

Threat Appraisal, Coping, and Emotions Across Pregnancy Subsequent to Perinatal Loss

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Abstract:

Background- Pregnancies after perinatal loss are known to be anxiety-filled. Stress in pregnancy and the response to it, often seen as anxiety and depression, have known negative consequences for obstetric outcomes, parenting, and infant behaviors. Women have reported fluctuating emotions in response to events in their subsequent pregnancies, but these pregnancies have not been studied longitudinally.

Objectives- To test Lazarus' theory of stress, coping, and emotions in this population, and to understand the patterns of threat appraisal, coping, and emotional states of women across pregnancy after perinatal loss.

Methods- In this predictive correlational study, 82 women pregnant after loss (PAL) were followed, and the study was guided longitudinally by Lazarus' theory of stress, coping, and emotions. Obstetric and loss history, and assigned fetal personhood were gathered at intake (Time 1). Measures completed at 10-week intervals (one time each trimester) included Moneyham Threat Index (threat appraisal), Ways of Coping Checklist-Revised (relative coping), Pregnancy Anxiety Scale (pregnancy anxiety), Multiple Affect Adjective Checklist-Revised (emotional states), and Stress in Life (stress). Time 3 sample size was 70.

Results- Threat appraisal was correlated with assigned fetal personhood and gestational age of past loss. Pregnancy subsequent to loss was perceived as a threat, and threat appraisal strongly predicted pregnancy anxiety. Pregnancy anxiety, reported at moderate levels on average, decreased over time; threat appraisal, coping, and other emotions were stable across pregnancy. Coping did not mediate these effects, but relative coping was correlated with emotional status as theorized, with problem-focused coping used more than emotion-focused coping.

Discussion- Women find pregnancy after loss stressful and a threat, and this appraisal remains across pregnancy. Because pregnancy anxiety is common, and highest in early pregnancy, providers should address worries and fears with all women early in PAL. Interventions must be tested in future studies.

Article:

Taking on a new pregnancy after previous loss (PAL) is fraught with apprehension, fear of additional loss, and a sense of failure (Côté-Arsenault, Bidlack, & Humm, 2001; Franche & Mikail, 1999). Heightened negative emotions, most notably pregnancy anxiety, are known characteristics of women's pregnancy experiences when one or more of their past pregnancies

ended in loss (Côté-Arsenault, 2003). These negative emotions are a concern as they are often indicative of maternal stress (Gennaro & Fehder, 1996). High levels of prenatal maternal stress have been associated with adverse obstetric, neonatal, and parenting consequences (Heller & Zeanah, 1999; Hughes, Turton, Hopper, McGauley, & Fonagy, 2001; O'Connor, Heron, & Glover, 2002).

It is critical to understand key elements of maternal stress and possible mechanisms that impact and predict differences in emotions, and ultimately, to insure that these women and their families receive supportive and responsive care during their pregnancies after loss. Cognitive appraisal of stress and its relationship to emotions and adaptation provide the theoretical foundation for this study (Lazarus, 2000). Threat, changes and patterns of emotions, sense of risk, and coping strategies over time have not been studied; thus this investigation was undertaken.

REVIEW OF THE LITERATURE

Pregnancies end unsuccessfully at a rate of more than 2,000,000 per year in the United States (Gutmacher Institute, 2006). These perinatal losses, referred to as miscarriage, ectopic pregnancy, stillbirth, and neonatal death, occur spontaneously in 20% to 25% of all conceptions, at any time from conception through the first 28 days of life, with the majority occurring in the first trimester of pregnancy (Gemma & Arnold, 2002). Responses to these losses range from acceptance, to disappointment, to a deep sense of loss (Swanson, 1999; Wheeler, 2000). The anticipated child is often mourned and never forgotten. Pregnancy is never experienced in the same way after enduring the loss of a wished-for child (Côté-Arsenault & Mahlangu, 1999).

