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Is positive affect in pregnancy protective of postpartum depression?

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Abstract

Objective: To investigate the predictive/protective role of negative affect/positive affect in late pregnancy on the outcome of postpartum depression. *Methods*: A total of 491 pregnant women participated in the study. The participants were asked to fill out a series of questionnaires, which included the Profile of Mood States, the Beck Depression Inventory-II, psychosocial variables and socio-demographic characteristics and were asked to participate in a psychiatric interview. After delivery, 272 mothers participated again in the study and filled out a similar series of questionnaires. *Results*: Negative affect was associated with more intense depressive symptomatology, more self-perceived stress, lower self-reported social support, lower quality of life and perception of having a more difficult infant. By contrast, positive affect was negatively associated with these variables. Negative affect in late pregnancy increased the likelihood of experiencing postpartum depression (DSM-IV/OR = 2.1, 95%CI = 1.3-3.4, p = .003; ICD-10/OR = 2.1, 95%CI = 1.5-3.0, p < .001), while positive affect increased the odds of not having this condition (DSM-IV/OR = 2.0, 95%CI = 1.5-2.7, p = .042). *Conclusion*: In pregnancy, negative affect was a predictor of postpartum depression, whereas positive affect showed a protective role. Future studies are required to explore whether psychotherapeutic strategies focusing on decreasing negative affect and enhancing positive affect in the last trimester of pregnancy can reduce the risk of postpartum depression.

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Introduction

Depression during pregnancy and the first 12 months postpartum occurs in approximately 7-13% of women.[1] In severe cases, there is an increased risk for suicide, the leading cause of maternal death,[2] as well as an increased risk for filicide/infanticide, particularly in psychotic depressed women.[3,4] Other consequences of this disorder include problems with the child's cognitive and social developmental and behavioral difficulties in late infancy.[5] Depressive symptoms experienced in this period of time are similar to those observed in classical forms of depression and include depressed mood, loss of interest or enjoyment and reduced energy.[6] The most consistent predictive factors for postpartum depression (PPD) are a previous history of mental health problem (particularly depression), psychological distress in pregnancy (depression or anxiety), stressful life events and low social support.[7-9]

The fact that negative affect (or psychological distress) in pregnancy is predictive of the development of PPD is not surprising if we think of PPD as a trait rather than a state condition. The tendency to develop negative affect (NA) under stressful situations is characteristic of some personality traits, such as neuroticism,[10] which in turn is viewed as an endophenotype of depression, which shares some genetic susceptibility with PPD.[11] A twin study[12] has demonstrated that having a twin with a lifetime depression diagnosis was associated with an increased NA response to daily life stressors in the non-depressed co-twin. This effect was stronger in monozygotic (MZ) than in dizygotic (DZ) twins, indicating that a genetic component is involved in the NA reactivity to stress. Thus, the genes involved in depression may manifest as a tendency to display NA in response to minor stressors in daily life. These authors concluded "that such a trait, representing a mood bias toward NA in the face of stress, is state-independent and thus a likely endophenotype of depression."

Although the vulnerability to develop NA has been the focus of extensive research, positive affect (PA) is much less studied. Some studies have confirmed that PA may function as a source of resilience in buffering stress responses[13] and diminishes cardiovascular reactivity after a stressor.[14] It has also been hypothesized that PA may serve as a protective factor against depression in the sense that genetic NA in response to stress can be moderated when subjects are able to co-experience higher levels of positive emotions.[15] The results of this study suggest that the experience of PA buffers against NA reactivity and could attenuate the endophenotypic expression of genetic vulnerability for depression. As the authors stated, "sharing genetic vulnerability to depression matters less when subjects experience more PA during moments of stress."

Considering that pregnancy has been recognized as a stressful life event in its own right[16] and that the life event scale ranks pregnancy as the 12th most potentially harmful life event on a list of 43 items,[17] the aim of the present study was to investigate whether NA and PA in late pregnancy have a predictive and protective role, respectively, for PPD.

