Author’s response to reviews

Title: Pictorial Representation of Attachment: Measuring the parent-fetus relationship in expectant mothers and fathers

Authors:

Hedwig J.A. Van Bakel (H.J.A.vanBakel@tilburguniversity.edu)
Adriana J.B.M. Maas (a.j.b.m.maas@tilburguniversity.edu)
Charlotte M.J.M. Vreeswijk (c.m.j.m.vreeswijk@tilburguniversity.edu)
Ad J.J.M. Vingerhoets (vingerhoets@tilburguniversity.edu)

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Author's response to reviews: see over
Dear Editor and reviewers,

We were very pleased to read the positive comments of the reviewers on the first draft of our paper. We thank you and the two reviewers for your valuable comments and suggestions, which we closely followed in our revision of the manuscript.

Please find the revised version of our manuscript "Pictorial Representation of Attachment: Measuring the parent-fetus relationship in expectant mothers and fathers" which you invited us to resubmit in your e-mail of September 25th 2012.

Below, we highlight how we addressed the various issues raised by you and the two reviewers. The page numbers mentioned in our explanatory notes refer to the pages in the revised manuscript.

**Editor’s comments**

(a) “the authors may have some relevant data (according to the published protocol) - I would at least like them to acknowledge this within the manuscript and also justify why it has not been appropriate at this time to include it. For example, the aim outlined in the abstract is different from the two aims stated on page 6 of the introduction. In the abstract, they do not refer to parity and age. Perhaps data could be included if available?”

**Reply:**

As can be seen in our published study protocol (Maas et al., 2012) we indeed conducted a study with a variety of variables to answer a diversity of research questions and to gain more insight into pregnancy and infant mental health issues. We agree with you and the reviewers that we should acknowledge this in the manuscript and justify why we did not include more variables in the current paper.

For the current paper we prefer to focus on the concept of maternal fetal attachment as defined by Condon (1993) and Van den Bergh and Simons (2009) and not to elaborate on attachment as the construct defined by Bowlby and Ainsworth, i.e., the infant-to-parent relationship. See also our reply to comment b. We added extra information in the introduction section of the revised manuscript.

We could have broadened the scope of our paper by including other variables. For example, the Working Model of the Child Interview (assessed at 6 months of age) may be a valuable measure for the predictive validity of the PRAM. However (and unfortunately) it takes a lot of time and resources to reliably code those interviews. Because we were not able to code all maternal and paternal interviews at this moment, we focused on other validity aspects of the PRAM. We added the next sentence in the discussion section.

“Future studies using the PRAM with a focus on validity and reliability aspects of this
instrument (i.e., discriminant and predictive validity, test-retest reliability) are strongly recommended and are also in progress by our research group.”

We also agree that the aim outlined in the abstract differs from the aims in the introduction and that we did include parity, gender, and age into our study aims and statistical analyses. We corrected this in both the abstract and introduction. Abstract and introduction are comparable now.

(b) “about the use of the term ‘attachment’ in the manuscript and in the measure name. According to ‘strict’ attachment theory parents cannot be ‘attached’ to children - they can show bonding and care-giving - but attachment would imply some clinically significant role reversal which is not the case here. Perhaps a sentence can be added to explain attachment from a psychological perspective to an audience of non-psychologists, such as the general readership of BMC Pregnancy & Childbirth. The authors should address this and justify their decision, one reviewer with a clinical (non-psychology background) goes as far as suggesting that all mention of attachment would be removed and they would rename their instrument."

Reply:
The reviewer(s) are correct and we certainly acknowledge that according to ‘strict’ attachment theory parents cannot be ‘attached’ to children and that they merely show bonding and care-giving behavior. Although we agree that the word ‘attachment’ (from the attachment theoretical perspective) is not strictly correct during pregnancy, we do prefer to keep the word ‘attachment’ in the title and instrument for the following reasons. First, a critical analysis of the literature indeed suggests that this relationship is not an attachment relationship at all, as Bowlby (1969) and Ainsworth (1978) first defined it, but a multi-faceted construct guided by the caregiving system (Walsh, 2011). Although attachment behaviors are essentially about eliciting care from others, the substance of maternal–fetal relationships deals with the development of feelings of love and protection. These relationships can be seen as a strong emotional tie. Therefore it seems intuitive to refer to them as attachment, as a generation of researchers has done (e.g., Cranley 1981; Müller 1992; Condon 1993).

Second, the kind of measures that we use to concurrently validate the PRAM with, such as the MAAS/PAAS (Condon, 1998), also include the word attachment (i.e., Maternal Antenatal Attachment Scale). Moreover, this is in line with all other measures to assess the maternal fetal relationship [Maternal Fetal Attachment Scale (MFAS) (Cranley, 1981), and Prenatal Attachment Inventory (PAI) (Muller, 1993], which all contain the word ‘attachment’. See for an overview of scales to measure the mother-fetus relationship Van den Bergh and Simons (2009).

