



## King's Research Portal

DOI:

[10.1080/02646838.2021.1946023](https://doi.org/10.1080/02646838.2021.1946023)

*Document Version*

Peer reviewed version

[Link to publication record in King's Research Portal](#)

*Citation for published version (APA):*

Moulds, M., Black, M.J., Newby, J. M., & Hirsch, C. R. (2021). Correlates of Repetitive Negative Thinking in Postnatal First Time Mothers. *Journal of Reproductive and Infant Psychology*.  
<https://doi.org/10.1080/02646838.2021.1946023>

### **Citing this paper**

Please note that where the full-text provided on King's Research Portal is the Author Accepted Manuscript or Post-Print version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version for pagination, volume/issue, and date of publication details. And where the final published version is provided on the Research Portal, if citing you are again advised to check the publisher's website for any subsequent corrections.

### **General rights**

Copyright and moral rights for the publications made accessible in the Research Portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognize and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the Research Portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the Research Portal

### **Take down policy**

If you believe that this document breaches copyright please contact [librarypure@kcl.ac.uk](mailto:librarypure@kcl.ac.uk) providing details, and we will remove access to the work immediately and investigate your claim.

Correlates of Repetitive Negative Thinking in Postnatal First Time Mothers

Michelle L. Moulds<sup>1</sup>, Melissa J. Black<sup>1,2</sup>, Jill M. Newby<sup>1,2</sup>, & Colette R. Hirsch<sup>3,4</sup>

<sup>1</sup>School of Psychology, The University of New South Wales, UNSW Sydney, Australia

<sup>2</sup>Black Dog Institute, The University of New South Wales, UNSW Sydney, Australia

<sup>3</sup>King's College London, Institute of Psychiatry, Psychology and Neuroscience, UK

<sup>4</sup>South London and Maudsley NHS Foundation Trust, UK

**Address for correspondence:**

Michelle Moulds, School of Psychology, The University of New South Wales, UNSW Sydney  
NSW 2052, AUSTRALIA; phone: +612 9385 3041; Fax: +612 9385 3641; email:  
m.moulds@unsw.edu.au

Accepted for publication 16<sup>th</sup> June 2021 in Journal of Reproductive and Infant Psychology

**Word count:** 2933 (excluding references)

**RUNNING HEAD:** Repetitive Thinking

### Abstract

**Background:** Despite the well-established role of repetitive negative thinking (RNT) in the prediction and maintenance of depression and anxiety, only minimal research to date has investigated RNT in the context of postnatal psychological adjustment. **Objective:** We examined the relationships between RNT, associated maladaptive cognitive processes, infant responsiveness and psychopathology in a sample of first-time mothers ( $N = 235$ ) with babies under 12 months. **Methods:** Participants completed an online battery of measures that indexed RNT, dampening of positive affect, metacognitive beliefs about RNT, infant responsiveness, depression and anxiety symptoms. **Results:** As predicted, RNT was correlated with depression. Controlling for depression, RNT was associated with anxiety, dampening positive affect and positive beliefs about RNT. RNT was inversely related to maternal responsiveness, but this relationship was accounted for by depression.

**Conclusions:** Consistent with findings in the broader literature, RNT was associated with depression, anxiety and other unhelpful cognitive processes in the postnatal period, as well as with poor infant responsiveness. Whilst cross-sectional and preliminary, these data suggest there may be potential clinical utility in targeting RNT in first-time mothers.

**KEYWORDS:** postnatal; depression; anxiety; repetitive thinking; rumination

## Introduction

Rumination and worry are both maladaptive cognitive processes evident across a range of psychological disorders. Rumination has primarily been studied in the context of depression, whilst worry has been most investigated in anxiety disorders. The key theoretical distinction between them is temporal focus: whilst rumination involves mulling over the past, worry involves considering possible adverse future outcomes.

Notwithstanding this difference, worry and rumination share numerous features, prompting some researchers to propose the value of considering both under the banner of RNT (e.g., McEvoy et al., 2010; McEvoy, Watson, Watkins, & Nathan, 2013). This broader RNT construct refers to thinking that is perseverative and difficult to control, irrespective of its specific content, temporal focus, or the emotional context/psychological disorder in which it occurs.

