

Effect of Planning, Wantedness, and Attachment on Prenatal Anxiety

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Abstract: Anxiety symptoms are common during pregnancy. However, predictors of prenatal anxiety have not been well researched. We tested a model of pregnancy anxiety conceptualized from a stress and coping framework in which pregnancy wantedness, maternal attachment style, and attachment history were expected to predict anxiety in late pregnancy. Controlling for parity and risk, maternal attachment history significantly predicted general anxiety symptoms. Current relationship and/or attachment difficulties predicted general anxiety and prenatal anxiety subdimensions. Pregnancy wantedness significantly predicted one pregnancy-specific anxiety dimension. Pregnancy wantedness, suboptimal personal attachment experiences, and current relationship and/or attachment difficulties are risk factors for prenatal anxiety.

Keywords: Anxiety, Prenatal Anxiety, Wantedness, Maternal Attachment Style

Approximately four million U.S. women give birth each year (American Pregnancy Association, 2010). Improved understanding of pregnancy's unique vulnerabilities may offer opportunities to improve the physical and psychological health of mothers and infants. Among the psychological concerns of childbearing women is anxiety, which affects 30% of U.S. women during their lifetime (Kessler et al., 1994; Regier, 1990) and has a peak age of onset during the childbearing years, in the mid to late 20s (Brandes, Shores, & Cohen, 2004). The harmful effects of short and long-term anxiety on women are both physical and psychological. Generalized anxiety has been linked to less effective interpersonal relationships (Turk, Mennin, Fresco, & Heimberg, 2000), low self-esteem, and problems with interpersonal boundaries (Eng & Heimberg, 2006; Pincus & Borkovec, 1994). Correspondingly, anxiety experienced during pregnancy has important implications for the mother-infant relationship (Leerkes, Parade, & Gudmundson, 2011; Tsartsara & Johnson, 2006).

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Though research has demonstrated that women in the later stages of pregnancy are at higher-risk for prenatal anxiety, clear definitions of prenatal anxiety and effective assessment thereof are only now emerging. Lazarus and Folkman's (1984) cognitive appraisal model of stress theorizes that cognitive evaluation, coping, social support, and adaptation mediate the stress response. Distress is theorized to occur when one's appraisal of a threat exceeds perceived ability to cope. Applied to childbearing, specific appraisals of pregnancy itself could in turn predict stress outcomes, including anxiety. Appraisals include (though are not limited to) -pregnancy wantedness, maternal attachment style, and maternal attachment history.

Our primary aims were to 1) test predictors of prenatal anxiety and, 2) distinguish predictors of general anxiety from those of pregnancy-specific anxiety. Predictors included pregnancy wantedness, maternal attachment style, and attachment history, and outcomes included general anxiety and pregnancy specific anxiety. Based on available research presented later in this paper, we expected that women reporting low pregnancy wantedness would report higher levels of general and specific anxiety. We expected that a history of suboptimal personal attachment experiences and current relationship and/or attachment difficulties would predict higher rates of anxiety.

Pregnancy wantedness

The degree to which the pregnancy is wanted has critical implications for general appraisal of the pregnancy itself and related mood. Though concerns over conceptualizing pregnancy "wantedness" have been identified (Hummer, Schmertmann, Eberstein, & Kelly, 2004), the National Survey of Family Growth (National Center for Health Statistics, 1995) classifies unwanted pregnancies as those that occur when the mother did not want a pregnancy anytime in the future prior to becoming pregnant. In addition, wantedness represents positive and negative feelings that occur in response to a pregnancy (Bachrach & Newcomer, 1999; Miller, Sable, & Csizmadia, 2008; Stanford, Hobbs, Jameson, DeWitt, & Fisher, 2000) and have been grouped into emotions related to being pregnant, having a baby, and becoming a parent (Crowe, 1985). In contrast, "unplanned" pregnancy describes one that occurs sooner than anticipated.

Unwanted pregnancies have been linked to maladaptive maternal behaviors and increased stress (Gurung, Dunkel-

Schetter, Collins, Rini, & Hobel, 2005). In turn, unwanted pregnancy may negatively influence mother-infant attachment and longer-term relationships as well as increase risk of low birth weight and infant mortality (Barber, Axinn, & Thorton, 1999; Hummer et al., 2004; Marsiglio & Mott, 1988; Sable et al., 1997), and may have long term negative effects on the child's self-esteem (Axinn, Barber, & Thorton, 1998).

