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Original contribution

The Postpartum Bonding Questionnaire: a validation

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Summary

This is a validation of a self-rating questionnaire designed to detect disorders of the mother-infant relationship. 125 subjects filled in the questionnaire, and were also interviewed using the 5th Edition of the Birmingham Interview for Maternal Mental Health. On the basis of these interviews and the case records, we made consensus diagnoses of various forms and degrees of mother infant relationship disorder, according to criteria published in this paper. We calculated specificity, sensitivity and positive predictive value of the four scale scores generated by the questionnaire. Scale 1 (a general factor) had a sensitivity of 0.82 for all mother-infant relationship disorders. Scale 2 (rejection and pathological anger) had a sensitivity of 0.88 for rejection of the infant, but only 0.67 for severe anger. The performance of scale 3 (infant-focused anxiety) was unsatisfactory. Scale 4 (incipient abuse) selected only a few mothers, but was of some value in identifying those at high risk of child abuse. Revision of the thresholds can improve sensitivity, especially of scale 2, where a cut-off point of 12 = normal, 13 = high better identifies mothers with threatened rejection. These new cut-off points would need validation in another sample.

Keywords: Mother-infant relationship; rejection of infant; child abuse; postpartum anxiety.

Introduction

There is a wealth of literature on the normal mother-infant relationship (reviewed in Brockington, 1996). Investigatory methods include long periods of observation (Ainsworth et al, 1972) and videotape analysis (Tronick et al, 1978), which enable detailed measurements to be made of various forms of interaction. But little has been written about the detection of disorders of this relationship. Rating scales for nursing observations were developed by Salariya & Cater (1984), and Hipwell & Kumar (1996). In Japan, Nagata et al (2000) developed a self-rating scale – the Postpartum Maternal Attachment Scale. We published another self-rating questionnaire under the name "Postpartum Bonding Questionnaire" (PBQ, Brockington et al, 2001). This was based on a principal component analysis of two draft questionnaires developed by a Birmingham team and Dr Oates (of the Open University). The 84 items in the two questionnaires were condensed to 25, yielding scores on 4 factors – a general factor (scale 1), rejection & pathological anger (scale 2), anxiety about the infant (scale 3), and incipient abuse (scale 4). The Birmingham team interviewed 51 mothers with the 3rd edition of the Birmingham Interview for Maternal Mental Health, whose probes were published in *Motherhood and Mental Health* (Brockington, 1996). On the basis of interview responses, the mothers were assigned to three groups – depressed mothers with a normal mother-infant relationship, those with mild mother-infant relationship disorders, and those with pathological anger or rejection of the baby. Cut-off points were selected to maximise the discrimination between these groups. This achieved satisfactory specificity and sensitivity, particularly for scales 1 and 2. But these thresholds were optimized for the particular sample of mothers interviewed. It was necessary to verify them in a fresh sample of patients.

Subjects and methods

Patients

The mothers who agreed to participate in this study were referred to specialist mother-and-baby services in Birmingham

and Christchurch, both of which have the back-up of community out-reach, day care and in-patient mother and baby admission. Most of the patients were referred by family practitioners for investigation and treatment of a wide variety of postpartum psychiatric disorders. 104 Birmingham mothers were interviewed in 2000–2001; they included all patients (who agreed to be interviewed) referred to Professor Brockington, and a random sample of those referred to Dr. Wainscott. Twenty-five patients from Christchurch were interviewed by IFB in 2000, making 129 in all.

Observations

Two schedules were used – the Postpartum Bonding Questionnaire (PBQ) and the Birmingham Interview for Maternal Mental Health ('Birmingham Interview').

The PBQ has 25 statements, each followed by six alternative responses ranging from 'always' to 'never'. Positive responses, such as "I enjoy playing with my baby", are scored from zero ('always') to 5 ('never'). Negative responses, such as "I am afraid of my baby", are scored from 5 ('always') to zero ('never'). Appendix 1 shows to which factor each statement belongs. The scores are summated for each factor, a high score indicating pathology. Mothers completed the PBQ in respect of their *current* symptoms (useful for planning treatment), and *at their worst* (which corresponded to the epoch covered by the interview, looking back over the postpartum period). Scores *at their worst* were used in this analysis. All but four mothers completed the PBQ, so that 125 were available for this study.

