Early Human Development 147 (2020) 105080

Contents lists available at ScienceDirect

Early Human Development

journal homepage: www.elsevier.com/locate/earlhumdev

Baby preparation and worry scale (Baby-PAWS): Instrument development and psychometric evaluation

Nora L. Erickson[a], Alyssa A. Neumann[b], Gregory R. Hancock[c], Maria A. Gartstein[b,*]

[a] Hennepin Healthcare Research Institute, 701 Park Ave, Suite PP7.700, Minneapolis, MN 55415, United States of America
[b] Washington State University, P.O. Box 644820, Pullman, WA 99164-4820, United States of America
[c] University of Maryland, 1230 Benjamin Building, 3942 Campus Drive, College Park, MD 20742-1115, United States of America

ARTICLE INFO

Keywords:
Prenatal
Anxiety
Transition to parenthood

ABSTRACT

Background: The Baby Preparation and Worry Scale (Baby-PAWS) addresses expectant mothers' anticipatory worries regarding the transition to parenthood, focusing on practical concerns (i.e., ability to care for the infant, securing childcare, personal wellbeing, and partner involvement).
Aims: The present study describes measurement development, psychometric evaluation, and predictive and concurrent validity of Baby-PAWS, administered during pregnancy.
Study design: We used a repeated-measures design, with anonymous self-report obtained during the 3rd trimester of pregnancy and at 2 months postpartum.
Subjects: Healthy pregnant women (N = 276) completed Baby-PAWS and measures of depression, general anxiety, and pregnancy-specific anxiety. Demographic, pregnancy, and birth-related information (e.g., complications, gestational age) was also obtained. At postpartum follow-up, the majority (n = 154) met inclusion criteria and provided data on themselves and their infants.
Outcome measures: Prenatally, we examined correlations between Baby-PAWS and established measures of general anxiety, pregnancy-specific anxiety, and depression. Postnatally, Baby-PAWS scores were used to predict maternal depression, anxiety, and infant temperament.
Results and conclusions: Two factor-analytic techniques indicated a three-factor structure, with internal consistency for all three components and the overall scale. We labeled the three factors: Self and Partner Worry, Non-parental Childcare Worry, and Baby Caregiving Worry, based on item content. Higher Baby-PAWS scores were associated with greater anxiety and depression in the third trimester. Predictive links with postpartum anxiety/depression symptoms and infant temperament were observed for the overall Baby-PAWS score and Self and Partner Worry factor. Although this instrument requires further evaluation, it offers promising utility in research and clinical settings.

Pregnancy and the transition to parenthood are significant life events associated with notable physical, emotional, and psychosocial changes. Feelings of distress associated with these profound changes are common [1], and many perinatal women report transient symptoms of depression and anxiety [2,3]. A number of instruments have been developed to assess psychological distress during pregnancy and postpartum, ranging from indices of general anxiety to pregnancy-specific anxiety (i.e., concerns about the pregnancy and birth outcomes). However, no measure has yet been designed to assess pregnant women's anticipatory worry and logistic concerns associated with becoming a parent. The transition to parenthood is commonly marked by changes in self-esteem [4], variable social support, limited time for personal care, and strain on romantic relationships [5]—all of which can induce significant anxiety in those anticipating the birth of a child. Given the potential for lasting effects of prenatal distress on offspring, as well as distinct risks associated with different types of stressors, we expect assessment of anticipatory psychosocial and logistic worries about parenting to provide meaningful information, above and beyond what is available via current measures. The "Baby Preparation and Worry Scale" (Baby-PAWS) was designed to index this kind of prenatal anxious distress.

Prenatal stress has been defined in terms of physiological markers (e.g., cortisol), responses to significant events (e.g., violence, natural disasters), and it is frequently operationalized as symptoms of anxiety

* Corresponding author at: Department of Psychology, P.O. Box 644820, Washington State University, Pullman, WA 99164-4820, United States of America.
E-mail addresses: Nora.Erickson@hcmed.org (N.L. Erickson), alyssa.neumann@wsu.edu (A.A. Neumann), ghancock@umd.edu (G.R. Hancock), gartstma@wsu.edu (M.A. Gartstein).

https://doi.org/10.1016/j.earlhumdev.2020.105080
Received 16 December 2019; Received in revised form 2 May 2020; Accepted 19 May 2020

and depression [6]. Although experiencing some concerns is normative and expected in reaction to the considerable changes that occur during pregnancy—with approximately one in five women endorsing moderate fears of giving birth—more significant and distressing worries have been reported at an alarming rate of 14.8% for nulliparous women [7]. Anxiety and worry during pregnancy are significant because these symptoms exhibit considerable continuity from the prenatal to the postpartum period and may therefore compromise maternal well-being, negatively impact parenting, and affect mother-child interactions [8]. For instance, higher symptoms of prenatal anxiety are associated with lower anticipatory parenting self-efficacy [9] and predict greater postpartum parenting stress [10].

The emotional and psychosocial changes that women experience during pregnancy and postpartum coincide with a period of particularly rapid child development. A sizable literature indicates that prenatal maternal stress increases adverse health outcomes for offspring across their lifespan, from premature birth to metabolic risks in adulthood [11,12]. As prenatal stress and reactions to stress (e.g., anxiety/worry) affect maternal physiology, these changes in turn appear to "program" the fetus, altering subsequent behavioral phenotypes [13]. Dysregulation of the hypothalamic pituitary adrenal (HPA)-axis activity is understood to be a critical underlying mechanism for links between maternal distress and offspring behavioral effects [6]. These effects may be long-lasting, with offspring exposed to elevated cortisol in utero exhibiting anxiety as teens [14], setting the stage for potential intergenerational transmission of dysregulated stress responses and related symptomatology.

A number of studies specifically support associations between maternal distress during pregnancy and indicators of infant temperament, including negative emotionality and dysregulation [15]. Early manifestations of temperament are not only important as key components of social-emotional development, but they are also significant as early risk markers for later symptoms of psychopathology [16,17]. Mothers with higher prenatal emotional stress were more likely to have infants lower in fearfulness [18], which poses potential developmental risk given that low levels of fear contribute to externalizing disorders such as ADHD. Davis et al. (2007) [19] found that prenatal anxiety and depression, averaged across pregnancy, were associated with elevated infant negative reactivity. In addition, maternal anxiety during pregnancy was associated with poor infant self-regulation, likely setting the stage for later behavioral and emotional difficulties [20]. It should also be noted that pregnancy-specific anxiety, unique with respect to generalized trait or state anxiety [21], has emerged as an important predictor of infant and child outcomes. For example, pregnancy specific anxiety was associated with gray matter volume reductions in the offspring, independent of postnatal stress [22], and predicted infant negative emotionality after controlling for postpartum anxiety and depression [23].

