother-infant pair, T1 measures should have predicted T2 observations of the mentalization quality of interactions. The fact that this association was restricted to concurrent measurement of RF and MM indicates that a mother's capacity to mentalize may not always stay consistent over time. A tentative interpretation of this finding could be related to the fact that 31% of the mothers who consented to being videotaped interacting with their child received parent-infant psychotherapy between T1 and T2. This could have positively impacted their mentalization ability, which reinforces the benefit of sensitivity-promoting interventions with at-risk mothers. This could explain the lack of correlation between RF and MM when measured 12 months apart and demonstrate that mentalizing capacity is not necessarily an enduring capacity but one which can be altered via certain interventions. It could be the case that if the mothers who received intervention were excluded from the analysis there would be a significant correlation observed. Further research is required to investigate and challenge the theory and concepts which underlie how the capacity to mentalize is understood.

Validity of the ARR

The second aim of the current study was to investigate the validity of the newly developed ARR coding system for the PDI. ARR scores were compared with RF and MM scores. As ARR quantifies the representations of negative constructs about the infant, it was predicted that ARR would correlate strongly and negatively with RF and attuned MM, and correlate positively with non-attuned MM.

ARR and RF

Total ARR score did not correlate concurrently with RF score at neither T1 nor T2, although the correlations were in the predicted direction and the correlation between RF and ARR at T1 was approaching significance so the size of the sample may be a key aspect of interpreting the results. This finding is surprising given that concurrent RF and ARR scores are based on the same PDI narrative and therefore a built-in correlation due to shared method might be expected. This finding unexpectedly indicates that a mother's ability to reflect on her relationship with her child is not related to the negative constructs she has about her infant at that time. This is somewhat inconsistent with the work of Sleed (2013), who based the development of the ARR on the RF coding system for the PDI. Sleed found that both ARR and RF measures were significantly concurrently associated with ratings of the quality of parent-infant interaction, and that correlations were equally strong. One explanation for the differences in findings between the present study and Sleed may be due to sample size. Sleed had greater power to detect an association. Another high risk group (mothers in prison) was also included in addition to a clinical population in the Sleed sample and therefore Sleed may have captured more variance in negativity than was evident in this study.

However, Sleed did find some differences between RF and ARR, whereby ARR but not RF was significantly concurrently correlated with the child involvement scale of parent-infant interaction, maternal attachment anxiety and measures of maternal psychopathology. Additionally, when investigating the ARR subscales, Sleed found that only 4/10 were significantly concurrently correlated with PDI RF.

When the ARR subscales were investigated RF at T1 and T2 both concurrently correlated significantly and negatively with the ARR Hostile representations, but neither the Helpless nor Narcissistic representations. It could therefore be speculated that the mother's ability to reflect, and therefore non-defensively consider their infant's mental states, emotions, and behavioural intentions, reduces the likelihood of concurrent hostile representations about the infant, but is not related to helpless or narcissistic representations. As the overall concurrent relationship between RF and ARR at T1 is approaching significance, it could be this correlation which accounts for the overall relationship between the two measures. As the ARR is a relatively new coding system, further research is required to test the theoretical underpinnings which purport that positive and negative representations would necessarily be negatively correlated, as these may be relatively distinct, as indicated by the present findings.

There was a predictive association between the two measures. RF at T1 correlated significantly and negatively with ARR at T2. This indicates that a mother's ability to reflect about the relationship is related to fewer negative constructs about her infant 12 months later. When investigating the subscales of the ARR, the relationship between RF at T1 and Total ARR at T2 appears to be explained by the hostile subscale, as there is a significant predictive correlation, whereby mothers with higher RF at T1 are less likely to have hostile representations

about the infant at T2, but helpless and narcissistic representations are not associated. This is an interesting finding, and although it is not possible to definitively specify the causal factors, one tentative hypothesis regarding this findings this could be the nature of the experience in the intervening year. Greater maternal RF at T1 may result in the mother being more able to non-defensively consider their infant's mental states, emotions, and behavioural intentions at the younger age. Fonagy and colleagues hypothesised that RF provides the basis for parents' emotionally containing responses (Bion, 1962), which facilitate the development of secure infant attachment (Fonagy, et.al., 1995; Fonagy, Steele, Moran, Steele, & Higgitt, 1991). Therefore these infants one year later could have developed a securer attachment, and therefore mutually beneficial relationship, with the mother resulting in less hostility in the maternal representations. This could potentially also have been influenced by 31% of mothers undergoing therapeutic interventions between T1 and T2, therefore decreasing the negative maternal representations about the child. Again, this is a tentative speculation and further research is required to investigate the potential mechanisms proposed.

Additionally, although there is no predictive relationship between total ARR at T1 and RF at T2, there is an unexpected significant positive correlation between ARR helpless representations at T1 and RF at T2, indicating that mothers who had more helpless representations about their infant had better RF 12 months later. It could be speculated that helpless representations (as opposed to hostile and narcissistic) may be more likely to lead to maternal help-seeking behaviour which may in turn facilitate greater reflective capacity over the intervening year. However further research would be necessary before any definitive explanations could be offered regarding this association.

ARR and MM

In contradiction to the hypothesis, overall ARR was not significantly concurrently correlated with any measure of MM. This contradicts previous findings from Sleed (2013), described above, whereby ARR was significantly concurrently associated with ratings of the quality of parent-infant interaction. However, MM could be considered a fairly indirect measure of the quality of attachment as maternal behaviour, tone of voice and aspects of interactions such as joint attention are not captured. For example, Pawlby et al. (2010) reported how a mother included in their study correctly commented on her child being fascinated by the straps on the baby-seat, but appeared irritated with the child because this contradicted what the mother wanted the child to focus on. Therefore, although the mother was able to comment accurately on the child's state of mind, this did not lead to a positive interaction. Also in contradiction to the hypothesis, overall ARR was not significantly predictively correlated with any measure of MM.

These findings indicate that a mother's negative constructs about the infant do not relate to her tendency to treat her infant as an individual with a mind either concurrently or predictively (in 12 months' time). This is inconsistent with the findings reported by Sleed (2013) who, although MM was not included in the analysis, found that ARR predicted emotional availability, dyadic attunement and parent positive involvement with the child 12 months later, which indicates that ARR score can, in some samples, predict later parental behaviour. However, as discussed above, the ARR is a relatively new coding system, and therefore further research is required to test the theoretical underpinnings which purport that positive and negative representations would necessarily be negatively correlated, as these may be relatively distinct, as indicated by the present findings.

When investigating the subscales of the measures, ARR narcissistic representations at T1 were significantly correlated with non-attuned MR comments at T2, indicating that mothers who scored higher on representations of narcissism were more likely to make non-attuned comments when interacting with their infant 12 months later. This finding does support the work of Sleed (2013), who found that ARR scores predicted ratings of parental behavioural interaction with their child one year later. It could be speculated that mothers who have greater narcissistic representations about their infant may be less able to accurately infer their infant's mental states as they are more focussed on their own idealised view of the relationship.

These findings appear to indicate that there is a greater relationship between the positive and negative ways mothers reflect on their relationship with their infant than there is between the way mothers negatively reflect on their relationship with the infant and her capacity to treat the infant as an individual with a mind during free-play. There are many potential explanations for these findings. For example, this could potentially be explained by the fact that RF and ARR are based on the same PDI narrative and so they would be expected to be more similar than ARR and MM. Additionally RF and ARR could both be considered explicit measures of mentalizing whereas MM could be considered a more implicit measure. However, it could also be due to MM capturing a more reciprocal relationship between mother and infant, whereby maternal reflections are not the only influencing factor, and child characteristics can also influence maternal behaviour (e.g. Belsky, Rovine, & Taylor, 1984). These are tentative speculations at present, and further research is required to investigate the potential mechanisms proposed.

Attachment

The third aim of the current study was to investigate how each of the measures was related to the attachment security of the infant. As maternal RF and MM scores have previously been shown to be related to the security of infant attachment (Fonagy, Steele & Steele, 1991; Meins, 1998; Meins, Fernyhough, Fradley, & Tuckey, 2001; Schechter et al., 2005; Slade, Grienenberger, Bernbach, Levy, & Locker, 2005), it was predicted that each would significantly correlate with attachment security, where higher scores in RF and MM respectively would each be related to an increased likelihood of securely attached children. Further, it was hypothesised that attuned MM scores would be largely responsible for this relationship, and that non-attuned MM scores would be related to disorganised attachment classification. However, because MM and RF were hypothesised to capture two distinct categories of mentalization (implicit and explicit) it was predicted that they may be independently predictive of attachment security.

Contrary to the hypotheses, neither RF score at T1 nor T2 was related to attachment security or disorganisation at T2. Total MM at T2 was also not concurrently related to attachment security. However, MM at T2 was concurrently positively related to disorganised attachment, whereby the number of MR comments the mother made at T2 were greater when infants were classified as having disorganised attachment at this time. It was the attuned MR comments at T2 rather than non-attuned which were associated with the likelihood of disorganised attachment classification.