All mothers were also interviewed with the Birmingham Interview (5th edition, Brockington et al, in press). This interview is designed to explore the social, psychological and psychiatric course of pregnancy, parturition and the puerperium. It has 120 compulsory probes and 175 ratings, and takes an average of one hour 45 minutes to complete. There are 8 sections:

1. Psychiatric and obstetric history
2. Social and psychological background to this pregnancy
3. Prepartum psychiatric disorders
4. Parturition
5. Social and psychological background to the puerperium
6. Postpartum psychiatric disorders
7. Mother-infant relationship
8. Conclusion.

The section on the mother-infant relationship (section 7) is the one germane to this study. It has 17 compulsory probes, for example:

Have you felt disappointed with your feelings for (name of baby)?
How do you feel when your baby cries, or wakes you at night?
Does your baby make you feel angry?
What was the worst thing you felt an impulse to do?
Have you ever lost control when you felt angry with him/her?

There are cut-off points with additional questions. The first list of supplementary probes is headed, 'If there is evidence of an abnormal maternal emotional response'. It is followed by 9 additional probes, for example:

Have you ever felt that it would be better if someone else looked after him/her?
Did you ever wish that something would happen to him/her?

The second supplementary list is headed, 'If the mother lost control over her anger'. It is followed by four additional probes, for example:

What were the worst things you did?

Section 7 has 22 ratings, of which the following are most pertinent to this study:

Nature and strength of feelings for infant
Ideas of transferring care or escaping maternal duties
Ideas of infant loss
Obsessions of child abuse
Angry response to infant (with 5 categories of abuse).

Diagnosis

The patients were assigned to diagnostic groups as in the first validation. The criteria used were slightly different from those shown in Appendix 2 of the 2001 paper. The new criteria are shown in Appendix 2 of this paper. The criteria for pathological anger have been revised: in the 2001 paper there was one category – 'pathological anger towards the infant'. The present criteria define three grades – mild, moderate and severe. In the 2001 paper, there was one category – 'rejection of infant'. This has been subdivided into two grades – 'threatened rejection' and 'established rejection'; the main difference is between a desire for temporary transfer of care (threatened rejection) and a wish to be rid of the child altogether (established rejection).

Blind to the PBQ scores, IFB and CF independently studied the interviews and the case records, and assigned the mothers to categories. These preliminary diagnoses were used to calculate inter-rater reliability. They then met to resolve disagreements and reach a consensus diagnosis. In two cases with continuing disagreement, a third rater (Dr. Loh) was brought in to make a final decision.

Data analysis

After assigning the patients to diagnostic groups, the specificity, sensitivity and positive predictive value of the scales were calculated, using the original cut-off points. We then considered various revised thresholds that were optimal for this sample.

Results

Characteristics of the sample

The majority of the mothers were Caucasian, but there were 19 from ethnic minorities −10 of Indian or Pakistani origin, 3 Maori, 3 of mixed race, two Afro-Caribbean and one Japanese. Ages ranged from 17 to 43, with a median of 30. Half of the mothers (65) had given

birth to their first child, 39 to the second, 14 to the third, 8 to the fourth and 3 to the fifth or more (up to the tenth). 72 were married, 52 cohabiting and 5 single mothers.

Apart from disorders of the mother-infant relationship, most of these patients had other (co-morbid) disorders: 87 had some degree of depression, 76 some kind of anxiety disorder, 22 an obsessional disorder and 15 post-traumatic stress disorder. It was common for mothers to present with a combination of several disorders, and only six had an isolated mother-infant relationship disorder.

Consensus diagnoses

Table 1 shows the inter-rater reliability of the various categories, and the number of mothers with various consensus diagnoses.

This Table shows that 75 depressed mothers had a normal bond, including 57 with no evidence of any disorder in the mother-infant relationship, and 18 with infant-centered anxiety, anger or obsessions. 13 had a mild disorder, that is, delayed bonding, or ambivalence, or the secondary loss of a primary bond. 37 had signs of rejection of the infant – 20 with threatened and 17 with established rejection.

