# The Pregnancy Related Beliefs Questionnaire (PRBQ): An examination of the psychometric properties in perinatal samples

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**Abstract**

**Background:** Identifying vulnerability to perinatal depression is an important public health issue (NICE, 2007). Risk factors include general and maternal-specific dysfunctional attitudes. Scales of maternal attitudes have a number of shortcomings. Further, it is not known whether antenatal maternal attitudes predict postnatal depression, independently of general dysfunctional attitudes (GDA). The aim of the current study was to examine the psychometric properties of the Pregnancy Related Beliefs Questionnaire (PRBQ; Moorhead, Owens, & Scott, 2003), and to establish, prospectively, the utility of the revised PRBQ in predicting the symptoms of postnatal depression. **Method:** In study one, a cross-sectional sample of 344 participants, who were either pregnant or in the postnatal period, completed a battery of questionnaires assessing background factors, GDA, attitudes specific to motherhood (PRBQ), and depression. In study two, a sample of 210 women completed a battery of questionnaires, including a measure of GDA, the PRBQ-8, and depression, on two occasions: early in the second trimester of pregnancy and postnatally. **Results:** Exploratory and confirmatory factor analyses supported a one-factor, eight-item measure of maladaptive attitudes specific to motherhood (PRBQ-8). The PRBQ-8 was found to have good convergent, concurrent, and predictive validity and high internal and test-retest reliability. A hierarchical regression analysis revealed that antenatal PRBQ-8 scores predict the severity of postnatal depression symptoms, after controlling for background factors, antenatal depression, and GDA. **Conclusions**: The PRBQ-8 is a psychometrically sound measure of maternal attitudes that can be used antenatally to identify women at risk of postnatal depression.

Key words: cognitive style; maladaptive maternal attitudes; motherhood; perinatal depression.

## 1. Introduction

### *1.1 Perinatal depression: prevalence and predictors*

Depression during the perinatal period is estimated to occur in approximately 13% of women (Bennett, Einarson, Taddio, Koren, & Einarson, 2004; O'Hara & Swain, 1996) with similar prevalence rates being reported during pregnancy and postnatally (Heron, O'Connor, Evans, Golding, & Glover, 2004). Perinatal depression is associated with a range of adverse outcomes for both mother and child (Brouwers, van Baar, & Pop, 2001; Murray & Cooper, 1996); hence, identifying risk factors for perinatal depression is an important public health issue (NICE, 2007). Despite decades of research, it remains contentious whether the perinatal period is a time of greater risk for the development of depression or not, with some researchers suggesting that the risk is not greater than at other times in life (Cox, Murray, & Chapman, 1993; O'Hara, 1994), and others reporting that the postpartum period is associated with an increased risk of psychiatric illness generally, and depression specifically (Eberhard-Gran, Eskild, Tambs, Samuelsen, & Opjordsmoen, 2002; Munk-Olsen, Laursen, Pedersen, Mors, & Mortensen, 2006). Furthermore, the evidence seems to concur that having a child constitutes a specific risk factor for some women, but not for others, and hence, that women depressed postnatally are cognitively heterogeneous (Church, Brechman-Toussaint, & Hine, 2005; Cooper & Murray, 1995; Warner, Appleby, Whitton, & Faragher, 1997).

A number of demographic (low income), social (past history of mental illness, absence of partner support, adverse life events and high perceived stress), and psychological risk factors (neuroticism, perfectionism, low self-esteem, cognitive style) for the development of antenatal and postnatal depression have been identified (Biaggi, Conroy, Pawlby, & Pariante, 2016; Eberhard-Gran et al., 2002; Jones et al., 2010; Leigh & Milgrom, 2008).

Most of these are also associated with depression, generally. It remains uncertain, however, whether there are additional vulnerabilities, specific to the perinatal period, that put at least some women at risk of developing depression.

*1.2 Cognitive style and perinatal depression*

The role of cognitive style and dysfunctional attitudes in depression is most comprehensively conceptualised within Beck's Cognitive Model of Depression (Beck, 1967). According to this model, individuals vulnerable to depression have maladaptive cognitive schemas, which are relatively stable and lay dormant, until triggered by stressful life events. Dysfunctional attitudes reflect the content of these relatively stable schemas and were initially conceptualised by Beck as a general cognitive vulnerability factor. The Dysfunctional Attitudes Scale (DAS) was developed in order to assess the presence and intensity of general dysfunctional beliefs in depression (Weissman & Beck, 1978) and is focussed on themes of personal inadequacy, failure, and negative perceptions of the self, world, and future, with a more recent refinement of the DAS (i.e. DAS-A-17; de Graaf, Roelofs, & Huibers, 2009) providing evidence for the salience of two particular dimensions of general dysfunctional attitudes (GDA): 'perfectionism /performance evaluation' and 'need for approval by others.' However, subsequent empirical research has demonstrated that individuals at risk of depression may have dysfunctional attitudes in some, but not all, areas of their lives (de Graaf et al., 2009; Dyck, 1992; Hilsman & Garber, 1995). The particular stressors in these individuals' lives interact with these specific dysfunctional beliefs, increasing the risk for depression. While there is a debate as to whether dysfunctional attitudes are indicative of an enduring cognitive style predictive of depression (or are covariates of depression and, thus, state-dependent), a significant body of work has demonstrated an association between elevated GDA and depression (Dent & Teasdale, 1988; Reilly-Harrington, Alloy, Fresco, & Whitehouse, 1999).