These findings contradict what was predicted. Theories of the determinants of attachment style have purported that caregiver behaviour is related to attachment style, whereby caregivers of securely attached infants respond consistently and

appropriately to the child (Aronoff, 2012; Schacter, Gilbert, & Wegner, 2009), caregivers of infants with anxious attachment classifications respond in unpredictable or rejecting ways (Crittenden, 2999; Main, 1977; 1979; Soloman, George, & De Jong, 1995) and caregivers of children classified with disorganised/disoriented attachment styles may behave in frightened or frightening ways (Bronfman, Parsons, & Lyons-Ruth, 1999; Hesse & Main, 2006; Main & Hesse, 2005). Maternal state of mind in relation to attachment (Carlson & Sroufe, 1995; Main, 1995, 2000; Main, Kaplan, & Cassidy, 1985; van IJzendoorn, 1995), maternal sensitivity (Fonagy, Gergely, Jurist & Target, 2002; Gottman, Katz & Hooven, 1996; Meins, Fernyhough, Fradley, & Tuckey, 2001) maternal mentalization (Bateman & Fonagy, 2004; Fonagy & Bateman, 2006, 2008; Fonagy & Target, 2006; Luyten, Fonagy, Mayes, & Van Houdenhove, 2009; Sharp, Fonagy, & Goodyer, 2008; Slade, 2005) and maternal MM (Meins, Fernyhough, Fradley, & Tuckey, 2001) have extensively been demonstrated to be related to infant attachment security, whereby higher levels of these are associated with secure attachment classifications and are protective against disorganisation.

Therefore the unexpected findings of the present study do not fit with the literature. There are many possible explanations regarding this. In terms of the relationship between RF and SSP classification one hypothesis for the lack of expected findings is that there was insufficient power in this study to detect the relationship, as attachment was only measured in a small subsample of participants. Another potential explanation could be that the way the constructs were measured may not have been appropriate in this study. For example, the binary coding system for attachment may have been oversimplified to the extent that relationships between RF and SSP classification were not captured.

The highly significant positive relationship between attuned MR comments and disorganised attachment classification is more challenging to explain. Again it could possibly be due to the way attachment style was categorised in this study. An additional hypothesis is that it could be due to the limitations in the validity of the coding of MM in this study. The videos were often of quite poor visual and auditory quality which could have led to some erroneous coding. In addition, the videos used in this study ranged from three to seven minutes long, whereas in the MM coding manual it is recommended that 20 minute videos are used. Additionally, although an attempt to address this was used in the present study by using two coders who met a high rate of inter-rater reliability, the MM coding system itself can be subjective when classifying comments as attuned or non-attuned as the coder is making a personal judgement about the intentions of the child which may itself be incorrect.

Taking these considerations into account, it is hypothesised that the lack of expected associations found between child attachment classification and both RF and MM are to do with methodological, rather than theoretical, limitations and therefore that maternal mentalization does impact on child attachment security. However, these findings cannot be completely discounted and it may be that there are issues with the theories and concepts which underpin this study and the purported associations between the measures used. Therefore, again, further research is required to investigate the associations, or lack of, between the concepts discussed.

Limitations

In addition to some specific limitations already mentioned, it is also important to consider the following methodological and theoretical limits of the present study.

The dropout rate of 20% between T1 and T2 could have introduced bias into the analysis, especially as the mothers who dropped out were significantly younger, had fewer years education and lower RF scores than those who did not drop out. Additionally, of the remaining participants at T2, 23% did not consent to free-play interactions being videotaped. Again mothers who did not consent had significantly lower RF scores than those who did, which could have biased the analysis.

Another potential limitation was the decision to combine referred and non-referred samples to be considered as one group. Although this resulted in an increase in power, it may not have been valid. However, this was controlled for by including participant group as a confound in the analyses. Additionally, 54% of the mothers in the referred sample experienced parent-infant psychotherapy between T1 and T2, which could have impacted considerably on RF and ARR scores in between these times, and improved their ability to act in a mind-minded way towards their infant during free-play at T2.

That RF at T1 did not significantly correlate with MM score 12 months later contradicted what was expected if mentalizing capacity is considered to be an enduring capacity that characterises a particular mother-infant pair. This finding could be explained by the fact that 31% of the mothers who consented to being videotaped received parent-infant psychotherapy between T1 and T2, which biased the results. It could be the case that if the mothers who received intervention were excluded from the analysis there would be the predicted significant correlation observed.

Total ARR score did not correlate concurrently with RF score at neither T1 nor T2. However this result could be explained by a lack of power, as only 53% and 55% of the participants had ARR scores at T1 and T2 respectively. This hypothesis is

supported by the observed correlations being in the predicted direction and approaching significance. Therefore further research on the relationship between these two measures, with a larger sample and adequate power, is required. ARR was not significantly correlated with any measure of MM at T1 or T2. This unexpected finding could also be due to lack of power, although the correlation between overall ARR and total MM was neither in the predicted direction nor approaching significance.

Attachment was only classified in a subsection (42%) of the original sample, and all of these infants were from the referred sample. Therefore this use of attachment classification as a variable could be biased. In addition, the binary coding systems used (disorganised (yes/no) and secure – not disorganised (yes/no)) was oversimplified and did not capture the range of potential attachment styles exhibited.

The findings that, contrary to the hypotheses, neither attachment security nor disorganisation at T2 was related to RF score at T1 or T2, and that attachment security at T2 was not concurrently related to total MM at T2, may potentially be explained by lack of power, although the correlations were not approaching significance.

The use of MM to capture implicit maternal mentalization may also be considered a limitation. MM only captures what is said by the mother to the infant and then categorises this as mind-minded or not dependent on the current interaction taking place. This could be viewed as somewhat subjective, as the individual coder would be required to make their own judgement of the infant's mental state or intentions. Although this was partially addressed in the current study by ensuring independent coders met at least an 80% inter-rater reliability score. Additionally,

MM does not capture other aspects of the interaction such as maternal tone of voice or behaviour, joint attention or eye gaze.

Future research

In light of the limitations described above, future research should ensure that adequate power is obtained for all of the investigated associations to ensure that a Type 2 error is avoided.

As ARR is a relatively new coding system, and the present study did not find the predicted associations between ARR and RF and MM, further research on the relationship between these measures would be beneficial. Additionally, due to the interesting nature of some of the associations with ARR subscales and both RF and MM, further research investigating which representational risk factors are related to mentalizing ability would be useful, in order to enable clinicians to potentially identify mothers more at risk of sub-optimal interactions with their infants.

It could be the case that if the mothers who received an intervention between T1 and T2 were excluded from the analysis there would be a significant correlation observed between RF at T1 and MM 12 months later. Therefore future research should attempt to use samples which have equivalent therapeutic interventions between T1 and T2. This finding may also offer support to sensitivity enhancing interventions, which would encourage the continued use of these in clinical practice.

In light of the finding that RF and MM may measure related but distinct concepts, it would be advisable for future research into mother-infant interactions to use both explicit and implicit measures of mentalization in order to ensure that the information gathered is as complete as possible and captures greater variance in the quality of relationships.

There is an increasing amount of support from empirical evidence that maternal representations are related to mother-infant interactions (Grienenberger, Kelly & Slade, 2005; Steinberg & Pianta, 2006). Therefore future studies could further focus on the antecedents of mind-mindedness amongst parents from various age groups, cultures, socioeconomic status, and other possible psychosocial risk factors.

References

Abrams, K., Rifkin, A., & Hesse, E. (2006). Dissociative "FR" parental behavior observed in a laboratory play session predicts infant disorganization. *Development and Psychopathology, 18,* 345-361.

Ainsworth, M. D. S., Bell, S. M., & Stayton, D. J. (1971). Attachment and exploratory behaviour of one year olds. In H. R. Schaffer (Ed.), *The origins of human social relations*. New York: Academy Press.

Ainsworth, M. D. S., Bell, S. M., & Stayton, D. J. (1974). Infant mother attachment and social development: Socialisation as a product of reciprocal responsiveness to signals. In M. J. M. Richards (Ed.), *The Integration of a Child into the Social World* (pp. 99-135). London: Cambridge University press.

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the Strange Situation*. Hillsdale, NJ: Erlbaum.

Arnott, B., & Meins, E. (2007). Links among antenatal attachment representations, postnatal mind-mindedness, and infant attachment security: A preliminary study of mothers and fathers. *Bulletin of the Menninger Clinic, 71,* 132-149.

Aronoff, J. (2012). Parental Nurturance in the Standard Cross-Cultural Sample: Theory, Coding, and Scores. *Cross-Cultural Research, 46,* 315-347.

Baradon, T., Broughton, C., Gibbs, I., James, J., Joyce, A., & Woodhead, J. (2005). *The Practice of Psychoanalytic Parent Infant Psychotherapy: Claiming the Baby*. Routledge.

Bateman, A. W., & Fonagy, P. (2004). Mentalization-based treatment of BPD. *Journal of Personality Disorders, 18,* 36-51.

Belsky, J., Rovine, M., & Taylor, D. G. (1984). The Pennsylvania Infant and Family Development Project, III: The origins of individual differences in infant-mother attachment: Maternal and infant contributions. *Child development*, 718-728.

Bion, W.R. (1962). A Theory of Thinking. In E. Bott Spillius (Ed.) *Melanie Klein Today: Developments in theory and practice. Volume 1: Mainly Theory*. 1988. London: Routledge.

Bowlby, J. (1969). *Attachment and Loss, Vol. 1: Attachment*. London: Hogarth Press and the Institute of Psycho-Analysis.