23 had infant-focused anxiety, and of these only 6 had anxiety alone, most of the others showing signs of rejection of greater or lesser degree. 40 showed pathological anger, which was mild in 9, moderate in 16 and severe (with frank child abuse) in 15. Most of these mothers also had signs of rejection. 8/15 of those with severe anger had established rejection.

The inter-rater reliability of the preliminary diagnoses (independently made by IFB and CF) ranged between 0.67 and 0.97 (Cohen's Kappa). Where there are two or three severity grades of a single phenomenon, it seemed best to measure the reliability of any grade, then the more severe grade(s), and not to treat them as if they were different categories. Thus we measured the reliability of threatened or established rejection (37 cases), then of established rejection alone (17 cases).

Table 1. Diagnostic groups

Category		Inter-rater reliability (Cohen's Kappa)	Number with consensus diagnosis
Disorders of the bond			
Depressed mothers with normal bonding	normal	0.76	75[a]
Mild disorders of bonding	delay	0.89	7
	ambivalence	0.97	1
	2nd loss	0.84	5
Rejection	threatened	0.67 (threatened or established)	20
	established	0.90	17
Additional disorders			
Infant-focused anxiety[b]	mild	0.76 (mild or severe)	12
	severe	0.96	11
Pathological anger[b]	mild	0.69 (any degree)	9
	moderate	0.83 (at least moderate)	16
	severe	0.96	15

[a] This includes 57 mothers with no abnormality at all, and 18 with a normal bond, but pathological infant-centered anxiety, anger or obsessions.

[b] Diagnoses of infant-focused anxiety and pathological anger were made in addition to an assessment of the bond. Mothers with infant-centered anxiety or pathological anger could have a normal bond, a mild disorder, or rejection (threatened or established).

Scores on the Postpartum Bonding Questionnaire

Tables 2 and 3 show the scores in mothers with various consensus diagnoses. Table 2 gives a brief summary of the scores obtained in the first validation (Brockington et al., 2001) and Table 3 shows the scores in the present study, with means and standard deviations for factors 1–3, and numbers with each score on factor 4.

The mean scores of the depressed mothers with normal bonding were almost identical to those found in the 2001 study (8.7 and 8.8), indicating that the patients in the two studies were similar. Those in the present study with mild ''bonding'' disorders had lower scores, which is probably due to separating off a new category of ''threatened rejection''. The scores for ''severe bonding disorders'' and ''established rejection'' in the two studies were similar. The mean scores in mothers with severe anger were close to those with established rejection.

Validation of the original thresholds

Some data on specificity, sensitivity and positive predictive value of various factors and thresholds are shown in

Table 2. Mean scores obtained in 2001 study

Groups	Factor			
	1	2	3	4
Normal mothers	6.1	3.1	3.1	0
Depressed mothers with normal bond	8.7	5.1	4.4	0.24
Mild bonding disorders	19.9	11.8	6.6	0
Severe bonding disorders	41.3	24.8	10.2	1.78

Table 3. Factor scores in various categories (this study)

Category	N	Mean scores on factors			Number with scores on factor 4							
		1	2	3	0	1	2	3	4	5	6	7
Quality of bond												
Depressed mothers with normal bond	57	8.8 ± 7.3	5.1 ± 5.5	5.0 ± 3.9	54	2				1[a]		
Normal bond plus pathological anxiety or anger	18	17.4 ± 8.6	10.2 ± 5.4	9.0 ± 4.6	11	3	4					
Mild bonding disorders	13	14.8 ± 9.9	9.2 ± 5.4	6.0 ± 4.1	10	3						
Threatened rejection	20	26.1 ± 9.8	16.4 ± 5.5	9.3 ± 4.4	12	5	3					
Established rejection	17	41.6 ± 11.0	23.5 ± 5.7	12.7 ± 4.0	5	2	5	1	2		1	1
Infant-focused anxiety												
Mild anxiety	12	28.3 ± 11.9	16.7 ± 7.1	10.3 ± 2.7	7	4	1					
Severe anxiety	11	25.2 ± 16.8	15.2 ± 8.9	12.0 ± 6.5	6		5					
Pathological anger												
Mild anger	9	22.8 ± 7.9	14.7 ± 5.7	8.0 ± 2.9	7	2						
Moderate anger	16	25.7 ± 16.4	15.1 ± 8.5	8.6 ± 5.2	6	3	5	1	1			
Severe anger	15	33.3 ± 15.4	19.3 ± 8.8	11.4 ± 4.6	1	7	4		1		1	1

[a] One mother, whose interview and clinical records gave no hint of any problem in the relationship with her baby, scored 23, 16, 15 and 5 on the 4 factors, raising the suspicion that she was simulating the disorder.