The role of maternal attachment style and history

Empirical research indicates that, opposed to genetic influences, early learning and relationship experiences strongly contribute to the development and maintenance of affective symptoms such as anxiety (George, Kaplan, & Main, 1984, 1985; Hesse, 1999; Hudson & Rapee, 1997; Main & Goldwyn, 1984, Main, Goldwyn, & Hesse, 2003). Because early experiences have been theorized to produce individual conceptual models for expectations of others and views of the self (Bowlby, 1973; Green & Piel, 2002), suboptimal early maternal-child attachment has been associated with long-term relationship problems including difficulty with trust, intimacy, and boundaries (Harter, 2000). Theoretically, difficulty establishing secure attachment bonds in infancy leads to heightened anxiety, and mothers with a personal history of either low maternal care (deprivation) or overprotection (over involvement) may find pregnancy and motherhood particularly stressful and anxiety provoking. As well, attachment experiences may have a significant role in the formation of emotion regulation capacities (Cassidy, 1994; Thompson, 1994).

Available research lends support to the theoretical association between early attachment experiences and development of anxiety. For example, early home environments characterized by low care and high overprotection have been associated with the development of adult anxiety in Caucasian Americans (Arrindell et al. 1989; Bennet & Stirling, 1998; Leon & Leon, 1990; Parker, 1979). Alexander, Feeney, and Noller (2001) reported that relationship anxiety and current attachment difficulties predicted adjustment difficulties to parenthood. Along similar lines, research with non-clinical populations has demonstrated that positive memories of being parented and current secure adult attachment buffer against anxiety (Carter, Sbrocco, Lewis, & Friedman, 2001; Bennet & Stirling, 1998; Mickelson, Kessler, & Shaver, 1997; Monk, Leight, & Fang, 2008).

Pregnancy-specific anxiety

Studies on mood symptoms during pregnancy have often lumped pregnancy related anxiety with depression, stress, or general anxiety, rather than treating it as a separate construct. As a result, it is difficult to draw firm conclusions on prenatal anxiety and risk factors thereof. It has, however, been generally assumed that anxiety and depression are highly comorbid, with one meta-analysis reporting comorbidity between depression and anxiety to be as high as 42-100% in patients with depression and 17-65% in patients with an anxiety disorder (Dobson & Cheung, 1990), leading to questions on how specific mood dimensions relate to maternal and child outcomes. For example, some studies have indicated that child outcomes may relate to prenatal depression but not anxiety (Abrams, Field, Scafidi, & Prodromidis, 1995; Dieter et al., 2001; Field, Diego, & Hernandez-Reif, 2003) whereas others have reported that anxiety rather than depression (Beck, 2004; Teixeira, Fisk, & Glover, 1999; Roesch, Dunkel-Schetter, Woo, & Hobel, 2004) predicts outcomes. Equivocal findings may result from differing measurements of maternal depression and anxiety differs across studies, with some using global measures and others using measures tailored to pregnancy concerns (e.g., Cox, Holden, & Sagovsky, 1987; Rini, Dunkel-Schetter, Wadhwa, & Sandman, 1999; Van den Bergh, 1990).

To draw clear conclusions across studies, then, clearly defining mood constructs in pregnancy is essential. Standley et al. (1979) distinguished prenatal anxiety as a unique pregnancy related condition involving general anxiety as well as two pregnancy-specific dimensions, "anxiety about pregnancy and childbirth," and "anxiety about future parenting." Other authors have identified pregnancy specific fears including those related to delivery, fulfilling the maternal role, pain, concerns of health for baby and self, changes in personal life, and loss of control (Areskog, Uddenbert, & Kjessler, 1981; Beck et al., 1980; Burstein, Kinch & Stern, 1974; Elliot et al., 1983; Leifer, 1977; Rizzardo et al., 1985; Sjögren, 1997).