Reliable and valid and measurement tools are needed to adequately capture important components of prenatal distress, including anxiety and worries during pregnancy that may put women and their offspring at higher risk in the postpartum period. Numerous self-report scales assess general anxiety (e.g., the State/Trait Anxiety Inventory (STAI) [24]) and more comprehensive instruments often include anxiety symptoms as one component (e.g., Symptom Checklist-90-Revised [25]). Additional measures gauge specific worry surrounding pregnancy (e.g., the Pregnancy-Related Anxiety Questionnaire [PRAQ] and Pregnancy-Related Anxiety Questionnaire-Revised [PRAQ-R]), addressing concerns about adverse child outcomes, physical appearance changes, and the process of giving birth [20,26]. The PRAQ-R includes items such as: "I am afraid the baby will be mentally handicapped or will suffer from brain damage" and "I am worried about the pain of contractions and the pain during delivery." Measures evaluating women's expectations concerning motherhood during pregnancy are also available. The Prenatal Maternal Expectations Scale [27] assesses realistic and unrealistic prenatal expectations pertaining to characteristics of the baby and childcare, enjoyment associated with mothering, changes in significant relationships and lifestyle, and projected image of the self as a mother. Example items for the Prenatal Maternal Expectations Scale include: "This child will make my life complete in a way that no other life event can" and "I worry about my ability to be an adequate mother." Finally, the Cambridge Worry Scale (CWS) was developed for the Cambridge Prenatal Screening study and focuses on women's worries about the health of their baby in the context of other pregnancy-related and more general concerns [28–30]. The CWS directs women to rate their worries related to housing, finance, legal issues, relationships (with spouse/partner and others), health (their own, the baby's, and others'), giving birth, and coping with the new baby.

In comparison, the novel instrument (Baby-PAWS) introduced herein was designed to capture a variety of concerns women often experience as they begin to contemplate changes brought on by parenthood and the adaptations required to provide adequate infant care, while also maintaining their own wellbeing, which existing measures do not address. Baby-PAWS was developed and evaluated in a manner that would encourage use in research as well as clinical settings, where it can serve as a relatively brief screen for anticipatory worry related to this significant life transition. In addition to examining Baby-PAWS factor structure and basic psychometric properties (e.g., internal consistency), we sought to demonstrate concurrent and predictive validity via associations with established prenatal and postpartum measures. Specifically, we focused on concurrent indicators of general and pregnancy-specific anxiety, as well as symptoms of prenatal depression, with follow-up assessments of general anxiety and depression repeated in early postpartum. Validated anxiety and depression scales implemented in prior perinatal measurement development efforts [26,30] were included, and we expected Baby-PAWS scores to be related to these indicators, as worry bodes risk for internalizing concerns [31]. At the same time, we anticipated that our scale would provide additional information that does not overlap perfectly with existing symptom markers. The final evaluation of predictive associations involved an inter-generational focus, with Baby-PAWS scores predicting mother-reported infant temperament. The emphasis on infant temperament as an offspring outcome was a function of existing studies demonstrating links with prenatal stress, anxiety, and depression, which are relevant to worry regarding parenthood and early individual differences in reactivity/regulation [14,15,18–20].

It was hypothesized that the Baby-PAWS items would form one or more coherent scales, as items addressed worry regarding self-care, partner/relationship considerations, own caregiving, and relying on others for infant care once the baby is born. We expected to find significant positive correlations for Baby-PAWS scores (i.e., total score and/or subscales) with concurrent distress and symptom indicators (i.e., prenatal depression, state/trait anxiety, pregnancy-specific anxiety). It was further hypothesized that our measure would significantly predict postpartum depression and state/trait anxiety, as well as offspring outcomes (i.e., infant temperament). Specifically, more "difficult" infant temperament profiles (i.e., higher levels of attributes associated with negative emotionality, lower regulatory-related scores) were hypothesized for infants of mothers with higher Baby-PAWS scale values during pregnancy. Given support for these hypotheses, we anticipate that Baby-PAWS could serve as a useful measure of prenatal worry regarding logistic and psychosocial preparedness for parenthood, with potential for a variety of clinical applications in the context of gauging and/or maintaining perinatal emotional health.

1. Method

1.1. Participants

Expectant mothers in their third trimester of pregnancy (i.e., 27–40 weeks gestation; Time 1) were recruited through a combination of community flyers, advertisements through social media, birthing

Table 1
Descriptive statistics.

Variable	Mean	SD	Range	Percentage
Maternal age	29.04	4.71	19–41	
Weeks gestations	32.14	3.88	27–40	
Race/Ethnicity				
Caucasian				86.6%
Asian				1.4%
African American				0.7%
Filipino				0.7%
Hispanic/Latino				6.3%
Native American				2.1%
Other				2.1%
Total family income	$70,129.20	$52,013.69	$8000 – $300,000	
Work status				
Work				66.0%
Stay at home				28.4%
Student				5.6%
Partnership status				
Married/Living together				96.5%
Single				3.5%
Parity				
Primiparous				40.8%
Multiparous				59.2%
Infant sex				
Male				46.1%
Female				53.9%
Infant age (Weeks)	9.95	1.61	8–17	
Birth weight (Grams)	3516.64	557.14	2608.15–4734.37	
Prenatal depression	6.90	4.77	0–28	
Prenatal state anxiety	34.60	10.49	20–73	
Prenatal trait anxiety	37.98	11.60	21–74	
Pregnancy-related anxiety	14.73	4.00	9–28	
Postnatal depression	7.05	5.74	0–26	
Postnatal state anxiety	34.89	12.73	20–78	
Postnatal trait anxiety	38.13	13.18	20–75	
Infant negative emotionality				
Fear	2.52	1.08	1.00–6.33	
Distress to limitations (Frustration)	3.82	1.10	1.33–6.33	
Sadness	3.38	1.24	1.17–7.00	
Falling reactivity/Recovery from distress	5.06	0.97	2.00–7.00	
Infant regulatory capacity/ Orienting				
Duration of orienting	3.64	1.48	1.00–7.00	
Soothability	5.37	0.97	2.57–7.00	
Cuddliness	6.17	0.79	2.67–7.00	
Low intensity pleasure	5.51	0.91	2.86–7.00	

classes, and hospitals in Eastern Washington and Northern Idaho. Of the 276 participants who originally consented and completed questionnaires at Time 1, 176 completed the follow-up evaluation at Time 2 (i.e., 2 months postpartum) and 154 met the final inclusion criteria. Participants were excluded due to high-risk pregnancy factors and birth outcomes. The most common reasons for exclusion included prenatal hypertension (n = 4), gestational diabetes (n = 3), premature birth (i.e., before 37 weeks; n = 5), time spent on the Neonatal Intensive Care Unit (NICU; n = 4), and low birth weight (i.e., below 2500 g; n = 2). Women were mostly in their late 20s or early 30s, and primarily Caucasian. Although the average income was relatively high, the range was also considerable, with most women reporting working and living with a spouse/partner at Time 1 evaluation. Additional demographics for the final sample are included in Table 1.

2. Procedure

Following multi-modal recruitment efforts (e.g., flyers, in-person recruitment at community events), participants were provided a link to the informed consent materials through the online Qualtrics Survey Software. At Time 1, all consenting participants anonymously completed the electronic self-report questionnaires measuring demographics, depression/anxiety, pregnancy-specific anxiety, and responded to Baby-PAWS. Participating women were also asked about parity and any pregnancy complications to ensure they met inclusion criteria requiring a healthy pregnancy. Participants provided their contact information in a separate survey link to safeguard anonymity. Using reported information about their anticipated due date, participants were contacted again via email at approximately 2 months postpartum. At Time 2, mothers responded to questions concerning birth outcomes (used for inclusion/exclusion criteria), postpartum depression/anxiety, and a parent-report instrument addressing infant temperament. All participants were provided with a $5 electronic gift card at each time point (total of $10).