Table 4. Identification of any disorder of the mother infant relationship

Measure	Threshold	Specificity[a]	Sensitivity	Positive predictive value
Factor 1	11 normal 12 high	39/57 = 0.68	56/68 = 0.82	56/74 = 0.76
Total score	25 normal 26 high	42/57 = 0.74	57/68 = 0.84	57/72 = 0.79

[a] This refers to the number of normal mothers correctly identified.

Table 5. Identification of rejecting mothers

Group	Measure	Threshold	Sensitivity	Positive predictive value
Threatened and established rejection combined	Factor 1	11 normal 12 high	34/37 = 0.92	34/74 = 0.46
	Factor 2	16 normal 17 high	25/37 = 0.68	25/33 = 0.76
	Factor 2	12 normal 13 high	32/37 = 0.86	32/44 = 0.73
	Total score	39 normal 40 high	33/37 = 0.89	32/44 = 0.73
Established rejection	Factor 1	11 normal 12 high	17/17 = 1.0	17/74 = 0.23
	Factor 2	16 normal 17 high	15/17 = 0.88	15/33 = 0.45
	Factor 2	12 normal 13 high	16/17 = 0.94	16/33 = 0.48
	Total score	39 normal 40 high	17/17 = 1.0	17/44 = 0.39

Table 6. Identification of dangerously angry mothers

Group	Measure	Threshold	Sensitivity	Positive predictive value
Severe anger	Factor 1	11 normal 12 high	14/15 = 0.93	14/74 = 0.19
	Factor 2	16 normal 17 high	10/15 = 0.67	10/33 = 0.30
		12 normal 13 high	11/15 = 0.73	11/44 = 0.25
	Factor 4	2 normal 3 high	3/15 = 0.20	3/6 = 0.50
		1 normal 2 high	7/15 = 0.47	7/18 = 0.39
	Total score	25 normal 26 high	13/15 = 0.87	13/72 = 0.18
		39 normal 40 high	12/15 = 0.80	12/44 = 0.27
Moderate or severe anger	Factor 4	2 normal 3 high	5/31 = 0.16	5/6 = 0.83
		1 normal 2 high	14/31 = 0.45	14/18 = 0.78

Tables 4–6. Table 4 deals with the combined group of all mother-infant relationship disorders. Table 5 deals with rejection of the infant, and Table 6 with pathological anger.

Factor 1

This is a general factor, based on 12 questions, with a maximum score of 60. The original cut-off score was

11 = normal, 12 = high. In this study, the following 74 mothers scored above this threshold:

Normal mother-infant relationship 18/57
Mild bonding disorder, or pathological anxiety or anger (without rejection) 22/31
Threatened rejection 17/20
Established rejection 17/17

Thus, this threshold correctly identified only 39 of the 57 depressed mothers with an entirely normal bond. This is a specificity of 0.68, which is much lower than the figure of 0.85 found in the first validity study. The 2001 study, however, included 33 mothers from the normal population, almost all of whom had scores below threshold, augmenting the numbers correctly identified as normal.

Of the remaining 68 patients (all of whom had some kind of disorder), 56 had scores above the threshold (Table 4). This is a sensitivity of 0.82, which compares with 0.93 in the first validity study. Positive predictive value was 0.76.

The figures for rejecting mothers are shown in Table 5. No mothers with established rejection, and only three with threatened rejection scored below threshold. This is a sensitivity of 0.92 for the combined group, and 1.0 for established rejection.

There were 15 mothers who had already perpetrated some form of abuse ('severe anger'). Eight of these had established rejection and two threatened rejection, but five had milder disorders. All but one scored at least 12 on Factor 1 (sensitivity 0.93). Positive predictive values for anger and rejection were low, indicating the low specificity of factor 1 for these severe disorders.