Methods

Participants

The initial sample included 491 pregnant women with a mean age of 29.8 years (SD = 4.99). Most women were in their last trimester of pregnancy (94% were ≥ 28 weeks of gestation; Mean = 32.6; SD = 3.43; range = 23-42). The vast majority was Portuguese (86.2%) and married (76.1%). Most of the participants had finished high school or had a degree (80.4%). In total, 60.6% of women were working, 26.2% were on sick leave, and 13.2% were unemployed. With respect to parity, 62.9% of women were nulliparas, 30.8% were primiparas, and 6.3% were multiparas.

Most of the pregnant women approached to participate in the study accepted the initial invitation. A small number (6-7%) refused, citing lack of time or interest in the research topic.

After delivery (3 months postpartum) all participants were systematically contacted to participate in the study, but a significant number of mothers declined the invitation. The most frequently reasons given for refusal were lack of time, lack of interest, life hassles, moving house or having infants with health problems. Occasionally, mothers did not answer the phone or failed to meet us when an appointment was scheduled. A total of 272 (55.4%) mothers attended the second appointment. Most of these women had full term pregnancies (91.6%; 37-42 weeks). In general, the mothers had a normal delivery (44.3%), with 33.6% having caesareans and 22.1% experiencing an instrumental partum (vacuum extraction or forceps). Most mothers were breastfeeding (62.2%), 24.8% were bottle feeding, and 13% were mixed feeding. The follow-up group was not significantly different from the "refusal" group with respect to socio-demographic characteristics (mean age, level of education, parity or marital status).

Procedure

Pregnant women in their last trimester of pregnancy with uncomplicated healthy pregnancies, aged 18 years or more, and who were waiting for prenatal medical appointments at the local medical health center were invited to participate in the study. This recruitment procedure was followed to avoid selecting women with risk pregnancies (who are followed in obstetric units) and to obtain a representative sample of healthy pregnant Portuguese women. Women who enrolled in the study were contacted by phone 3 months after delivery to participate again in the research. These meetings usually took place at the mother's medical center (frequently when mothers took their babies in for vaccination) or at their homes. At both assessments (baseline: last trimester of pregnancy; time 1: 3 months postpartum), participants were asked to answer a psychiatric interview and to fill in a booklet of questionnaires about their mood.

The aims and procedures of the study were explained to the participants, confidentiality was guaranteed, and written consent was obtained. Project approval was obtained from the Ethical Committee of the Faculty of Medicine (Coimbra, Portugal).

Instruments

Affect - The Portuguese version of the 65-item Profile of Mood States (POMS) was used to assess NA and PA.[18,19] Subjects were asked to rate their emotions in the previous month in order to increase the likelihood of assessing NA and PA traits instead of merely mood states.

Depressive symptoms - The Portuguese version of the Beck Depression Inventory (BDI-II)[20,21] was applied to measure depressive symptoms. We used the factor structures of the BDI-II that we previously optimized for pregnancy and postpartum in a previous study by our group.[22]

Depression - Women were interviewed with the Portuguese version of the Diagnostic Interview for Genetic Studies (DIGS).[23,24] Symptoms of different psychiatric disorders, including depression, can be identified and psychiatric diagnoses can be made according to different diagnostic systems, including the Diagnostic and Statistical Manual of Mental Disorders (DSM) IV[25] and the International Classification of Diseases (ICD) 10. Demographics, medical history, an overview of psychiatric disturbances, major depression, dysthymia, depressive/hyperthymic personality, suicidal behavior and a brief section of mania/hypomania were assessed by DIGS. Major depression, suicidal behavior and part of the mania/hypomania sections were used in the postpartum visit.

The final consensus diagnosis of depression was obtained following the best-estimate diagnostic procedure.[26] Based on the information obtained with the DIGS, the interviewer completed the Operational Criteria Checklist for Psychotic Illness (OPCRIT).[27] The interviews and the OPCRIT checklist were discussed with an independent rater in our group (senior psychiatrist/psychologist) to produce a final consensus OPCRIT checklist. Data from this checklist were entered into the OPCRIT software system to generate a diagnosis of depression according to the DSM-IV and ICD-10 diagnostic systems. A DSM-IV/PPD case implied that the episode started in the 4 weeks after delivery, while an ICD-10/PPD case implied that the episode initiated within the 6 weeks postpartum.