3. Measures

3.1. Baby preparation and worry scale (Baby-PAWS)

As noted, this instrument was designed to address a gap in research and available measurement tools, focusing on expectant mothers' apprehension regarding self-care, partner/relationship considerations, own caregiving, and relying on others for infant care once the baby is born (Table 2). The respondents were instructed in the following manner: “When you think about your life after the baby is born, how often do you worry, feel nervous or uneasy about the following?” with the items listed thereafter. In addition, instructions asked participants to rate each item on a 7-point scale reflecting frequency of worry: 1 – “Never”, 2 – “Very rarely”, 3 – “Less than half the time”, 4 – “Half the time”, 5 – “More than half the time”; 6 – “Almost always”; and 7 – “Always.” The “Does not apply” response option was also included. Item content was derived following consultation with perinatal health experts domestically and abroad. In addition, expectant mothers were consulted to ensure that the questions appeared relevant to their experience and the wording was accessible and clear. The present study represents the first empirical evaluation of the Baby-PAWS psychometric properties.

3.1.1. The Edinburgh postnatal depression scale (EPDS)

Cox and colleagues (1987) introduced this most widely used measure of maternal depression in the perinatal period [32]. In this 10-item self-report questionnaire, participant responses are rated on a four-point scale ranging from 0 (“No, not at all”) to 3 (“Yes, most of the time”). Six items are reverse-coded (items 3, 5, 6, 7, 8, and 9), and a total score is computed as the sum of all items. In clinical settings, a

Table 2
Baby Preparation and Worry Scale (Baby-PAWS) Items.

1. Not being able to figure out why the baby is crying.[3]
2. Transitioning back to work, because it will be difficult to separate from the baby.*
3. Having a strong social support network I can rely on to help with childcare.[2]
4. Finding quality time to be with my partner once we have the baby.[1]
5. Having “me time” to relax and enjoy hobbies after the baby is born.[1]
6. Leaving my baby with others.*
7. Changes in the relationship with my romantic partner.[1]
8. Breastfeeding and/or the baby's diet.[3]
9. Knowing what to do if the baby is sick or injured.[3]
10. Having friends whom I can talk to about parenting.*
11. Not finding adequate childcare for my baby.[2]
12. The costs of daycare and other financial needs of the child.[2]
13. Having the time to complete household tasks (e.g., cooking, cleaning, laundry) once the baby is born.*
14. Sharing tasks like feeding and changing our child with my partner.[1]
15. Bonding with the baby.*
16. Feeling exhausted/sleep-deprived and stressed-out after having the baby.[1]

Note. A 7-point response scale was used: 1-Never to 7-Always.
[1]Self and Partner Worry subscale items; [2]Non-parental Childcare Worry items; [3]Baby Caregiving Worry items; *Items excluded following factor analytic procedures because of their lack of contribution to component scales.

score > 14 suggests major depression, whereas a score of 12–14 is indicative of minor depression. The EPDS has been applied in both clinical and research settings [32] and has been validated for use during pregnancy to assess prenatal depressive symptomatology [33,34]. In the present sample, the EPDS had good internal consistency prenatally (α = 0.88, ω = 0.88) as well as postpartum (α = 0.91, ω = 0.91).

3.1.2. The state trait anxiety inventory (STAI)

This self-report measure of anxiety consists of two forms, one for each anxiety construct (i.e., state and trait), with each including 20 statements [24]. The STAI instructs the rater to either describe how she feels at a certain moment in time (state-anxiety) or how she generally feels (trait-anxiety) on a scale of 1 ("Almost Never") to 4 ("Almost Always"). Scores are summed and can range from 20 to 80. Sample items include "I feel nervous" and "I feel calm." State anxiety is conceptualized as a more time-limited emotional state that includes feelings of tension and apprehensiveness, whereas trait anxiety is a relatively stable indicator of anxiety that is more personality-based [35]. In investigations of depression and anxiety symptoms, including those in the perinatal period, both state and trait anxiety have been typically assessed [36]. Previous research [37] indicates that the STAI has adequate internal consistency (Cronbach's α = 0.92). In the present sample, the state and trait anxiety scales of the STAI had excellent reliability when measured both prenatally (State α = 0.93, ω = 0.94; Trait α = 0.97, ω = 0.95) and postnatally (α = 0.96, ω = 0.96 for both scales).

3.1.3. The pregnancy related anxieties questionnaire – revised (PRAQ-R)

Anxiety concerns specific to the prenatal period are addressed by this instrument [20]. The original 20-item questionnaire was designed to differentiate general anxiety from pregnancy-related anxiety [26]. The revised 10-item version of this scale also provides support for the construct of pregnancy-related anxiety as distinct from other anxiety symptoms/disorders, yielding a three-factor structure: (a) Fear of giving birth, (b) Fear of bearing a handicapped child, and (c) Appearance concerns during pregnancy. Research supports adequate internal consistency across these three factors [20]: Fear of giving birth α values ranged from 0.79 to 0.83; Fear of bearing a physically or mentally handicapped child α values ranged from 0.87 to 0.88; Appearance concerns α values ranged from 0.76 to 0.83. Although the PRAQ-R was originally designed for use among primiparous women, a more recent investigation supported validity and utility among both primiparous and multiparous women [38]. For the current sample, the PRAQ-R demonstrated adequate internal consistency overall (α = 0.74, ω = 0.74), and in terms of its respective scales: (a) Fear of giving birth (α = 0.67, ω = 0.69); (b) Fear of bearing a handicapped child (α = 0.72, ω = 0.73); and (c) Appearance concerns during pregnancy (α = 0.79, ω = 0.79).

3.1.4. The Infant behavior questionnaire-revised, short form (IBQ-R)

This shortened version of the IBQ-R is a 91-item, parent-report measure of infant temperament [39,40]. Originally designed for use with infants between 3 and 12 months of age, the IBQ-R Short Form and its predecessor the original IBQ, have been successfully utilized with much younger infants [40–44]. Existing research with this instrument indicates that temperament scores are reliable as early as 2 months of age [40]. Items are rated on a 7-point scale, indicating the frequency of occurrence for various temperament characteristics in the past week, or two weeks for less frequent events (e.g., encounters with unfamiliar adults). Factor analytic studies have demonstrated that the 14 IBQ-R scales yield three higher order factors: (a) Positive Affectivity/Surgency, (b) Negative Emotionality, and (c) Regulatory Capacity/Orienting. The IBQ-R has consistently demonstrated satisfactory psychometric properties with mothers and fathers, as well as international samples, with Cronbach's α values ranging from 0.77 to 0.96 [39,40,43,44]. Evidence also supports predictive and construct validity of this measure, including both correlations with laboratory instruments and prediction of anxiety and depressive symptoms in toddlerhood [45–47]. For the purpose of this study, we were particularly interested in scales comprising the negative emotionality factor: fear, distress to limitations, sadness, and falling reactivity (i.e., recovery from distress, associated with a negative factor loading); as well as duration of orienting, cuddliness, soothability, and low intensity pleasure, components of the regulatory capacity/orienting factor. In the current sample, the short form of the IBQ-R negative emotionality scales demonstrated good internal consistency (α range = 0.77–0.84 with mean of 0.79, ω range = 0.75–0.86 with mean of 0.80), as did the regulatory capacity/orienting indicators (α range: 0.68–0.83 with mean of 0.76, ω range = 0.67–0.87 with mean of 0.80).