Factor 1, therefore, serves to identify some kind of problem in the mother-infant relationship. Using a threshold derived from the 2001 study, the sensitivity (0.82) is satisfactory. The overall performance can be summarised in these terms: one hundred interviews conducted with mothers whose score on factor 1 was >11 would identify 76 with a variety of different disorders and 24 normal mothers; it would miss 21 mothers with a disordered infant relationship, including occasional cases of threatened rejection and severe pathological anger, but no cases of established rejection.

Factor 2

This factor is based on 7 questions, with a maximum score of 35. Its purpose is to identify severe mother-infant relationship disorders. The original cut-off score was 16 = normal, 17 = high. In the first validity study, all normal mothers, depressed mothers with normal bond and mothers with mild bonding disorders scored below this threshold, a specificity of 1.0. In the present study 33 mothers scored above the threshold – 3 depressed mothers with a normal bond, 3 with abnormal anxiety or anger alone, 2 with mild ''bonding'' disorders, 10 with threatened rejection and 15 with established rejection. Thus, its specificity – capacity to identify normal mothers – was high (0.95). It also correctly identified 15/17 mothers with established rejection – a sensitivity of 0.88, which is almost the same as that obtained in the 2001 study (0.89).

This factor, however, was less satisfactory in identifying mothers with threatened rejection. The mean score in these 20 mothers (16.4) was below threshold, and only half of them scored above the cut-off point. If we consider the combined group of 37 mothers with threatened or established rejection, sensitivity was only 0.68. The positive predictive value, however, was 0.76 for the combined group and 0.45 for established rejection, reflecting the improvement in specificity when mothers with threatened rejection were included.

In patients with pathological anger, sensitivity was 0.53 for all 40 angry mothers, 0.55 for those 31 mothers with moderate or severe anger, and 0.67 for the fifteen with severe anger. Positive predictive value for severe anger was 0.43.

The overall performance of factor 2 can be illustrated by considering the effect of conducting 33 interviews with mothers who scored at least 17 on factor 2. Those interviews would identify 15 mothers with established rejection, 10 with threatened rejection, 10 with severe anger (most of them overlapping with other groups), 4 with milder disorders and 3 with a normal bond. It would miss 2 mothers with established rejection, 10 with threatened rejection and 5 with severe anger (of which one also had established rejection). The balance is positive, with correct identification of 27 mothers against 16 missed, but these sixteen mothers all needed urgent investigation and treatment.

Factor 3

This factor is based on only four questions, all related to infant-focused anxiety. Its performance in the first validity study was less satisfactory than factors 1 and 2, and the same was true in this study. The original ''cut-off'' score was 9 = normal, 10 = high. Mothers with a diagnosis of infant-focused anxiety had a mean score above this (11.1 for the combined group of 23 mothers), but so did mothers with established rejection (mean 12.7) and

severe anger (mean 11.4). Of the 102 mothers who did not show infant-focused anxiety, 33 had a score >9 (specificity 0.64). Of the 23 with infant-focused anxiety, 9 had a score <10 (sensitivity 0.61). Of the 11 with severe anxiety, 4 had a score <10 (sensitivity 0.64). This scale, therefore, does not satisfactorily identify this group of mothers. It was more sensitive in identifying mothers with established rejection (sensitivity 0.82).

Factor 4

This was based on only two questions, ''I feel like hurting my baby'' and ''I have done harmful things to my baby'', with a maximum score of 10. In the first validity study, a cut-off score of 2 = normal, 3 = high was selected, but only 5 mothers scored above this threshold. In the present study, only 33 mothers had a score above zero: fifteen had a score of 1, twelve a score of 2 and six a score of 3–7, of whom five had established rejection and one a normal bond. The purpose of this factor is the identification of dangerous mothers. But only 5/40 with any degree of pathological anger and 3/15 with severe anger scored above threshold. This is a very low sensitivity (0.13 and 0.20).

Improving the thresholds

We considered whether adjustment of the cut-off scores would improve sensitivity. Alterations to the thresholds for factors 1 and 3 had trivial effects, but cut-off points for factors 2 and 4 could be improved.