Bowlby, J. (1973). *Attachment and Loss, Vol. 2: Separation: Anxiety and Anger*. London: Hogarth Press and Institute of Psycho-Analysis.

Bowlby, J. (1982). *Attachment and Loss, Vol. 1: Attachment* (2nd ed.). New York: Basic Books.

Bronfman, E., Parsons, E., & Lyons-Ruth, K. (1999). *Atypical Maternal Behavior Instrument for Assessment and Classification (AMBIANCE): Manual for coding disrupted affective communication, version 2.* Unpublished manuscript. Cambridge, MA: Harvard Medical School.

Brown, L., Sherbenou, R. J., & Johnsen, S. K. (1997). *Test of Nonverbal Intelligence-Third Edition*. Austin, TX: PRO-ED.

Carlson, E. A. (1998). A prospective longitudinal study of attachment disorganization/disorientation. *Child Development, 69*, 1107-1128.

Carlson, E.A., & Sroufe, L.A. (1995). Contribution of attachment theory to developmental psychology. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology, Vol. 1: Theory and methods* (pp. 581-617). New York: Wiley.

Crawford, A., & Benoit, D. (2009). Caregivers' disrupted representations of their unborn child predict later infant-caregiver disorganized attachment and disrupted interactions. *Infant Mental Health Journal, 30*, 124-144.

Crittenden, P.M. (1999). Danger and development: The organization of self-protective strategies. In J. Vondra & D. Barnett (Eds.), *Monographs of the Society for Research on Child Development, 64*, 145–171.

Crowell, J. A., & Feldman, S. S. (1988). Mothers' internal models of relationships and children's behavioral and developmental status: A study of mother-child interaction. *Child Development, 59*, 1273-1285.

Crowell, J., O'Connor, E., Wollmers, G., Sprafkin, J., & Rao, U. (1991). Mothers' conceptualizations of parent-child relationships: Relation to mother-child interaction and child behavior problems. *Development and Psychopathology, 3*, 431-444.

Davies, M. (1994). The mental simulation debate. In C. Peacocke (Ed.), *Objectivity, simulation and the unity of consciousness* (pp. 99–128). Oxford: Oxford University Press.

Dennett, D. C. (1987). *The intentional stance*. MIT Press.

Dutra, L., Bureau, J., Holmes, B., Lyubchik, A., & Lyons-Ruth, K. (2008). Quality of early care and childhood trauma: Prospective study of developmental pathways to dissociation. *Journal of Nervous and Mental Disease, 197,* 383-390.

Dutra, L., & Lyons-Ruth, K. (2005). *Maltreatment, maternal and child psychopathology, and quality of early care as predictors of adolescent dissociation. In: Borelli J, editor. Interrelations of attachment and trauma symptoms: A developmental perspective*. Paper presented at the Symposium conducted at the biennial meeting of the Society for Research in Child Development.

Farnfield, S., Hautamäki, A., Nørbech, P., & Sahhar, N. (2010). DMM assessments of attachment and adaptation: Procedures, validity and utility. *Clinical child psychology and psychiatry, 15,* 313-328.

Field, A. (2009). *Discovering statistics using SPSS*. Sage publications.

Fonagy, P., & Bateman, A. W. (2006). Mechanisms of change in mentalization-based treatment of BPD. *Journal of Clinical Psychology, 62,* 411-430.

Fonagy, P., & Bateman, A. (2008). The development of Borderline Personality Disorder: A mentalizing model. *Journal of Personality Disorders, 22,* 4-21.

Fonagy, P., Gergely, G., Jurist, E., & Target, M. (2002). *Affect Regulation, Mentalization and the Development of the Self*. New York: Other Press.

Fonagy, P., Leigh, T., Kennedy, R., Mattoon, G., Steele, H., Target, M., Steele, M, & Higgitt, A. (1995). Attachment, borderline states and the representation of emotions and cognitions in self and other. In D.Cicchetti & S.S.Toth (Eds.), *Rochester Symposium on Developmental Psychopathology: Cognition and emotion* (Vol. 6, pp. 371-414). Rochester, NY: University of Rochester Press.

Fonagy, P., Steele, H., Moran, G., Steele, M., & Higgitt, A. (1991). The capacity for understanding mental states: The reflective self in parent and child and its significance for security of attachment. *Infant Mental Health Journal, 13*, 200-217.

Fonagy, P., Steele, M., & Steele, H. (1991). Maternal representations of attachment during pregnancy predict the organization of infant–mother attachment at one year of age. *Child Development, 62*, 891 – 905.

Fonagy, P., Steele, M., Steele, H., & Target, M. (1997). *Reflective-Functioning Manual, version 4.1, for Application to Adult Attachment Interviews*. London: University College London.

Fonagy, P., & Target, M. (1998). Mentalization and the changing aims of child psychoanalysis. *Psychoanalytic dialogues, 8*, 87-114.

Fonagy, P., & Target, M. (2005). Bridging the transmission gap: An end to an important mystery of attachment research? *Attachment & Human Development, 7*, 333-343.

Fonagy, P., & Target, M. (2006). The mentalization-focused approach to self pathology. *Journal of personality disorders*, *20*, 544-576.

Fonagy, P., Target, M., Steele, H., & Steele, M. (1998). Reflective-functioning manual, version 5.0, for application to adult attachment interviews. *London: University College London*.

George, C., & Solomon, J. (2008). The caregiving behavioral system: A behavioral system approach to parenting. In J. Cassidy & P. Shaver (Eds.), *Handbook of Attachment: Theory, Research, and Clinical Application* (2nd ed.). New York: Guilford Press.

Goldberg, D. P. & Williams, P. (1988). *A users guide to the general health questionnaire*. Windsor: Nfer Nelson.

Gottman, J., Katz, L., & Hooven, C. (1996). Parental meta-emotion philosophy and the emotional life of families: Theoretical models and preliminary data. *Journal of Family Psychology*, *10*, 243-268.

Grienenberger, J., Kelly, K., & Slade, A. (2005). Maternal reflective functioning, mother-infant affective communication, and infant attachment: Exploring the link between mental states and observed caregiving behavior in the intergenerational transmission of attachment. *Attachment & Human Development*, *7*, 299-311.

Grossman, K., Fremmer-Bombik, E., Rudolph, J., & Grossman, K. E. (1988). Maternal attachment representations as related to patterns of infant-mother attachment and maternal care during the first year. In R.A.Hinde &

J.Stevenson-Hinde (Eds.), *Relationships Within Families: Mutual Influences* (pp. 241-260). Oxford, England: Clarendon Press.

Hesse, E., & Main, M. (2006). Frightened, threatening, and dissociative parental behavior in low-risk samples: Description, discussion, and interpretations. *Developmental Psychopathology, 18,* 309-343.

Laranjo, J., Bernier, A., & Meins, E. (2008). Associations between maternal mind-mindedness and infant attachment security: Investigating the mediating role of maternal sensitivity. *Infant Behavior and Development, 31,* 688-695.

Leerkes, E. M., Blankson, A. N., & O'Brien, M. (2009). Differential effects of maternal sensitivity to infant distress and nondistress on social-emotional functioning. *Child Development, 80,* 762-775.

Lieberman, M. D. (2007). Social cognitive neuroscience: a review of core processes. *Annu. Rev. Psychol., 58,* 259-289.

Lundy, B. (2003). Father- and mother–infant face-to-face interactions: Differences in mind-related comments and infant attachment. *Infant Behavior and Development, 26,* 200-212.

Luyten, P., Fonagy, P., Mayes, L., & Van Houdenhove, B. (2009). Mentalization as a multidimensional concept. *Manuscript submitted for publication.*

Lyons-Ruth, K., Alpern, L., & Repacholi, B. (1993). Disorganized infant attachment classification and maternal psychosocial problems as predictors of hostile-aggressive behavior in the preschool classroom. *Child Development, 64,* 572-585.

Lyons-Ruth, K., Dutra, L., Schuder, M. R., & Bianchi, I. (2006). From infant attachment disorganization to adult dissociation: Relational adaptations or traumatic experiences? *Psychiatric Clinics of North America, 29,* 63-86.

Lyons-Ruth, K., Easterbrooks, A., & Cibelli, C. (1997). Infant attachment strategies, infant mental lag, and maternal depressive symptoms: Predictors of internalizing and externalizing problems at age 7. *Developmental Psychology, 33,* 681-692.

Madigan, S., Moran, G., & Pederson, D. R. (2006). Unresolved states of mind, disorganized attachment relationships, and disrupted interactions of adolescent mothers and their infants. *Developmental Psychology, 42,* 293-304.

Main, M. (1977) Analysis of a peculiar form of reunion behaviour seen in some day-care children. In R. Webb (ed.) Social Development in Childhood (pp.33-78), Baltimore: John Hopkin

Main, M. (1979) The "ultimate" causation of some infant attachment phenomena. *Behavioral and Brain Sciences, 2,* 640-643.

Main, M. 1995. "Discourse, prediction and studies in attachment: Implications for psychoanalysis". In *Research in Psychoanalysis: Process, Development, Outcome,* Edited by: Shapiro, T. and Emde, R. N. Madison, CT: International Universities Press.

Main, M. (2000). The organized categories of infant, child, and adult attachment: Flexible vs. inflexible attention under attachment-related stress. *Journal of the American Psychoanalytic Association, 48,* 1055 – 1096.