Finally, changing the word ‘attachment’ in the instrument would have consequences since we published before about this instrument (see Hoffenkamp et al., 2012) and colleagues and researchers are using the PRAM at this moment. They are all aware of the conceptual issues involved with using the term attachment but also agree that changing the term does not resolve the conceptual problem in itself.

In line with the above mentioned arguments we added the next paragraph to the introduction section. “Prenatal attachment can be described as the unique relationship that develops between parent and fetus. This relationship may be represented by an affiliation and interaction with the unborn baby and the desire of the parent to know and to be with the unborn baby (Brandon, et al., 2009). Analysis of the literature suggests that this
relationship during pregnancy is not the same kind of attachment relationship as Bowlby (1969) and Ainsworth et al., (1978) have defined it, but a multi-faceted construct guided by the caregiving system (Walsh, 2011). Although attachment behaviors are essentially about eliciting care from others, the substance of maternal–fetal relationships during pregnancy deals with the development of feelings of parental love and protection. These relationships can be seen as a strong emotional tie. Therefore it seems reasonable to refer to them as attachment, as a generation of researchers has done (e.g., Walsh, 2011; Cranley 1981; Müller 1992; Condon 1993).

Reviewer 1
1. “In an adequate sample of primi- and multipara women and their partners the study finds a significant positive association between the PRAM and a verbal measure of prenatal attachment (M/PAAS). The questions are clearly defined and the authors provide a good overview of the existing literature in the introduction. The methods in the manuscript are appropriate and well described by the authors in the method section. However, I would like the authors to comment on the problems potentially associated with the 2 antenatal attachment measures being administered at the same time point.”

Reply:
We are very pleased by the positive comments given by reviewer 1. She, however, would like us to comment on the problems potentially associated with the M/PAAS and PRAM being administered at the same time point.
The purpose of the present study was to assess the convergent/concurrent validity of our newly developed non-pictorial measure. One of the main requirements when determining the convergent validity is the concurrent assessment of two convergent measures. Therefore we choose to administer the M/PAAS and PRAM at the same time point at 26 weeks gestational age. Especially, because maternal fetal attachment is known to increase within the course of pregnancy. This was an additional reason to administer the instruments at the same time.

2. “The data presented in the results section seem to be sound. However, the authors do not present the range of scores for participants for the M/PAAS or for the PRAM. I would like these to be included, particularly for the PRAM since it is a new measure”

Reply:
The reviewer is right that we did not present the range of scores for the study variables. Apologies for this. In Table 1 we now have added the range of scores for both the M/PAAS and PRAM.

3. a “The authors discuss the limitations of the study, but perhaps do not place enough emphasis on them. While this is a useful research tool the fact that it has not yet been investigated with a clinical sample is a major limitation. Although the authors do mention this, it could be stressed further.”

Reply:
We acknowledge the limitation that the PRAM has not been extensively investigated with a clinical sample. In the meantime we have published a paper using the PRAM in a
sample of very and moderate premature infants (see Hoffenkamp et al., 2012; Evolutionary Psychology). We have added the next paragraph in the discussion section. “Longitudinal analyses revealed that mothers’ PRAM scores decreased after moderately preterm delivery, whereas decreases in PRAM scores were observed in both parents after very preterm delivery. As lower PRAM scores represent stronger feelings of parent-infant connectedness, these findings suggest a higher degree of bonding after premature childbirth. These results were in line with outcome measures operationalized with other instruments, as parents of preterm infants reported less bonding problems compared to parents of full-terms. These findings may support the hypothesis that in affluent countries with adequate resources, bonding in parents of preterm infants on average may be higher than in parents of full-term infants. Future studies with different clinical populations, in developing countries or in parents with very limited resources, as well as later follow-up measurements, are still needed to clarify the development and process of parent-infant bonding.”

3b. “Another major limitation is the lack of validity and reliability data. While the authors acknowledge this is a problem, I do wonder if this is something that they could have addressed. From the published protocol of this study it seems that they have collected more data that would be of relevance to these questions. It would be useful for the authors to comment on the other data that they have and whether it would be appropriate to include it in the paper. For example, a comparison with the Working Model of Child Interview seems very useful and if they had data on the PRAM at any other time points in pregnancy this would also be very relevant.”