Pregnancy After Perinatal Loss

The majority of women who have perinatal losses do have subsequent pregnancies, and their attitudes about embarking on a new pregnancy vary (Caelli, Downie, & Letendre, 2002). First pregnancies are greeted commonly with excitement about being pregnant and having a baby, but women with past losses know that sometimes pregnancies end unsuccessfully so they approach pregnancy with some level of reserve and sense of vulnerability. Emotions are often withheld or moderated (Côté-Arsenault & Marshall, 2000). The experience of loss affects one's view of pregnancy. To these women, pregnancy no longer equals baby because the concepts of both birth and death are now components of pregnancy (Côté-Arsenault & Freije, 2004). Women with a history of perinatal loss are more anxious about their pregnancies and resultant outcomes than multigravidas who have not experienced perinatal loss (Côté-Arsenault, 2003). Some scholars (Franche & Mikail, 1999; Swanson, 1999; Theut et al., 1992) have suggested that one's response to loss, and thus, the potential impact on a subsequent pregnancy, might be related to the gestational age of the loss (e.g., miscarriage vs. stillbirth), presence of other children, meaning of the loss, degree of grief, and time since the loss.

Women with a history of perinatal loss, compared with those without loss, have less prenatal attachment (Armstrong & Hutti, 1998), are concerned greatly that this baby too will die, have lost trust in pregnancy, have altered self-concepts, and may even experience posttraumatic stress in the new pregnancy (Côté-Arsenault et al., 2001; O'Leary, 2005). Even after a successful birth, mothers with loss histories are more concerned about their new baby's health and about differentiating this baby from the baby that died (Theut et al., 1992) when compared to a no-loss

group. Babies born subsequent to loss have been shown to have disorganized attachments to their mothers (Heller & Zeanah, 1999; Hughes et al., 2001).

In addition to the emotional burden these women carry, women with PAL also utilize more healthcare resources, even when their pregnancy is deemed low risk. Hutti, Armstrong, McClain-Patton, and Taylor (in review) conservatively calculated that each woman's prenatal care costs \$533 more than women without a history of loss due to additional testing, visits, and procedures. Côté-Arsenault, Donato, and Earl (2006) note that frequently turning to care providers for continuing reassurance about the fetus' well-being is common and that women with loss request more prenatal tests than those without loss (Côté-Arsenault, 2003).

Stress in Pregnancy

Although researchers have been trying to investigate the potential impact of maternal stress on obstetric outcomes for decades, studies reported in the last 10 years finally provide extensive evidence that maternal stress has multiple negative effects on the mother, and consequently, on the fetus and infant. Stress is a complex, multidimensional concept that can be due to life events or daily hassles. It is the responses to stress, whether psychological (e.g., anxiety or depression), physical (cardiovascular response or stress hormones), or both (Rice, 2000), that are the usual focus of study. Stress responses in life and pregnancy can result in personal growth and broader coping strategies, or in reduced functioning (Rice, 2000; Sittner, DeFrain & Hudson, 2005). Negative maternal mood can affect gestational age at birth and birth weight. The strongest effects on infant development and behavior from pregnancy-specific anxieties including fears about fetal well-being (Mulder et al., 2002). Maternal stress hormones and placental blood flow appear to be two of the mechanisms through which the fetus is affected. Maternal anxiety has been shown to be related to an increase in uterine arterial resistance (Texeira et al., 1999), causing a decrease in arterial blood flow to the fetus. High prenatal stress and subsequent anxiety were found also to be associated with spontaneous abortion and preterm birth (Mulder et al., 2002). "Exposure to prenatal stress not only affects physical development of the infants..., but also their functional development" up to 10 years of age (Mulder et al., 2002, p. 12). Understanding pregnant women's responses to stressful situations can assist nurses to identify and possibly intervene with women using unhealthy coping strategies that might place their fetuses at risk.