Main, M., & Goldwyn, R. (1990). Adult attachment rating and classification systems. In M. Main (Ed.), *A Typology of Human Attachment Organization Assessed in Discourse, Drawings and Interviews*. New York: Cambridge University Press.

Main, M., & Hesse, E. (1990). Parents' unresolved traumatic experiences are related to infant disorganized attachment status: Is frightened and/or frightening parental behavior the linking mechanism? In M. Greenberg, D. Cicchetti & E. M. Cummings (Eds.), *Attachment in the preschool years: Theory, research and intervention* (pp. 161-182). Chicago: University of Chicago Press.

Main, M., & Hesse, E. (2005). *Frightened, threatening, dissociative, timid-deferential, sexualized, and disorganized parental behavior: A coding system for frightened/frightening (FR) parent–infant interactions.* Unpublished manuscript, University of California at Berkeley.

Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. *Monographs of the Society for Research in Child Development, 50,* 66-104.

Main, M., & Solomon, J. (1986). Discovery of an insecure-disorganized/disoriented attachment pattern. In T.B.Brazelton & M.W.Yogman (Eds.), *Affective Development in Infancy* (pp. 95-124). Norwood, NJ: Ablex.

Main, M., & Solomon, J. (1990). Procedures for identifying infants as disorganized/disoriented during the Ainsworth Strange Situation. In M. Greenberg, D. Cicchetti & E. M. Cummings (Eds.), *Attachment during the preschool years: Theory, research and intervention* (pp. 121-160). Chicago: University of Chicago Press.

Mayes, L. C. (2006). Arousal regulation, emotional flexibility, medial amygdala function, and the impact of early experience: Comments on the paper of Lewis et al. *Annals of the New York Academy of Sciences, 1094,* 178–192.

Meins, E. (1997). *Security of attachment and the social development of cognition*. Hove, UK: Psychology Press.

Meins, E. (1998). The effects of security of attachment and maternal attribution of meaning on children's linguistic acquisitional style. *Infant Behaviour and Development, 21,* 237-252.

Meins, E., & Fernyhough, C. (1999). Linguistic acquisitional style and mentalising development: The role of maternal mind-mindedness. *Cognitive Development, 14*, 363-380.

Meins, E., & Fernyhough, C. (2010). *Mind-mindedness coding manual, Version 2.0*. Unpublished manuscript. Durham University, Durham, UK.

Meins, E., Fernyhough, C., Fradley, E., & Tuckey, M. (2001). Rethinking maternal sensitivity: Mothers' comments on infants' mental processes predict security of attachment at 12 months. *Journal of Child Psychology and Psychiatry, 42,* 637–648.

Meins, E., Fernyhough, C., de Rosnay, M., Arnott, B., Leekam, S. R., & Turner, M. (2010). The roots of attachment security and organization: Maternal mindmindedness predicts secure and organized infant–mother attachment. *Manuscript submitted for publication.*

Mikulincer, M., Shaver, P. R., & Pereg, D. (2003). Attachment Theory and Affect Regulation: The Dynamics, Development, and Cognitive Consequences of Attachment-Related Strategies. *Motivation and Emotion, 27,* 77-102.

Oppenheim, D. & Koren-Karie, N. (2002). Mothers' insightfulness regarding their children's internal worlds: The capacity underlying secure child-mother relationships. *Infant Mental Health Journal, 23,* 593-605.

Pawlby, S., Fernyhough, C., Meins, E., Pariante, C. M., Seneviratne, G., & Bentall, R. P. (2010). Mind-mindedness and maternal responsiveness in infant–mother interaction in mothers with severe mental illness. *Psychological Medicine, 40,* 1861-1869.

Perner, J. (1991). *Understanding the representational mind*. Cambridge, MA: MIT Press.

Schacter, D. L., Gilbert, D. T., & Wegner, D. M. (2009). *Introducing psychology*. Macmillan.

Schechter, D. S., Coots, T., Zeanah, C. H., Davies, M., Coates, S. W., Trabka, K. A., Marshall, R. D., Liebowitz, M. R., & Myers, M. M. (2005). Maternal mental representations of the child in an inner-city clinical sample: Violence-related posttraumatic stress and reflective functioning. *Attachment and Human Development, 7*, 313–331.

Schore, A. (1994). *Affect Regulation and the Origin of the Self: The Neurobiology of Emotional Development*. Hillsdale, NJ: Erlbaum.

Schore, A. (2001). Contributions from the decade of the brain to infant mental health: An overview. *Infant Mental Health Journal, 22,* 1-6.

Sharp, C., Fonagy, P., & Goodyer, I. (Eds.). (2008). Social cognition and developmental psychopathology. Oxford: Oxford University Press.

Slade, A. (2005). Parental reflective functioning: An introduction. *Attachment and Human Development, 7,* 269-281.

Slade, A., Aber, J. L., Bresgi, I., Berger, B., & Kaplan, M. (2004). *The Parent Development Interview – Revised.* Unpublished protocol. The City University of New York.

Slade, A., Belsky, J., Aber, L., & Phelps, J. L. (1999). Mothers' representations of their relationships with their toddlers: Links to adult attachment and observed mothering. *Developmental Psychology, 35,* 611-619.

Slade, A., Bernbach, E., Grienenberger, J., Levy, D., & Locker, A. (2004). *Addendum to Fonagy, Target, Steele, & Steele reflective functioning scoring manual for use with the Parent Development Interview.* Unpublished Manuscript. New York: The City College and Graduate Center of the City University of New York.

Slade, A., Grienenberger, J., Bernbach, E., Levy, D., & Locker, A. (2005). Maternal reflective functioning, attachment, and the transmission gap: A preliminary study. *Attachment and Human Development, 7,* 283-298.

Sleed, M. (2013). The Assessment of Risk in Early Parent-Infant Relationships. Doctoral thesis. University College London.

Sleed, M. and Wain, H. (2013). The Assessment of Representation Risk Coding Manual. Unpublished manuscript. University College London.

Solomon, J., George, C., & Dejong, A. (1995). Children classified as controlling at age six: Evidence of disorganized representational strategies and aggression at home and at school. *Development and Psychopathology, 7*, 447-463.

Spangler, G., & Grossman, K. E. (1993). Biobehavioral organization in securely and insecurely attached infants. *Child Development, 64*, 1439-1450.

Spunt, R. P., & Lieberman, M. D. (2013). The busy social brain: evidence for automaticity and control in the neural systems supporting social cognition and action understanding. Psychol Sci, 24(1), 80-86.

Sroufe, L. A. (1996). *Emotional development: The organization of emotional life in the early years*. New York: Cambridge University Press.

Steinberg, D.R., & Pianta, R.C. (2006). Maternal representations of relationships: Assessing multiple parenting dimensions. In O. Mayseless (Ed.*), Parenting representations: Theory, research, and clinical implications* (pp. 41-78). New York: Cambridge University Press.

van IJzendoorn, M. H. (1995). Adult attachment representations, parental responsiveness, and infant attachment: A meta-analysis on the predictive validity of the Adult Attachment Interview. *Psychological Bulletin, 117*, 387-403.

Ward, M. J., & Carlson, E. A. (1995). Associations among adult attachment representations, maternal sensitivity, and infant-mother attachment in a sample of adolescent mothers. *Child Development, 66*, 69-79.

Wartner, U. G., Grossman, K., Fremmer-Bombrik, E., & Suess, G. (1994). Attachment patterns at age six in South Germany: Predictability from infancy

and implications for pre-school behaviour. *Child Development, 65*, 1014-1027.

Wong, V. (2014). The relationship between parental mentalization and maternal psychopathology: during and after postpartum period. Unpublished clinical psychology doctoral thesis, Department of Clinical, Educational, and Health Psychology, University College London.

Part 3: Critical appraisal

Introduction

This critical appraisal will provide a reflection on the process of completing the thesis. It will begin by discussing the background and overarching themes to the research, before going on to discuss the issues with examining the relationship between various measures of maternal mentalization with each other, and with infant attachment security. It will focus on:

- Background and theme of the thesis
- Considerations on the literature review
- Considerations on the empirical paper
    - Joint working
    - A discussion about selecting an appropriate coding system to apply to videos of mother-infant free-play, which would capture maternal representations about the infant
    - The advantages and challenges in using pre-existing data
    - The clinical implications of this research

Background and theme of the thesis

The overarching theme of the thesis was parent-infant interactions from an attachment focussed orientation. Prior to conducting this research project I had an interest in psychodynamic theory and in particular the practical applications of attachment theory. Working in CAMHS also gave me experience of this work in practice and the positive results that were possible for mothers and their children who were experiencing disruptions in their relationship. I was keen to develop a greater

understanding of the tools available to clinicians for both assessment and intervention.

The aim of this thesis was also to gain a clearer overall understanding of how technology has impacted upon parent-infant assessment and intervention. Specifically in this case how video recordings of parents and infants during free-play can be utilised in psychological work with parents and their infants. In the literature review the use of video recordings was investigated as an intervention, whereby parents were shown clips taken from free-play videos of their interactions with their child and received feedback on these interactions from a therapist. In the empirical paper the videos of mother-infant interaction were used for the purposes of assessment, whereby free play videos were coded for percentage of mind-minded comments made during the interaction to the child by the mother.