Reply:
We agree with the reviewer and also acknowledge that there is a lack of validity and reliability data at this moment. Although we collected a lot of data, to assess reliability with a 1-item measure is limited. Very short-term test-retest reliability with the PRAM is needed in future studies. We measured the PRAM only once during pregnancy, at 26 weeks gestational age. Concurrently we administered the M/PAAS at 26 weeks GA which enabled us to assess convergent validity aspects. For the purpose of predictive validity aspects of the PRAM—which is beyond the scope of the present study that specifically focused on prenatal relationship—using the Working Model of the Child Interview at 6 months postpartum is certainly useful. See also our comment b (editor’s comments).

4. “I do think that the authors could discuss further the other data that they seem to have in relation to this sample and this measure and whether it is relevant to include it in this manuscript.”

Reply:
See our former replies. There is a need for future studies to focus on these aspects.

5. “Both the title and abstract do accurately convey what is found in the study, with one very large caveat: the use of the term ‘attachment’ in relation to this measure. In the strictest attachment terms a parent cannot form an attachment to a child (unborn or otherwise) – unless there is a significant degree of role reversal with clinical significance. Instead in the strictest terms bonding or caregiving would be more preferable. The authors should provide thorough justification as to why they have chosen the term attachment to describe their instrument.”
Reply:
See our reply to comment a and b (Editor)

6. “The written English in the manuscript is perfectly acceptable. There are a couple of discretionary changes that I have suggested (see below).

   a. Would suggest **moving** this sentence in Introduction section:
      “Moreover, only few studies have evaluated both the feelings of antenatal attachment in women and their partner concurrently (Lorensen et al., 2004; Ustunsoz et al., 2010)” to the end of the previous paragraph as it fits better with the content of the previous paragraph”

Reply:
We agree and moved the sentence.

   b. “In the Introduction section, there is a one sentence paragraph: “Finally, there is some evidence that demographic variables such as age of the parent show a negative relationship with feelings of attachment, although these findings are not consistent (Cranley, 1981; Lerum & LoBiondo Wood, 1989; Lindgren, 2001; Zachariah, 1994; Ustunsoz et al., 2010)”. I suggest that the authors could **unpack** this idea a little more to make a more substantial paragraph.”

Reply
We added the next information
A recent study by McMahon et al (2011) showed that women having their first baby when older appear to have some psychological advantages over younger women, because they are more resilient and better adjusted. This may result in less preoccupation with the fetus (i.e., as reflected in lower maternal-fetal attachment scores).
Although the reasons for inconsistent results are not always clear, the fact that maternal antenatal attachment was measured during different time periods of pregnancy, the use of different instruments - each stressing slightly other aspects of the prenatal attachment relationship- in pregnant women whose ages varied across the different samples, may have played a role.

7. “Minor compulsory: Third sentence of abstract refers to ‘young’ parents – I suspect this is a typo since this is not a particular characteristic of this sample”

Reply:
We agree and corrected this.

8. “Major compulsory: The authors need to thoroughly justify their reasoning for describing this measure as an ‘attachment’ measure, when in the strictest sense of the term parents cannot show ‘attachment’ to a child (unborn or otherwise) without significant clinical concerns. Suggesting that a parent is ‘attached’ to the fetus might suggest that they used the unborn child as a safe base from which to explore and a safe have to return to – yet this is not the case. Instead it would be preferable to use the terms bonding and/or caregiving or even to discuss the measure as a representation of the relationship between the parent and the fetus. The authors do use these terms throughout but unfortunately the very name of the instrument implies more than this”.
Reply:
We agree and explained this in our former replies.

9. “The authors should discuss the decision to use the two assessments (PRAM and M/PAAS) at the same time point in pregnancy and whether this has any implications for the results.”

Reply:
We agree and explained this in our former replies.

10. “The authors don’t give range of scores in this sample for M/PAAS or for the PRAM. I would like to see this information added to the results, especially in the light of the PRAM being a relatively new measure. It would be useful to know as much about the psychometrics of it as possible”

Reply:
We agree and added this information in Table 1.

11. “While the authors do propose that the PRAM measure may suffer less from participant social desirability concerns they need to make a more convincing argument for this. Indeed, it could be argued that the significant positive correlation between the PRAM and the M/PAAS might actually be indicating the desire of some participants to respond in a socially desirable way. It would be good if the authors could address these concerns further.”

Reply:
We agree with the reviewer that our argument of social desirability may be more convincing. However, we have to admit that the PRAM does not seriously limit social desirability issues and therefore we omitted this sentence in the introduction and added the next sentence in the discussion section. “It could be argued that the significant positive correlation that we found between the PRAM-SBD and the M/PAAS might actually be indicating the desire of some participants to respond in a socially desirable way”. The range in scores (i.e., distance between self and baby) indicates that parents felt free to put the sticker close to themselves or at larger distance.