Despite the substantial body of evidence demonstrating the predictive and maintaining roles of rumination and worry in depressive and anxiety disorders, respectively, the nature, role and consequences of RNT have been less studied in the context of perinatal psychological adjustment (de Jong et al., 2016). The perinatal period is one of profound psychological, physiological and hormonal change. Given its distinctive and complex biological and social context, we cannot merely assume that the abovementioned relationships between RNT and psychological adjustment in non-perinatal samples also emerge in the postnatal period (Moulds et al., 2018). Poor postnatal mental health has a host of significant and long-term consequences; for example, predicting poor prognosis for offspring's mental health (e.g., Pearson et al., 2013; Pawlby et al., 2008). As a transdiagnostic modifiable risk factor for depression and anxiety, a better understanding of

the role of RNT in predicting postnatal mental health problems will have the potential to guide efforts to prevent their emergence.

To date, researchers have examined whether rumination in pregnancy predicts postnatal depression, and reported conflicting findings (see de Jong et al., 2016 for review). Whilst Barnum et al. (2013) reported that antenatal rumination predicted increased depression from pregnancy to 8 weeks postpartum, Raes et al. (2014) found no evidence of a predictive relationship. Similarly, whilst some studies documented a link between worry during pregnancy and postnatal depression (e.g., Austin et al., 2007; Penacoba-Puente et al., 2016), others have not (e.g., Mohammad et al., 2011). Experimental studies have shown that rumination/worry reduce maternal responsiveness (Stein et al., 2012), and that rumination compromises parenting problem-solving (O'Mahen et al., 2010) and has a negative impact on mother-infant interactions (Tester-Jones et al., 2017). In addition, O'Mahen et al. (2015) found that rumination decreased problem solving effectiveness in dysphoric postnatal mothers.

Taken together, these studies provide some evidence of associations between depression and both rumination and worry in the postnatal period. They also highlight the fact that research on RNT in the perinatal context has predominantly examined worry or rumination about specific *content* (e.g., worry about pregnancy-related concerns, rumination about sad/depressed mood) – as opposed to investigating the *process* of RNT generally. Such an approach makes it difficult to disentangle the presence and severity of issues related to the content of worry/rumination content from the extent to which respondents engage in the actual process of RNT. To date, a relatively small number of studies have focused on the broader construct of RNT in the postnatal period.

In such studies, researchers have employed self-report measures which index the *process* of RNT (e.g., Perseverative Thinking Questionnaire, PTQ; Ehring et al., 2011; Repetitive Thinking Questionnaire, RTQ; McEvoy et al., 2010), rather than RNT about disorder-specific content. For example, Egan et al. (2017) found that antenatal RNT did not directly predict postnatal depression; however, antenatal perfectionism predicted postnatal depression via antenatal depression and antenatal RNT. Similarly, Muller et al. (2013) reported that antenatal RNT did not predict postpartum depression symptoms; however, the unproductive (but not repetitiveness) facets of antenatal RNT predicted impairments in mother-infant relationship (as reported by mothers) at 5 weeks postpartum. In another study, women with consistently high levels of RNT during both pregnancy and postpartum reported more depression and anxiety symptoms (Muller et al., 2019). In addition, infants with mothers with high levels of RNT spent more time examining their environment, and protested less frequently, relative to infants of low RNT mothers. Harrison et al. (2021) found that high levels of social support from friends (but not family or significant others) buffered the effects of RNT on postnatal depression and anxiety. Collectively, these studies provide preliminary evidence of an interrelationship of RNT and depression in the postnatal period. Notably, their findings demonstrate that this relationship is not always direct, with other factors playing a role in their association.

However, many questions remain. One of these concerns the link between RNT and postnatal anxiety. While Vossbeck-Elsebusch et al. (2014) investigated RNT in a sample of new mothers and found it predicted childbirth-related PTSD symptoms specifically, to our knowledge, the relationship between general postnatal anxiety symptoms and RNT has not been examined (Moulds et al., 2018). Indeed, postpartum anxiety is common but has received far less research attention than depression (Goodman et al., 2016), despite

evidence of its prevalence (e.g., Dennis et al., 2017; Viswasam et al., 2019). Should RNT and postnatal anxiety be related, it will also be important to determine whether their association is independent of postnatal depression symptoms.

The extent to which postnatal RNT is associated with other maladaptive processes which play a role in depression, such as the tendency to dampen positive affect (Feldman, Joormann, & Johnson, 2008), is also unknown. Dampening refers to responding to positive experiences/emotions in ways that are likely to reduce their positive emotional intensity and impact (e.g., by thinking that positive feelings won't last or are too good to be true; Feldman et al., 2008). Studies with non-clinical samples have demonstrated that the tendency to engage in dampening in response to positive affect is associated with depression symptoms (e.g., Feldman et al., 2008), and that dampening prospectively predicts depression symptoms at 3 and 5 months, controlling for baseline depression (Raes et al., 2012). Raes et al. (2014) reported that dampening reported in the third trimester predicted postpartum depression, even when antenatal depression symptoms (indexed in the third trimester) and depression history were controlled. However, no study has examined the extent to which new mothers engage in dampening postpartum, and if they do, the extent to which it is related to RNT, as well as depression and anxiety.