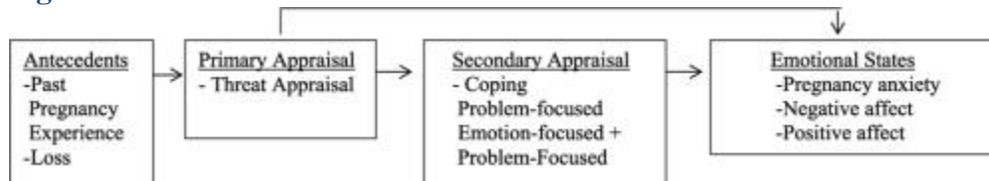
Theoretical Framework: Appraisal, Coping and Emotions

Stress is the result of a person's interaction with situations in their life. Lazarus (2000) stated that there are three major areas to consider in human responses to stressful events: a person's appraisal of the event, their choice of responses including coping options, and the resultant emotions. Given that women report that their pregnancies are stressful and anxiety-laden, this framework provides a very useful theoretical model (Figure 1) through which to understand women's emotional responses to pregnancy after perinatal loss.

In any given circumstance, the appraisal of the situation influences how a person reacts, feels, and behaves under these conditions. Appraisals occur in three phases-primary, secondary, and reappraisal-and are based in part on a person's past experiences (e.g., past obstetric and loss history). The personal significance of the past experience is theorized as directly related to one's appraisal of a new (or revisited) situation. Primary appraisal is about relevance-"What is at stake

for the person?”-and it consists of three types: (a) irrelevant, (b) benign-positive, or (c) stressful. In the case of pregnancy after perinatal loss, most pregnancies are wanted, and thus, not irrelevant, but there is fear of another loss. Evidence indicates that the most likely primary appraisal of pregnancy after loss is that of “stressful” (Côté-Arsenault, 2003). Given this likely appraisal of stress, secondary appraisal then occurs: “What should be done about this?” and “How should I cope?” The secondary appraisal options in stressful situations are harm and loss, threat, or challenge.

Figure 1: Theoretical model



Past pregnancy experience has taught women that loss is a realistic possibility so secondary appraisal of threat, harm, or loss is probable (Côté-Arsenault & Freije, 2004; Phipps, 1985), thus requiring coping to occur in order to manage the psychological stress of the situation. Coping is of two types, problem-focused and emotion-focused (Lazarus & Folkman, 1984). Problem-focused coping is intended to alleviate or change the situation causing the stress, and emotion-focused coping aims to change one's attention, interpretation, or response to the situation. Lazarus and Folkman (1984) theorized that problem-focused coping is used when the threat can be acted upon or the situation changed, and is associated with fewer negative and more positive emotions. Emotion-focused coping is used when there is little control or great ambiguity in a situation, and is associated with more negative and fewer positive emotions. It is likely that both types of coping are used in most situations, but one or the other likely predominates (Lazarus, 2000). It is therefore appropriate to determine the relative coping of individuals; that is, the dominant type of coping in the total coping effort. The third and final phase of appraisal is reappraisal. Appraisals must often change in response to altered flow of events, and are thus termed reappraisals. According to the theory, coping type predicts emotional state and mediates appraisal and emotions. It is not known if appraisals or emotions change over the course of pregnancy so this is a major aim of this study.

The theory of stress, coping, and emotions provides a testable model for understanding pregnancy after perinatal loss by first determining which antecedent variables explain threat appraisal in the beginning of the pregnancy; then examining whether or not threat appraisal, coping, and emotions change across pregnancy; and, finally, testing whether coping mediates appraisal and emotions.

Hatmaker and Kemp (1998) utilized Lazarus and Folkman's (1984) theory when they compared perception of threat and emotional well-being of high-risk women on home monitoring for preterm labor symptoms versus low-risk pregnant women. Subjects were all multiparas. The high-risk group had higher perceived threat and more negative affect than the low-risk comparison group. Positive affect increased over time in both groups. The researchers concluded that degree of threat, measured by the Moneyham Threat Index (MTI; Moneyham, 1991), was related negatively to positive affect, which is consistent with the theory of stress and coping.