Supporting the importance of pregnancy-specific anxieties, Huizink, Robles de Medina, Mulder, Visser, & Buitelaar (2003) found that only 8-27% of the variance in pregnancy anxiety was explained by general anxiety and depression. Similarly, pregnancy-specific anxiety measures have been found to better predict adverse birth outcomes than general anxiety (DiPietro, Ghera, Costigan, & Hawkins, 2004; Krammer et al., 1993; Roesch

et al., 2004; Wadhwa, Sandman, Porto, Dunkel-Schetter, & Garite, 1993), with those outcomes including, for example, shorter gestation (Rini et al., 1999; Wadhwa et al., 1993), lower infant mental and motor developmental scores (Allen, Lewinsohn, & Seeley, 1998), poor attention regulation (Huizink, Robles de Medina, Mulder, Visser, & Buitelaar, 2002), difficult infant temperament (Austin, Hadzi-Pavlovic, Leader, Saint, & Parker, 2005; Huizink, Mulder, Robles de Medina, Visser, & Buitelaar, 2004; Werner et al., 2007), and later behavioral and emotional problems (Glover & O'Connor, 2002; O'Connor, Heron, Glover, & the ALSPAC study team, 2002). The mechanism for these effects has been hypothesized as related to an increased release of cortisol and catecholamines (Beck, 1998; Beck, 2004; Benedict, Paine, & Paine, 1999) affecting fetal central nervous system development (Beck, 2004; Bennett, Einarson, & Taddio, 2004; Buss, Davis, Muftuler, Head, & Sandman, 2010; Rees, Harding, & Walker, 2008).

Anxiety in pregnancy also has important consequences for mothers. For example, Grant, McMahon, and Austin (2008) found that women with pregnancy-specific anxiety were significantly more likely to meet diagnostic criteria for anxiety or mood disorder during the first year postpartum. Other critical outcomes of prenatal anxiety include fear of childbirth (Andersson et al., 2003), negative expectations of motherhood (Bibring, Dwyer, Huntington, & Valenstein, 1961; Hart & McMahon, 2006), difficulty adjusting to the maternal role (Barnett, Schaafsma, Guzman, & Parker, 2007), and the development of postpartum anxiety and depressive symptoms (Austen, Tully, & Parker, 2007; Heron et al., 2004; Matthey, Barnett, Howie, & Kavanagh, 2003; Robertson, Grace, & Wallington, 2004; Teissedre & Chabol, 2003). In terms of the maternal role, prenatal anxiety has been shown to negatively influence the mother-infant relationship (Dennis & Stewart, 2004; Gaffney, 1986; Laucht, Esser, & Schmidt, 2001; Leifer, 1980; Matthey, Silove, & Barnett, 1999; Robertson et al., 2004), and to negatively influence parenting behaviors such as warmth and boundary setting (e.g., Ainsworth, Blehar, Waters, & Wall, 1978; Hubbs-Tait, Culp, Culp, & Miller, 2003; Landry, Smith, Miller-Loncar, & Swank, 1997).

Methods

Participants and recruitment

Sixty pregnant women were recruited from obstetric clinics ($n = 15$; 25%), prenatal classes ($n = 10$; 16.7%), and electronic bulletin boards ($n = 35$; 58.3%) in the Pacific Northwest. There were no significant differences on demographic variables by recruitment site. Racial distribution of participants were as follows: 82% Caucasian, 9% Asian American, 5% mixed, 2% Hispanic, 2% other. This racial distribution is reflective of the population of the recruitment region. The average chronological of participants was 28 years ($M = 27.8$, $SD = 5.11$) and the average time of gestation was 27 weeks ($M = 27.4$, $SD = 5.20$). Most participants ($n = 34$; 56.6%) reported annual income in the 25,000 - 35,000 range. Education levels were as follows: professional degree ($n = 4$; 6.6%), Bachelors degree ($n = 13$; 21.6%), Associates degree ($n = 12$; 20%), some college ($n = 17$; 28.3%), high school graduate ($n = 10$; 16.6%), and completed 8 -12 grade ($n = 4$; 6.6%). Due to recruitment from the only obstetrics clinic in the region, with a large proportion of higher-risk cases, $n = 20$ (33%) of participants reported their pregnancy as higher-risk.

Measures

Demographics. Participants reported their age, weeks' gestation, educational level, parity, pregnancy risk status (higher vs. low-risk), income, and relationship status.

Table 1
Participant Characteristics/Demographics broken down by Recruitment Site

	Recruitment Site	
	OB/GYN Clinic ($n = 25$)	Electronic ($n = 35$)
	<i>M</i>	<i>M</i>
Age	27.89	26.08
Maternal age at recruitment	28.33	29.31
Income	2.6	2.05
Parity	1.2	1.2
Pregnancy related anxiety total	23.92	20.54
PRAQ-R Total	56.16	53.14
HADS-A	8.6	8.23
High Risk	32%	34.3%

Income of 1 = 0 – 25,000

4 = 50,000+

PRAQ-R = Pregnancy related anxieties – revised

HADS-A = General anxiety symptoms

Explanatory/Predictor Variables. Consistent with previous literature in which pregnancy wantedness is assessed with a single dichotomous item (Kroelinger & Oths, 2000; Marsiglio & Mott, 1988; Miller et al., 2008; Zabin, Astone, & Emerson, 1993), we measured pregnancy wantedness with the question, “Are you glad to be having this baby?”