Considerations on the literature review

The literature review aimed to collate evidence regarding the impact of parent-infant video feedback interventions for the children involved. Previous reviews had mainly focussed on the impact on the parents and there was a lack of a detailed description of the way children could be affected.

The main challenge of the literature review was attempting to assimilate findings from the results of studies which utilised a vast variation in video feedback techniques with a range of participants. For example, there were 15 differently named interventions in the 22 studies reviewed, with varying types of interactions being videotaped, and different content and focus of the feedback given. The duration of intervention also varied, ranging from two to 26 sessions, and the length of sessions varied from 30 to 180 minutes. The variation in participants included in

the studies was not only related to whether children had a clinical diagnosis or parents were from an "at risk" group, but also the age of the children which varied from two weeks to 16 years.

Although the results of this review are useful for clinicians in terms of providing evidence that video feedback interventions can benefit the children involved in terms of attachment, behaviour, cognition / language and social skills, in hindsight it may have been more useful to review the separate aspects of video feedback once a large enough sample of primary studies on the different populations and outcomes have been conducted.

Considerations on the empirical paper

Joint working

The empirical paper was part of a joint project conducted with Vivien Wong (Wong, 2014). Details of the contribution of each trainee are outlined in Appendix 1. Joint working had both advantages and disadvantages in comparison to undertaking the research project independently.

Working jointly enabled a far more efficient data coding strategy. Learning the coding system together and being able to discuss it and practice together certainly increased my confidence in going on to independently apply it. Transcribing and coding all of the videos may not have been possible alone and the process would have either taken longer, or fewer videos would have been coded, reducing the power of the statistical analyses. In addition, having inter-rater reliability increased the robustness of the results. Additionally joint working proved to be a valuable source of support and understanding during stressful and challenging times of the research process.

Although relying on the other trainee can be an asset, it can also be one of the challenging aspects of joint working. Different individuals inevitably have different pressures on their time and different schedules due to their clinical placements. This can impact on arranging meetings and delay completing tasks that require the input of both trainees. Therefore joint working can often feel as though it is not improving efficiency as much as expected. In addition it also often involves compromising and relinquishing some of the control that you would otherwise have if conducting a project independently.

Overall undertaking this project jointly has greatly increased my skills in organisation, planning, communication and patience and my ability to co-operate and compromise, which will be invaluable skills to take with me into the future.

Selecting an appropriate coding system

A difficult aspect of this study was selecting an appropriate coding system for the videos of mother-infant free-play. Initially I hoped to use Parental Embodied Mentalization (PEM; Shai, 2010; Shai & Belsky 2011a; 2011b). PEM attempts to capture aspects of the mother-infant non-verbal interaction by identifying embodied circles of communication (ECCs) within the video. These are then coded for various aspects of physical movement between mother and infant, including directionality, pacing, pathways, tension-flow, tempo and space. Each ECC is then scored from 1 (very low) to 9 (very high) according to guidelines such as who initiated the interaction, how repetitive the ECC was, whether the mother displayed an embodied detection of the infant's mental state and whether the mother then followed the infant's mental state. The overall score for the interaction is then scored on the same scale taking into account both the mean and mode of individual ECC scores.

However, after attending four days of PEM training at the Anna Freud Centre in July 2013 and beginning to code some practice videos it because clear that unfortunately this system was not appropriate for the mother-infant interaction videos that were available for this project. This was due, in part, to time limits, as each video was a minimum of five to six hours to code and 78 videos needed to be coded in total. Due to the timescale of the thesis this would not be possible. Additionally the infants in the videos available for the project were somewhat older than the infants for which the PEM scheme was developed. Therefore free-play was less focussed upon reasonably static mother-infant interactions together on the floor and infants were instead often walking and engaging in independent activity. This resulted in identifying and coding ECCs being more challenging and sometimes impossible.

In discussion with Prof. Pasco Fearon the decision was made, in October 2013, to the maternal mind-mindedness (MM) coding system for the videos rather than PEM. The focus of MM is on mental representations, especially those regarding the infant's emotions and cognitions. MM refers to the regularity with which caregivers interact with the infant as an individual with a mind and intentionality (Meins, 1997), "rather than merely a creature with needs that must be satisfied" (Meins, Fernyghough, Fradley, & Tuckey, 2001, p. 638). MM seemed much more appropriate for use in the study, as it captured mothers' verbal tendency to consider their infant's intentions.

However, there were some limitations to using this coding system. For example, one limitation was that other data such as the aspects of non-verbal communication discussed above which would have been captured by PEM were not captured by the MM coding system. Additionally other qualities of parental speech

are not coded by MM such as tone of voice. Judging maternal mentalization purely on the content of what is said can be problematic, as in the example by Pawlby et al. (2010), who reported on a mother included in their study correctly commenting on her child being fascinated by the straps on the baby-seat, but appearing irritated with the child because this contradicted what the mother wanted the child to focus on. Therefore, although mothers may be able to comment accurately on their child's state of mind, this may not necessarily lead to a positive interaction.

Furthermore, there was a wide range in the quality of video recordings. In some recordings the sound or picture quality was very poor, which made transcribing and then coding the appropriateness of the comments a time-consuming and difficult task. In addition the sheer task of transcribing the free-play interactions verbatim and then analysing the content and context of each phrase uttered by the mother was extremely time-consuming, despite sharing this task with a fellow trainee.

Advantages and challenges to using pre-existing data

Using pre-existing data was extremely helpful, as I was not required to gain ethical approval or to recruit participants, both of which are potentially time-consuming tasks. However, there were also some challenges with this. The database contained over 200 variables. It contained participants and time points of data collection that were not relevant to my specific research hypotheses. This rendered the database confusing and difficult to utilise. Time was needed in order to understand and extract the relevant information. A further challenge was related to understanding the procedures of the study and how and when each of the measures were conducted. However, frequent contact with the researchers at the Anna Freud

Centre provided continuous guidance, support and information which proved extremely helpful.

In addition, a lack of control over the length and quality of the video recordings supplied was another challenge faced when using pre-existing data, as described above.

Clinical implications

The construct of MM is well supported by research evidence. It has been found to relate to maternal sensitivity (Meins, Fernyhough, Fradley, & Tuckey, 2001), maternal state of mind in relation to past attachment experiences (Arnott & Meins, 2007; Bernier & Dozier, 2003) and child attachment security (Laranjo, Bernier, & Meins, 2008). In the present study the concurrent relationship between MM and maternal RF was supported, as was the previous research by Luyten, Fonagy, Mayes and Van Houdenhove (2009), who proposed that mentalization can be divided into two broad categories, implicit and explicit, and Lieberman (2007) who demonstrated that these two dimensions are impacted by two relatively distinct neurological systems. The findings could therefore indicate that RF may be an explicit measure, as it is controlled, verbal, reflective and aware whereas MM is more likely to be a measure of implicit mentalizing, which is automatic, unconscious and nonverbal. This distinction is consistent with the suggestions of Lieberman (2007) based on neuroimaging findings and the theoretical frame advanced by Luyten et al. (2009).

Therefore it may be advisable for future research into maternal mentalization to ensure that both implicit and explicit ways of capturing this are used in the study

in order to measure the different aspects of the mothers' mentalizing ability or tendency.

However, the finding in the present study that RF did not predict MM score 12 months later could indicate that mentalizing capacity may not be an enduring capacity that characterises a particular mother-infant pair and that a mother's capacity to mentalize may not always stay consistent over time. An interpretation of this finding could be related to 31% of the mothers receiving parent-infant psychotherapy between T1 and T2 which could have positively impacted their mentalization ability. This therefore may serve to reinforce the benefit of sensitivity-promoting interventions with at-risk mothers, indicating that such interventions are worthwhile with potential benefits to mother and child.

ARR provides a measure of the more negative representations that the mother has towards her relationship with her infant and is relatively brief and simple to use in comparison to other coding systems which aim to capture the qualities of representations which are more prevalent in less optimal parent-infant relationships. The findings in the present study that there were both overlaps and differences between the ARR measure and both RF and MM indicates that this may be a useful addition to clinical assessments as well as pre- and post-therapy measures.

The present study did not find the expected associations between RF and MM respectively with attachment. However, upon consideration of the limitations of the present study and the vast amount of literature which supports the positive associations between both measures and secure infant attachment relationships (e.g. Carlson & Sroufe, 1995; Main, 1995, 2000; Bateman & Fonagy, 2004; Fonagy & Bateman, 2006, 2008; Fonagy, Gergely, Jurist & Target, 2002; Fonagy & Target, 2006; Gottman, Katz & Hooven, 1996; Luyten, Fonagy, Mayes, & Van Houdenhove,

2009; Main, Kaplan, & Cassidy, 1985; Meins, Fernyhough, Fradley, & Tuckey, 2001; Sharp, Fonagy, & Goodyer, 2008; Slade, 2005; van IJzendoorn, 1995) it must be considered that the lack of expected associations are to do with methodological, rather than theoretical, limitations and therefore that maternal mentalization does impact on child attachment security. The unique contributions of explicit and implicit aspects of maternal mentalization to child attachment security require further investigation.

Conclusion

The literature review outlined findings from video feedback interventions concerning the impact on the children involved. It was found that such interventions can have positive effects on children's attachment, behaviour, cognition / language, and social functioning. The need for future research including replications with robust research design and adequate power, as well as moving towards consistent ways of conducting video feedback, measuring outcomes and identifying which child and parent populations benefit from this intervention was highlighted.