Metacognitive beliefs about the benefits of RNT (e.g., the belief that engaging in RNT helps one to solve their problems) have been linked to rumination in depression. Formerly depressed individuals continue to endorse these beliefs when their depressive episode has remitted, and to a comparable level as currently depressed individuals (Watkins & Moulds, 2005). As an important maintaining factor, positive beliefs about RNT warrant investigation in the context of postnatal psychological adjustment (Egan et al., 2017). In a comparison of

pregnant women with and without depression, Isa Alfaraj et al. (2009) found that depressed expectant mothers were more likely to endorse positive metacognitive beliefs about rumination relative to their non-depressed counterparts. Further, such beliefs predicted depression over and above perceived social support. To our knowledge, no study in the published literature has examined positive metacognitive beliefs about RNT in the context of postnatal depression.

Finally, Stein et al. (2009) argued for the importance of investigating maternal cognitive processes as potential mechanisms through which maternal postnatal mental health influences children's development. They conceptualized maternal preoccupation as a 'core process of repetitive thinking' (p.13), and proposed that it compromises a mother's capacity to be present and responsive to a child's cues. Indeed, antenatal RNT predicts impairments in the mother-infant relationship at 5 weeks postpartum, controlling for pre- and postnatal depression (Muller et al., 2013). Further, Tester-Jones et al. (2015) found that in a sample of new mothers with infants high in negative temperament, rumination was related to maternal depression and infant responsiveness. Interestingly, for mothers of infants who were low in negative temperament, rumination mediated the relationship between maternal depression and infant responsiveness. However, the link between postnatal RNT and infant responsiveness requires further examination.

In order to understand and treat postnatal psychological distress, we need to better understand the way in which RNT is related to postnatal depression and anxiety, as well as other unhelpful cognitive processes. Accordingly, we recruited a sample of first-time mothers with babies under 12 months old. We predicted positive associations between RNT, depression and anxiety; and hypothesized that the association between RNT and anxiety

would remain when controlling for depression. We also hypothesized that RNT would be positively correlated with dampening of positive affect, positive metacognitive beliefs about RNT, and infant responsiveness.

## **Materials and Methods**

### *Participants and Procedure*

Women whose first child was born within the last 12 months were recruited via online sources (e.g., social media groups, relevant websites) and advertisements. Participants were given the option of providing contact details to be entered into a draw to win one of five \$AUD50 shopping gift cards (or an Amazon voucher of equivalent value for overseas participants). The study received ethical approval from xxx<sup>1</sup> Human Research Ethics Advisory Panel C (HREAP – Behavioural Sciences; application file number 2765). Given the online format of the study, participants provided informed consent by ticking a box. All participants provided consent prior to commencing the study.

A total of 251 new mothers commenced the survey<sup>2</sup>. Participants were excluded if they did not complete any of the questionnaires, or their baby was outside the specified age range (i.e., > 12 months). The final sample included 235 participants (who completed at least one questionnaire); average age was 32.0 years ( $SD = 4.5$ , range = 21-44). A post hoc power analysis indicated that the study was sufficiently powered (i.e., using Cohen's formula, power was estimated to be 99%, entering the parameters of 236 participants per group, effect size at 0.3 (medium), and alpha at  $p = .05$ , two-tailed).

See Table 1 for all participant details.

### *Measures*

**Demographic Questions and Personal Background Information.** Participants indicated their age, ethnic background, relationship status, social support (i.e., how many people they can rely on for support), educational level, and employment status. Participants Cron indicated that they had their first child in the past 12 months and noted the child's age. In addition, they indicated whether they had experienced any complications with falling pregnant/carrying a child to term, pregnancy, the labour/childbirth, or whether they or their child had experienced any problems in the postnatal/neonatal period.

Participants also completed the following self-report measures:

**Depression Anxiety Stress Scales – 21-item version (DASS-21; Lovibond & Lovibond, 1995):** A measure of depression, anxiety and stress over the past week. The DASS-21 subscales have excellent internal consistencies (depression:  $\alpha = 0.94$ ; anxiety:  $\alpha = 0.87$ ; stress:  $\alpha = 0.91$ ; Antony et al., 1998). In the current sample, Cronbach's alpha = .87 and .78 for the depression and anxiety subscales, respectively.