The 25-item *Parental Bonding Inventory* (PBI; Parker 1979) was used to measure maternal attachment history. The PBI assesses two dimensions of perceived parental bonding: care and overprotection (Parker, 1979). Items are rated from 0 (*very unlikely*) to 3 (*very likely*), with the range of possible scores on the *care* dimension 0-36 and 0-39 on the *overprotection* dimension. Scores were summed to form one total score. The PBI has been reported acceptable psychometric characteristics (Favaretto, Torresani, & Zimmerman, 2001; Lovejoy, Weis, O’Hare, & Rubin, 1999; Parker, Tupling, & Brown, 1979).

The *Experiences in Close Relationships-Revised* (ECR-R; Fraley, Waller, & Brennan, 2000) is a 36-item questionnaire assessing how individuals experience emotionally intimate relationships. It assesses two broad dimensions (*anxiety* and *avoidance*) theoretically underlying adult attachment (Brennan, Clark, & Shaver, 1998; Kurdek, 2002). Individuals rate how well items describe their feelings in romantic relationships from 1= *strongly disagree* to 7= *strongly agree*. Scores from the two dimensions were summed to form one total score. The ECR-R has shown satisfactory psychometric characteristics (Fraley et al., 2000; Lu, Huo, & Gao, 2006).

Outcome variables. The Hospital Anxiety and Depression Scale (HADS) contains two, 7-item subscales, one measuring depression (HADS-D), and one assessing general anxiety symptoms (HADS-A; Zigmond & Snaith, 1983). Items focus primarily on cognitive rather than physical symptoms, making this measure appropriate for pregnant participants. Responses are rated on a four-point (0-3) response category, with range of possible scores 0-21. The HADS-A is widely used with good psychometric characteristics (e.g., Herrmann, 1997; Van Bussel, Spitz, & Demyttenaere, 2009).

Two measures of *pregnancy specific* anxiety were used. The 10-item *Pregnancy-related Anxiety Scale* (PRA; Rini et al., 1999) assessed how much participants worried or felt concerned about their health, their baby’s health, labor, and caring for a baby. Respondents rate items on a 1 (*never or not at all*) to 4 (*a lot of the*

time or very much) scale, and item scores are summed to produce a total scale score. No published psychometric data were found, though the questionnaire has been widely used in studies assessing prenatal anxiety (Gurung et al., 2005; Harville, Savitz, Dole, Herring, & Thorp, 2009; Mancuso, Schetter, Rini, Roesch, & Hobel, 2004).

The Pregnancy Related Anxieties Questionnaire – Revised (PRAQ-R; Van den Bergh, 1990) is a 20-item questionnaire also assessing pregnancy anxiety. Responses are rated on a seven-point scale ranging from “Does absolutely not apply” to “Applies very well.” Its five subscales include *concern during pregnancy*, *fear for the integrity of the baby*, *fear of delivery*, *fear of changes*, and *concern about the future*. Subscale and the total scale score have satisfactory psychometric characteristics (Van Bussel et al., 2009).

Procedure

Before or after a scheduled prenatal visit, expectant mothers recruited from clinics completed a consent form, followed by questionnaires with demographic questions and major study measures. Clinic participants completed the survey anonymously and returned the survey to clerical staff. Electronic recruitment involved posting a study announcement and link to study forms on a regional parenting website. Mothers received a \$15 gift card for study completion.

Results

Statistical approach

Analyses were conducted using STATA (version 11.0, College Station, Texas). *P* values of $<.05$ were considered statistically significant. Analyses indicated a power of 78% in detecting differences at the 5% level and of medium effect size (Cohen, 1992) in a sample of 60 women.