3.2. Analytic strategy

Our approach entailed a three-stage strategy, wherein the first stage involved an evaluation of structure via factor analytic techniques and internal consistency. With respect to the latter, we relied on Cronbach's α's for consistency with the existing literature, also computing ω coefficients which are known to rely on fewer assumptions than α [48,49]. Second, we considered concurrent associations between Baby-PAWS and indicators of prenatal anxiety/depression: EPDS, STAI (state and trait scores), and PRAQ-R (subscale and total scores). Finally, predictive relations between Baby-PAWS and postnatal maternal and infant functioning were considered. Specifically, we examined the extent to which Baby-PAWS was able to predict postpartum anxiety and depression symptoms: EPDS, STAI (state and trait scores), as well as infant temperament. We focused on the temperament domains measuring negative emotionality and regulatory capacity, considering relevant IBQ-R scales as outcomes. We chose to address these domains because prenatal maternal internalizing symptoms, of which worry is one, have been linked primarily with child distress and dysregulation outcomes [50]. Importantly, there is ample evidence that the fine-grained (i.e., scale) level of analysis is more optimal for temperament constructs, given that narrowly-defined dimensions have demonstrated varied predictive relations with key domains of functioning, such as later behavior problems [51–53], contributed differentially to temperament types [54], and were shown to have developmental trajectories that largely differed from the overarching factors [55].

4. Results

4.1. Structure and internal consistency

Two different exploratory factor analytic techniques were used: Principal Axis Factoring and Maximum Likelihood Factor analyses. Both clearly suggested the same three-factor structure for Baby-PAWS, with 11 of 16 original items making important contributions. Specifically, the first factor consisted of five items: 4, 5, 7, 14, 16 (Table 2), the content of which related to worry concerning self-care and the relationship with one's partner–thus labeled "Self and Partner Worry." The second factor included three items: 3, 11, 12 (Table 2), all related to non-parental childcare, and labeled "Non-parental Childcare Worry." The third factor was also formed by three items: 1, 8, 9 (Table 2), which addressed concern regarding the baby and one's own caregiving, referred to as "Baby Caregiving Worry." Factor loadings for the final 11 items were unambiguous, indicating these were associated with one primary factor and not equally reflective of multiple dimensions, with standardized loadings ≥0.48 and averaging 0.75 in absolute value. Item-average scores were formed for each of the three Baby-PAWS factors, showing reasonable internally consistency: Self and Partner Worry α = 0.90, ω = 0.91; Non-parental Childcare Worry α = 0.77, ω = 0.79; Baby Caregiving Worry α = 0.74, ω = 0.75 (and for the average of all 11 items α = 0.89, ω = 0.90).

Table 3
Concurrent associations between Baby-PAWS, prenatal anxiety/depression indicators.

	1	2	3	4	5	6	7	8	9	10	11
1. Self/Partner worry	–										
2. Non-parental childcare worry	0.47**	–									
3. Baby caregiving worry	0.60**	0.47**	–								
4. Baby-PAWS total	0.90**	0.76**	0.79**	–							
5. EPDS	0.43**	0.25**	0.34**	0.43**	–						
6. STAI-state	0.48**	0.33**	0.35**	0.50**	0.76**	–					
7. STAI-trait	0.52**	0.31**	0.37**	0.51**	0.80**	0.82**	–				
8. PRAQ-R/Fear of giving birth	0.34**	0.26**	0.47**	0.47**	0.18*	0.21*	0.27**	–			
9. PRAQ-R/Fear of bearing handicapped child	0.19*	0.13	0.25**	0.23**	0.30**	0.36**	0.36**	0.23**	–		
10. PRAQ-R/Appearance concerns	0.34**	0.05	0.32**	0.30**	0.32**	0.38**	0.41**	0.40**	0.10	–	
11. PRAQ-R total***	0.44**	0.20*	0.48**	0.45**	0.39**	0.47**	0.51**	0.70**	0.62**	0.77**	–

* $p < .05$.
** $p < .01$.
*** $p < .10$.

4.2. Concurrent associations

Simple bivariate correlations were computed between Baby-PAWS three subscales (Self and Partner Worry, Non-parental Childcare Worry, and Baby Caregiving Worry), the total score (computed based on the final 11 items), and prenatal anxiety and depression indicators: EPDS, STAI (state and trait), PRAQ-R components (Fear of giving birth, Fear of bearing a handicapped child, Appearance concerns) and PRAQ-R total score. All but three correlation coefficients reached statistical significance ($p < .05$), with one trend-level ($p < .10$) and two non-significant relations (Table 3). The observed associations were all in the hypothesized direction–greater worry regarding transition to parenthood was associated with elevated levels of anxiety and depression. Partial correlations, controlling for maternal age, weeks of gestation, and parity, produced an identical pattern of results; thus, simple correlations are presented herein. Following Cohen's (1988) guidelines [56], the magnitudes of these correlations are in the moderate-to-large effect size range; given that correlations are somewhat attenuated by less than perfect reliability of measures involved, the true correlations between the constructs should be even stronger.

4.3. Predictive relations

Hierarchical multiple regression was utilized to examine predictive links between Baby-PAWS scores, maternal postnatal anxiety and depression (EPDS, STAI state and trait indicators; Table 4), and infant temperament outcomes: fear, distress to limitations, sadness, and falling reactivity (components of Negative Emotionality); duration of orienting, cuddliness, soothability, and low intensity pleasure (components of Regulatory Capacity; Table 5). Covariates included maternal age, child gestational age, parity, as well as prenatal anxiety and depression scores in relevant equations, in order to account for their stability. The three Baby-PAWS subscale scores (Self and Partner Worry, Non-parental Childcare Worry, and Baby Caregiving Worry) were considered separately from the total instrument score because of multicollinearity, and to ascertain information that may be gleaned from these components vs. the entire scale. As hypothesized, the Baby-PAWS total score was predictive of all postpartum maternal anxiety and depression indicators (controlling for prenatal symptoms), as well as of multiple infant temperament outcomes (Table 5). Specifically, higher levels of overall worry associated with the transition to parenthood predicted higher levels of anxiety (state and trait) and depression after the child's birth, and was linked with greater infant frustration (i.e., distress to limitations), sadness, and lower soothability. There was also a trend-level effect for falling reactivity (i.e., the ability to recover from distress), with lower levels predicted by greater prenatal concerns regarding preparedness for the child's arrival. A more nuanced pattern of results was observed for the three Baby-PAWS subscale scores. There were statistically significant effects on postnatal depression and state anxiety, but not trait anxiety, with higher levels of Self and Partner Worry predicting greater internalizing symptoms. Self and Partner Worry also predicted the same temperament outcomes as the overall scale score (i.e., distress to limitations, sadness, and soothability), in addition to lower falling reactivity. All associations were in the hypothesized direction, and there were no significant effects of the other two Baby-PAWS subscales. According to Acock's (2014) guidelines [57], the magnitudes of the statistically significant standardized regression weights tend to fall in the weak-to-moderate effect size range; as with correlations, the true relations among the constructs represented by these measures should be even stronger given less than perfect reliability of measures being used in the regression analyses.