Psychosocial variables – Three questions about the subjects' self perceptions of current stress, social support and quality of life were included in the protocol:

(1) How stressful is your life now? (Stressful life events/difficulties include, for example, daily hassles, problems/worries at home, at work, relatives, friends, financial, diseases, death and/or others). Response options: not at all stressful, not very stressful, a bit stressful, very stressful (score from 1-4);
(2) Do you feel that, in general, you have the support and help you need? (from husband/partner, family, friends, neighbors and/or others?) Response options: most of the time, often, occasionally, rarely ever (1-4);
(3) How do you find your quality of life at this time? Response options: very good, good, neither good nor bad, bad, very bad (1-5).

Child Temperament - Difficult infant temperament was measured by asking mothers about their perception of their infants' characteristics and behaviors with an 8 item questionnaire (*Difficult Infant Temperament Questionnaire*/DITQ) developed by one of the authors (MHA) to assess mothers' perceptions of their infant's temperament. Response options varied from never/nearly never to always/nearly always (range 1-6). The questions were as follows:

1) has your baby been having feeding problems?
2) has your baby been having sleeping problems?
3) has your baby been giving you bad nights?
4) has your baby been difficult to raise?
5) does your baby have difficulties falling asleep at bedtime?
6) is your baby irritable or fussy?
7) does your baby cry excessively?
8) is your baby difficult to comfort or calm down?

The rationale for the development of DITQ was as follows: 1) to study the relationship between infant temperament and mother's behavior, focusing on the "difficult temperament" cluster; 2) to create items reflecting the way mothers experience and report behavioral characteristics of a difficult infant; 3) items should have clinical relevance and assess difficulties involved in handling a difficult infant; 4) the questionnaire should be brief, as it was to be included in a larger study on Postpartum Depression and Sleep, already containing a considerable number of assessment instruments.

A total score was calculated by summing the 8 response scores. A high score was associated with a more difficult child temperament (perceived by the mother).

On the DITQ psychometric properties questionnaire, a principal components analysis revealed a one-factor solution, explaining 53.1% of the total variance. DITQ internal consistency was very good (Cronbach's alpha coefficient; $\alpha = .89$).[28]

Statistical analysis

Data were analyzed using SPSS for windows (version 15.0). Factor analysis was applied to explore POMS factor structure in pregnancy and postpartum. This data-reduction technique helps to identify a set of grouping factors from a large number of variables. The number of factors was determined based on the Cattel's scree test. Items with factor loadings greater than .6, considered high by Kline,[29] were retained. Spearman rank correlation analysis between factors and Cronbach's alpha for each factor was calculated to assess each factor's internal consistency. To explore associations between POMS factors and psychosocial variables or the mother's perception of the child's temperament, Spearman rank correlations were calculated. The Cohen criterion[30] was adopted for size effect interpretation of coefficient correlations: .1 = small; .3 = medium; .5 = large. To compare POMS factor scores in pregnancy between the group without PPD and the group with PPD, Mann Whitney U tests were computed. Finally, logistic regressions were performed to investigate the ability of NA, PA and fatigue in late pregnancy to predict PPD. All effects were assessed for significance at the $p \leq .05$ level.

Results

POMS factor analysis - pregnancy

POMS factor analysis in pregnancy revealed a factor structure with 30 items and 4 factors (Table 1):

Table 1 Factor structure (Varimax rotation) of the profile of mood states during pregnancy (n = 366): POMS-30