Reviewer 2

TITLE
1. “Title: makes no reference to two of the variables studied, parity and age”

Reply:
The reviewer is right. Because we did not mention all study variables in detail in the title we also omitted age and parity. We preferred this relatively short title. However, if the reviewer prefers the inclusion of parity and age in the title we will adapt this. In the abstract we now added parity and age.

ABSTRACT
2. “Abstract: The aim outlined in the abstract is different from the two aims stated on page 6 of the introduction. In the abstract, they do not refer to parity and age”

Reply:
We agree that the aim outlined in the abstract differs from the aims in the introduction and that we did include parity, gender, and age into our study aims and statistical analyses. We corrected this in both the abstract and introduction. Abstract and introduction are comparable now.

3 “Did they measure the “usefulness” of the measure or whether the PRAM has convergent validity as a measure of attachment?”

Reply:
The reviewer is right. We did not particularly measure usefulness but convergent validity indeed. The word “usefulness” is therefore not appropriate and changed into ‘valid’ in the abstract.

4 “Should include a brief statement of the procedure”

Reply:
We added the next sentence in the abstract. “At 26 weeks gestational age, expectant mothers and fathers filled in the PRAM and the M/PAAS (Maternal/Paternal Antenatal Attachment Scale, Condon, 1985/1993)”.

5. “There is no mention of the results with age and parity”

Reply:
We now added the results of age and parity to the abstract. “Age and parity were both found significantly related to M/PAAS scores, whereas only age was found associated with the PRAM.”

6. “How did the results show that the PRAM is an “effective” instrument of “parent-infant”bonding?”

Reply:
We are aware of the confusing word choice we have sometimes made throughout the text and changed this type of words. For example effective changed into valid. See also our reply to comment b (editor).

INTRODUCTION

1. “P3, L6 It is not clear what the terms “young parents” mean? Is it referring to age of the parent or attachment of parents-to-be during pregnancy?”

Reply:
We agree that this word is not clear and deleted the word from the text. It does not add information.

2. “P4 L2 several of the terms the authors use are not scientific or self explanatory, e.g., L2 “useful and meaningful”; or L 6 “slight tendency”;”

Reply:
We agree and changed terms as useful and meaningful into valid and reliable and deleted ‘slight’ tendency.

3. “L3 the measures are lengthy and require considerable time to complete e.g., Condon’s measure is only 19 items. Why is this considered lengthy? It is true that a verbal measure requires a certain reading level”.
Reply:
We agree and deleted that they are lengthy and require a ‘considerable’ time to complete. The M/PAAS however, actually requires a certain reading level, more than the PRAM requires. The PRAM may give an indication about the fetus’ place in the parent’s life, also for parents who a less literate.

4. “The verbal measures have several data points, the nonverbal measure has one. What do the authors feel about this?”

Reply:
The reviewer is right that the PRAM is a one item measure and the M/PAAS consists of 19 items. This is the reason that reliability statistics are limited. Since it is not possible to conduct item analyses or inter-item consistency measures on a single-item scale (Russel et al, 1989), no reliability analyses have been performed. We explicitly mention this issue in the discussion section.

5. “Why is it felt that verbal measures, and not non-verbal measures, are affected by social desirability of response? Is there any literature to suggest that this is true? It is very likely that both verbal and non-verbal measures are affected by social desirability. It partly depends on how the data is collected, which is not well explained in this study.”

Reply:
The reviewer is right. See also our reply on comment 11 Reviewer 1.

6. “L9 non-verbal measures can be used to obtain “useful information” why not verbal measures?”

Reply: The reviewer is right. The word useful is deleted. It does not add information.

7. “L11- when the authors propose an alternative method, why is there no reference to the pilot study by Van Bakel, Vreeswijk & Maas (2009) as well as a discussion of how the present study is similar or different from the original study? There is more discussion of the PRISM measure than the original study using the PRAM. I would think that the 2009 study is the base from which this study developed.”

Reply:
We did not particularly refer to the study by Van Bakel, Vreeswijk and Maas (2009) in the introduction because this reference is not a publication of a pilot study. This is actually a reference of a presentation at a conference in which we presented our preliminary results that we conducted on a subsample of the current study. We think that it is not appropriate to refer to that publication as a pilot study because it contains similar participants as the current study.

8. “How do the authors know that the PRAM can be validly used with parents from different ethnic backgrounds? Was this a factor that was looked at in the data?”

Reply:
We did not specifically address the question of validity in different ethnic groups. And therefore rephrased the sentence.

9. “A discussion of the 2009 study would help the reader to understand the basis for assuming the PRAM is measuring “feelings of connectedness”. What do the authors
mean by the terms “feelings of connectedness”? Are they using these terms as equivalent to “attachment”?"