5. Discussion

This study represents a measurement development effort and an initial psychometric evaluation of the “Baby Preparation and Worry Scale” (Baby-PAWS), designed to measure uncertainty pregnant women may face with regard to logistics involved in the transition to parenthood. Our hypotheses were largely supported, as two different exploratory factor analytic techniques (i.e., Principal Axis Factoring and Maximum Likelihood Factor analyses) indicated a three-factor structure based on 11 Baby-PAWS items, including Self and Partner Worry, Non-parental Childcare Worry, and Baby Caregiving Worry components (all internally consistent). As hypothesized, we found significant positive correlations for the Baby-PAWS scores (i.e., total scale and component scores) and established measures of concurrent distress and internalizing symptoms (i.e., prenatal depression, state/trait anxiety, pregnancy-specific anxiety), even after controlling for maternal age, parity, and weeks of gestation. Importantly, predictive links between Baby-PAWS scores and postpartum symptoms were observed after controlling for prenatal internalizing symptoms, despite the considerable stability across the perinatal period [8]. Finally, it was hypothesized that Baby-PAWS scores would predict infant behavioral outcomes, with higher levels of negative emotionality and lower levels of regulatory capacity-related attributes anticipated for infants of mothers with greater prenatal worry. Predictive relations with infant temperament outcomes in line with these expectations were demonstrated for the Baby-PAWS total score and the Self and Partner Worry scale. Overall, our findings provide initial evidence of good psychometric properties and validity for Baby-PAWS and add to the existing literature documenting links among maternal emotional stress and worry during pregnancy, postpartum psychological symptoms, and infant social-emotional development [8,18–20].

The Baby-PAWS factor labeled Self and Partner Worry emerged as a critical predictor when components of the instrument were examined with respect to maternal and infant functioning. Self and Partner Worry

Table 4
Hierarchical multiple regression: Baby-PAWS predicting postnatal maternal symptoms.

Variable	R	R^2	ΔR^2	β
EPDS				
Predictor: Baby-PAWS total score				
Final model	0.71	0.51	0.06**	
Maternal age				−0.04
Parity				−0.04
Gestational age				−0.04
Prenatal EPDS				0.54**
Baby-PAWS total				0.28**
Predictors: Baby-PAWS subscale scores				
Final model	0.72	0.51	0.07**	
Maternal age				−0.04
Parity				−0.04
Gestational age				−0.03
Prenatal EPDS				0.53**
Self/Partner Worry				0.22**
Non-parental Childcare Worry				0.02
Baby Caregiving Worry				0.08
STAI-State				
Predictor: Baby-PAWS Total Score				
Final model	0.68	0.47	0.05**	
Maternal age				−0.05
Parity				0.04
Gestational age				0.02
Prenatal STAI-state				0.51**
Baby-PAWS total				0.27**
Predictors: Baby-PAWS subscale scores				
Final model	0.68	0.47	0.05**	
Maternal age				−0.05
Parity				0.03
Gestational age				0.02
Prenatal STAI-State				0.51**
Self/Partner worry				0.20*
Non-parental childcare worry				0.05
Baby caregiving worry				0.07
STAI-Trait				
Predictor: Baby-PAWS total score				
Final model	0.81	0.66	0.02*	
Maternal age				−0.07
Parity				−0.05
Gestational age				0.04
Prenatal STAI-Trait				0.72**
Baby-PAWS total				0.14*
Predictors: Baby-PAWS subscale scores				
Final model	0.82	0.66	0.01	
Maternal age				−0.07
Parity				−0.05
Gestational age				0.04
Prenatal STAI-trait				0.72**
Self/Partner worry				0.11
Non-parental childcare worry				0.05
Baby caregiving worry***				0.01

* $p < .05$ level.
** $p < .01$ level.
*** $p < .10$.

findings speak to the importance of concerns expectant mothers harbor with respect to their own wellbeing postpartum, as well as their partner stepping into the caregiving role. Although existing measures addressing related constructs have posed questions regarding relationship concerns [28–30], Baby-PAWS is unique in the specificity of items that address partner participation in caregiving activities. Perinatal services often include screening for internalizing symptoms, yet they fail to ask questions regarding these types of worries. Self and Partner Worry items elicit concerns regarding changes in the partner relationship, finding quality time with one's partner, and being able to divide tasks of parenting with one's partner. Thus, the significant predictive power associated with the Self and Partner Worry factor is consistent with existing literature indicating that the status of one's relationship satisfaction (e.g., perceived tension) and perceived partner support can

Table 5
Hierarchical multiple regression: Baby-PAWS predicting infant temperament.

Variable	R	R2	ΔR2	β
IBQ-R distress to limitations				
Predictor: Baby-PAWS total score				
Final model	0.28	0.08	0.07**	
Maternal age				−0.04
Parity				−0.01
Gestational age				−0.08
Baby-PAWS total				0.27**
Predictors: Baby-PAWS Subscale Scores				
Final model	0.30	0.09	0.08**	
Maternal age				−0.01
Parity				−0.04
Gestational age				−0.07
Self/Partner worry				0.29**
Non-parental childcare worry				−0.04
Baby caregiving worry				0.02
IBQ-R sadness				
Predictor: Baby-PAWS total score				
Final model	0.23	0.05	0.05**	
Maternal age				0.05
Parity				0.02
Gestational age				0.04
Baby-PAWS total				0.22**
Predictors: Baby-PAWS subscale scores				
Final model	0.27	0.07	0.07*	
Maternal age				0.07
Parity				−0.02
Gestational age				0.04
Self/Partner worry				0.28**
Non-parental childcare worry				0.06
Baby caregiving worry				−0.12
IBQ-R falling reactivity				
Predictor: Baby-PAWS total score				
Final model	0.25	0.06	0.02#	
Maternal age				0.15#
Parity				0.03
Gestational age				−0.06
Baby-PAWS total				−0.16#
Predictors: Baby-PAWS subscale scores				
Final Model	0.30	0.08	0.05*	
Maternal age				0.13
Parity				0.08
Gestational age				−0.07
Self/Partner worry				−0.29*
Non-parental childcare worry				0.03
Baby caregiving worry				0.13
IBQ-R soothability				
Predictor: Baby-PAWS total score				
Final model	0.23	0.06	0.04*	
Maternal age				0.01
Parity				0.00
Gestational age				−0.10
Baby-PAWS total				−0.20*
Predictors: Baby-PAWS subscale scores				
Final model	0.30	0.09	0.08**	
Maternal age				−0.01
Parity				0.05
Gestational age				−0.11
Self/Partner worry				−0.34**
Non-parental childcare worry				0.01
Baby caregiving worry***				0.13

* $p < .05$ level.
** $p < .01$ level.
*** $p < .10$.

act as a risk or protective factor in relation to perinatal anxiety [2,58]. Although current findings require replication, the notable effects associated with the Self and Partner Worry subscale may further underscore the need for couples-based interventions that begin prenatally [59,60].

With respect to infant temperament, aspects of negative emotionality and emerging regulation, (i.e., distress to limitations, sadness, falling reactivity, as well as soothability) were most closely associated with worries regarding transition to parenthood, in the expected

direction. That is, greater concerns, especially in the area of Self and Partner Worry, translated into caregiver observations of more significant infant frustration and sadness, along with difficulties being soothed and lowering one's own level of distress. Infant fear was not associated with this type of worry, which may speak to differential etiology for this domain of temperament (e.g., genetic contributions). The latter pattern of results may also be a function of a more protracted developmental trajectory of fearfulness, with a marked increase between 8 and 10 months of age [61,62]. Baby PAWS scores predicted soothability and falling reactivity, but not other regulation-related domains, possibly because infants' ability to lower their level of arousal—in response to parental soothing efforts and on their own—-represent the most salient aspect of emerging self-regulation early in life [63]. Future research should explore similar effects later in infancy to see if other facets of regulation, and possibly fearfulness, are implicated later in development. Nonetheless, current temperament-related findings provide further support for the intergenerational transmission of distress proneness, indicating that worries regarding practical aspects of the transition to parenthood are associated with offspring outcomes, similar to previously reported effects of prenatal anxiety, depression, and posttraumatic stress [6,19,20,64].