Preliminary analyses

Depending on the type of data (continuous vs. categorical), *t*-tests, correlations, or one-way analyses of variance were used to test for effects of demographics on measured variables. No effects of recruitment site were found. Parity and risk status (low- vs.

higher-risk) had significant associations with the Pregnancy Related Anxieties Questionnaire – Revised (PRAQ-R) total and subscale scores and were used as covariates in major analyses. Correlations (Pearson's r) between primary outcome variables (HADS-A and HADS-D, PRA [pregnancy-related anxiety], PRAQ-R [pregnancy-related anxiety], and EPDS) were calculated, and correlations over 0.7 were considered for data reduction.

Table 2
Correlations between Outcome Variables

	1	2	3	4	5	6	7	8	9	10
1. PRA Total	--	.66**	.32**	-.69**	-.52**	.41**	.56**	.18	.40**	.30**
2. PRAQ-R Total		--	.71*	-.76**	-.74**	.66**	.83**	.34**	.35**	.37*
3. Pregnancy concern			--	-.42**	-.51**	.45**	.61**	.14	.44**	.56**
4. Integrity of baby				--	.58**	-.39**	-.57**	0.30*	0.27*	-.15
5. Delivery					--	-.38**	-.66**	-.17	-.29	-.28*
6. Changes						--	.52**	.04	.27	.28*
7. Future							--	-.19	.38**	.47**
8. Compare								--	-.20	-.26*
9. HADS-A									--	.85**
10. EPDS										--

The EPDS was dropped due to high correlations with other outcome variables ($>.80$). The PRAQ-R subdimensions *concern during pregnancy*, *fear for the integrity of the baby*, *fear of delivery*, *fear of changes*, and *concern about the future* were log transformed to correct for non-normality. The PRA subdimensions *maternal health*, *baby's health*, *labor*, and *caring for a baby* were dropped due to correlations of $>.7$ with total score.

Major analyses

Hierarchical multiple regression equations with simultaneous variable entry were used to test predictors of primary outcomes (general anxiety, pregnancy specific anxiety -- two scales). In cases where the explanatory variables significantly predicted overall scale scores, post-hoc analyses were conducted on subscale scores. Due to their significant association with measured variables, parity and risk status were entered as control variables in each equation.

To test the predictive value of *pregnancy wantedness* on the three anxiety scale summary scores (HADS-A, PRA, PRAQ-R), three separate regression equations were run with parity and risk status (control variables) entered first, followed by pregnancy wantedness. The first equation with HADS-A scores as the outcome was non-significant, $F(3, 56) = 2.25, p = n.s.$ The second equation with PRA (pregnancy-specific anxiety) as the outcome was also non-significant, $F(3, 56) = 2.65, p = n.s.$

The third equation with PRAQ-R (pregnancy-specific anxiety) was significant, $F(3, 56) = 3.17, p = .03$, and the full set of predictors accounted for 14.5% of the variance, with first time mothers reporting more anxious symptoms ($\beta = -.3443, -2.63, p < .05$).

In post hoc analyses on PRAQ-R subscales, the explanatory variables did not significantly predict *concern about the pregnancy* [$F(3, 56) = 0.37, p = n.s.$], *concern about the integrity of the baby* [$F(3, 56) = 1.38, p = n.s.$], *fear about the delivery* [$F(3, 56) = 1.85, p = n.s.$] or *fear of changes* [$F(3, 56) = 0.57, p = n.s.$]. The equation with PRAQ-R subscale *concern about the future* was significant, $F(3, 56) = 3.38, p < .05$, and the predictors (parity, risk status, wantedness) accounted for 15.3% of the variance. First-time mothers ($\beta = -.30, -2.32, p < .05$) and those reporting low wantedness ($\beta = -.26, 2.02, p < .05$) reported higher anxiety.

To test the predictive value of *suboptimal personal attachment experiences*, including *low care* and *high overprotection* on the three anxiety scale summary scores (HADS-A, PRA, PRAQ-R), three separate regression equations were run with parity and risk status entered first, followed by PBI subscales low care and high overprotection. The first equation with HADS-A scores as the outcome was significant, $F(4, 55) = 3.77, p < .05$. The full equation accounted for 21.5% of the total variance. No specific explanatory variable uniquely predicted higher general anxiety.