Reply:
We agree that assuming that the PRAM is measuring feelings of connectedness may be a little arbitrary. However, we refer now to other studies to explain how we define antenatal attachment. See also comment b (editor). Although attachment behaviors are essentially about eliciting care from others, the substance of maternal–fetal relationships during pregnancy deals with the development of parental feelings of love and protection. These relationships can be seen as a strong emotional tie. Therefore it seems reasonable to refer to them as attachment, as a generation of researchers has done (e.g., Walsh, 2011; Cranley 1981; Müller 1992; Condon 1993). Moreover, it is inspired by the Inclusion of Other in the Self Scale (IOS: Aron, Aron, & Smolan, 1992) a single-item non-verbal measure for the structure of interpersonal closeness in relationships.

10. “P5 How are the studies about the PRISM and PTSD or non-physical illness or loss of a premature child related to the present study?”

Reply:
These studies are mentioned in the introduction because they show that this type of pictorial measurements validly capture psychological concepts such as grief and stress.

11. “Para 2- What does it mean to say “considerable similarity” or “adequate convergent validity”?"

Reply:
We agree that words as ‘considerable’ can be omitted and ‘adequate convergent validity’ can be changed (i.e., ‘have shown convergent validity’).

12. “When they say they introduce the PRAM, what about the previous study?”

Reply:
See reply 7.

13. “expect it to be a useful tool” – what does this mean?”

Reply:
‘useful’ changed into valid.

14. “It is not clear what “the place of the (unborn) child…”means to the parents. Where the parents ever asked what the question meant to them?”

Reply:
We agree with the reviewer that it is not entirely clear the place of the (unborn) child…”means to the parents. After placing the sticker representing the (unborn) child, we asked parent to verbally explain the distance between themselves and their (unborn) child. We did not qualitatively analyse these explanations yet. This may be relevant for future studies.
We also acknowledge the fact that there is no “golden standard” to measure the complex and multifaceted concept of parental bonding and this might be considered a drawback. The question still remains if these outcomes solely represent the strength of the bond between parent and infant, or if they also reflect alternative constructs, such as parental emotional
arousal, the intrusiveness of the infant in daily life, or even suffering. In addition, low PRAM-SBD scores could represent the desire of parents to be close to their infant.

15. “P6 The authors mention some of the research studies on prenatal attachment of expectant mothers and fathers. Do they have any suggestions as to why this literature is so inconsistent? Of interest would be a critical evaluation of the inconsistencies in the literature and a discussion of what the authors are adding to this literature.”

Reply:
As we stated in the introduction the studies indeed show inconsistent results. Although the reasons for inconsistent results are not always clear, the fact that maternal antenatal attachment was measured during different time periods of pregnancy, the use of different instruments - each stressing slightly other aspects of the prenatal attachment relationship-in pregnant women whose ages varied across the different samples, may have played a role.

16. “Parity and age are mentioned without a rationale for selecting them as research variables. Why is it important to study them? And, with the inconsistent findings in the literature with both of these variables, what will this study add or how will this study help to clarify, or further explore, the inconsistencies?”

Reply:
We now added a rationale for parity and age and for the inconsistent findings in the introduction. See also reply to comment 6b reviewer 1.
Furthermore, according to meta-analytic studies (e.g., Yarcheski et al., 2009) demographic predictors such as age had low effect sizes in relation to antenatal attachment measures. It is suggested that these factors are less useful for strict theory building but merely need to be included as potential confounding factors.
A recent study by McMahon et al (2011) showed that women having their first baby when older appear to have some psychological advantages over younger women, because they are more resilient and better adjusted. This may result in less preoccupation with the fetus (i.e., as reflected in lower maternal-fetal attachment scores).
Although the reasons for inconsistent results are not always clear, the fact that maternal antenatal attachment was measured during different time periods of pregnancy, the use of different instruments - each stressing slightly other aspects of the prenatal attachment relationship-in pregnant women whose ages varied across the different samples, may have played a role.

We expected to find evidence supporting the validity of the PRAM as a measure of parent-fetus attachment. More precisely, we anticipated a relatively strong association between PRAM and M/PAAS. In addition, in the discussion section we critically evaluate this measure and discuss possible alternative PRAM interpretations, which has been brought up recently by Hoffenkamp et al. (2012).