The empirical paper explored the way that explicit and implicit ways of measuring maternal mentalization are related to each other, a measure of more negative representations and infant attachment security. Implicit and explicit measures were found to capture related but different aspects of mentalization. However, the relationship between these measures and ARR and attachment were not as predicted, which may be explained by methodological issues.

This critical appraisal has commented upon the background to undertaking this thesis and the overall themes, the challenges in conducting the literature review,

the experience of joint working, the selection of an appropriate coding system, the advantages and challenges of using pre-existing data and the clinical implications of the findings reported.

References

Bateman, A. W., & Fonagy, P. (2004). Mentalization-based treatment of BPD. *Journal of Personality Disorders, 18,* 36-51.

Carlson, E.A., & Sroufe, L.A. (1995). Contribution of attachment theory to developmental psychology. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology, Vol. 1: Theory and methods* (pp. 581-617). New York: Wiley.

Fonagy, P., & Bateman, A. W. (2006). Mechanisms of change in mentalization-based treatment of BPD. *Journal of Clinical Psychology, 62,* 411-430.

Fonagy, P., & Bateman, A. (2008). The development of Borderline Personality Disorder: A mentalizing model. *Journal of Personality Disorders, 22,* 4-21.

Fonagy, P., Gergely, G., Jurist, E., & Target, M. (2002). *Affect Regulation, Mentalization and the Development of the Self*. New York: Other Press.

Fonagy, P., & Target, M. (2006). The mentalization-focused approach to self pathology. *Journal of personality disorders, 20,* 544-576.

Gottman, J., Katz, L., & Hooven, C. (1996). Parental meta-emotion philosophy and the emotional life of families: Theoretical models and preliminary data. *Journal of Family Psychology, 10,* 243-268.

Laranjo, J., Bernier, A., & Meins, E. (2008). Associations between maternal mind-mindedness and infant attachment security: Investigating the mediating role of maternal sensitivity. *Infant Behavior and Development, 31,* 688-695.

Lieberman, M. D. (2007). Social cognitive neuroscience: a review of core processes. *Annu. Rev. Psychol.*, *58*, 259-289.

Luyten, P., Fonagy, P., Mayes, L., & Van Houdenhove, B. (2009). Mentalization as a multidimensional concept. *Manuscript submitted for publication*.

Main, M. 1995. "Discourse, prediction and studies in attachment: Implications for psychoanalysis". In *Research in Psychoanalysis: Process, Development, Outcome*, Edited by: Shapiro, T. and Emde, R. N. Madison, CT: International Universities Press.

Main, M. (2000). The organized categories of infant, child, and adult attachment: Flexible vs. inflexible attention under attachment-related stress. *Journal of the American Psychoanalytic Association, 48,* 1055 – 1096.

Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. *Monographs of the Society for Research in Child Development, 50,* 66-104.

Meins, E. (1997). *Security of attachment and the social development of cognition*. Hove, UK: Psychology Press.

Meins, E., Fernyhough, C., Fradley, E., & Tuckey, M. (2001). Rethinking maternal sensitivity: Mothers' comments on infants' mental processes predict security of attachment at 12 months. *Journal of Child Psychology and Psychiatry*, *42,* 637–648.

Pawlby, S., Fernyhough, C., Meins, E., Pariante, C. M., Seneviratne, G., & Bentall, R. P. (2010). Mind-mindedness and maternal responsiveness in infant–mother

interaction in mothers with severe mental illness. *Psychological Medicine, 40,* 1861-1869.

Satpute, A. B., & Lieberman, M. D. (2006). Integrating automatic and controlled processes into neurocognitive models of social cognition. *Brain Research, 1079,* 86–97.

Shai, D. (2010). Introducing parental embodied mentalising: Exploring moments of meeting of mind of parent and infants from a relational whole-body kinaesthetic perspective. In S. Bender (Ed.), *Movement analysis of interaction* (pp. 107-124). Berlin: Logos Verlag.

Shai, D., & Belsky, J. (2011a). When words just won't do: Introducing parental embodied mentalising. *Child Development Perspectives, 5,* 173-180.

Shai, D., & Belsky, J. (2011b). Parental embodied mentalising: Let's be explicit about what we mean by implicit. *Child Development Perspectives, 5,* 187-188.

Sharp, C., Fonagy, P., & Goodyer, I. (Eds.). (2008). Social cognition and developmental psychopathology. Oxford: Oxford University Press.

Slade, A. (2005). Parental reflective functioning: An introduction. *Attachment and Human Development, 7,* 269-281.

van IJzendoorn, M. H. (1995). Adult attachment representations, parental responsiveness, and infant attachment: A meta-analysis on the predictive validity of the Adult Attachment Interview. *Psychological Bulletin, 117,* 387-403.

Wong, V. (2014). The relationship between parental mentalization and maternal psychopathology: during and after postpartum period. Unpublished clinical psychology doctoral thesis, Department of Clinical, Educational, and Health Psychology, University College London

Appendix 1

Outline of contribution in relation to joint working

The study described in the empirical paper was part of a joint research project conducted between myself and a fellow trainee, Vivien Wong, who were both supervised by Professor Peter Fonagy.

The workload in terms of ethics, data protection and risk assessment procedures was shared equally.

Although the research hypotheses were formulated independently, both Vivien and I required a sample of mother-infant participants who had completed the measures as set out in the empirical paper and recorded a free-play video. Organising access to participants (via the Anna Freud Centre) was therefore shared equally, as was setting up and maintaining a database of participant information. Coding of the videos for mind-mindedness (except for the required 25% overlap to determine inter-rater reliability), data entry related to our individual hypotheses and all data analyses were conducted independently.

Although Vivien and I shared a large proportion of participants, due to some missing data on specific measures central to our different hypotheses there are also some differences between our overall samples.

The write-up was conducted independently.

Appendix 2

Measures conducted in the empirical paper

Appendix removed due to copyright

Appendix 3

Participant consent forms

Referred sample

Patient Identification Number:

CONSENT FORM

A study of psychological help for mothers with young babies

Name of Researchers: Peter Fonagy, Mary Target, Michelle Sleed

Please initial box

1. I confirm that I have read and understand the information sheet dated 11/2008 (version 5) for the above study and have had the opportunity to ask questions. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, without my medical care or legal rights being affected. ☐
3. I understand that I will be videotaped with my baby as part of the research. ☐
4. I agree for myself and my baby to take part in the above study. ☐
5. I agree for the video of play with my baby to be used for teaching professionals about baby development and behaviour (optional). ☐

_____	_____	_____
Name of Parent	Date	Signature

_____
Name of child

_____	_____	_____
Researcher taking consent	Date	Signature

1 for patient; 1 for researcher; 1 for referring professional

Non-referred sample

Informed Consent Form for ..... in Research Studies

(*define target group i.e. Parent/Guardian/Child/Teacher*)

Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

Title of Project: **The nature and quality of early parent-infant relationships in a normative population.**

This study has been approved by the UCL Research Ethics Committee [Project ID Number]:

- Thank you for considering to take part in this research. The person organising the research must explain the project to you before you agree to take part.
- If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.
- I understand that if I decide at any other time during the research that I no longer wish to participate in this project, I can notify the researchers involved and be withdrawn from it immediately without penalty and without affecting the standard of care I receive.
- I consent to the processing of my personal information for the purposes of this research study. I understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.

Participant's Statement

I .....

agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information Sheet about the project, and understand what the research study involves.

Signed: Date:

Researcher's Statement

I .....

confirm that I have carefully explained the purpose of the study to the participant and outlined any reasonably foreseeable risks or benefits (where applicable).

Signed: Date:

Appendix 4

Participant information sheets

Referred sample

Participant Information Sheet

A study of psychological help for mothers with young babies

You are being invited to take part in a research study. This information sheet is to answer some of your questions and to help you decide if you want to take part.

1. **What is the purpose of the study and why have I been chosen?**

We understand that you and your doctor/ health visitor/ or other professional have spoken about some concerns about how you are feeling, or how your baby is doing. This study will compare a service called parent-infant psychotherapy with the services that are normally offered in your area. Parent-infant psychotherapy is a psychological service for mothers and babies together. We would like to see how well it works compared to the services that are usually available. This study will help us to find out in what ways these different services will benefit different families.

2. **Do I have to take part?**

No, it is up to you to decide whether or not to take part. If you decide to take part you are still free to change your mind at any time and without giving a reason. A decision to pull out of the study at any time will not affect the standard of care you receive. If you would like to receive treatment but not take part in the study, the person who has referred you (such as your GP or health visitor) can discuss the treatment options with you.

3. **What will I have to do if I take part?**

If you decide to take part in the study, a researcher will see you and your baby together. This can be done either at the place where you were referred from, at the Anna Freud Centre, or in your home, whichever you prefer. During these interviews, you will be asked some questions about how you think you and your baby are doing and you will complete some questionnaires with the researcher.

Sometimes we might find out from this first interview that the study is not quite right for some mothers and babies. If this happens, the researcher will discuss this with you and you will not be included in the study. If you do still wish to receive some kind of help, you can discuss other options with the person who referred you to the study.