			F1	F2	F3	F4
NEGATIVE	F1: Depression-hostility	Bitter	**.809**	.192	-.098	.143
AFFECT	(VE: 17.3%)	Helpless	**.769**	.108	-.178	.122
α = .949	α = .942	Deceived	**.764**	.283	-.166	.037
		Muddle	**.748**	.177	.001	.100
		Miserable	**.738**	-.008	-.035	.083
		Resentful	**.724**	.329	-.115	.130
		Rebellious	**.721**	.358	-.091	.047
		Spiteful	**.712**	.115	-.059	.052
		Furious	**.669**	.496	-.043	.015
		Guilty	**.654**	.056	-.243	.084
		Desperate	**.639**	.196	-.028	..097
		Bushed	**.637**	.227	-.066	.128
		Discouraged	**.636**	.391	-.132	.093
	F2: Anxiety-anger	Grouchy	.177	**.789**	-.091	.207
	(VE = 13.4%)	Peeved	.222	**.787**	-.071	.185
	α = .933	Uneasy	.135	**.779**	.012	.153
		On edge	.250	**.750**	-.053	.086
		Blue	.268	**.739**	-.103	.176
		Bad tempered	.304	**.697**	-.118	.124
		Annoyed	.422	**.625**	-.061	.065
		Angry	.335	**.622**	-.005	.025
POSITIVE	F3: Vigor-friendliness	Cheerful	-.139	-.115	**.781**	-.014
AFFECT	(VE = 6.6%)	Full of pep	-.153	-.032	**.699**	-.136
α = .851		Good-natured	-.133	.023	**.684**	.030
		Lively	-.260	-.183	**-.661**	-.112
		Sympathetic	-.103	-.082	**.635**	.065
		Trusting	-.139	-.017	**.634**	-.097
FATIGUE	F4: Fatigue	Exhausted	.196	.298	-.006	**.801**
α = .839	(VE = 4.4%)	Fatigued	.135	.294	-.020	**.769**
		Worn-out	.152	.353	-.133	**.663**

F: Factor; VE: Variance explained by the factor; POMS: Profile of Mood States. Total variance explained = 41.7%; α = Cronbach's Alpha; Excluded items (< .6).

Factor 1 (F1): depression-hostility was composed of 13 items that reflected depressed and hostile mood states (e.g., "helpless", "furious") and explained 17.3% of the total variance;
Factor 2 (F2): anxiety-anger included 8 items (e.g., "on edge") and explained 13.4% of the total variance;
Factor 3 (F3): vigor-friendliness included items such as "cheerful" or "lively" and explained 6.6% of the total variance;
Factor 4 (F4): fatigue included 3 items (e.g., "exhausted") and explained 4.4% of the total variance.

The coefficient correlations between factors were as follows: between F1-F2, .65; F1-F3, r_s = -.29; F1-F4, r_s = .50; F2-F3, r_s = -.27; F2-F4, r_s = .59; F3-F4, r_s = -.20. The internal consistencies of the POMS subscales were high, as indicated by the Cronbach's alpha: F1, α = .94; F2, α = .93; F3, α = .85; F4, α = .84.

POMS factor analysis - postpartum

The postpartum POMS factor analysis revealed a 27-item scale with 3 distinct factors (Table 2):

Factor 1 (F1): anxiety-anger was composed of 10 items reflecting tension, strain and bad temperament, explaining 15.4% of the total variance;
Factor 2 (F2): depression-dejection included 7 items (e.g., "miserable", "unhappy") explaining 12.6% of the total variance;
Factor 3 (F3): vigor-friendliness included items such as "sympathetic" or "full of pep", explaining 11.0% of the total variance.

The coefficient correlations among factors were as follows: between F1 and F2, .57; F1-F3, r_s = -.34; F2-F3, r_s = -.28. Cronbach alphas indicated that POMS subscales possessed high internal consistencies: F1, α = .92; F2, α = .90; F3, α = .80.

In pregnancy and postpartum, a single dimension designated by negative affect (NA) was formed by summing F1 and F2 score items (F1+F2), as both factors reflected negative mood. This factor (NA) was associated with the other POMS factors as follows: pregnancy, NA(F1+F2)-F1, r_s = .77; NA(F1+F2)-F2, r_s = .97; NA(F1+F2)-F3, r_s = -.31; NA(F1+F2)-F4, r_s = .61; postpartum, NA(F1+F2)-F1, r_s = .99; NA(F1+F2)-F2, r_s = .64; NA(F1+F2)-F3, r_s = -.35. The designation of positive affect (PA) was given to the POMS vigor-friendliness factor in pregnancy and postpartum, as it reflected positive mood (Tables 1 and 2). Cronbach's alpha for NA dimension was α = .95 for pregnancy and α = .93 for postpartum.