The purpose of this study was to test the theoretical model in this population and to examine the patterns of threat appraisal, coping, and emotional states of women across pregnancy after perinatal loss. The specific aims were: (a) to examine the relationships between the antecedent variables of demographics, obstetric and loss history, and assigned fetal personhood (personal significance of loss) with threat appraisal and stress; (b) to examine the effect of time across pregnancy on threat appraisal, coping (problem-focused in relation to emotion-focused), and emotional states (pregnancy anxiety, negative affect, positive affect); (c) to determine whether coping mediates the effect of threat appraisal on emotional states; and (d) to determine what type of coping predicts more positive affect, less negative affect, and less pregnancy anxiety.

METHODS

Sample

A convenience sample of currently pregnant adult women (20 years and older) with a history of spontaneous pregnancy loss at any gestational age, without a technologically induced pregnancy, and prior to feeling fetal movement, were recruited into this study through private practices, a regional perinatal center, community flyers, newspapers, and networking. A minimum sample size of 68 subjects was determined using guidelines from Cohen (1988) through an analysis of power for multiple regression at the .80 level, alpha level of $p \leq .05$, and assuming a medium effect size of $f^2 = .15$ for two predictor variables: pregnancy anxiety (Côté-Arsenault, 2003) and threat appraisal (Hatmaker & Kemp, 1998).

Instruments

Background and Antecedent Variables. Background and antecedent variables were collected one time, upon entry into the study and included demographic data; obstetric history including loss history (e.g., gestational age, number and type, spacing with live children); medical risk; and assignment of fetal personhood. Medical risk was computed as the sum of the number of preexisting medical conditions that could impact pregnancy negatively, not including previous pregnancy loss. This count of risk factors without weighting was chosen because this is a straightforward option for capturing medical risk, and there is no agreement on how to compute risk scores and their predictive value (Gomez & Young, 2002; Simpson & Creehan, 2001).

Assignment of Fetal Personhood. A measure of assignment of personhood to a dead fetus rates how the mother and others view the fetus' status in society. Differentials in the assignment of personhood are scored incrementally after the question, "What is it that you feel that you lost?" For each pregnancy loss, a woman selects from the following choices: a pregnancy, a baby, a baby with a name, a baby who would now be ___ years old. In addition, she is asked whether she had a memorial or funeral service for that pregnancy because having a memorial service is evidence of higher personhood. Scores range 0-5; higher scores indicate more assignment of fetal personhood. Construct validity has been established; a greater degree of assigned fetal personhood was associated with higher pregnancy anxiety and with older gestational age of first loss (Côté-Arsenault & Dombeck, 2001). Assignment of fetal personhood is a subjective assessment of the personal meaning of each perinatal loss.

All of the following variables were measured at three time points: upon entry into the study, and in the second and third trimesters.

Stress. As a means of determining subjective current stress level assessments and their source, two visual analogue scales (VAS) were developed for this study. Stress in Life (SiL) yields two scores measured by asking two questions: the current degree of stress from life excluding pregnancy and stress from their pregnancy in particular. Response scores from each question can range 0-100, with 0 indicating no stress at all and 100 the most stress ever felt. These VAS were pilot tested with 10 pregnant women to determine clarity; no revisions were needed.

Threat Appraisal of Pregnancy. The MTI (Moneyham, 1991) is used to measure the degree of threat appraised (primary appraisal) in a particular situation (pregnancy, in this study) and taps three dimensions: stakes, outcome, and control. This 15-item Likert-type scale includes five items that measure each dimension. Total threat scores can range from a possible 15 (low threat) to 75 (high threat). Coefficients of internal consistency of .80-.86 have been reported. Cronbach's alpha in the present study was .84-.86. Content and construct validity evidence has been reported by Moneyham (1991) and Hatmaker and Kemp (1998). Hatmaker and Kemp provide evidence in support of the construct validity of the MTI with reported degree of threat levels for high-risk pregnant women in their second ($M = 43.68$; $SD = 8.81$) and third trimesters ($M = 42.37$; $SD = 7.82$); low-risk pregnant women had lower mean threat levels of 38.12 ($SD = 5.55$) and 38.36 ($SD = 6.22$), respectively.