The second equation with PRA (pregnancy-specific anxiety) as the outcome was non-significant, $F(4, 55) = 2.05, p = n.s.$, as was the equation with PRAQ-R (pregnancy-specific anxiety) was non-significant, $F(4, 55) = 1.79, p = n.s.$

Table 3

Regression of Analyses for Wantedness, Attachment History, Current Attachment Style and Significantly Correlated Anxiety Variables

Model	R ²	Variables	Beta	t	P
PRA Total 1	0.293	Current Attachment	0.531	4.61	0.000
		Parity	-0.274	-2.26	0.027
		Risk status	0.133	-1.11	0.272
PRAQ-R Total 1	0.145	Wantedness	0.224	1.78	0.080
		Parity	-0.344	-2.63	0.011
		Risk status	0.142	-1.07	0.0289
2	0.336	Current Attachment	0.502	4.49	0.001
		Parity	-0.429	-3.66	0.001
		Risk status	0.188	-1.61	0.113
Pregnancy concern 1	0.165	Current Attachment	0.412	3.29	0.002
		Parity	-0.142	-1.08	0.284
		Risk status	0.088	-0.67	0.504
Integrity of the baby 1	0.242	Current Attachment	-0.464	-3.92	0.000
		Parity	0.313	2.52	0.015
		Risk status	-0.209	1.69	0.096
Fear of delivery 1	0.130	Current Attachment	-0.230	-1.80	0.078
		Parity	0.340	2.53	0.014
		Risk status	-0.086	0.64	0.523
Fear of changes 1	0.135	Current Attachment	0.336	2.64	0.011
		Parity	-0.222	-1.66	0.102
		Risk status	0.184	-1.38	0.174
Worry of future 1	0.153	Wantedness	0.253	2.02	0.048
		Parity	-0.302	-2.32	0.024
		Risk status	0.000	0.01	0.996
HADS-A 1	0.215	Low Care	-0.296	-1.36	0.180
		Overprotection	0.129	0.59	0.555
		Parity	0.061	0.48	0.632
		Risk status	-0.131	-1.03	0.309
2	0.428	Current attachment	-0.629	6.07	0.000
		Parity	-0.050	-0.46	0.648
		Risk status	0.301	-2.77	0.007

The final regression equations tested the hypothesis that current attachment/relationship difficulties would predict global and pregnancy-specific anxiety. The explanatory variables (risk, parity, current attachment/relationship difficulties reflected in summed anxiety and avoidance) significantly predicted HADS-A (general anxiety) symptoms, and the full equation accounted for 42.7% of the variance. Higher risk was the only explanatory variable to uniquely predict higher anxiety ($\beta = .30, -2.77, 2.02, p <$

.05). The second equation on PRA (pregnancy-specific anxiety) scores was significant, $F(3, 56) = 7.74, p < .001$, and accounted for 29.3% of the variance. First-time mothers reported higher PRA scores ($\beta = -.274, -2.26, p < .05$).

The third equation with PRAQ-R (pregnancy-specific anxiety) was significant, $F(3, 56) = 9.45, p < .001$, and the full equation accounted for 33.6% of the variance. First time mothers reported higher anxiety ($\beta = -.429, -3.66, p < .05$). In post-hoc analyses on the five PRAQ-R subscales, explanatory variables (risk, parity, summed anxiety and avoidance attachment subscale scores) significantly predicted *concern during pregnancy*, $F(3, 56) = 3.68, p < .05$, accounting for 16.5% of the variance, with the attachment variable the only unique predictor ($\beta = .412, 3.29, p < .001$).

Specifically, more anxious and avoidant attachment predicted higher concern during pregnancy. The same explanatory variables significantly predicted *fear for integrity of the baby*, $F(3, 56) = 6.28, p < .001$, accounting for 25.2% of the variance. In the overall equation, multiparity significantly predicted *fear for the integrity of the baby* scores ($\beta = .313, 2.52, p < .05$). Explanatory variables significantly predicted *fear of delivery*, $F(3, 56) = 2.78, p < .05$, accounting for 12.9% of the variance, with multiparity predicting higher *fear of delivery* scores ($\beta = .340, 2.53, p < .05$). Explanatory variables significantly predicted *fear of changes*, $F(3, 56) = 2.90, p < .05$, accounting for 13.5% of the variance, with the attachment variable the only unique predictor ($\beta = .336, 2.64, p < .05$). Specifically, more anxious and avoidant attachment predicted higher fear of changes. The final equation with *concern about the future* as the outcome was significant, $F(3, 56) = 7.98, p < .001$, accounting for 30% of the variance. First-time mothers reported higher *concern about the future* ($\beta = -.378, -3.14, p < .05$).