Given considerable support for our hypotheses, we anticipate that Baby-PAWS can be integrated into research and clinical efforts as the first measure of prenatal psychosocial stress and worry focused exclusively on preparedness for parenthood. Multiple anxiety and worry-related instruments are available for use in the perinatal period, including those assessing general anxiety (e.g., STAI [24]), pregnancy-specific concerns (e.g., PRAQ [20,26]), and expectations regarding motherhood (e.g., Prenatal Maternal Expectations Scale; [27–30]). However, to our knowledge, Baby-PAWS is also unique in its focus on prenatal distress and worry around practical aspects of the transition to parenthood (e.g., preparedness for baby's arrival in terms of logistic readiness and psychosocial role shifts), with specific questions regarding one's own caregiving capabilities, availability of external childcare, self-care and partner involvement. Baby-PAWS is expected to be particularly useful for services targeting new mothers in regions such as the United States—given a sociocultural climate emphasizing independence and a prompt return to work after birth [65]—in contrast to cultures that practice multi-generational living or allow extended parental leave. Importantly, this scale offers clinical utility in assessing unique aspects of perinatal emotional health that predict postpartum wellbeing and infant behavioral outcomes. If integrated into routine prenatal screenings, such information could help providers identify potential areas requiring supportive resources (e.g., texting or group-based services, parenting mentorship programs, psychotherapy [66,67]).

The implications of this work notwithstanding, this study has several limitations, including a relatively small and homogeneous sample. Future research should include larger and more diverse groups of expectant women, exploring ways in which anticipatory anxiety regarding the transition to parenthood may differ based on additional risk factors (e.g., poverty, single parenthood, systemic stressors). This psychometric evaluation was undertaken with a regional U.S. sample; thus, items addressing anticipated psychosocial stressors may be context dependent. As such, future validation of this scale across broader samples, including cross-cultural comparisons, may be important to establish generalizability of this measure. Given the importance of understanding longitudinal trajectories of anxiety across the perinatal period [2,3], assessing potential changes in Baby-PAWS scores across pregnancy, and not just in the 3rd trimester, is warranted. Moreover, only self-reported internalizing symptoms and maternal ratings of infant temperament were examined in this study. In the future, clinician ratings of maternal symptoms, observations, and/or physiological markers of infant temperament should be considered.

Despite these limitations, the present study provides an important foundation, demonstrating a three-factor structure and internal consistency for the first instrument designed specifically to gauge worries regarding practical aspects of the transition to parenthood. Our use of ω coefficients, along with Cronbach's α, adds to the confidence concerning good psychometric properties, given the former's tolerance of items that load differentially on the scale's underlying construct. In addition, compelling evidence regarding concurrent validity relative to markers of anxiety and depression was provided, and Baby-PAWS scores were predictive of maternal internalizing symptoms, as well as infant distress proneness and regulation. Effect sizes observed herein were generally in a low-to-moderate range, which is typical in the literature [19,23], and interpreted as reflecting the multi-faceted etiology of outcomes (e.g., infant reactivity and regulation).

Acknowledgement

Research reported in the manuscript was made possible by the 2015 Marchionne Summer Research Fellowship from Washington State University to the first author.

Author statement

All of the co-authors made critical contributions to the manuscript:

(1) Nora Erickson conducted the research and investigation process, performing all data collection. She also secured funds to support data collection.
(2) Alyssa Neumann helped with conceptualization and contributed to the development of this manuscript; specifically, to the writing of the initial draft and subsequent revisions.
(3) Gregory Hancock conducted statistical analyses reported in the manuscript and assisted with the interpretation as well as the written description of results.
(4) Maria (Masha) Gartstein was responsible for oversight and leadership with respect to all research activity planning and execution, including mentorship of the core team. She also led formulation of overarching research goals and aims.

References

[1] C.P. Cowan, P.A. Cowan, When Partners Become Parents: The Big Life Change in Couples, Erlbaum, Mahwah, NJ, 2000.
[2] B.P. Don, A. Chong, S.N. Biehle, A. Gordon, K.D. Mickelson, Anxiety across the transition to parenthood: change trajectories among low-risk parents, Anx, Stress, & Coping 27 (2014) 633–649, https://doi.org/10.1080/10615806.2014.903473.
[3] A.C. Huizink, B. Menting, M. Oosterman, M.L. Verhage, F.C. Kunseler, C. Schuengel, The interrelationship between pregnancy-specific anxiety and general anxiety across pregnancy: a longitudinal study, J. Psychosom. Obstet. Gynecol. 35 (2014) 92–100, https://doi.org/10.3109/0167482X.2014.944498.
[4] W. Bleidorn, R.C. Arslan, J.J.A. Denissen, P.J. Rentfrow, J.E. Gebauer, S.D. Gosling, Age and Gender Differences in Self-Esteem - A Cross-Cultural Window, 111 Pers Process Ind Diff, 2015, pp. 396–410, https://doi.org/10.1037/pspp0000078.
[5] K. Adamsons, Predictors of relationship quality during the transition to parenthood, J Reprod Infant Psychol 31 (2013) 160–171, https://doi.org/10.1080/02646838.2013.791919.
[6] C. de Weerth, Prenatal stress and the development of psychopathology: lifestyle behaviors as a fundamental part of the puzzle, Dev. Psychopathol. 30 (2018) 1129–1144, https://doi.org/10.1017/S0954579r418000494.
[7] P. Poikkeus, T. Saisto, L. Unkila-Kallio, R.I. Punamaki, L. Repokari, S. Vilska, A. Tiitinen, M. Tulppala, Fear of childbirth and pregnancy-related anxiety in women conceiving with assisted reproduction, Obstet. Gynecol. 108 (2006) 70–76.
[8] P.M. Dietz, S.B. Williams, W.M. Callaghan, D.J. Bachman, E.P. Whitlock, M.C. Hornbrook, Clinically identified maternal depression before, during, and after pregnancies ending in live births, Am. J. Psychiatry 164 (2007) 1515–1520, https://doi.org/10.1176/appi.ajp.2007.06111893.
[9] J.J. Wernand, F.C. Kunseler, M. Oosterman, A.T. Beekman, C. Schuengel, Prenatal changes in parenting self-efficacy: linkages with anxiety and depressive symptoms in primiparous women, Infant Ment. Health J. 35 (2014) 42–50, https://doi.org/10.1002/imhj.21425.
[10] A.C. Huizink, B. Menting, M.H.M. De Moor, M.L. Verhage, F.C. Kunseler, C. Schuengel, M. Oosterman, From prenatal anxiety to parenting stress: a longitudinal study, Arch Women's Ment Health 20 (2017) 663–672, https://doi.org/10.1007/s00737-017-0746-5.
[11] D.J. Barker, Fetal origins of coronary heart disease, BMJ 311 (1995) 171–174, https://doi.org/10.1136/bmj.311.6998.171.
[12] N.M. Talge, C. Neal, V. Glover, The early stress, translational research and