If you the study is suitable for you and it's something you are interested in doing, you will either receive parent-infant psychotherapy or you will receive what we call "treatment as usual". If you are placed in the "treatment as usual" group, you will continue to receive the care/treatment you have from your GP, health visitor, mental health team, psychiatrist, etc. If you are in the "parent-infant psychotherapy group", you will be offered appointments with a parent-infant psychotherapist in addition to the services you already use.

Because we don't know which of the two types of treatment is better for which people, we need to place people to both types of treatment and then compare the groups. The type of treatment group you are placed in will be done by a computer and you have a 50:50 chance of being in either group. You will not be able to choose which treatment group you go to. Once you have been placed in one of the two groups, the research psychologist will let you know which one you will be receiving.

By taking part in the study you and your child will be seen by a researcher 3 times in one year. The researcher will complete a set of questionnaires with you about how you are feeling, what it's like for you to be a parent, and about your experience of services you have used. We will also do a simple assessment of your baby's development by playing some games with him or her, and we will video-record you and your baby spending time together for a little while. **At the 6-month follow-up, we will also ask if you are willing for your baby to take part in a study of infant brain development. During this we will record tiny electrical signals of your baby's brain using sensors on your baby's scalp. The sensor net doesn't produce any electricity, it only measures the electrical impulses your baby's brain naturally creates. The procedure is non-invasive and won't harm your baby in any way. For your baby it will be the same feeling as wearing a hat. This is voluntary and will be up to you to whether or not you would like your baby to take part.** At the 12 month follow-up we will ask you and your child if you would be willing to do an experiment which involves you and your child being together and then separating for short time periods so that we can see how these separations are for your child. This is voluntary and it will be up to you if you would like to do it or not. These research assessments will probably take between one-and-a-half to two-and-a-half hours at each time point.

4. **Will it be difficult to do?**

Parents usually find the questionnaires quite interesting, and talking over their relationship with their baby is often enjoyable or helpful. Finding that problems have improved in later assessments is good to know. The babies enjoy the simple tests (which are like the ones doctors use in Well Baby Clinic checks), and their parents enjoy seeing what their baby can already do.

5. **What are the possible disadvantages and risks of taking part?**

Sometimes the questionnaires and interviews used in this study can be a bit upsetting because they include asking about any problems you are having. However, this would probably be no more difficult than when you discussed the same things with your doctor or health visitor. It does take some time (about two hours at three different time points), and that might be difficult if you are very busy.

6. **What are the possible benefits of taking part?**

The study gives you the chance to be offered help with any problems you have for yourself and your baby. Both parent-infant psychotherapy and the community services that are normally offered have been very helpful for many parents and children. Also, the information we get from this study will help us in the future to provide the best services to other families with young children experiencing difficulties. So if you take part you will know that you are making a difference for others like you.

7. **What if something goes wrong?**

If you are not happy with anything about the research or if you want to talk to somebody about the study, you may contact any of the people listed at the end of this information sheet.

8. **Will my taking part in this study be kept confidential?**

The information you give will be kept very private. We make sure of this by keeping the questionnaires and videotapes locked away, and we will not write your name or any other personal details on any of these. All personal information you give us will be remain locked away and then destroyed after 5 years. When we report the results of the study, we will not include any personal details about any of the families that took part so that they can be recognised. Only the research staff will be able to look at the information you give us. Your General Practitioner will be sent a letter saying that you have agreed to take part in the study and which treatment group you have been put in. However, your doctor and practice staff will not need to be told about your assessments or what is discussed in the therapy, except in very rare cases if there is serious risk to you or your

baby, which is not already known to your doctor. If that happened, of course we would talk to you about this as well as to your doctor.

9. Who is organising and funding the research?

This study is being conducted by the Anna Freud Centre and has been funded by the Big Lottery Fund. The study has been approved by a local research ethics committee.

10. Contact for Further Information

If you would like further information about the study, you can contact the Research Psychologist:

Michelle Sleed
Anna Freud Centre
21 Maresfield Gardens
NW3 5SD

Telephone: 020 74432216
Email: Michelle.Sleed@annafreud.org

Or you could contact the Chief Investigator of the study:

Prof Peter Fonagy
Anna Freud Centre
21 Maresfield Gardens
NW3 5SD

Telephone: 020 76795960
Email: P.Fonagy@ucl.ac.uk

Non-referred sample

Information Sheet for ..... in Research Studies
(define target group i.e. Parent/Guardian/Child/Teacher)

You will be given a copy of this information sheet.

Title of Project: **The nature and quality of early parent-infant relationships in a normative population.**

This study has been approved by the UCL Research Ethics Committee [Project ID Number]:

Name, Address and Contact Details of Investigators:

Prof Peter Fonagy
Anna Freud Centre
21 Maresfield Gardens
NW3 5SD

Telephone: 020 76795960
Email: P.Fonagy@ucl.ac.uk

Michelle Sleed
Anna Freud Centre
21 Maresfield Gardens
NW3 5SD

Telephone: 020 74432216
Email: Michelle.Sleed@annafrued.org

We would like to invite ..... to participate in this research project.
(i.e. you or your child)

You should only participate if you want to; choosing not to take part will not disadvantage you in any way. Before you decide whether you want to take part, it is important for you to read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

Details of the Study:

This research will be carried out to examine in more detail the nature and quality of early parent-infant relationships in a normative population. We are currently collecting data from high risk and clinical populations of mothers and babies. This project will allow us to collect data from a non clinical population in order to compare. We are recruiting a sample of mothers and babies from mother-baby groups, clinics and children's centres and those mothers that chose to take part will be interviewed and asked to complete a set of questionnaires about how they are feeling, about their baby and about the relationship between them. We will also video record the mothers and babies playing together to assess the quality of parent-infant interaction.

It is entirely up to you to decide whether or not to take part. If you decide to take part you are still free to change your mind at any time and without giving a reason. A decision to pull out of the study at any time will not affect the standard of care you receive and you may withdraw your data from the project at any point up until it is transcribed for use in the final report. If you would like to access services but not take part in the study, the researcher you are in contact with can discuss the service options with you.

If you decide to take part in the study, a researcher will see you and your baby together. This can be done either at the Anna Freud Centre, or in your home, whichever you prefer. During these interviews, you will be asked some questions about how you think you and your baby are doing and you will complete some questionnaires with the researcher.

By taking part in the study you and your child will be interviewed by a researcher 3 times in one year. The researcher will complete a set of questionnaires with you about how you are feeling and what it's like for you to be a parent. We will also do a simple assessment of your baby's development by playing some games with him or her, and we will video-record you and your baby spending time together for a little while. At the 12 month follow-up we will ask you and your child if you would be willing to do an experiment which involves you and your child being together and then separating for short time periods so that we can see how these separations are for your child. This is voluntary and it will be up to you if you would like to do it or not. These research assessments will probably take one-and-a-half to two hours at each time point. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form.

Appendix 5

Ethics and research and development approval

Camden & Islington Community Local Research Ethics Committee
Room 3/14
Third Floor, West Wing
St Pancras Hospital
4 St Pancras Way
London
NW1 0PE

25 May 2005

Prof Peter Fonagy
Chief Executive
Anna Freud Centre & University College London
21 Maresfield Gardens
London
NW3 5SD

Dear Prof Fonagy

Full title of study: ***Helping parents with mental health problems to parent young infants: A randomised controlled trial of Parent-Infant Psychotherapy (PIP)***
REC reference number: ***05/Q0511/47***
Protocol number:

Thank you for your letter of 13 May 2005, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair and Ms Gillian Miles.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised.

The favourable opinion applies to the research sites listed on the attached form.

Conditions of approval

The favourable opinion is given provided that you comply with the conditions set out in the attached document. You are advised to study the conditions carefully.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document Type:	Version:	Dated:	Date Received:
Application	1	23/02/2005	25/02/2005
Investigator CV	1	23/02/2005	22/03/2005
Protocol	1	23/02/2005	25/02/2005
Covering Letter	1	23/02/2005	25/02/2005
Summary/Synopsis	2	13/05/2005	17/05/2005
Compensation	1	20/07/2004	25/02/2005

UCL RESEARCH ETHICS COMMITTEE
GRADUATE SCHOOL OFFICE

Professor Peter Fonagy
Psychoanalysis Unit
Department of Clinical, Educational and Health Psychology
UCL

01 December 2008

Dear Professor Fonagy

Notification of Ethical Approval
Ethics Application: 1603/001: A study of early parent-infant relationships

I am pleased to confirm that your project has been approved by the UCL Research Ethics Committee for a period of 12 months from the commencement of the project, i.e. 1st December 2008.

Members made a minor comment in relation to the Informed Consent Form which should contain an additional bullet point relating to consent for video-recording. It was recommended that participants, who initially consented to being video-recorded, should be re-contacted at a later stage and given the option to withdraw their consent if they so wished. Participants should also be told how long the videotapes will be held and when they will be destroyed.

It was suggested that the stock phrase 'will not affect the standard of care you receive' should be removed from the Information Sheet as it was deemed to be inappropriate in the context of this project.

Members were also concerned about the negative and repetitive nature of the questionnaires which might lead the mothers to believe that they have a problem. It was recommended that the mothers involved in the research should be reassured that they have been recruited from a normative, non-clinical population and that this should be emphasised in the Information Sheet.