Table 2 Factor structure (Varimax rotation) of the profile of mood states during the postpartum period (n = 233): POMS-27

			F1	F2	F3
NEGATIVE	F1:Anxiety-anger	On edge	**.780**	.209	-.106
AFFECT	VE = 15.4%	Grouchy	**.771**	.100	-.141
α = .926	α = .915	Peeved	**.704**	.147	-.133
		Nervous	**.695**	.246	-.097
		Uneasy	**.682**	.008	-.057
		Ready to fight	**.676**	.216	-.049
		Blue	**.667**	.133	-.087
		Bad tempered	**.641**	.438	-.106
		Tense	**.610**	.179	-.125
		Restless	**.606**	.053	.003
	F2:Depression-dejection	Miserable	.005	**.848**	-.079
	VE = 12.6%	Desperate	.187	**.798**	-.065
	α = .895	Unhappy	.227	**.687**	.009
		Guilty	.216	**.682**	-.029
		Helpless	.308	**.681**	-.063
		Bushed	.308	**.630**	-.155
		Deceived	.336	**601**	-.073
POSITIVE	F3:Vigor-friendliness	Sympathetic	-.112	-.159	**.765**
AFFECT	VE = 11.0%	Full of pep	-.053	-.034	**.760**
	α = .803	Efficient	-.023	.017	**-.731**
		Trusting	-.014	-.047	**.731**
		Cheerful	-.222	-.177	**.726**
		Helpful	-.024	-.018	**.724**
		Energetic	-.176	-.076	**.715**
		Good-natured	.026	-.115	**.690**
		Active	-.133	-.034	**.684**
		Considerate	-.144	-.221	**.649**

F: Factor; VE: Variance explained by the factor; POMS: Profile of Mood States. Total variance explained = 39.0%; α = Cronbach's Alpha; Excluded items (< .6).

Psychosocial variables and POMS factors

In pregnancy, NA was positively correlated with the BDI-II total score (r_s = .60), BDI-II cognitive-affective factor (r_s = .54), BDI-II anxiety-somatic factor (r_s = .54) and BDI-II fatigue factor (r_s = .40). In addition, higher levels of NA were associated with increased self-reported stress (r_s = .48), lower social support (r_s = .23) and lower quality of life (r_s = .28). Similar results were obtained when focusing on the POMS fatigue factor. By contrast, PA was negatively associated with all BDI-II variables (BDI-II total score and BDI-II factors) and psychosocial variables (stress, social support and quality of life).

In the postpartum period, identical results were obtained. NA was positively associated with BDI-II variables: total score (r_s = .64), somatic-anxiety factor (r_s = .61), cognitive-affective factor (r_s = .55) and guilt factor (r_s = .37). Higher levels of NA were again associated with increased levels of stress (r_s = .49), lower quality of life (r_s = .36) and lower social support (r_s = .19). PA was negatively associated with these variables, suggesting that mothers who experienced more postpartum PA experienced fewer symptoms of depression, lower levels of stress, more social support and a higher quality of life.

NA was positively associated (r_s = .30, p < .001) with the perception of a more difficult infant temperament (reported by mothers), while higher levels of PA were associated with a less difficult temperament (r_s = -.22, p < .001).

Cases/no cases of postpartum depression and POMS factors in pregnancy

The prevalence of PPD cases in our sample was 8.6% (n = 21/244) according to the DSM-IV classification system (55% were recurrent cases of depression, i.e., had lifetime history of depression/DSM-IV) and 17.1% according to the ICD-10 system (n = 43/251; 50% were recurrent cases of depression/ICD-10).