The role of GDA in relation to perinatal depression has been examined across several studies. It has been reported that GDA are associated with antenatal depression (Leigh & Milgrom, 2008), and that they differentiate between depressed postnatal samples and healthy controls (Jones et al., 2010). They were also found to be significantly higher in postnatal women with a previous history of depression, compared to those with no previous depression history (Church, Brechman-Toussaint, & Hine, 2005). However, GDA do not differentiate between women with a history of major depression and those with a history of postnatal depression (PND; Jones et al., 2010). In line with evidence suggesting that postnatally depressed women are cognitively heterogeneous, it could be that GDA contribute to vulnerability to PND in some women, but that there is also a further subset of women in whom having a child acts as a specific stressor, which triggers maladaptive cognitions related to being, or becoming, a mother, increasing their risk for PND. As such, dysfunctional attitudes related to motherhood can both, independently or additively (together with GDA), and in interaction with other background factors, increase the chances of PND.

*1.3 Dysfunctional attitudes related to motherhood and perinatal depression*

A number of researchers have reported that attitudes towards motherhood and parenting-specific beliefs are associated with perinatal depression. However, a range of shortcomings relating to these studies should be noted (see Table 1 for a summary of the existing measures and their limitations). Most of the existing measures provide only preliminary evidence of their construct validity, as no factor analytic methods were utilised to confirm the proposed themes/dimensions. Another significant shortcoming concerns the conceptual lack of clarity regarding what these maternal cognitions actually assess. Sockol and colleagues (2014) highlighted that some of the existing maternal attitudes scales measure women's expectations, representing beliefs concerning predictions of the future (e.g. I will be happy to have a baby) and/or experiences, representing situations individuals have experienced during

motherhood/pregnancy (e.g. I feel guilty when my baby cries), as well as attitudes, which, by definition, include an evaluative component (e.g. If my baby is unsettled, it is because I am a bad mother). Although optimistic expectations about motherhood have been associated with better adjustment postnatally (Coleman, Nelson, & Sundre, 1999; Green & Kafetsios, 1997), when real-life experiences are not as positive as one's expectations, optimistic expectations are no longer associated with well-being and the discrepancy may lead to increased symptoms of depression (Harwood, McLean, & Durkin, 2007).

To address these conceptual shortcomings, Sockol and colleagues (2014) developed the 12-item measure of dysfunctional maternal attitudes (AToM), consisting of three factors: beliefs about others' judgements, beliefs about maternal responsibility, and maternal role idealization. In cross-sectional samples of both primiparous and multiparous women, the AToM predicted both perinatal depression and anxiety (Sockol et al., 2014; Sockol & Battle, 2015). Preliminary evidence demonstrated that the AToM is a valid and reliable measure of maternal attitudes associated with perinatal depression, although not all three of their factors may have concurrent validity. A recently developed Rigidity of Maternal Beliefs Scale (RMBS; Thomason et al., 2015) also seems to highlight the role that maternal attitudes, relating to women's perceptions of their ability to 'mother' effectively, play in predicting postnatal depression. After controlling for antenatal depression levels, the 'maternal dichotomy' factor (a four-item factor focussing on attitudes related to what represents a good/bad parent/mother) was the only dimension that predicted postnatal depression levels; perceptions of societal expectations, role identify, and maternal confidence/efficacy were not predictive of PND.

*1.4 GDA and maternal specific attitudes in predicting perinatal depression*

Only two studies, to date, have examined contemporaneously the contribution of dysfunctional general and maternal-specific cognitions in predicting depression during the

perinatal period. Sockol and colleagues (2014) found that maternal beliefs were significantly associated with symptoms of perinatal depression, whilst taking into account GDA and interpersonal risk factors. Church and colleagues (2005) provided evidence using a postnatal sample that dysfunctional general and maternal cognitions may act as independent cognitive mediators of various risk factors for the development of PND, and, hence, that identifying different vulnerable risk profiles is important, so that they can be the target of psychological intervention. The limitation of both of these studies was that they used cross-sectional designs; therefore, determining whether dysfunctional general and maternal attitudes contributed causally to the development of depressive symptoms, or whether they simply reflected the symptoms of depression, could not be concluded with confidence.

*1.5 Aims of our Study*

The aims of our study were twofold: first, we wanted to examine and refine the psychometric properties of the Pregnancy Related Beliefs Questionnaire (PRBQ; Moorhead et al., 2003) to produce a revised and psychometrically sound scale of maternal attitudes, for use both antenatally and postnatally, to identify women with a vulnerable cognitive style that could put them at risk for depression. The PRBQ is 54-item questionnaire, which was developed to reflect the themes identified in antenatally and postnatally depressed women, such as concern about the maternal role, perceptions of coping ability, expectations about the behaviours of the new born, issues related to self-esteem, and relationship insecurity. These were suggested to represent vulnerability beliefs /attitudes, similar to those identified by the DAS, but more specific to motherhood. The authors reported preliminary evidence of its construct validity (the PRBQ scores correlated meaningfully with DAS and the Beck Depression Inventory scores) and high internal reliability. However, its length and the fact that it was developed on a very small sample limits its wider use with perinatal populations. Hence, our first goal was to refine this scale psychometrically and examine its factor structure, construct validity, and

reliability. Secondly, we wanted to establish the predictive utility of this revised PRBQ, using a longitudinal sample, whilst controlling for background factors and GDA. As such, our study would offer further empirical examination, to date only provided using cross-sectional samples, of whether both dysfunctional general and specific maternal attitudes play a role in predicting the severity of symptoms of depression during the postnatal period.