**Edinburgh Postnatal Depression Scale (EPDS; Cox et al., 1987):** A measure of postnatal depression symptoms with excellent internal consistency ( $\alpha = 0.87$ ;  $\alpha = 0.87$  in the current sample). Owing to the online format of our study and in order to meet the requirements of our ethics committee we removed the suicidality item.

**Repetitive Thinking Questionnaire – 10-item version (RTQ-10; McEvoy et al., 2010):** A transdiagnostic measure of perseverative thinking developed from the items of existing measures of rumination, worry, and post-event processing with disorder-specific content (e.g., references to depression) removed. Participants were instructed to answer the questions *in relation to thinking about your day-to-day experience of being a new mother and thinking about your baby*. An example of one of the items is as follows: *Once I started*

*thinking about the situation, I couldn't stop.* RTQ-10 scores are highly correlated with those on the full (31-item) RTQ (McEvoy et al., 2010), and the RTQ-10 possesses excellent internal consistency ( $\alpha = .89$ ). Cronbach's alpha = .95 in the current sample.

**Ruminative Response Scale (RRS)** of the Response Styles Questionnaire (RSQ; Nolen-Hoeksema & Morrow, 1991): A 22-item instrument assessing the trait tendency to engage in depressive rumination; i.e., rumination in response to depressed mood. The RRS has two subscales, brooding and reflection (Treyner et al., 2003). We administered the full RRS but report the brooding subscale here, given evidence its capacity to predict rumination over time (Schoofs et al., 2010). Internal consistency of the RRS is  $\alpha = 0.90$  (Treyner et al., 2003) ( $\alpha = .95$  in the current sample).

**Dampening subscale of the Response to Positive Affect Scale (RPAS;** Feldman et al. 2008). The dampening subscale is an 8-item measure that asks respondents to indicate the extent to which they experience thoughts/responses that likely dampen positive moods (e.g., 'Think "This is too good to be true"') when they feel happy, excited, or enthused. Internal consistency of the dampening subscale is acceptable ( $\alpha = 0.72$ ;  $\alpha = .84$  in the current sample).

**Positive Beliefs about Rumination Scale – Adapted (PBRs-A;** Watkins & Moulds, 2005). A questionnaire assessing beliefs about the helpfulness of repetitive thinking, with high internal consistency ( $\alpha = 0.89$ ;  $\alpha = .92$  in the current sample).

**Maternal Infant Responsiveness Scale (MIRI;** Amankwaa & Pickler, 2006): A 22-item measure assessing maternal responsiveness to infant cues. It includes items assessing a mother's feelings and beliefs about how she responds when caring for and spending time with her baby (e.g., *I believe my baby responds well to my holding him/her*). It possesses

good internal consistency ( $\alpha = 0.87$ ; Amankwaa et al., 2007). Cronbach's alpha = .83 in the current sample.

## Procedure

The survey was open from 18/2/17 to 1/6/17. All study information, consent forms and measures were presented via an online survey platform (Qualtrics; Provo, UT). Participants provided informed consent online before completing the questionnaire battery. They were given the option to complete the measures in more than one sitting; in total, the measures took approximately 30-45 minutes to complete. All participants were provided with written debriefing information and were given contact details for mental health resources and services.

## Results

**Associations between RNT and depression, anxiety.** We conducted Spearman correlations as questionnaire scores (particularly DASS scores) were skewed. RNT was positively associated with depression (i.e., EPDS:  $r_s = .65, p = .000$ ; DASS-D:  $r_s = .55, p = .000$ ) and anxiety (DASS-A:  $r_s = .46, p = .000$ ). Interestingly, the associations between RNT and anxiety (i.e., DASS-A) remained when depression was controlled; i.e., when both EPDS and DASS-D scores were entered as covariates ( $r_s = .17, p = .01$  and  $r_s = .27, p = .000$ , respectively). In addition, depressive rumination (RRS-brooding) was associated with both depression (i.e., EPDS:  $r_s = .40, p = .000$ ; DASS-D:  $r_s = .37, p = .000$ ) and anxiety (DASS-A:  $r_s = .24, p = .000$ ).