Discussion

This study confirms previous findings suggesting that appraisals of pregnancy could predict stress outcomes (Saisto, Salmela-Aro, Nurmi, & Halmesmaki, 2008; Terry, 1991), and outcomes in the current study included global and pregnancy-specific anxiety. Appraisals including attachment history, current attachment style, and wantedness significantly predicted both global and pregnancy-specific anxiety, and several relationships held after controlling for pregnancy risk and parity. (Because the HADS-D depression scale was dropped in the process of data reduction, the remaining discussion will focus on anxiety symptoms.)

The model with PBI (history of attachment) combined subscales of low care and high overprotection predicted general anxiety symptoms in late pregnancy. This finding supports previous research implicating negative early attachment experiences in heightened levels of anxiety in later development (Bowlby, 1973; Harter, 2000; Hesse, 1999). However, the PBI was but one variable in the explanatory model, and none of the variables uniquely predicted anxiety, indicating that its influence depends on the presence of other conditions -- in this case, parity and higher-risk status. Across life phases, attachment history may be a more or less critical or unique driver of global anxiety, which remains to be further tested.

In contrast to the significant predictive effect of maternal *history* of attachment difficulties on *global* anxiety, current perceived relationship and/or attachment difficulties as measured by the ECR-R significantly predicted dimensions of *pregnancy-specific anxiety*, specifically, the PRAQ-R subdimensions *concern during pregnancy* and *fear of changes*. The *concern during pregnancy* scale measures concern over psychological changes in pregnancy (e.g., sudden mood changes) whereas the *fear of changes* scale measures concerns over physical changes (e.g. difficulty regaining pre-pregnancy body shape). The predictive effect of the ECR-R on *fear of changes* makes intuitive sense from the perspective that an existing view on romantic relationships characterized by insecurity would presumably be associated with a concern over maintaining relationship stability. In the case of an impending and stressful transition such as becoming a mother, concerns related to relationships with intimate partners may be foremost in mothers' minds because they may rely on their partners as primary or most readily available support sources. The predictive value of maternal views on their current relationship on pregnancy-specific anxiety was consistent with predictions drawn from a stress and coping framework (Lazarus & Folkman, 1984), in which appraisal of available resources, in this case, current attachment relationships, influences the stress response.

Low pregnancy wantedness, measured using a single item drawn from previous research, significantly predicted the pregnancy anxiety subdimension *concern about the future*, confirming our hypothesis that women reporting low pregnancy wantedness would be at higher risk for anxiety. In addition, our finding supports research indicating that early attitudes toward the pregnancy significantly predicted anxiety (Gurung et al.,

2005), though in this study, anxiety was restricted to aspects of the pregnancy itself. Because first-time mothers also had significantly higher scores on the *concerns about the future* pregnancy-specific anxiety subscale, it can be said that first-time mothers with unwanted pregnancies are especially uneasy regarding their ability to sustain care for their infants in the future.

Although the measured variables of pregnancy wantedness, maternal attachment history, and current attachment/relationship difficulties significantly predicted both global and pregnancy-specific anxiety in several cases, it must be noted that fixed or medical dimensions of pregnancy, i.e., risk and parity, also significantly predicted prenatal anxiety. In terms of *global* anxiety, higher-risk status emerged as the only medical variable to predict higher HADS-A scores, suggesting that higher risk is a sufficiently powerful concern to raise general anxiety levels. The nature of concerns emanating from higher-risk pregnancy status may have been captured in the dimensions measured by our pregnancy-specific anxiety outcome measures such as *fear for integrity of the baby* or *concerns about the future*, and for that reason, higher-risk status did not predict either pregnancy-specific scale score.

Parity, a fixed variable, also predicted anxiety, but only *pregnancy-specific* anxiety. Specifically, first time mothers had higher PRAQ-R total and *concern about the future* subscale scores than multiparous mothers. This finding comes as little surprise when considering that first-time motherhood is essentially a journey into the unknown. In contrast, however, multiparity was significantly associated with increased fear for the integrity of the baby and fear of delivery. In interpreting that outcome, we conducted a Chi-square analysis on parity and risk status, which revealed no significant differences between groups. We can only speculate that the increased anxiety on these subdimensions among multiparous mothers related to previous negative birth experiences.