Total scores of POMS factors in pregnancy were compared between subjects with PPD, defined according to DSM-IV and ICD-10 coding systems, and subjects with no PPD. Cases of current depression in pregnancy were excluded from these analyses (n = 16). Results revealed that PPD/DSM-IV cases had significantly more NA, with a median (Md) of 11, interquartile range (IQR) 11-15.8 (p = .007), less PA (Md = 13; IQR = 11-15.8, p = .007) and more fatigue (Md = 5; IQR = 3-8, p = .025) in pregnancy than the group without PPD (NA: Md = 5; IQR = 1-10; PA: Md = 16; IQR = 13-18; fatigue: Md = 3; IQR = 1-5.5). Similar results were obtained when comparing PPD/ICD-10 cases with unaffected mothers.

Logistic regressions were carried out to investigate whether NA, PA and fatigue in pregnancy, excluding cases of current depression, were predictive of PPD. Results depicted in Table 3 show that NA and fatigue in pregnancy

Table 3 Logistic regression analyses of negative affect, positive affect and fatigue during pregnancy as predictors of postpartum depression (DSM-IV/ICD-10)

	Postpartum Depression									
	DSM-IV					ICD-10				
	n	ß	OR	95% CI	p	n	ß	OR	95% CI	p
NA	187/18	.736	2.09*	1.29-3.39	.003*	174/37	.744	2.11*	1.48-3.03	<.001*
PA	197/21	-.465	1.98*	1.49-2.68	.042*	185/39	2.11	1.24	0.90-1.69	.185
Fatigue	201/21	.482	1.66*	1.09-2.39	.015*	187/41	1.48-3.03	1.65*	1.23-2.22	.001*

NA: Negative affect; PA: Positive affect; n: cases of Postpartum Depression; *: Significant Statistical Results.

were predictive of PPD according to DSM-IV and ICD-10 classifications. PA was predictive of fewer cases of PPD/DSM-IV but not of PPD/ICD-10.

Discussion

Factor analysis of POMS in pregnancy and postpartum revealed two factors, anxiety and depression, which could be combined into a single dimension of "negative affect" (NA). An additional factor, vigor-friendliness, was identified that included items that corresponded to a "positive affect" (PA) dimension. A similar POMS factor structure has been described in the literature.[31] A study of a sample of current and retired lead-smelter workers[31] found that POMS factor structure included a major factor designated as "general distress", composed of items from the five original subscales (depression, anxiety, anger, fatigue and confusion), and an additional factor, entitled "psychological adjustment", that contained items from the original "vigor-activity" and "friendliness" subscales.

When studying the associations between affect dimensions and other psychosocial variables, as expected, the POMS NA dimension was positively associated with the BDI-II total score and all of its factors, while POMS PA dimension was negatively associated with these variables. Higher levels of NA were also associated with more self-perceived stress, lower social support and a lower quality of life. PA was inversely associated with these variables. These results were observed for pregnancy and postpartum and contribute to the further validation of the POMS NA and PA dimensions.

In the postpartum period, a moderate correlation was observed between NA and the mother's perception of having a difficult child. Similar results are described in the literature. A meta-analysis of 17 studies found a moderate association between mothers' depressive symptoms and the infant's temperament in the first year of life (range from r = .31 to r = .36).[32] The paper by McGrath et al.[33], which reviewed 13 studies on depression and infant temperament, revealed that most studies (10 out of 13; 76.9%) found a similar association.

As expected, a moderate negative association was observed between NA and PA dimensions (r = -.31 in pregnancy and r = -.35 in postpartum). These opposed dimensions of affect are in agreement with the circumplex model of affect, which postulates that emotions have a bipolar valence dimension and an orthogonal dimension of activation.[34] This model is supported by affective neuroscience research.[35] However, if the two dimensions were polar opposites, a coefficient correlation close to -.1 would be expected, which was not the case in our study. In fact, a possible explanation for these results is that mixed feelings can also co-occur,[36] particularly when emotions are not extreme.