**Associations between RNT and related cognitive processes.** As predicted, RNT was positively associated with dampening (i.e., RPAS-D:  $r_s = .54, p = .000$ ) and positive beliefs

about rumination (PBRS-A;  $r_s = .31, p = .000$ ), and inversely related to maternal infant responsiveness (MIRI;  $r_s = -.26, p = .000$ ). Controlling for depression, the relationships between RNT and both dampening (controlling for EPDS:  $r_s = .36, p = .000$ ; controlling for DASS-D:  $r_s = .41, p = .000$ ) and positive beliefs about rumination (PBRS; controlling for EPDS:  $r_s = .27, p = .000$ ; controlling for DASS-D:  $r_s = .31, p = .000$ ) persisted. However, the partial correlations between RNT and maternal infant responsiveness (MIRI) were no longer significant (controlling for EPDS:  $r_s = -.06, p = .40$ ; controlling for DASS-D:  $r_s = -.11, p = .13$ ).

### Discussion

As predicted, RNT was significantly correlated with depression. RNT was also associated with anxiety, dampening of positive affect and positive beliefs about RNT, and these associations remained even when depression was controlled. Finally, RNT was inversely related to maternal responsiveness, but this association was accounted for by depression. Together, these findings confirm that the well-established relationships between RNT and both depression and anxiety are also evident in the postnatal period. Further, they extend our understanding of psychological functioning in postpartum by demonstrating that RNT is associated with both the endorsement of unhelpful metacognitive beliefs and the tendency to dampen positive affect – again, replicating findings in non-perinatal samples.

The findings speak to potential implications for clinical practice. Specifically, they raise the possibility that targeting RNT in new mothers may reduce postnatal anxiety and depression. Indeed, in a sample of pregnant women, a single training session targeting interpretation bias reduced RNT in the short-term (Hirsch et al., under review). Further evaluations of the effectiveness of such interventions in reducing RNT, and in turn

postpartum depression and anxiety symptoms, will be an important next clinical step. To our knowledge, whilst there is some evidence that cognitive behavioural interventions for anxiety reduce worry in postnatal women (e.g., Green et al., 2015, 2020), to our knowledge no randomised controlled trials to date have evaluated the effectiveness of an intervention for RNT specifically in postpartum.

Whilst providing an initial understanding of RNT in the postnatal period, we acknowledge that our findings are preliminary and limited by the cross-sectional design. More longitudinal investigations of the capacity of RNT to predict later symptom levels, assessed via studies in which RNT and psychological symptoms are sampled multiple times throughout the postnatal period, are needed. For example, Muller et al. (2019) sampled RNT at multiple timepoints throughout pregnancy and postpartum, enabling examination of the trajectory of RNT, as well the opportunity to distinguish women who were consistently high versus consistently low in RNT throughout the perinatal period. More studies adopting such a design will enable us to better understand the course and predictive role of postnatal RNT.

In addition, experimental studies are needed to determine the directionality of the associations reported here. For example, whilst there is evidence that rumination is causal in reducing maternal responding (e.g., Tester-Jones et al., 2017; Stein et al., 2012), the converse (i.e., that mothers who respond less to their infant engage in more rumination as a result) is also plausible, and warrants empirical test. Another possible research direction will be to shed light on whether temporal associations have the potential to explain the relationship between RNT and dampening. There are a number of seemingly plausible possibilities: that engaging in RNT in turn leads to dampening responses, that the tendency to dampen positive affect results in RNT, and/or the two cognitive processes act in concert and result in depression and anxiety symptoms, to name a few. There have been few

experimental studies of RNT in the perinatal period. More such investigations will be theoretically informative and will highlight key areas of focus for psychological interventions for postnatal women.

Finally, we acknowledge that our study would have been strengthened by the use of a measure which specifically indexes anxiety in postpartum (e.g., Postpartum Specific Anxiety Scale, PSAS; Fallon et al., 2016). Whilst the DASS-21 has been used as a general measure to assess postnatal anxiety symptoms (e.g., Miller et al., 2006), in future studies researchers could consider administering measures which index postpartum-specific anxiety features in order to better capture the way in which anxiety manifests in this population.

In sum, despite a wealth of studies that have developed our understanding of how RNT maintains depression and anxiety, we cannot assume the same relationships in the perinatal context - as it is feasible that the unique and fluctuating characteristics and challenges which accompany the perinatal period interact with cognitive processes in critical ways. Replicating findings in the broader literature, we found that RNT is associated with postnatal depression symptoms; and further, with postnatal anxiety and other maladaptive cognitive processes, independently of depression. Whilst high RNT was linked to low maternal responsiveness, this relationship was driven by depression. Further work is needed to broaden understanding of the role of RNT in postpartum, and will inform clinical efforts to prevent and treat postnatal psychological distress.