Although we identified measurable and fixed predictors of both global and pregnancy-specific anxiety, limitations of the study must be acknowledged. The study's cross-sectional design could not capture the potential effects of low- vs. higher pregnancy wantedness as they might influence anxiety over time. Also, though we drew from measure of pregnancy wantedness from previous studies, the concept remains to be better defined with additional research. There was a wide range of gestational age (18

– 41wks), which has been associated with psychological adjustment to pregnancy (Berryman & Windridge, 1996; Bloom, 1995; Grace, 1989; Lerum, Major, & LoBiondo-Wood, 1989), but we should state that our preliminary analyses revealed no significant correlations between gestational age and measured variables. Retrospective self reports of attachment history may be biased, particularly considering the connection between memory loss and anxiety (Canter-Graae, Cardenal, Ismail, & McNeail, 1998; Delgado-Rodriguez, Gomez-Olmedo, Bueno-Cavanillas, Garcia-Martin, & Galvez-Vargas, 1995; Mackenzie & Lippman, 1989). All measures were self report and focused on anxiety symptoms rather than anxiety diagnoses.

Despite the limitations, important clinical and research implications can be drawn from our study data. From our results, it can be said that pregnancy wantedness and current attachment concerns relate to both global and pregnancy-specific anxiety. In terms of global anxiety, which tends to be the focus of clinical assessment and treatment, two predictors emerged as important and included mothers' personal attachment histories of low care and high overprotection and higher-risk pregnancy status, and the combination of these variables was essential in producing a significant equation. In clinical treatment of anxiety symptoms in childbearing women, focus on attachment history may be especially critical because this risk variable, left unresolved, may place women at risk for persistent anxiety, emotions that could carry from the current pregnancy into the parenting experience and even into subsequent pregnancies. Somewhat in contrast, higher-risk pregnancy status has a good chance of successfully resolving itself once the pregnancy has passed. Still, in clinical encounters involving discussions of pregnancy risk, emphasis should be placed on relative risk rather than inevitability, and support should be provided to help mothers deal with the unsettling sense of the unknown that can accompany news of possible negative pregnancy or birth outcomes.

Similar to higher-risk status, pregnancy-specific anxiety may resolve once the pregnancy has passed, and whether pregnancy-specific anxiety tends to recur across pregnancy is an important question for further research, particularly in light of our finding on higher pregnancy-specific anxiety in multiparous mothers. Even if pregnancy-specific anxiety were to remit at some point postpartum, clinical attention on this phenomenon is important because it has ramifications for the birth experience and even for birth outcomes (e.g., Orr, Reiter, Blazer, & James, 2007; Soliday,

2012). In addition, deliberate efforts to identify anxiety symptoms are critical because it has been found that mothers reporting anxiety symptoms were significantly less likely than those with depressive symptoms to seek professional help (Woolhouse, Brown, Krastev, Perlen, & Gunn, 2009). For this reason, identification of pregnancy-specific anxiety and offering appropriate services, which might best be tailored to the nature of the pregnancy-specific concerns, early in pregnancy could lead to healthier pregnancies overall and better birth outcomes.

Based on this study, mothers who reported lower pregnancy wantedness may be at special risk for negative outcomes previously associated with lower wantedness (e.g., Barber et al., 1999; Gurung et al., 2005; Hummer et al., 2004; Marsiglio & Mott, 1988; Sable et al., 1997), and also for the added risks associated with increased pregnancy-specific anxiety. One mechanism by which lower wantedness may exert its influence on pregnancy and birth outcomes could be endocrine effects associated with increased anxiety, and that question warrants further study. In the immediate term, due to its association with more negative mood dimensions as was found in this study, it is worth re-stating that pregnancy *planning*, sometimes the focus of clinical assessment, and pregnancy *wantedness* are different. The difference between these constructs is reflected in distinct research definitions and measurement, and though wantedness of a pregnancy is indeed a sensitive subject to approach with mothers, clear wording in clinical assessment should be emphasized.

In sum, in handling emotional issues in pregnancy, the focus is often on global symptoms and on theoretically immutable physical parameters of pregnancy such as pregnancy risk and parity. This study's results indicated a more complex picture involving the mother's historical and current psychological context. In other words, focusing solely on physical variables and on global anxiety stands to have only limited effect in addressing the potentially wide ranging effects of prenatal maternal anxiety. Clearly distinguishing between pregnancy wantedness and pregnancy planning and supporting mothers surrounding "unknown" aspects of pregnancy risk are two clinical concerns that can be addressed in treatment easily and at no cost. Longer term questions of the persistence of global and pregnancy-specific anxiety, its results, and related treatments remain to be addressed.

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