17. “With the aims of the study, the relationship between PRAM and Condon’s measures of prenatal attachment has already been studied, what do the authors want to add in doing this study?” From the research literature, did the authors have any hypotheses about what they would expect to find in their study?”
Reply:
The relationship between PRAM and M/PAAS has not been published before with this COMPLETE sample. Please see also our reply to comment 7. We expect to find a significant correlation between PRAM Self-Baby Distance and M/PAAS scores with parents scoring higher on maternal and paternal antenatal attachment as measured with the M/PAAS showing lower Self-Baby Distance. However, in the discussion section we now discuss results and alternative hypotheses as brought up by a recent study by Hoffenkamp et al., (2012).

“P7. It is not clear to me why the PRAM is “specifically directed at the fetus per se”. I would suggest using “significantly correlated” rather than “meaningfully associated”.”

Reply:
Thank you for this good suggestion. We deleted the word ‘per se’ and changed “meaningfully associated” into “significantly correlated”.

METHOD:
1. “P8 It is mentioned that the present study is part of a larger project, but not explained where in the project this part of the study was done. What other measures were included in the larger study? It would be particularly important to know what other measures preceded those used in this study. How did the present study fit into the larger project?”

Reply:
The present study is part of a prospective longitudinal cohort study on prenatal risk factors and postnatal infant development in which pregnant women are followed from 15 weeks gestational age until 24 months after the child birth. In this longitudinal project we collected a variety of variables to answer a diversity of research questions and to gain more insight in pregnancy and infant mental health issues. For the study variables we would like to refer to the study protocol (Maas et al., 2012). One of the questions was whether the newly developed measure of antenatal attachment has convergent validity.

2. “Did the same person administer the study measures that administered the other measures in the larger project?”

Reply:
The PRAM was administered during a home-visit at 26 weeks gestational age. The M/PAAS were send by mail and parents were asked to fill in these questionnaires. Three researchers conducted all home-visits.

3. “They say that between 9 and 15 weeks gestational age, the women were invited to participate in the larger project. What was the gestational age when the different measures were administered? How were the men invited to participate?”

Reply:
As mentioned in the method section the PRAM was administered during a home-visit at 26 weeks gestational age. The M/PAAS were sent by mail at 26 weeks GA and parents were asked to fill in these questionnaires. Women and men who filled in the questionnaires (M/PAAS) after 31 weeks gestational age were excluded from the
analyses to limit the gestational age range and since antenatal attachment is known to increase during the course of pregnancy. See the protocol (Maas et al., 2012), Figure 3 for a detailed description of all instruments and waves. Women were asked by their midwives and they asked their partners to participate.

4. “What information about the aim and design of the study were the participants given both for the larger project and for the present study?”

Reply:
At the first routine visit (between 9–15 weeks gestational age), midwives gave mothers information about the purpose of the study (i.e., relationship between psychological factors during pregnancy and infant development) and invited them to participate. The oral information was accompanied by an information brochure with specific information about the study, which each mother received. If mothers were interested in participation, one of the researchers contacted them by phone to provide additional information and asked whether mothers wanted to enroll in the study. Partners were not directly approached by the researchers but the mothers were informed about the importance of involvement of their partners in the study. After parents received oral and written information about the protocol, both parents were asked for written consent. For the present study parents were asked to complete the PRAM and a questionnaire. The demographic questionnaire filled in at 15 weeks GA was used for parity, age, and other demographic information.

5. “Where the order effects of the measures used in this study counterbalanced?”

Reply:
Parents were asked to complete the PRAM during the home-visit at 26 weeks GA. The M/PAAS was send by email before the home-visit. All parents were given the PRAM and M/PAAS in the same order. So we did not counterbalance and did not control for order effects.

6. “Most participants were white Caucasian” – what were the other participants and did this variable seem to affect the results in any way?”

Reply:
Most participants were white Caucasian women with the Dutch nationality (84%). The other participants have another western (7%; Polish, xx) or non-western (e.g., Moroccan, Turkish, Surinam or Asian) ethnic background (9%). The numbers are too small to conduct separate analyses for ethnic background. However, all parents were asked if they understood the questions and whether they could verbally explain the distance of the sticker.

7. “Was the group divergent in terms of variables such as family income, if both parents were working or not?”

Reply:
We asked parents if they worked full-or parttime or were unemployed. These variables did not affect the results and were not taken into account in the subsequent analyses.

8. “Under what conditions were the parents tested? For example, were the parents tested separately, immediately after each other, or, in some cases, was there a period of time so that the parents could have spoken to each other about the
measures?”

**Reply:**
During the home visit at 26 weeks GA parents were asked to leave the room if one of the parents was interviewed. So parents independently filled in the PRAM and did not know where their partner placed the sticker.