Approval is subject to the following conditions:

1. It is a requirement of the Committee that research projects which have received ethical approval are monitored annually. Therefore, you must complete and return our 'Annual Continuing Review Approval Form' PRIOR to the **1st December 2009**. If your project has ceased or was never initiated, it is still important that you complete the form so that we can ensure that our records are updated accordingly.

2. You must seek Chair's approval for proposed amendments to the research for which this approval has been given. Ethical approval is specific to this project and must not be treated as applicable to research of a similar nature. Each research project is reviewed separately and if there are significant changes to the research protocol you should seek confirmation of continued ethical approval by completing the 'Amendment Approval Request Form'.

The forms identified above can be accessed by logging on to the ethics website homepage: http://www.grad.ucl.ac.uk/ethics/ and clicking on the button marked 'Key Responsibilities of the Researcher Following Approval'.

City and Hackney NHS
Teaching Primary Care Trust

14 February 2013

Directorate of Quality and Service Improvement
'Grd flr, Nurses Home
14 Kenworthy Road
London E9 5TD

Tel: 020 7682 2758
Fax: 020 7682 2766
e-mail: cindy.hall@chpct.nhs.uk

Professor Peter Fonagy
Chief Executive
Anna Freud Centre & University College London
21 Maresfield Gardens
London
NW3 5SD

Dear Professor Fonagy,

Re: CH0012_2005 - Helping parents with mental health problems to parent young infants: A randomised control trial of parent-infant psychotherapy (PIP) and counselling.

Thank you for sending me a copy of your application form to the Research Ethics Committee and the supporting documentation. City and Hackney Teaching Primary Care Trust are therefore pleased to inform you that we give you our Trust management approval for the study to commence.

Please ensure that you report all adverse events as and when they happen to the Research Ethics Committee and the City and Hackney Primary Care Trust R&D Office. Failure to abide by this agreement will result in the withdrawal of the Trust's approval.

The R&D office is required by the Department of Health to maintain a comprehensive database of all research projects taking place in the Trust. To ensure that we have accurate information for our submissions to the National Research Register please provide the R&D office with any project amendments, project extensions or terminations.

City and Hackney Teaching Primary Care Trust wishes you well in your research.

Yours sincerely

Cindy Hall
Clinical Effectiveness and R&D Manager

City and Hackney NHS
Teaching Primary Care Trust

16 July 2014

Directorate of Quality and Service Improvement
'Grd flr, Nurses Home
14 Kenworthy Road
London E9 5TD

Tel: 020 7682 2758
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e-mail: cindy.hall@chpct.nhs.uk

Professor Peter Fonagy
Chief Executive
Anna Freud Centre & University College London
21 Maresfield Gardens
London
NW3 5SD

Dear Professor Fonagy,

Re: CH0012_2005 - Helping parents with mental health problems to parent young infants: A randomised control trial of parent-infant psychotherapy (PIP) and counselling.

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Please ensure that you report all adverse events as and when they happen to the Research Ethics Committee and the City and Hackney Primary Care Trust R&D Office. Failure to abide by this agreement will result in the withdrawal of the Trust's approval.

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City and Hackney Teaching Primary Care Trust wishes you well in your research.

Yours sincerely

Cindy Hall
Clinical Effectiveness and R&D Manager

Appendix 6

Which participants had scores on each measure

Participant	Group	RF T1 (1 = yes, 0 = no)	RF T2 (1 = yes, 0 = no)	SSP (1 = yes, 0 = no)	MM (1 = yes, 0 = no)	ARR T1 (1 = yes, 0 = no)	ARR T2 (1 = yes, 0 = no)
1	Non-referred	1	1	0	1	0	0
2	Non-referred	1	1	0	1	0	0
3	Non-referred	0	1	0	0	0	0
4	Non-referred	0	0	0	0	0	0
5	Non-referred	0	1	0	0	0	0
6	Non-referred	1	1	0	1	0	0
7	Non-referred	0	0	0	0	0	0
8	Non-referred	1	1	0	1	0	0
9	Non-referred	0	1	0	0	0	0
10	Non-referred	1	1	0	1	0	0
11	Non-referred	0	0	0	0	0	0
12	Non-referred	0	1	0	0	0	0
13	Non-referred	0	0	0	0	0	0
14	Non-referred	1	1	0	1	0	0
15	Non-referred	1	0	0	1	0	0
16	Non-referred	1	1	0	1	0	0
17	Non-referred	1	1	0	1	0	0
18	Non-referred	0	0	0	0	0	0
19	Non-referred	1	1	0	1	0	0
20	Non-referred	1	1	0	1	0	0
21	Non-referred	0	0	0	0	0	0
22	Non-referred	1	1	0	1	0	0
23	Non-referred	1	1	0	1	0	0
24	Non-referred	1	1	0	1	0	0
25	Non-referred	1	1	0	1	0	0
26	Non-referred	0	0	0	0	0	0
27	Non-referred	0	1	0	0	0	0

28	Non-referred	1	1	0	1	0	0
29	Non-referred	1	1	0	1	0	0
30	Non-referred	1	1	0	1	0	0
31	Non-referred	1	1	0	1	0	0
32	Non-referred	1	1	0	1	0	0
33	Non-referred	1	1	0	1	0	0
34	Non-referred	1	1	0	1	0	0
35	Non-referred	0	0	0	0	0	0
36	Non-referred	1	1	0	1	0	0
37	Non-referred	1	1	0	0	0	0
38	Non-referred	1	1	0	1	0	0
39	Non-referred	1	1	0	1	0	0
40	Non-referred	1	1	0	1	0	0
41	Non-referred	0	1	0	1	0	0
42	Non-referred	0	1	0	0	0	0
43	Non-referred	1	1	0	1	0	0
44	Non-referred	1	1	0	0	0	0
45	Non-referred	0	1	0	0	0	0
46	Non-referred	0	1	0	1	0	0
47	Non-referred	1	1	0	1	0	0
48	Non-referred	0	1	0	0	0	0
49	Non-referred	1	1	0	1	0	0
50	Non-referred	0	0	0	0	0	0
51	Non-referred	0	1	0	0	0	0
52	Non-referred	0	0	0	1	0	0
53	Non-referred	0	0	0	0	0	0
54	Non-referred	1	1	0	1	0	0
55	Referred	1	1	0	0	1	1
56	Referred	1	0	0	0	1	0

57	Referred	1	1	1	1	1	1
58	Referred	1	1	1	1	1	1
59	Referred	1	1	1	1	1	1
60	Referred	1	1	1	1	1	1
61	Referred	1	1	1	1	1	1
62	Referred	1	1	1	1	1	1
63	Referred	1	0	0	0	1	0
64	Referred	1	1	1	1	1	1
65	Referred	1	1	1	1	1	1
66	Referred	1	1	1	0	1	1
67	Referred	1	1	1	1	1	1
68	Referred	1	1	1	1	1	1
69	Referred	1	1	1	1	1	1
70	Referred	1	1	1	1	1	1
71	Referred	1	1	1	1	1	1
72	Referred	1	1	1	1	1	1
73	Referred	1	0	0	0	1	0
74	Referred	1	1	1	1	1	1
75	Referred	1	0	0	0	1	0
76	Referred	1	1	1	1	1	1
77	Referred	1	1	1	0	1	1
78	Referred	1	1	1	0	1	1
79	Referred	1	1	1	1	1	1
80	Referred	1	1	1	1	1	1
81	Referred	1	1	1	1	1	1
82	Referred	1	1	1	0	1	1
83	Referred	1	1	1	1	1	1
84	Referred	1	1	1	1	1	1
85	Referred	1	0	0	0	1	0

86	Referred	1	0	0	0	1	0
87	Referred	1	1	0	0	1	1
88	Referred	0	1	1	1	0	1
89	Referred	1	0	0	0	0	0
90	Referred	1	1	1	1	1	1
91	Referred	1	1	1	0	1	1
92	Referred	1	1	1	0	1	1
93	Referred	1	0	0	0	1	0
94	Referred	1	1	1	1	1	1
95	Referred	1	1	1	1	1	1
96	Referred	1	1	1	1	1	1
97	Referred	1	1	1	1	1	1
98	Referred	1	1	0	0	1	1
99	Referred	1	1	1	1	1	1
100	Referred	1	0	0	0	0	0
101	Referred	1	1	1	1	1	1
102	Referred	1	1	1	1	1	1
103	Referred	1	1	1	0	1	1
104	Referred	1	1	1	1	1	1
105	Referred	1	0	0	0	1	0
106	Referred	1	0	0	0	0	0
107	Referred	1	1	1	1	1	1
108	Referred	1	1	1	1	1	1
109	Referred	1	1	1	1	1	1
110	Referred	1	0	0	0	0	0
111	Referred	1	1	1	1	1	1
112	Referred	1	1	1	1	1	1
113	Referred	1	1	1	0	1	1
114	Referred	1	1	1	1	1	1

115	Referred	1	1	1	1	1	1
116	Referred	1	0	0	0	1	0
117	Referred	1	1	1	1	1	1
118	Referred	1	0	0	0	1	0
119	Referred	1	1	1	1	1	1
120	Referred	1	1	0	1	0	0
121	Referred	1	1	1	1	1	1
122	Referred	1	1	1	1	1	1
123	Referred	1	1	0	0	1	1
124	Referred	1	1	1	1	1	1
125	Referred	1	1	1	1	1	1
126	Referred	1	0	0	0	1	0
127	Referred	1	0	0	0	1	0