**Footnotes**

1. Omitted for the purpose of blind peer review.
2. We attempted to collect follow-up data from participants 6 months post-baseline, to investigate the extent to which RNT at baseline predicted depression and anxiety. Response rate was poor (i.e., 25%) and not representative of the initial sample (i.e., participants who completed follow-up measures had lower depression and anxiety symptoms at baseline). We therefore opted not to report these data.
3. We also asked participants whether they had experienced any two week periods of low mood and/or anhedonia, in an attempt to obtain information about possible depression history. However, given the absence of diagnostic interviews to confirm veracity, and for the sake of brevity, we opted not to report these data.

## Declarations

### Consent to participate

Participants provided electronic consent prior to taking part in the study.

### Consent for publication

All participants consented to their data being published in an anonymised format

### Disclosure statement

The authors declare that they have no competing interests.

### Funding

This work received some support from UNSW Sydney PLuS Alliance Fellows funding awarded to Michelle Moulds. UNSW PLuS Alliance had no role in the study design, the collection, analysis or interpretation of the data, or the writing of the manuscript.

### Authors' contributions

This study was conducted as part of a larger collaboration amongst all authors. MM and MB designed the study. MB programmed the survey content. JN, MM, MB and CH all contributed to writing the manuscript; all authors read and approved the final version.

### Acknowledgements

Dr. Colette Hirsch receives salary support from the National Institute for Health Research (NIHR), Mental Health Biomedical Research Centre at South London and Maudsley NHS Foundation Trust and King's College London. The views expressed in this article are those of the author(s) and not necessarily those of Kings College London, NIHR or the Department of Health.

### Ethical approval

The study received ethical approval from the UNSW Sydney Human Research Ethics Advisory Panel C (HREAP – Behavioural Sciences; application file number 2765).

### Authors' information

CH receives salary support from the National Institute for Health Research (NIHR), Mental Health Biomedical Research Centre at South London and Maudsley NHS Foundation Trust and King's College London. JN receives support from the Australian Medical Research Future Fund/National Health and Medical Research Council (MRFF/NHMRC). The views expressed in this article are those of the author(s) and not necessarily those of King's College London, NIHR, or NHMRC.

## References

- Amankwaa, L., & Pickler, R. (2006). Measuring maternal responsiveness. *Official Journal for the Association of Black Nursing Faculty in Higher Education, 18*, 4–15.
- Amankwaa, L.C., Pickler, R.H., & Boonme, J. (2007). Maternal responsiveness in mothers of preterm infants. *Newborn and Infant Nursing Reviews, 7*, 25-30.
- Austin, M.P., Tully, L., & Parker, G. (2007). Examining the relationship between antenatal anxiety and postnatal depression. *Journal of Affective Disorders, 101*, 169-174.
- Barnum, S.E., Woody, M.L., & Gibb, B.E. (2013). Predicting changes in depressive symptoms from pregnancy to postpartum: The role of brooding rumination and negative inferential styles. *Cognitive Therapy and Research, 37*, 71-77.
- Cox, J.L., Holden, J.M., & Sagovsky, R. (1987). Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. *The British Journal of Psychiatry, 150*, 782-786.
- DeJong, H., Fox, E., & Stein, A. (2016). Rumination and postnatal depression: A systematic review and a cognitive model. *Behaviour Research and Therapy, 82*, 38-49.
- Dennis, C.L., Falah-Hassani, K., & Shiri, R. (2017). Prevalence of antenatal and postnatal anxiety: systematic review and meta-analysis. *British Journal of Psychiatry, 210*, 315-323.
- Egan, S.J., Kane, R.T., Winton, K., Eliot, C., & McEvoy, P.M. (2017). A longitudinal investigation of perfectionism and repetitive negative thinking in perinatal depression. *Behaviour Research and Therapy, 97*, 26-32.
- Ehring, T., Zetsche, U., Weidacker, K., Wahl, K., Schonfeld, S., & Ehlers, A. (2011). The Perseverative Thinking Questionnaire (PTQ): Validation of a content-independent measure of repetitive negative thinking. *Journal of Behavior Therapy and Experimental Psychiatry, 42*, 225-232.
- Fallon, V., Halford, J.C.G., Bennett, K.M., & Harrold, J.A. (2016). The Postpartum Specific Anxiety Scale: development and preliminary validation. *Archives of Women's Mental Health, 19*, 1079-1090.
- Feldman, G.C., Joormann, J., & Johnson, S.L. (2008). Responses to positive affect: A self-report measure of rumination and dampening. *Cognitive Therapy and Research, 32*, 507–525.
- Goodman, J.H., Watson, G.R., & Stubbs, B. (2016). Anxiety disorders in postpartum women:

- a systematic review and meta-analysis. *Journal of Affective Disorders*, 203, 292-331.
- Green, S.M., Donegan, E., McCabe, R.E., Streiner, D.L., Agako, A., & Frey, B.N. (2020). Cognitive behavioral therapy for perinatal anxiety: A randomised controlled trial. *Australian and New Zealand Journal of Psychiatry*, 54, 423-432.
- Green, S.M., Haber, E., Frey, B.N., & McCabe, R.E. (2015). Cognitive-behavioral group treatment for perinatal anxiety: A pilot study. *Archives of Women's Mental Health*, 18, 631-638.
- Harrison, V., Moulds, M.L., & Jones, K. (in press). Support from friends moderates the relationship between repetitive negative thinking and postnatal wellbeing during COVID-19. *Journal of Reproductive and Infant Psychology*.
- Hirsch C.R., Meeten F., Newby J.M., O'Halloran, S., Gordon, C., Krzyzanowski, H., & Moulds M.L. (in press). Looking on the bright side reduces worry in pregnancy: training interpretations in pregnant women. *Clinical Psychology in Europe*.
- Isa Alfaraj, A.M.A., Spada, M.M., Nikčević, A.V., Puffett, A., & Meer, S. (2009). Positive beliefs about rumination in depressed and non-depressed pregnant women: a preliminary investigation. *Journal of Reproductive and Infant Psychology*, 27, 54-60.
- Lovibond, S. H., & Lovibond, P. F. (1995). Manual for the Depression Anxiety Stress Scales (2nd Edition ed.). Sydney: Psychology Foundation.
- McEvoy, P. M., Mahoney, A. J., & Moulds, M. (2010). Are worry, rumination, and post-event processing one and the same? Development of the Repetitive Thinking Questionnaire. *Journal of Anxiety Disorders*, 24, 509-515.
- McEvoy, P.M., Watson, H., Watkins, E.R., & Nathan, P. (2013). The relationship between worry, rumination, and comorbidity: evidence for repetitive negative thinking as a transdiagnostic construct. *Journal of Affective Disorders*, 151, 313-320.
- Mohammad, K.I., Gamble, J., & Creedy, D.K. (2011). Prevalence and factors associated with the development of antenatal and postnatal depression among Jordanian women. *Midwifery*, 27, e238-e245.
- Moulds, M.L., Black, M.J., Newby, J.M., & Hirsch, C.R. (2018). Repetitive negative thinking and its role in perinatal mental health. *Psychopathology*, 51, 161-166.
- Muller, D., Teismann, T., Havemann, B., Michalak, J., & Seehagen, S. (2013). Ruminative thinking as a predictor of perceived postpartum mother-infant bonding. *Cognitive Therapy and Research*, 37, 89-96.

- Muller, D., Teismann, T., Hirschfeld, G., Zmyj, N., Fuths, S., Vocks, S., Schneider, S., & Seehagen, S. (2019). The course of maternal repetitive negative thinking at the transition to motherhood and early mother-infant interactions: Is there a link? *Development and Psychopathology, 31*, 1411-1421.
- O'Mahen, H.A., Flynn, H.A., & Nolen-Hoeksema, S. (2010). Rumination and interpersonal functioning in perinatal depression. *Journal of Social and Clinical Psychology, 29*, 646-667.
- Pawlby, S., Sharp, D., Hay, D., & O'Keane, V. (2008). Postnatal depression and child outcome at 11 years: The importance of accurate diagnosis. *Journal of Affective Disorders, 107*, 241-245.
- Pearson, R.M., Evans, J., Kounali, D., Lewis, G., Heron, J., Ramchandani, P.G., O'Connor, T.G., & Stein, A. (2013). Maternal Depression During Pregnancy and the Postnatal Period: Risks and Possible Mechanisms for Offspring Depression at Age 18 Years. *JAMA Psychiatry, 70*, 1312-1319.
- Penacoba-Puente, C., Marin-Morales, D., Carmona-Monge, F., J., & Furlong, L.V. (2016). Post-partum depression, personality, and cognitive-emotional factors: A longitudinal study on Spanish pregnant women. *Health Care for Women International, 37*, 97-117.
- Raes, F., Smets, J., Wessel, I., Van Den Eede, F., Neli,s S., Franck, E., Jacquemyn, Y., & Hanssens, M. (2014). Turning the pink cloud grey: Dampening of positive affect predicts postpartum depressive symptoms. *Journal of Psychosomatic Research, 77*, 64-69.
- Schoofs, H., Hermans, D., & Raes, F. (2010). Brooding and reflection as subtypes of rumination: Evidence from confirmatory factor analysis in nonclinical samples using the Dutch Ruminative Response Scale. *Journal of Psychopathology and Behavioral Assessment, 32*, 609-617.
- Stein, A., Craske, M.G., Lehtonen, A., Harvey, A., Savage-McGlynn, E., Davies, B., Goodwin, J., Murray, L., Cortina-Borja, M., & Counsell N. (2012). Maternal cognitions and mother-infant interaction in postnatal depression and generalized anxiety disorder. *Journal of Abnormal Psychology, 121*, 795-809.
- Stein, A., Lehtonen, A., Harvey, A.G., Nicol-Harper, R., & Craske, M. (2009). The influence of