A marked reduction of the threshold for factor 2 to 12 = normal, 13 = high would improve the identification of mothers with threatened rejection. Eleven mothers scored in the range 13–16, of whom 6 had threatened rejection, one established rejection, one severe anger (with no other disorder) and one each obsessions, anxiety and no disorder at all. Thus 16/20 mothers with threatened rejection and 32/37 in the combined group of rejecting mothers would be identified by the revised threshold (sensitivity 0.86 and positive predictive value 0.73). The identification of severe anger – 11/15 (sensitivity 0.73) and established rejection – 16/17 (sensitivity 0.94) would also be improved. The improvement in performance can be appreciated if we consider the effect of interviewing 44 mothers with scores above 12 on factor 2: this would identify 32 with rejection of the infant (threatened or established), plus two with severe anger, six with minor disorders and four normal mothers; it would miss only 5 rejecting and 3 dangerously angry mothers. This is a ratio of 34 successes to 8 failures – a much better ratio than obtained by the original threshold of 17. There is no reason why both thresholds should not be used to identify possible cases of threatened and established rejection.

As for scale 4, it would be an advantage to reduce the threshold to 1 = normal, 2 = high. This would gather in mothers who ''sometimes'' felt like hurting their babies *or* had done harmful things to them, *or* ''rarely'' done both. Only four mothers without evidence of pathological anger scored 2 or more on factor 4. One was a normal mother with quixotic scores, including 5 on factor 4. The others were two mothers considered to have obsessional impulses, and one severely anxious mother. This is a specificity of 0.95. The sensitivity of the scale, in detecting mothers with at least mild pathological anger, would rise to 0.35 for the whole group, 0.45 for those with at least moderate anger, and 0.47 for severe anger. While this sensitivity still leaves much to be desired, it is an improvement. It would be well to bear in mind that obsessional mothers may have false-positive scores.

There is also the possibility of using the total score – the sum of all four factors. This has a maximum of 125; but in this sample the range was 0–104, with a median of 30 and no clear mode. A score of 26 achieved the maximum split between normal mothers and those with some kind of disorder: 15/57 normal and 57/68 abnormal mothers scored at least 26. Thus the specificity was 0.61, sensitivity 0.84 and positive predictive value 0.79. These are slightly better figures than were obtained with factor 1 at a threshold of 12 (Table 4). A second cut-off point of 39 low, 40 high would be useful in identifying severe disorders. It picked up 33/37 rejecting mothers, 9 with other disorders, and 3 normals (Table 5). This gives a specificity of 0.89 with respect to normal mothers, and sensitivities for rejecting mothers of 0.89 and severely angry mothers of 0.80. These figures are better than those obtained with factor 2 at a threshold of 12 low, 13 high. But the thresholds are optimal for this sample, while the figures for factors 1 and 2 are a replication of thresholds obtained in another population. It is not yet clear whether there is an advantage in using the total score rather than the scores on factors 1 and 2.

These revised thresholds would have to be validated in an independent sample.

Discussion

The name ''Postpartum Bonding Questionnaire'' was chosen for its brevity. 'Bonding' is an unsatisfactory term, but is widely used and less cumbersome than 'mother-infant relationship'. 'Attachment' is a synonym for bond-

ing, and risks confusion with infant-mother attachment, a totally different phenomenon.

This study has confirmed the value of the PBQ, especially scales 1 and 2. The consensus diagnoses of various forms of abnormal mother-infant relationship, based on improved definitions, were well determined within the limitations of psychiatric interviewing. Inter-rater reliability was high, and the reliability of the consensus diagnoses must be considerably higher (Brockington et al, 1992). The number of subjects was large. But, except in the few admitted to hospital, there were no observational data. Since direct observation is the 'gold standard' for the study of the mother-infant relationship, there is always room for error in diagnoses based on interviews alone. In addition, all self report is prey to simulation, dissimulation and other forms of response bias. It is therefore surprising that the results were so good.