## Study 1: Item Analysis, Exploratory Factor Analysis, and Reliability and Validity Analyses of the PRBQ

### 2. Method

*2.1 Participants*

A total of 344 participants, ages 19-47 years, completed questionnaires at one-time point. A convenience sample was recruited online (n = 199, 57.8%) and a consecutive sample was recruited through St. Michael's Hospital, NHS North Bristol Trust's antenatal clinic waiting room (n = 145, 42.2%). Participants were included if they were 18 years of age or older, residing in the UK, could complete the questionnaires in English, and were either pregnant or had given birth in the last six months. Demographic characteristics of the participants are given in Table 2. Out of these 344 women, a further, randomly selected sample of 84 women were mailed the second version of the PRBQ 10 weeks after the first administration. Sixty-six participants (79% response rate) completed this second version the PRBQ-8 (mean time difference between sets = 12.49 weeks, SD = 1.92 weeks); of these, 13 were pregnant (19.7%) and 53 (80.3%) had given birth within the last six months.

*2.2 Instruments*

*2.2.1 Measure of depression*

The Edinburgh Postnatal Depression Scale (EPDS; Cox, Holden, & Sagovsky, 1987) is a 10-item questionnaire that measures women's depressive symptoms and can be used as a

screening tool to identify women at risk for perinatal depression. Respondents are given 10 questions and are asked to choose the answer (scored 0-3) that most closely represents how they have been feeling over the last seven days, with higher scores representing greater depressed mood. The scale has sound psychometric properties and has been used widely in perinatal samples.

*2.2.2 Measure of general dysfunctional attitudes*

The Dysfunctional Attitudes Scale (Form A) Revised (DAS-A-17; de Graaf et al., 2009) is a 17-item measure of the presence and intensity of general dysfunctional cognitive style, with two factors: perfectionism/performance evaluation and need for approval by others. Respondents are asked to rate the extent to which they agree or disagree with each statements using a seven-point Likert-style scale. Scores range from 17-119 and higher scores indicate more dysfunctional attitudes. Sound psychometric properties of the DAS-A-17 have been reported (de Graaf et al., 2009).

*2.2.3 Measures of dysfunctional beliefs specific to the perinatal period*

The Pregnancy Related Beliefs Questionnaire (PRBQ: Moorhead et al., 2003) is a 54-item questionnaire in its preliminary stages of development used to measure beliefs about motherhood. Respondents are asked to indicate how much they agree or disagree with each statement using a 7-point Likert-style scale, with answer options ranging from totally agree (1) to totally disagree (7). Higher scores indicate greater levels of dysfunctional attitudes towards motherhood.

The Attitudes towards Motherhood Scale (AToM; Sockol et al., 2014) is a 12-item questionnaire measuring women's attitudes towards motherhood using a six-point Likert-style scale. Scores range from 0-60, with higher scores representing more dysfunctional attitudes. The AToM has been tested with perinatal samples and possesses good psychometric properties (Sockol et al., 2014; Sockol & Battle, 2015)

*2.2.4 Study-developed questionnaire*

Questions were developed by the researchers to examine demographic factors, such as age, education, ethnicity, marital status, and parity. Past history of mental health difficulties was assessed via a single question asking participants to state whether they have ever consulted their GP or a mental health specialist for emotional difficulties and what problem it was. Those who answered "yes" and listed a problem were deemed to have a past history of mental health difficulties (PHMHD).

*2.3 Procedure*

Participants were recruited online through a brief advertisement posted on social media sites for mothers (e.g. Facebook groups for Bristol mothers) and mumsnet.com. The advertisement invited women, aged 18 and above, who were pregnant or had given birth within the last six months, to participate in the study on "maternal attitudes and depression;" those interested were invited to follow a hyperlink to view the information sheet and complete the questionnaires. Recruitment at the NHS North Bristol Trust St. Michael's Hospital took place in the antenatal clinic waiting room. Consecutive women who were 18 and older and attending the clinics were given an information sheet by the researcher. The information sheet outlined the purpose of the study, the anonymity of responses, and explained that consent would be assumed when participants submitted their responses. Women who expressed interest in participating were given the option to complete the questionnaire online or via hard copy. Participants who chose to complete the questionnaires online were emailed a hyperlink, directing them to the study's website, which contained the information sheet about the study, the consent page, and the battery of questionnaires. Participants who chose to complete a hardcopy were provided with a copy of the questionnaires and were asked to return them in the provided stamped and addressed return envelope at their leisure. All participants were given the option to enter into a draw to win one of two £50 Amazon vouchers.

Once the initial data had been collected and analysed, a random sample of women who entered the draw and provided their contact details, were invited via email to follow a hyperlink to complete an eight-item version of the PRBQ (PRBQ-8). Participants who completed the PRBQ-8 were entered into a draw to win a £10 Amazon voucher. Participants were included if they were still pregnant or had given birth within the last six months and if they completed the PRBQ-8 within four months after completing the first set of questionnaires. This research project was approved by both the National Health Service (NHS) Ethics Committee Board and the University ethics committee.

## 3. Results

### *3.1 Principal components analysis*

Following the initial scrutiny and elimination of incomplete responses or those completed within an unreasonably short time period (for internet-based responses), we were left with 344 completed questionnaires. From the 54-item PRBQ, we first eliminated items that did not represent attitudes, but expectancies (n = 5; e.g. “After my baby is born, I will never be lonely in my life again”), or were tapping into general, rather than attitudes specific to motherhood (n = 7; e.g. “I should be able to control how I feel”). One item that participants reported to be difficult to understand (“I should be able to bring on milk if I want to”) was also eliminated. Items with the inadequate facility index (n = 4) and those with low item-total correlations (<0.3) were also eliminated (n = 17). A principal components factor analysis (PCFA), using SPSS v.23 (SPSS, 2015) was conducted on the remaining 20 items of the PRBQ, using an oblique rotation method (direct oblimin). Based on an analysis of the scree plot, and the eigen values, three factors were retained, accounting for 46.73% of the cumulative variance. Because questions 28 and 38 were very similar (“If my baby was unhappy, it would be because of something I had not done” and “If my baby is unhappy, I will feel that it is my fault”), the item with the lower factor loading, item 28, was removed.