prevention science network: fetal and neonatal experience on child and adolescent mental health, antenatal maternal stress and long-term effects on child neurodevelopment: how and why? Child Psychol. Psychiatry 48 (2007) 245–261, https://doi.org/10.1111/j.1469-7610.2006.01714.x.
[13] O. Babenko, I. Kovalchuk, G.A.S. Metza, Stress-induced perinatal and transgenerational epigenetic programming of brain development and mental health, Neurosci Biobeh Rev 48 (2015) 70–91, https://doi.org/10.1016/j.neubiorev.2014.11.013.
[14] P. Davis, C.A. Sandman, Prenatal psychobiological predictors of anxiety risk in preadolescent children, Psychoneuroendocrinology 37 (2012) 1224–1233, https://doi.org/10.1016/j.psyneuen.2011.12.016.
[15] R. Korja, S. Nolvi, K.A. Grant, C. McMahon, The relations between maternal prenatal anxiety or stress and child's early negative reactivity or self-regulation: a systematic review, Child Psychiatry Human Dev 48 (2017) 851–869, https://doi.org/10.1007/s10578-017-0709-0.
[16] K. Perez-Edgar, L.A. Schmidt, H.A. Henderson, J. Schulkin, N.A. Fox, Salivary cortisol levels and infant temperament shape developmental trajectories in boys at risk for behavioral maladjustment, Psychoneuroendocrinology 33 (2008) 916–925, https://doi.org/10.1016/j.psyneuen.2008.03.018.
[17] S. Whittle, N.B. Allen, D.I. Lubman, M. Yücel, The neurobiological basis of temperament: towards a better understanding of psychopathology, Neurosci. Biobehav. Rev. 30 (2006) 511–525.
[18] E. Mohler, P. Parzer, R. Brunner, A. Wiebel, F. Resch, Emotional stress in pregnancy predicts human infant reactivity, Early Hum. Dev. 82 (2006) 731–737, https://doi.org/10.1016/j.earlhumdev.2006.02.010.
[19] E.P. Davis, L.M. Glynn, C.D. Schetter, C. Hobel, A. Chicz-Demet, C.A. Sandman, Prenatal exposure to maternal depression and cortisol influences infant temperament, J. Am. Acad. Child Adolesc. Psychiatry 46 (2007) 737–746, https://doi.org/10.1097/chi.0b013e318047b775.
[20] M.I. Van den Heuvel, M.A. Van Den Johannes, J. Henrichs, B.R.H. Van Den Bergh, Maternal mindfulness during pregnancy and infant socio-emotional development and temperament: the mediating role of maternal anxiety, Early Hum. Dev. 91 (2015) 103–108, https://doi.org/10.1016/j.earlhumdev.2014.12.003.
[21] A.C. Huizink, E.J. Mulder, P.G. Robles de Medina, G.H. Visser, J.K. Buitelaar, Is pregnancy anxiety a distinctive syndrome? Early Hum. Dev. 79 (2004) 81–91, https://doi.org/10.1016/j.earlhumdev.2004.04.014.
[22] C. Buss, E.P. Davis, T. Muftuler, K. Head, C.A. Sandmana, High pregnancy anxiety during mid-gestation is associated with decreased gray matter density in 6-9 year-old children, Psychoneuroendocrinology 35 (2010) 141–153.
[23] S. Nolvi, L. Karlsson, D.J. Bridgett, R. Korja, A.C. Huizink, E.L. Kataja, H. Karlsson, Maternal prenatal stress and infant emotional reactivity six months postpartum, J. Affect. Disord. 15 (2016) 163–170.
[24] C.D. Spielberger, R.L. Gorsuch, R. Lushane, P.H. Vagg, G.A. Jacobs, Manual for the State Trait Anxiety Inventory (Form Y), University of South Florida, Tampa, FL, 1989.
[25] L.R. Derogatis, SCL-90-R: Administration, Scoring of Procedures Manual-II for the Revised Version and Other Instruments of the Psychopathology Rating Scale Series, Clinical Psychometric Research Incorporated, Baltimore, MD, 1992.
[26] B. Van den Bergh, The influence of maternal emotions during pregnancy on fetal and neonatal behavior, Pre-Peri-Nat Psychol J. 5 (1990) 119–130.
[27] P. Coleman, E.S. Nelson, D.L. Sundre, The relationship between prenatal expectations and postnatal attitudes among first-time mothers, J Reprod Infant Psychol 17 (1999) 27–39, https://doi.org/10.1080/02646839908404582.
[28] J.M. Green, K. Kafetsios, Positive experiences of early motherhood: predictive variables from a longitudinal study, J Reprod Infant Psychol 15 (1997) 141–157.
[29] H. Statham, J.M. Green, The effects of miscarriage and other 'unsuccessful' pregnancies on feelings early in a subsequent pregnancy, J Reprod Infant Psychol 12 (1994) 45–54.
[30] J.M. Green, K. Kafetsios, H.E. Statham, C.M. Snowdon, Factor structure, validity and reliability of the Cambridge Worry Scale in a pregnant population, J. Health Psychol. 8 (2003) 753–764.
[31] M.G. Newman, S.J. Llera, T.M. Erickson, A. Przeworski, L.G. Castonguay, Worry and generalized anxiety disorder: a review and theoretical synthesis of evidence on nature, etiology, mechanisms, and treatment, Ann Rev Clin Psychol 9 (2013) 275–297.
[32] J.L. Cox, J.M. Holden, R. Sagovsky, Detection of postnatal depression: development of the Edinburgh postnatal depression scale, Br. J. Psychiatry 150 (1987) 782–786.
[33] H.A. Bennett, A. Einarson, A. Taddio, G. Koren, T.R. Einarson, Prevalence of depression during pregnancy: systematic review, Obstet. Gynecol. 103 (2004) 698–709, https://doi.org/10.1097/01.AOG.0000116689.75396.5f.
[34] D. Murray, J.L. Cox, Screening for depression during pregnancy with the Edinburgh postnatal depression scale, J Reprod Infant Psychol 8 (1990) 99–107, https://doi.org/10.1080/02646839008403615.
[35] C.D. Spielberger, Anxiety: Current Trends in Theory and Research, Academic Press, Oxford, England, 1972, pp. 3–19, https://doi.org/10.1016/B978-0-12-657401-2.50008-3.
[36] S.C. Chong, B.F.P. Broekman, A. Qiu, I.M. Aris, Y.H. Chan, A. Rifkin-Graboi, E. Law, C.Y.I. Chee, Anxiety and depression during pregnancy and temperament in early infancy: findings from a multi-ethnic, Asian, prospective birth cohort study, Infant Ment. Health J. 37 (2016) 584–598, https://doi.org/10.1002/imhj.21582.
[37] C.D. Spielberger, R.L. Gorsuch, R. Lushene, P.R. Vagg, G.A. Jacobs, Manual for the State-Trait Anxiety Inventory, Consulting Psychologists Press, Palo Alto, CA, 1983.
[38] M. Westerneng, P. de Cock, E.R. Spelten, A. Honig, E.K. Hutton, Factorial invariance of pregnancy-specific anxiety dimensions across nulliparous and parous pregnant women, J. Health Psychol. 20 (2015) 164–172, https://doi.org/10.1177/1359105313500684.