Our sample showed a considerable difference between PPD/DSM-IV prevalence rates (8.6%) and PPD/ICD-10 prevalence rates (17.1%), which can be easily explained. The DSM-IV classification system mainly identifies cases of major depression, whereas the ICD-10 classification differentiates depression severity (mild, moderate and severe depression) and sub-types of depression (mild depression with somatic syndrome, moderate depression with somatic syndrome, severe depression without psychotic symptoms and severe depression with psychotic symptoms). Therefore, the DSM-IV classification system is likely to identify fewer cases of depression than the ICD-10 classification system.

When exploring the predictive value of POMS factors in pregnancy for PPD (excluding cases of current depression), NA in pregnancy was predictive of PPD, and high PA in pregnancy was predictive of a lower probability of experiencing PPD. This latter result is new and needs further exploration in future studies, but it suggests that PA in pregnancy might be protective against postpartum depression.

Our findings that NA in pregnancy predicts PPD are in agreement with systematic reviews on predictive factors for PPD, which consistently report that psychological distress in pregnancy is one of the most predictive factors for PPD, in addition to a previous history of mental health problems (particularly depression), stressful life events and low social support.[7-9] It is worth mentioning that fatigue in pregnancy also showed a predictive value for PPD. Although fatigue is a common symptom reported by mothers, particularly in the last trimester of pregnancy, a previous study showed that excessive fatigue in late pregnancy can predict depressive symptoms after delivery.[37]

By contrast, PA influences the response to stress and even modulates the expression of certain genes.[38,39] Some preliminary work in the field of molecular genetics has indicated that the protective effects of positive emotions on stress sensitivity may be influenced by the brain-derived neurotrophic factor (BDNF) Val[66]Met genotype.[39] Heterozygous Val/Met subjects showed increased social stress sensitivity compared with Val/Val subjects. Additionally, it was found that a higher experience of positive emotions resulted in a lower moderating effect of the BDNF genotype on stress sensitivity. In the case of high PA, BDNF Val/Met subjects no longer displayed a stronger NA response to social stress

than the Val/Val subjects, showing that the emotional experience of the subject at the moment of the stressor was able to neutralize, in part, the effect of the genetic modification. Thus, the impact of the BDNF genotype on stress sensitivity is conditional on the experience of positive emotions.

One limitation of the present study is the follow-up participation rate (55.4%) from the first assessment to the second assessment, which can compromise the generalization of the results. Nevertheless, this was a community based study with a large sample dimension, and 272 women participated in both assessments. Another limitation is that postpartum depression cases were not divided into recurrent depression, new onset depression (postpartum), prior (but not current) depression and healthy controls, as in the study of Phillips et al.[40] These authors found that mothers with recurrent depression showed more negative maternal attitudes than women with new-onset postpartum depression. If we had divided our sample in a manner similar to that of Phillips et al.,[40] we might have been able to explore whether NA was predictive of recurrent depression or new onset PPD. The small number of cases with depression in our study hindered the statistical analysis required to explore this hypothesis. In addition, the validity of the new POMS dimensions (negative vs. positive) was not compared to those of other scales, for example, the PANAS scale,[41] which is one of the most frequently used scales used to measure NA and PA. Future studies could explore the validity of the POMS factor structures obtained in the present study compared to that of the PANAS scale. Additionally, the protocol included single questions to assess perceived stress, social support and quality of life instead of standardized and validated scales. This procedure was followed to simplify the protocol and facilitate mother's participation. Associations between POMS dimensions and these individual items followed the direction of the associations obtained with larger instruments. Thus, these results suggest that single items can reflect the conceptual nucleus of the constructs[42].

Conclusion

Negative and positive dimensions of affect were associated with psychosocial variables in pregnancy and postpartum. Because NA reactivity may be a trait that shares a genetic susceptibility with depression, the identification of a pregnancy by instruments such as POMS may be useful for predicting PPD. In contrast, PA has been a neglected area of investigation, and its protective role against depressive symptoms may be identified and strengthened by the use of instruments that have the capability of identifying this dimension, such as POMS.

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Disclosures

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*** Significant*
**** Significant. Amounts given to the author's institution or to a colleague for research in which the author has participation, not directly to the author.*

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