The PCFA with oblique rotation (direct oblimin) was repeated on the scale with 19 items. Based on an analysis of the scree plot and the eigen values, three factors were retained, with eigen values of 5.19, 2.21, and 1.51, accounting for 46.87% of the cumulative variance. Items that loaded less than .4 on any of the factors were discarded. If an item loaded more than .4 on one factor, and also loaded on another factor within approximately .2 of the loading on the first factor, it was also discarded. This procedure led to the removal of five items, leaving a 14-item, three-factor structure scale. Table 3 shows the factor loadings, after rotation.

*3.2 Reliability and validity*

Cronbach's alpha (Cronbach, 1951) was used to calculate reliability. The first factor, representing attitudes specific to motherhood and consisting of eight items ($\alpha = .86$), demonstrated high reliability. The reliability analysis of the second factor ($\alpha = .57$), representing idealistic attitudes towards motherhood, showed that if item 25 were removed, reliability would be slightly improved. After removing item 25, the remaining two items in factor two still possessed a low reliability coefficient ($\alpha = .63$). The three items in the third factor, representative of attitudes towards changes in one's body, also had a weak reliability coefficient ($\alpha = .60$).

A series of Kolmogorov-Smirnov tests suggested that study variables significantly differed from normality. Consequently, a series of non-parametric, Spearman's Rho correlation analyses were conducted to examine the association between the three factors of the PRBQ and the EPDS, AToM, and DAS-A-17 scores. Results of the correlation analyses, along with the means, standard deviations, and ranges for our variables of interest are presented in Table 4. Factor one (eight items) was strongly associated with our outcomes of interest: EPDS, DAS-A-17, and AToM. Factor two (two items) was not significantly correlated with either the EPDS or the DAS-A-17, and was only weakly associated with the

AToM. Factor three (three items) also revealed weak correlations with EPDS, DAS, and AToM scores.

Because of the poor reliability indices of the two factors, the lack of meaningful relationship with our outcomes of interest, and the lack of theoretical association with attitudes specific to motherhood that are linked to depression, these factors were discarded from the final version of the PRBQ. Subsequent analyses were carried out on the first factor, labelled 'attitudes specific to motherhood', which formed the PRBQ-8. Temporal stability of the PRBQ-8 was examined using a test-retest reliability analysis. Mean PRBQ-8 scores between time one and time two were highly correlated (r  = .70, p < .001 the PRBQ-8 is reliable over time. Spearman's Rho correlational analyses showed the PRBQ-8 was significantly correlated with the EPDS, DAS, and the AToM (see Table 4), demonstrating convergent and concurrent validity.

*3.3 Predictive validity of the PRBQ-8*

In order to test predictive validity, we ran a regression analysis in which the EPDS scores were the dependent variable and the predictor variables were entered stepwise in the following order: demographics, PHMHD, DAS-A-17 scores, and PRBQ-8 scores. The results showed that the regression model was significant: $F(9, 334) = 25.04$; $p < .001$; $R = .64$, explaining 40.3% of the variance in depression scores. The PRBQ-8 was the strongest predictor of depression symptoms, followed by GDA, and PHMHD (Table 5).

3.4 *Predictive validity of the AToM*

We run an additional regression analysis using AToM as the measure of the maternal attitudes in order to compare the predictive relationship between the PRBQ-8 and EPDS, to the previously validated AToM questionnaire. The predictor variables were entered in the following order: demographics, PHMHD, DAS-A-17, and AToM scores; EPDS was the outcome variable. This regression model was significant: $F(8,335) = 26.40$; $p < .001$; $R =$

.62; it explained 38.7% of the variance in depression scores. In this model, GDA ($\beta = .38$, $p < .001$) was the strongest predictor of depression symptoms, followed by PHMHD ($\beta = -.23$, $p < .001$), and finally the AToM ($\beta = .20$, $p = .001$).

## Study 2: Confirmatory Factor Analysis and predictive validity of the PRBQ-8

### 4. Introduction

In order to further validate the PRBQ-8, we examined the construct validity of the scale, using confirmatory factor analysis (CFA). Additionally, using longitudinal data, we tested whether antenatal PRBQ-8 scores would predict postnatal depression scores, after controlling for sociodemographic factors, antenatal depressive symptoms, and GDA.

### 5. Method

*5.1 Participants*

A consecutive sample of participants (n = 210), aged 19-41 years, were recruited from St. Michaels Hospital, NHS North Bristol Trust and completed a battery of questionnaires at two time points: the second trimester (M =14.43 weeks gestation; SD = 1.65) and postnatally (M = 7.21 weeks after birth; SD = 1.97). The majority were Caucasian (92.9%), educated to least A-levels (87.6%), employed (84.3%), and married (67.1%). For the CFA, we randomly selected PRBQ-8 antenatal (n = 104) and postnatal responses (n = 106), ensuring a cross-sectional sample.

*5.2 Instruments*

*5.2.1 Measure of depression*

The EPDS, described in study one, was used to measure perinatal depressive symptoms.

*5.2.2 Measure of maternal attitudes*

The PRBQ-8 was used to measure maladaptive maternal attitudes. Each of eight statements is rated on a 7-point Likert-style scale, ranging from (1) totally agree to (2) totally disagree.

Total scores range from 7-56; higher scores indicate greater levels of maladaptive attitudes towards motherhood.

*5.2.3 Study-developed questionnaire.*

Questions were developed by the researchers to examine demographic factors, such as age, education, ethnicity, marital status, and parity, as reported in Study 1.

*5.3 Procedure*

The recruitment was conducted at the NHS North Bristol Trust St. Michael's Hospital and followed the same procedure as described in Study 1 (only hospital-based recruitment) and with the same study inclusion criteria. Women who agreed to participate and signed the consent form, were given the option to complete the questionnaire online or via hard copy. Participants were offered a £5 Amazon voucher after completion of the second questionnaire. This research project was approved by both the National Health Service (NHS) Ethics Committee Board and University ethics committee.