[39] M.A. Gartstein, M.K. Rothbart, Studying infant temperament via the revised infant behavior questionnaire, Infant Behav Dev 26 (2003) 64–85, https://doi.org/10.1016/S0163-6383(02)00169-8.
[40] S.P. Putnam, A.L. Helbig, M.A. Gartstein, M.K. Rothbart, E. Leerkes, Development and assessment of short and very short forms of the infant behavior questionnaire-revised, J. Pers. Assess. 96 (2014) 445–458, https://doi.org/10.1080/00223891.2013.841171.
[41] J. Worobey, Neonatal stability and one-month behavior, Infant Behav Dev 9 (1986) 119–124, https://doi.org/10.1016/0163-6383(86)90043-3.
[42] J. Worobey, V.M. Blajda, Temperament ratings at 2 weeks, 2 months, and 1 year: differential stability of activity and emotionality, Dev. Psychol. 25 (1989) 257–263, https://doi.org/10.1037/0012-1649.25.2.257.
[43] M.A. Gartstein, G.G. Knyazev, H.R. Slobodskaya, Cross-cultural differences in the structure of infant temperament: United States of America (U.S.) and Russia, Infant Behav Dev 28 (2005) 54–61, https://doi.org/10.1016/j.infbeh.2004.09.003.
[44] S.H. Parade, E. Leerkes, The reliability and validity of the infant behavior questionnaire-revised, Infant Behav Dev 31 (2008) 637–646, https://doi.org/10.1016/j.infbeh.2008.07.009.
[45] M.A. Gartstein, A.E. Bateman, Early manifestations of childhood depression: influences of infant temperament and parental depressive symptoms, Infant Child Dev. 17 (2008) 223–248, https://doi.org/10.1002/icd.549.
[46] M.A. Gartstein, D.J. Bridgett, M.K. Rothbart, C. Robertson, E. Iddins, K. Ramsay, A. Schlect, A latent growth examination of fear development in infancy: contributions of maternal depression and the risk for toddler anxiety, Dev. Psychol. 46 (2010) 651–668.
[47] M.A. Gartstein, J. Marmion, Fear and positive affectivity in infancy: convergence/discrepancy between parent-report and laboratory-based indicators, Infant Behav Dev 31 (2008) 227–238, https://doi.org/10.1016/j.infbeh.2007.10.012.
[48] G.R. Hancock, J. An, Framing and improving scale reliability assessment using structural equation models, Educ Measure: Issues and Prac. 37 (2018) 73–74.
[49] D. McNeish, Thanks coefficient alpha, we'll take it from here, Psychol Meth 23 (2018) 412–433.
[50] N.L. Erickson, M.A. Gartstein, J.A. Dotson, A review of prenatal maternal mental health and the development of infant temperament, J. Obstet. Gynecol. Neonatal. Nurs. 46 (2017) 588–600, https://doi.org/10.1016/j.jogn.2017.03.008.
[51] M.A. Gartstein, S.P. Putnam, M.K. Rothbart, Etiology of preschool behavior problems: contributions of temperament attributes in early childhood, Infant Ment. Health J. 33 (2012) 197–211, https://doi.org/10.1002/imhj.21312.
[52] L. Muhtadie, Q. Zhou, N. Eisenberg, Y. Wang, Predicting internalizing problems in Chinese children: the unique and interactive effects of parenting and child temperament, Dev. Psychopathol. 25 (2013) 653–667, https://doi.org/10.1017/S0954579413000084.
[53] F.Y. Scheper, M. Majdandžić, P.M. van de Ven, L.M.C. Jansen, T.A.H. Doreleijers, C. Schuengel, A.L.C. de Vries, Temperament traits and psychopathology in young clinically referred children compared to a general population sample, Child Psychiatry Hum. Dev. 48 (2017) 841–850, https://doi.org/10.1007/s10578-016-0708-6.
[54] M.A. Gartstein, A. Prokasky, M.A. Bell, S. Calkins, D.J. Bridgett, J. Braungart-Rieker, E. Leerkes, C. Cheatham, R.D. Eiden, K.D. Mize, N. Jones, G. Mireault, E. Seamon, Latent profile and cluster analysis of infant temperament: comparisons across person-centered approaches, Dev. Psychol. 53 (2017) 1811–1825, https://doi.org/10.1037/dev0000382.
[55] M.A. Gartstein, G.R. Hancock, Temperamental growth in infancy: demographic, maternal symptom, and stress contributions to over-arching and fine-grained dimensions, Merrill-Palmer Q. 65 (2019) 121–157, https://doi.org/10.13110/merrpalmquar1982.65.2.0121.
[56] J. Cohen, Statistical Power Analysis for the Behavioral Sciences, 2nd ed., Lawrence Erlbaum Associates Publishers, Hillsdale, NJ, 1988.
[57] A.C. Acock, A Gentle Introduction to Stata, 4th ed., TX, Stata Press, College Station, 2014.
[58] H. Bayrampour, S. McDonald, S. Tough, Risk factors of transient and persistent anxiety during pregnancy, Midwifery 31 (2015) 582–589, https://doi.org/10.1016/j.midw.2015.02.009.
[59] J. Petch, W.K. Halford, Psychoeducation to enhance couples' transition to parenthood, Clin. Psychol. Rev. 28 (2008) 1125–1137, https://doi.org/10.1016/j.cpr.2008.03.005.
[60] P.D. Pilkington, T.A. Whelan, L.C. Milne, A review of partner-inclusive interventions for preventing postnatal depression and anxiety, Clin. Psychol. 19 (2015) 63–75, https://doi.org/10.1111/cp.12054.
[61] M.K. Rothbart, Temperament and the development of the inhibited approach, Child Dev. 59 (1988) 1241–1250.
[62] M.A. Gartstein, G.R. Hancock, S.L. Iverson, Positive affectivity and fear trajectories in infancy: contributions of mother-child interaction factors, Child Dev. 89 (2018) 1519–1534, https://doi.org/10.1111/cdev.12843.
[63] M.A. Gartstein, S.P. Putnam, E. Aaron, M.K. Rothbart, Temperament and personality, in: S. Matzman (Ed.), Oxford Handbook of Treatment Processes and Outcomes in Counseling Psychology, Oxford University Press, New York, NY, 2016, pp. 11–41.
[64] A.J. Lang, M.A. Gartstein, Intergenerational transmission of traumatization: theoretical framework and implications for prevention, J of Trauma and Dissoc 16 (2017) 1–14.
[65] H.R. Markus, American = independent? Perspect on Psychol Sci 12 (2017) 855–866, https://doi.org/10.1177/1745691617718799.
[66] M. Mihelic, A. Filus, A. Morawaska, Correlates of prenatal parenting expectations in new mothers: is better self-efficacy a potential target for preventing postnatal adjustment difficulties? Prev. Sci. 17 (2016) 949–959, https://doi.org/10.1007/s11121-016-0682-z.
[67] M.J. Woodward, J. Eddinger, A.V. Henschel, T.S. Dodson, H.N. Tran, J.G. Beck, Social support, posttraumatic cognitions, and PTSD: the influence of family, friends, and a close other in an interpersonal and non-interpersonal trauma group, J Anx Disord 35 (2015) 60–67, https://doi.org/10.1016/j.janxdis.2015.09.002.