The most important requirement of screening interviews is sensitivity. The performance of scale 1 in identifying some kind of 'bonding disorder' is not as good as in the 2001 validation (0.82 compared with 0.93), but is still useful. The sensitivity obtained for scale 2, in the identification of the most severe disorders, is almost identical to the 2001 study (0.88 compared with 0.89). But the original threshold was not effective in identifying mothers with the new category of threatened rejection. A reduction by 4 points would improve this sensitivity while preserving specificity. It is vital to identify mothers with these severe disorders, because a great deal can be done to help them. It is probable that the effect of 'post-natal depression' on infant cognitive development (Murray et al., 1996), as well as some child abuse, child neglect and filicide result from these severe disorders, so that the consequences of missing the diagnosis are dire.

It was both surprising and disappointing that the principal component analysis (reported in Brockington et al, 2001) did not yield a separate anger factor. Clinically rejection and pathological anger are closely associated, but they differ in several important ways. By definition, the symptoms are different. The treatment is different, with play therapy appropriate for one, and anger management for the other. The risks may be different – rejection tending towards neglect, and anger to assaults. The causal determinants may be different, with more emphasis on unwanted pregnancy in one, and challenging infant behaviour in the other. But Factor 2 is a mixture of items related to both. It proved more successful in identifying rejecting than angry mothers. Neither scale 2 nor scale 4 was sensitive in picking out mothers who were a danger to their infants. It may be that self-rating questionnaires are not effective in penetrating the defences of these mothers, and only probes like, ''What is the worst thing you did to your baby?'' and ''What is the worst thing you had an impulse to do?'' can disclose what is happening. But scale 1, at a threshold of 12, picks up 93% of them. Once this general factor has signaled the likelihood of a relationship problem, a clinical interview can explore infant-provoked anger, as well as a range of other disorders. Scale 4, at the new threshold of 2, identifies nearly half of those with severe anger.

Infant-related anxiety disorders are not well identified by this questionnaire. In the first validity study, this was excused by the fact that few of the 51 mothers interviewed had a marked element of anxiety in their disordered infant relationship. That was not true in the present, much larger, sample. Mothers with severe infant-focused anxiety (11) were not much less numerous than those with established rejection (17). It is possible that the addition of further questions would improve this scale, but the problem may be that many highly anxious mothers have elements of rejection, and sometimes their anxiety is based on the fear of acting out aggressive impulses.

To our knowledge, two other relevant questionnaires have been published. The Postpartum Maternal Attachment Scale of Nagata et al (2000) consists of 21 4-point scales, the points being 'not at all', 'not really', 'most of the time' and 'always'. The questionnaire was filled out by 424 mothers attending a Red Cross Hospital in Nagoya, during the first week after delivery. There were several statements that expressed a negative feeling towards the child – ''I am not that interested in my child'', ''I don't find my baby cute'', ''I don't know how to interact with my baby'', ''I have trouble actually feeling the baby is mine'' and ''I have trouble feeling I am a mother''. Many of the positive statements, answered 'not at all' would signal a disordered relationship. The questionnaire is similar in construction and content to the PBQ. The other questionnaire (Taylor et al, 2005) consists of eight 4 point scales, the points being 'very much', 'a lot', 'a little' and 'not at all'. Mothers are asked to rate their feelings, which include feeling 'resentful', 'disappointed', 'neutral or felt nothing', 'dislike' and 'aggressive'. Again, giving a rating of 'not at all' to the positive feelings – 'loving', 'joyful' and 'protective' – would count towards a negative relationship. Like the Japanese questionnaire, this questionnaire has been tested in a non-psychiatric sample of recently delivered mothers – in this case up to 12 weeks after the birth. Neither questionnaire has been tested in a clinical pop-

ulation which includes mothers with severe mother infant relationship disorders, and neither has been validated against an external criterion such as an interview. It remains to be seen whether their specificity and sensitivity will be as good as the PBQ.

The Postpartum Bonding Questionnaire will prove a useful screening questionnaire. A high score on factor 1 (the general factor) indicates that an interview is necessary to explore the quality of the mother-infant relationship and the presence of infant-centered anxiety, anger or obsessions. A high score on factor 2 suggests that rejection of the infant is at least threatened, and focused treatment may be required. A high score on factor 4 signals the need for urgent investigation. But there is room for improvement in this questionnaire. Some of the twelve questions used for scale 1 may be supernumerary. They could be replaced by more discriminating anxiety questions, and/or questions concerned with obsessional and post-traumatic symptoms, thus constructing a broad spectrum postpartum screening questionnaire.