9. “What **instructions** were given to them? Were the instructions given in both Dutch and English? Is there a difference in the meaning of the word “place” in the different languages? Why were the terms “the place of the baby in your life at the moment” chosen. How do the authors know what these terms mean to the participants. Was there any kind of pilot work done to determine if this language was easily understood and what it meant to the participants? P10 How was the PRAM introduced to the parents? Did the authors find that any of the parents had difficulty understanding what “where would you place the baby in your life at the moment” meant? Did the terms have to be explained more than once, or in another way, to any of the parents? As stated earlier, it would be very interesting to know what “the place in your life” would mean to the different parents.”

**Reply:**
Instructions: The parent was provided with a white A4-size paper with a big circle in the centre (diameter of 18.6 cm), which represents the parent’s current life. A yellow circle of 5 cm in the centre of the big circle represents the parent her- or himself. The parent was handed a green round sticker (5 cm) and was asked to imagine that the green circle represents the unborn child. They were then asked "where would you place the baby in your life at the moment?".

The instructions and question were given in Dutch for most parents (for parents who were able to speak and understand the Dutch language sufficiently). For parents who were not able to understand Dutch the instruction and questions were given in English.

The meaning of the word ‘place’ is the same in Dutch as it is in English. The question and instructions are adopted from the original PRISM instructions that we closely followed.

**RESULTS**

1. “P11 Table 1 could also have included the descriptive statistics for each measure and parity. It would also be helpful to the reader to include the range of scores for each variable.”

**Reply:**
We agree and we have added the range and min and max scores for each variable in Table 1.

2. “Probability values are usually in the text”

**Reply:**
We agree that probability values are commonly mentioned in the text but we preferred to mention them in Table 1.

3. “Terms such as “moderate” correlations, “somewhat lower” correlations are not precise.”
Reply:
We agree with the reviewer and deleted them.

4. “P13 It would add to the understanding of the data to test for the interaction between age and parity.”
Reply:
We did analyses with an interaction between parity and age. Parity and age are correlated but interaction terms did not alter the results. Therefore we decided not to mention these statistics.

DISCUSSION:

1. “P14 The authors switch from one to two study aims.”
Reply:
In the first paragraph of the discussion section we also added the second aim of the study about gender, parity, and age effects.

2. “Also, I have problems with the assumption that because the PRAM is correlated with Condon’s measures that means it is “a valid and feasible instrument to measure parental prenatal bonding and connectedness” and “represents the emotional feelings of connectedness and bonding towards the unborn child during pregnancy” and, that “the Pram-SBD is a reflection of a general feeling of bonding and connectedness with the unborn child at that moment”. These statements are conceptual leaps which are not justified by the data presented. How do the authors feel they have tested the”emotional feelings of connectedness”?”
Reply:
We agree that the statement that the PRAM represents “emotional feelings of connectedness” may be too strong. We adapted these statements in the discussion section and have weakened our results in this. We also included additional information in the discussion section. See also comment b (editor).

3. “Are the authors planning to follow-up on this study by examining more directly what the concept of “Place” means to the expectant parents? Understanding the meaning of the instructions to the participants is particularly important when you have one data point.”
Reply:
We agree with the reviewer that additional information about the subjective meaning of the instructions and question about the ‘place’ is valuable. Qualitative research and thematic analyses of the parents answers would add to the validity of the PRAM and its exact meaning to parents. We will consider this for future research.

4. “How do the results in the present study relate to the findings of the 2009 pilot study? Why was this comparison not discussed?”
Reply:
See our reply to comment 7 Introduction
5. “Why might the PRAM be a “less judgmental” measure and how do you know that it may be limiting social desirability bias?”

Reply:
See our reply to comment 11 of Reviewer 1 and reply to comment 5 Introduction.

6. “The terminology, “couples to some extent share their degree of bonding with the fetus” is vague, particularly when there was a significant difference between mothers and fathers. How do the authors feel their findings relate to the research literature on prenatal attachment of mothers- and fathers-to-be?”

Reply:
The reviewer finds the terminology that couples to some extent share their degree of bonding with the fetus vague. We changed this sentence into: “Interestingly, significant positive relations were found between women and their partners for all study variables. This may suggest that at different time periods of pregnancy when mothers feel less or more attached with the fetus their partners also show less or more attachment behaviors towards the fetus. Literature about differences between mothers- and fathers-to-be are mentioned in the discussion section.

7. “While noting gestational age is important to attachment, it is not clear in the study how many weeks pregnant the mothers were or why this time was chosen.”

Reply:
As mentioned in the method section (and also in the abstract) women were 26 weeks pregnant. Our study was conducted at the end of second trimester of pregnancy at 26 weeks, after the routine ultrasound check at 20 weeks gestational age. Because after 20 weeks, quickening (i.e., the moment that refers to the initial motion of the fetus in the uterus as it is perceived or felt by the pregnant woman) enhances feelings of attachment towards the fetus and because the pregnancy may be more eminent to the father.