postnatal psychiatric disorder on child development: Is maternal preoccupation one of the key underlying processes? *Psychopathology*, 42, 11-21.

Tester-Jones, M., Karl, A., Watkins, E., & O'Mahen, H. (2017). Rumination in dysphoric mothers negatively affects mother-infant interactions. *Journal of Child Psychology and Psychiatry*, 58, 38-45.

Tester-Jones, M., O'Mahen, H., Watkins, E., & Karl, A. (2015). The impact of maternal characteristics, infant temperament and contextual factors on maternal responsiveness to infant. *Infant Behaviour and Development*, 40, 1-11.

Treynor, W., Gonzalez, R., & Nolen-Hoeksema, S. (2003). Rumination reconsidered: A psychometric analysis. *Cognitive Therapy and Research*, 27, 247-259.

Viswasam, K., Eslick, G.D., & Starcevic, V. (2019). Prevalence, onset and course of anxiety disorders during pregnancy: A systematic review and meta-analysis. *Journal of Affective Disorders*, 255, 27-40.

Vossbeck-Elsebusch, A.N., Freisfeld, C., & Ehring, T. (2014). Predictors of posttraumatic stress symptoms following childbirth. *BMC Psychiatry*, 14, 200.

Watkins, E., & Moulds, M.L. (2005). Positive beliefs about rumination in depression – a replication and extension. *Personality and Individual Differences*, 39, 73-82.

Table 1. Participant Characteristics and Self-Report Measures (N = 235)

<b>Age</b>	32.02 (4.48)
<b>Ethnicity</b>	
<i>% Caucasian</i>	70.9
<i>% European</i>	10.3
<i>% Asian</i>	8.1
<i>% other</i>	10.7
<b>Relationship status</b>	
<i>% partnered/co-habiting/married</i>	97.4
<i>% single</i>	1.7
<i>%divorced</i>	0.9
<b>Education</b>	
<i>% high school</i>	6.4
<i>% diploma/TAFE</i>	18.9
<i>% undergraduate</i>	35.6
<i>% postgraduate</i>	38.2
<i>% other</i>	0.920.6
<b>Current employment status</b>	
<i>% full-time or part-time</i>	60.1
<i>% currently on maternity leave</i>	2.1
<i>% full-time student</i>	12.4
<i>% unemployed</i>	4.7
<i>% other</i>	
Perceived social support (no. of people can rely on for support)	17.96 (28.88)
<b>Age of child (months)</b>	5.91 (3.05)
<b>Birth/pregnancy complications</b>	
<i>% complications with pregnancy</i>	19.3
<i>% complications with labour/birth</i>	14.0
<i>% postnatal or neonatal difficulties</i>	11.3
EPDS	7.06 (4.73)
DASS-D	6.45 (6.63)
DASS-A	5.21 (5.84)
RTQ-10	21.40 (10.53)
RRS-brooding	7.75 (3.13)
MIRI	99.04 (7.89)
RPA-dampening	14.79 (5.11)
PBRS-A	21.51 (6.43)

*Note.* Mean values reported, with standard deviations in parentheses. EPDS = Edinburgh Postnatal Depression Scale; DASS-21 depression = Depression Anxiety Stress Scales – depression subscale; DASS-21 anxiety = Depression Anxiety Stress Scales – anxiety subscale; RTQ-10 = Repetitive Thinking Questionnaire – 10 item version; Ruminative Response Scale – brooding subscale; MIRI = Maternal Infant Responsiveness Scale; RPA-dampening = Responses to Positive Affect-dampening subscale; PBRs-A = Positive Beliefs about Rumination Scale-Adapted. Owing to missing data, *ns* vary across measures. Where percentages are reported, they refer to the proportion of participants who responded to the relevant item.