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Availability

Copies of the PBQ and a scoring key are available from IFB. E-mail address for correspondence: i.f.brockington@bham.ac.uk

Appendix 1

Post Partum Bonding Questionnaire

Please indicate how often the following ae true for you.

There are no 'right' or 'wrong' answers. Choose the answer which seems right in your recent experience.

Factor	Scoring	Statement	Always	Very often	Quite often	Some-times	Rarely	Never
1	0 → 5	I feel close to my baby						
1	5 → 0	I wish the old days when I had no baby would come back						
2	5 → 0	I feel distant from my baby						
2	0 → 5	I love to cuddle my baby						
2	5 → 0	I regret having this baby						
1	5 → 0	The baby does not seem to be mine						
1	5 → 0	My baby winds me up						
1	0 → 5	I love my baby to bits						
1	0 → 5	I feel happy when my baby smiles or laughs						
1	5 → 0	My baby irritates me						
2	0 → 5	I enjoy playing with my baby						
1	5 → 0	My baby cries too much						
1	5 → 0	I feel trapped as a mother						
2	5 → 0	I feel angry with my baby						
1	5 → 0	I resent my baby						
1	0 → 5	My baby is the most beautiful baby in the world						
1	5 → 0	I wish my baby would somehow go away						
4	5 → 0	I have done harmful things to my baby						
3	5 → 0	My baby makes me feel anxious						
3	5 → 0	I am afraid of my baby						
2	5 → 0	My baby annoys me						
3	0 → 5	I feel confident when caring for my baby						
2	5 → 0	I feel the only solution is for someone else to look after my baby						
4	5 → 0	I feel like hurting my baby						
3	0 → 5	My baby is easily comforted						

Appendix 2

Criteria for disorders of the mother-infant relationship.

Mild disorder

These mothers experience delay in the onset, ambivalence, or loss of the maternal emotional response to the infant.
The criteria are the same as those used in Brockington et al. (2001).
A to D are necessary.

A *Either* The mother expresses disappointment about her maternal feelings, e.g. she has no feelings. *Or* She feels estranged or distant from the baby – this is ''not her baby'', or she is ''baby-sitting'' for someone else.
B The definitions of threatened or established rejection are not met.
C The disorder has lasted at least one week.
D These feelings are distressing and have resulted in an appeal for help from family or professional staff.

Infant-focused anxiety

Mild anxiety

The mother reports feeling anxious, particularly when alone with her infant.

Severe anxiety

This anxiety leads to reduced contact.

Pathological anger

These criteria have been altered from those used in Brockington et al (2001).
There are now 3 grades – mild, moderate and severe.

Mild anger

- The mother has lost verbal control, shouting, screaming or swearing at the baby on at least two occasions.
- She has expressed her anger in no other way.

(Note that anger experienced inwardly, and controlled with difficulty, does not qualify, and a mother who loses verbal control only once is considered to be within normal.)

Moderate anger

In addition to loss of verbal control,

- *Either* the mother experiences impulses to harm the child (e.g. to smother, throw, shake or strike it),
- *Or* there has been some minor episode of abuse, such as shaking the pram.

(NB. It is vital to discriminate between aggressive impulses in a context of anger, and those experienced by mothers with obsessive-compulsive disorder.)

Severe anger

In addition to loss of verbal control *or* impulses to harm the child, at least one episode of frank child abuse has occurred.

Threatened rejection

These mothers all lack a positive emotional response to the baby, but in addition, they have betrayed a wish to relinquish the child. The main difference between threatened and established rejection is the permanence of this relinquishment. In the mothers with threatened rejection, the baby is not at present wanted, and the wish is for *temporary* transfer of care. They also lack marked aversion to the child, and have not experienced a wish for its ''disappearance''.

Established rejection

A, B *or* C are required:

A The mother expresses dislike, resentment or hatred for her child. Sometimes this was expressed in the terms, ''I wish it had been still born'', or ''It has ruined my life''.
B She has expressed the desire for *permanent* relinquishment of care.
C She has experienced a wish that the child disappear – occasionally be stolen, usually die from sudden infant death syndrome.

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