8. “There is a typographical error L13 “to the same extend” (extent).”

Reply:
Correct, we changed it!

9. “P15 Why is the PRAM considered a “more implicit measure”

Reply:
We changed this into pictorial.

10. “How can it be explained that some researchers feel that individual scores on prenatal attachment seem relatively stable from the first to the third trimester and others feel there is an increase over time? It would have added considerably to the write-up if the research literature was critically evaluated.”

Reply:
What is meant by the statement that ‘empirical studies have shown that prenatal attachment increases during pregnancy (Van Bussel, et al., 2010), although individual scores on prenatal attachment seem to be relatively stable from the first to the third trimester (Hjelmstedt, Widström, & Collins, 2007)’ is that the mean level of attachment scores significant increases from the first to the last trimester but that women scoring in
the lowest quartile of attachment during the first semester also score in the lowest quartile at the end of the pregnancy, although their mean levels increase.

11. “P16 The authors propose that since parity had no effect on the scores on the PRAM, but did have an effect on the Condon measures, that the PRAM might be an aspect of bonding that is less affected by the experience of having previous children and “therefore might be a more robust measure of global feelings of connectedness. Is it not equally possible to argue that the PRAM is a less sensitive measure of attachment and perhaps has less discriminant validity or measures some aspect of “connectedness” that is correlated with prenatal attachment? These are really research questions that need to be tackled before making the type of assumptions that the authors seem to be proposing.”

Reply:
We agree that the statement is strong and we did not empirically test this. Throughout the text we deleted this type of statements.

12. “How is it known that the PRAM is a more global measure of connectedness? What is an operational definition of “connectedness”? Could it be physical connection?” The statement that “the more global feeling of connectedness and bonding………..can be considered a more pure and unconscious measure of bonding” is a major conceptual leap from the results. What type of further study would the authors suggest are needed to substantiate these assumptions?”

Reply:
Throughout the text we deleted this type of statements. Based on our study with clinical (premature infants) we included additional info in the discussion section.

13. “P17 The point about the optimal distance between Baby and Self is an excellent one. Do parents tend to place the circle for the Baby above or below or on the same line or over the parents circle? It would be very interesting to have a discussion about individual differences in responding to the task. Before knowing the clinical usefulness of the instrument, it would seem important to have a more specific idea of what the measure is measuring. What are the authors’ ideas of future research?”

Reply: see former replies.

GENERAL CONCLUSIONS

Reply:
The general conclusions are a summary of the abovementioned comments and therefore we do not answer them again but refer to our replies to the comments.

[“This study describes a creative idea for the measurement of attachment and would be of interest to researchers in the prenatal attachment field. However, there are several problems with many of the assumptions expressed in the article and with the general write-up of the findings” “In the introduction, there is not a clear rationale for the selection of the variables studied. There are assumptions presented about the PRAM being a measure of “the feelings of connectedness” which are not tied to any data. From a critical evaluation of the research literature did the authors have any hypotheses about the relationship between the PRAM and the other variables studied? What do the authors see as the major contribution of this study beyond the 2009 study?"
“Some of the terminology used is unscientific and not self-explanatory, e.g., “considerable similarity”.

“The method used in the study is not well-described, particularly considering this study is part of a larger project. There is no description of how this study fit into the larger project. The details of the method are limited.”

“There are some particularly important factors that are not included, e.g., the order effects of the presentation of the PRAM and the Condon measure of attachment, the general instructions that were given to the participants, or where and how was the testing done.”

“Some discussion of the range of responses and reactions of the participants to the instructions would be helpful to the reader to understand the results. I would also think that this type of information would be useful to the authors in starting to understand how the participants interpreted the instructions.”

“The discussion section includes many assumptions that go well beyond the data described, e.g., that the PRAM “can be considered a more pure and unconscious measure of bonding”.

“it is not clear why the 2009 study was not discussed in more detail and how the findings of the original study relate to the present findings.”

Finally, we wish to thank you and the two reviewers for the time spent on our manuscript and for the valuable comments and suggestions which have -in our opinion- certainly led to a considerable improvement of our paper.

Yours Sincerely,

Hedwig J.A. van Bakel, Ph.D.
Janneke A.J.B.M. Maas, MSc.
Charlotte M.J.M. Vreeswijk, MSc.
Ad J.J. M. Vingerhoets, PhD

Address: Tilburg University, Tilburg School of Behavioural and Social Sciences, P.O. Box 90153, 5000 LE Tilburg, The Netherlands. Phone: +31 13 4663138.
E-mail: h.j.a.vanbakel@tilburguniversity.edu