**6. Results**

*6.1 Confirmatory Factor Analysis*

A Confirmatory Factor Analysis (CFA) was performed to test the fit of the model using AMOS v. 23 (Arbuckle, 2014). Five indices were utilised to evaluate the fit of the model: Chi-square measure of fit, the Comparative Fit Index (CFI), the Standardised Root Mean Square Residual (SRMR), the Root Mean Square Error of Approximation (RMSEA), and *p* of Close Fit (PCLOSE). The following criteria were adopted in the interpretation of the findings (Lei & Wu, 2007): A non-significant chi-square p-value indicates a failure to reject the null hypothesis, suggesting the model fits the data. The CFI is a goodness of fit index that is used to supplement Chi-square, adjusting for the effect of sample size; a CFI value greater than .95 indicates a good fit. For the SRMR and RMSEA, as absolute fit indices that measure the extent to which the model reproduces the sample covariance matrix, lower values indicate

better model-data fit. Hu and Bentler (1999) suggest the following criteria for good data-model fit: SRMR less than or equal to .08 and RMSEA less than or equal to .06. PCLOSE is used to test whether the RMSEA is greater than .05. A non-significant PCLOSE value indicates a close fitting model (Lei & Wu, 2007). The confirmatory factor analysis performed on our data confirmed the single factor structure of the PRBQ-8 and showed that the eight item, one factor model, is a good fit to the data, $x^2(20) = 23.64$, p = .26, CFI = 1.00, SRMR = .03, RMSEA = .03, PCLOSE = .76.

*6.2 Predictive validity of PRBQ-8*

A hierarchical regression analysis was conducted to examine the incremental predictive validity of the PRBQ-8, after controlling for demographic variables, antenatal depressive symptoms, and GDA. Correlations and descriptive statistics for the variables in the model are given in Table 6. Postnatal EPDS scores were the dependent variable and the predictor variables were entered in the stepwise fashion. The final regression model was significant: $F(8, 201) = 16.14$; $p < .001$; $R = .62.5$, explaining 39.1% of the variance in postnatal depression scores. After taking into account demographic variables, antenatal depression symptoms, GDA, and dysfunctional attitudes specific to the perinatal period, only antenatal depression and the PRBQ-8 significantly predicted postnatal depression symptoms (see Table 7).

**7. Discussion**

*7.1 Psychometric Properties of the PRBQ-8*

Our psychometric examination of the revised version (PRBQ-8) of the PRBQ (Moorhead et al., 2003) offers evidence that this is a valid and reliable instrument of maternal attitudes. The scale has face validity, as its items tap into attitudes towards the maternal role and what it means to be a ‘bad’ or a ‘good’ mother. An exploratory factor analysis of the 19-item PRBQ yielded three factors, of which only one demonstrated construct validity and satisfactory

reliability. The confirmatory factor analysis conducted on the PRBQ-8 supported a one-factor, eight-item measure. The PRBQ-8 demonstrated strong internal and temporal consistency and was significantly associated with the EPDS, the DAS-A-17, and the AToM, demonstrating convergent and concurrent validity. The PRBQ-8 also demonstrated strong predictive validity in both cross-sectional and longitudinal samples. In the longitudinal sample the PRBQ-8 antenatal scores significantly predicted postnatal depressive symptoms, after taking into account demographic variables, antenatal depression, and GDA.

*7.1 Predictors of Perinatal Depression: GDA and maternal attitudes*

Our results, based on cross-sectional data, suggest that amongst demographic variables only, lower educational status was significantly associated with perinatal depression levels, a finding commonly reported by other researchers (O'Hara & Swain, 1996; Rubertsson, Wickberg, Gustavsson, & Rådestad, 2005). In line with previous findings (Biaggi et al., 2016; Leigh & Milgrom, 2008), a reported history of mental health difficulties was also associated with perinatal depression symptoms. Our data support the notion that GDA represent a vulnerability factor for perinatal depressive symptomatology, a finding recently reported by Sockol and colleagues (2014). The particular aspects of GDA assessed in the current study were perfectionism/performance evaluation and need for approval by others, which have also been found to predict depression in the general population (Beck, 2002; Zuroff, Blatt, Sanislow, Bondi, & Pilkonis, 1999).

The results, based on the cross-sectional sample, supported our hypothesis that maternal attitudes would add incrementally to the explained variance in depression scores, after GDA were taken into account. It was therefore surprising that in our longitudinal study antenatal GDA scores were not predictive of postnatal depression symptoms, whilst antenatal attitudes specific to motherhood remained a significant predictor, even after controlling for background factors, antenatal depression, and GDA. Antenatal depression is commonly

reported as one of the most significant predictors of postnatal depression (Biaggi et al., 2016; Leigh & Milgrom, 2008; O'Hara & Swain, 1996). Consistent with Beck's theory (Beck, 2002), specific dysfunctional beliefs activated by relevant stressors, may be more relevant in predicting depression than GDA. Our results suggest that in the context of parenting-related stressors during pregnancy and the postnatal period, holding dysfunctional beliefs about motherhood and, specifically, what it means to be a good or bad mother, may be of greater importance than holding more general dysfunctional attitudes, such as perfectionism and attitudes relating to the need of approval by others. This is a novel finding, as no study, to date, has demonstrated the importance of maternal-specific attitudes in predicting postnatal depression levels prospectively, whilst taking into account background factors, symptoms of antenatal depression, and GDA.

A closer examination into the content of the PRBQ-8 reveals that most of the items typify attitudes relating to motherhood that are of a conditional nature, "if... then," which Beck termed conditional assumptions. These "if ...then" propositions give rise to 'rules' of how one must, or should, be. Overly rigid and inflexible cognitions regarding what makes a good or a bad mother, likely give rise to negative evaluations of oneself as a mother. Feelings of inadequacy may be triggered which, in turn, may activate ruminative thinking concerning one's own competency as a mother, further undermining the woman's confidence in her mothering ability and triggering low mood. Similar themes of dichotomous attitudes and judgements by the self and others stand out as particularly meaningful in previously-developed measures of dysfunctional attitudes specific to the perinatal period: the AtoM (Sockol et al., 2014) and the RMBS scale (Thomason et al., 2015). In both of these scales, subscales that tap into dichotomous thinking and judgments of what constitutes a good or bad parent were most strongly associated with perinatal depression symptoms, compared to other factors tapping into maternal role idealisation or role identity.

These findings have clear therapeutic implications. The PRBQ-8 could be added to antenatal screening measures (such as the EPDS) aimed at identifying women at risk of PND. The PRBQ-8 offers additional benefits compared to the EPDS; high EPDS antenatal scores indicate presence of depressive symptomatology, which represents a vulnerability risk factor for postnatal depression. However, the EPDS does not identify the presence of cognitive vulnerability in the form of maladaptive maternal attitudes to perinatal depression, which our study shows, independently contributes to the prediction of postnatal depression symptomatology, independently of antenatal depression severity. Where such maladaptive maternal beliefs are identified through the use of the PRBQ-8, therapies aimed at modifying unhelpful maternal beliefs could be initiated during the antenatal period. Future studies could establish whether a change in these maternal beliefs would be associated with lower likelihood of incidence of depression during the postnatal period and, thus, contribute to the development of maternal 'resilience' in the face of parenting challenges.

*7.3 Limitations*

There are a number of limitations to note. First, data are based on self-report questionnaires, which may be subject to social desirability, self-report errors, and poor recall. Future research could use more objective measures of mood problems, as well as objective records of PHMHD. Second, the use of a snowball recruitment method (in part, in Study 1) may lead to a selective sample. Third, the participants in our two studies are not representative of the general population as there was a disproportionately higher level of Caucasian participants present in the sample, as well as those who were educated to a degree level. Future research, using a more diverse sample, is required in order to ascertain cultural and linguistic generalisability of our findings.

Despite the above limitations, the current study extends our understanding of the role of dysfunctional maternal attitudes in predicting the symptoms of perinatal depression and

offers a new, brief assessment tool, i.e. the PRBQ-8, as a valid and reliable instrument for the assessment of such attitudes. The brevity and ease of completion of the PRBQ-8 make it particularly suitable for use as a screening instrument for identification of unhelpful maternal attitudes during the antenatal period. Women identified as holding such attitudes could be offered cognitive interventions aimed at attitude modification, which, in turn, may reduce their risk of developing depression postnatally. If the PRBQ-8 is to be used in routine care as a tool for identifying pregnant women at an increased risk of developing postnatal depression, normative data and cut-off scores for the likely occurrence of a future episode of postnatal depression should be established.

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Table 1. Summary of Measures on Maternal Cognition

| No | Measure | Design & Sample | Items, factors themes | Validity | Reliability | Limitations |
|---|---|---|---|---|---|---|
| **1** | Maternal Adjustment & Maternal Attitudes (MAMA; Kumar, Robson, & Smith; 1984) | Cross-sectional; 119 primiparous women in early pregnancy | 60-items representing beliefs regarding body image, somatic symptoms, marital relationship, attitudes towards sex, attitudes towards pregnancy/the baby | Criterion validity | Test-retest and split half reliability were acceptable | No factor analysis; no information relating to concurrent or predictive validity; internal reliability was not reported; Long questionnaire |
| **2.** | Cognitive Adaptation to Stressful Events during Pregnancy (CASE; Affonso, Mayberry, Lovett, & Paul, 1994) | Longitudinal; 202 women from early pregnancy to postpartum | 37-items; one factor: items assess cognitive adaptation to threatening events using dimensions of meaning, mastery and self-esteem | Factor analysis; Predictive, discriminant, and convergent validity | High internal reliability | The scale assesses the frequency of engagement in self-questioning relating to adaptation to pregnancy and postpartum rather than attitudes related to motherhood |

| | | | | | | |
|---|---|---|---|---|---|---|
| **3** | Maternal Attitudes Questionnaire (MAQ: Warner et al., 1997) | Cross-sectional; 483 post-partum women | 14 items representing expectations of motherhood, expectations of the self, as a mother, and role conflicts | Concurrent and discriminant validity | High internal reliability | No factor analysis; Restricted to use in the postnatal period |
| **4** | Pregnancy Related Beliefs Questionnaire (PRBQ; Moorhead et al., 2003) | Cross-sectional; 41 pregnant women | 54 items representing beliefs about the maternal role, perceptions of changing body image, expectations about the behaviours of new-borns, and relationship insecurity | Concurrent and criterion validity | High internal reliability | Small sample size; No factor analysis; Long questionnaire |
| **5** | Maternal Attitudes & Beliefs Scale (MABS; Madar, 2013) | Cross-sectional; 36 pregnant & 32 postnatal women | 55 items, themes of irrationality, rationality, demandingness, self-downing, frustration tolerance, & awfulizing | Concurrent and convergent validity | High internal reliability | Small sample sizes; No factor analysis; Long questionnaire; High correlations (.70 - .95) between MABS and EPDS and BDI-II, suggest conceptual overlap |

| | | | | | | |
|---|---|---|---|---|---|---|
| **6** | Attitudes towards Motherhood Scale (AToM; Sockol, Epperson, & Barber, 2014; Sockol & Battle, 2015) | Cross-sectional; 381 pregnant & postnatal women | 12 items, EFA and CFA confirmed three factors: beliefs about other's judgements, beliefs about maternal responsibility, and maternal role idealization | Concurrent and convergent validity | High internal reliability | Concurrent validity was not reported for each factor |
| **7** | The Rigidity of Maternal Beliefs Scale (RMBS; Thomason, Flynn, Himle, & Volling, 2015) | Longitudinal; 113 women from early pregnancy to postpartum | 24 items; EFA four factor solution: perceptions of societal expectations, role identify, maternal confidence/efficacy, and maternal dichotomy | Discriminant, convergent, and predictive validity | Good internal and test-retest reliability | Role identity factor had low internal reliability in postnatal sample ($\alpha = .51$) |

Table 2. Demographic characteristics of study one participants (N = 344)

| | N | % |
|---|---|---|
| Ethnicity | | |
| Caucasian | 310 | 90.1 |
| Asian | 11 | 3.2 |
| Hispanic | 11 | 3.2 |
| Black | 5 | 1.5 |
| Mixed | 5 | 1.5 |
| Other | 2 | .6 |
| Education | | |
| O levels/GCSE or equivalent | 35 | 10.2 |
| A levels or equivalent | 70 | 20.4 |
| University degree | 136 | 39.7 |
| Postgraduate degree | 101 | 29.4 |
| No answer | 1 | .3 |
| Employment status | | |
| Employed full time | 199 | 57.8 |
| Employed part-time | 71 | 20.6 |
| Homemaker | 50 | 14.5 |
| Student | 5 | 1.5 |
| Unemployed | 4 | 1.2 |
| Other | 15 | 4.4 |
| Marital status | | |
| Married | 220 | 64 |
| Not married | 124 | 36 |
| Pregnancy status | | |
| Pregnant | 213 | 61.9 |
| Postpartum | 131 | 38.1 |
| Children | | |
| Primiparous | 167 | 48.5 |
| Multiparous | 177 | 51.5 |
| PHMHD | | |
| Yes | 146 | 42.4 |

Table 3. Rotated factor loadings from the 19-item PRBQ exploratory factor analysis.

| | Factor 1 | Factor 2 | Factor 3 |
|---|---|---|---|
| 1. If some else's baby is happier than mine, it is probably because I am an inadequate mother | **.88** | | |
| 2. If I am unable to satisfy my baby, I am a bad mother | **.88** | | |
| 3. If I can't look after my baby properly, it shows I am useless | **.83** | | |
| 4. If I do not feel maternal, it means I am bad | **.74** | | |
| 5. If my baby is unhappy, I will feel that it is my fault | **.68** | | |
| 6. If I do not feel completely emotionally attached to my baby, I should worry about what this means | **.55** | | |
| 7. If someone important pays me less attention after the birth, it is because the baby is more important to them than I am | **.52** | | |
| 8. I am as enthusiastic as I should be about my role as a mother | **-.51** | | |
| 9. I should appreciate every single moment of the early part of my baby's life | | **.69** | |
| 10. I have to do all it takes to make my baby completely happy | | **.69** | |
| 11. Motherhood is an instinctive and natural state for a woman | | **.62** | |
| 12. I should try hard to keep my figure during pregnancy | | | **.82** |
| 13. I have got to do regular exercise after the birth to get my figure back | | | **.78** |
| 14. I welcome the changes in my body, even those like odours (not including any illnesses) | | | **-.58** |

Table 4. Correlations and descriptive statistics for study one variables (N = 344)

| **Descriptive statistics of study variables** | | | | | | |
|---|---|---|---|---|---|---|
| | Mean | SD | Range | Cronbach's α | | |
| EPDS | 8.53 | 5.38 | 0-29 | .89 | | |
| DAS-A-17 | 49.05 | 18.14 | 17-96 | .93 | | |
| PRBQ factor 1 | 25.44 | 9.14 | 8-54 | .86 | | |
| PRBQ factor 2 | 11.68 | 3.68 | 3-20 | .63 | | |
| PRBQ factor 3 | 11.17 | 2.39 | 4-14 | .60 | | |
| AToM | 24.99 | 10.93 | 0-59 | .88 | | |
| **Spearman's Rho Correlations** | | | | | | |
| | EPDS | DAS-A-17 | PRBQ-8 | PRBQ factor 2 | PRBQ factor 3 | AToM |
| DAS-A-17 | .52** | 1 | | | | |
| PRBQ factor 1 | .49** | .75** | 1 | | | |
| PRBQ factor 2 | .07 | .01 | .11* | 1 | | |
| PRBQ factor 3 | .19** | .34** | .26** | .02 | 1 | |
| AToM | .41** | .57** | .71** | .33** | .18** | 1 |

*$p < .05$

**$p < .01$

Table 5. Hierarchical regression analysis assessing the incremental predictive validity of the PRBQ-8 (factor 1) with EPDS as the outcome variable

| **Block of variables** | | | |
|---|---|---|---|
| Model | $R^2$ | F(*df*) | Sig of F |
| 1 | .04 | 2.01 (336) | .06 |
| 2 | .15 | 8.63 (335) | <.001 |
| 3 | .36 | 24.00 (334) | <.001 |
| 4 | .40 | 25.04 (333) | <.001 |
| **Individual variables in each model** | | | |
| | *β* | *t* | *p* |
| Model 1 | | | |
| Age | -.12 | -2.11 | .04 |
| Education | .03 | .57 | .57 |
| Ethnicity | -.07 | -1.27 | .20 |
| Marital status | .05 | .88 | .38 |
| Pregnant vs postpartum | .13 | 2.44 | .02 |
| Parity | .07 | 1.14 | .26 |
| Model 2 | | | |
| Age | -.13 | -2.37 | .02 |
| Education | .06 | 1.13 | .26 |
| Ethnicity | -.09 | -1.73 | .09 |
| Marital status | .04 | .66 | .51 |
| Pregnant vs postpartum | .10 | 1.97 | .05 |
| Parity | .04 | .83 | .41 |
| PHMHD | -.35 | -6.83 | <.001 |
| Model 3 | | | |
| Age | -.02 | -.34 | .73 |
| Education | -.10 | -2.07 | .04 |
| Ethnicity | -.06 | -1.48 | .16 |
| Marital status | .03 | .69 | .49 |
| Pregnant vs postpartum | .01 | .27 | .79 |
| Parity | .02 | .38 | .70 |
| PHMHD | -.22 | -4.88 | <.001 |
| DAS-A-17 | .51 | 10.57 | <.001 |
| Model 4 | | | |
| Age | -.01 | -.12 | .91 |
| Education | -.10 | -2.02 | .04 |
| Ethnicity | -.06 | -1.48 | .14 |
| Marital status | .02 | .39 | .69 |
| Pregnant vs postpartum | .00 | .03 | .97 |
| Parity | .02 | .44 | .66 |
| PHMHD | -.22 | -4.88 | <.001 |
| DAS-A-17 | .28 | 4.10 | <.001 |
| PRBQ-8 | .31 | 4.64 | <.001 |

Note: N = 344, Age and Education were entered as continuous variables; Ethnicity: Non-white = 1, White = 2; Marital status: Married = 1, Not married = 2; Pregnant vs postpartum: Currently pregnant = 1, Given birth in the last six months = 2; Parity: First child = 1, Not first child = 2; PHMHD = Past history of mental health difficulties: Yes = 0, No = 1; DAS-A-17 = Dysfunctional Attitudes Scale-Revised; PRBQ-8 = Pregnancy-Related Beliefs Questionnaire-8; EPDS = Edinburgh Postnatal Depression Scale

Table 6. Correlations and descriptive statistics for study two variables (N = 210)

| **Descriptive statistics of study variables** | | | | |
|---|---|---|---|---|
| | Mean | SD | Range | Cronbach's α |
| Antenatal PRBQ-8 | 26.16 | 9.14 | 8-53 | .85 |
| Antenatal DAS-A-17 | 46.40 | 16.89 | 17-102 | .92 |
| Antenatal EPDS | 6.68 | 4.83 | 0-23 | .86 |
| Postnatal PRBQ-8 | 24.87 | 9.80 | 8-53 | .87 |
| Postnatal EPDS | 6.94 | 4.73 | 0-25 | .87 |

| **Spearman's Rho Correlations** | | | | |
|---|---|---|---|---|
| | Antenatal DAS-A-17 | Antenatal EPDS | Postnatal PRBQ-8 | Postnatal EPDS |
| Antenatal PRBQ-8 | .64** | .45** | .66** | .38** |
| Antenatal DAS-A-17 | 1 | .37 | .50 | .36 |
| Antenatal EPDS | | 1 | .37 | .59 |
| Postnatal PRBQ-8 | | | 1 | .54 |
| Postnatal EPDS | | | | 1 |

**$p < .01$

Table 7. Hierarchical regression analysis assessing the incremental predictive validity of antenatal PRBQ-8 scores on postnatal depression

| **Block of variables** | | | |
|---|---|---|---|
| Model | $R^2$ | F(*df*) | Sig of F |
| 1 | .04 | 1.55 (204) | .18 |
| 2 | .37 | 19.82 (203) | <.001 |
| 3 | .38 | 17.47 (202) | <.001 |
| 4 | .39 | 16.14 (201) | <.001 |
| **Individual variables in final equation** | | | |
| | *β* | *t* | *p* |
| Model 1 | | | |
| Age | .03 | .36 | .72 |
| Education | .17 | 2.20 | .03 |
| Ethnicity | -.08 | -1.11 | .27 |
| Marital status | .11 | 1.42 | .16 |
| Parity | .04 | .47 | .64 |
| Model 2 | | | |
| Age | .08 | 1.24 | .22 |
| Education | .09 | 1.41 | .16 |
| Ethnicity | -.03 | -.61 | .55 |
| Marital status | .01 | .21 | .84 |
| Parity | -.03 | -.50 | .62 |
| Antenatal EPDS | .59 | 10.35 | <.001 |
| Model 3 | | | |
| Age | .06 | .91 | .37 |
| Education | .08 | 1.25 | .21 |
| Ethnicity | -.04 | -.65 | .52 |
| Marital status | .02 | .28 | .78 |
| Parity | -.02 | -.35 | .73 |
| Antenatal EPDS | .55 | 8.86 | <.001 |
| DAS-A-17 | .10 | 1.58 | .12 |
| Model 4 | | | |
| Age | .06 | -.06 | .96 |
| Education | .07 | -1.52 | .13 |
| Ethnicity | -.04 | -1.38 | .17 |
| Marital status | .02 | .47 | .64 |
| Parity | -.01 | -.16 | .88 |
| Antenatal EPDS | .50 | 7.59 | <.001 |
| DAS-A-17 | .01 | .17 | .86 |
| Antenatal PRBQ-8 | .17 | 2.16 | .03 |

Note: N = 210, Age and Education were entered as continuous variables; Ethnicity: Non-white = 1, White = 2; Marital status: Married = 1, Not married = 2; Pregnant vs postpartum: Currently pregnant = 1, Given birth in the last six months = 2; Parity: First child = 1, Not first child = 2; Antenatal EPDS: First trimester scores of Edinburgh Postnatal Depression Scale; DAS-A-17 = Dysfunctional Attitudes Scale-Revised; PRBQ-8 = Pregnancy-Related Beliefs Questionnaire-8.

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