Coping. The Ways of Coping Check List-Revised (WCCL-R) was derived from Lazarus' transactional model of stress by Vitaliano, Russo, Carr, Maiuro, and Becker (1985) as a measure of secondary appraisal (i.e., What should be done in this situation?). This is a 4-point Likert scale that requires the respondent to focus on a current stressor and to choose frequency of use for each of the 42 coping strategies proposed. Factor analyses identified five subscales that, for the purposes of consistency with this study's theoretical framework, were combined to form two broad categories of coping: problem-focused coping (problem-focused subscale) and emotion-focused coping (seeks social support, blamed self, wishful thinking, and avoidance subscales). Internal consistencies of the total WCCL-R and the two categories were adequate: Cronbach's alphas were .88 (total), .82 (problem-focused), and .83 (emotion-focused). Relative weight of problem-focused coping (PF) versus emotion-focused coping (EF), $PF/(PF + EF)$, was computed to arrive at a relative coping score (Vitaliano, Maiuro, Russo, & Becker, 1987).

Emotional States. Two measures of emotional states were used in this study: the Multiple Affect Adjective Checklist-Revised (MAACL-R) and the Pregnancy Anxiety Scale (PAS). The MAACL-R (Lubin & Zuckerman, 1999), a self-report, standardized tool, provided a measure of emotional states for this study. From the list of 132 affect-connoting adjectives (e.g., happy, nervous, angry, alone), subjects are asked to check only those items that describe how they are feeling today to complete the state form. Checked adjectives are combined to create single scores for the five separate scales: anxiety, depression, hostility, positive affect, and sensation seeking. Two summary scores, dysphoria and positive affect plus sensation seeking, were computed to differentiate negative and positive affect, respectively. Factor analyses have revealed that positive affect forms separate dimensions from negative affect, providing evidence of construct validity. Cronbach's alphas were .88-.91 in past studies; alpha coefficients ranged from .92 to .93 in the current study. This measure has been used successfully with pregnant women (Maloni, Kane, Suen, & Wang, 2002).

The PAS is a 9-item VAS that measures pregnancy anxiety, which is defined as concerns about the pregnancy and its outcome (Côté-Arsenault, 2003). The PAS was designed to be used during, or in reference to, a specific pregnancy. Items include “When I think about this pregnancy I feel anxious” and “I worry about getting myself through this pregnancy.” Validity evidence includes both content (panel of experts and face) and construct (discriminant, known-groups, and predictive) domains. Internal consistency (Cronbach's $[\alpha] = .74-.83$) and parallel forms of reliability have been previously estimated. Internal consistency for this study is adequate with Cronbach's alphas of $.85-.87$.

Procedure

Approval for the study was obtained through all applicable institutional review boards. Women were recruited primarily through obstetric practices, where they were approached by a staff member. Additionally, community flyers, the newspaper, and networking were used to solicit participants; particular effort was made to overrecruit minority women. Signed informed consent was obtained from all participants, both in person or over the phone (subsequently sent by mail). Data were collected at three points: at 10 weeks of gestation or before quickening; at 20-25 weeks; and at 30-35 weeks. Randomization of the administration order of the instruments was done to decrease completion order bias.

RESULTS

Demographic and Obstetric History of the Sample

The 82 women in the resulting sample were 20-42 ($M = 30.2$; $SD = 5.04$) years of age, primarily married or partnered, with an average of 2 years of college. Household incomes varied widely, from none to greater than \$120,000 annually (median category = \$60,000-79,000), and the majority of women were professionals or administrative staff. Ethnicity reflected the composition in the community (88% White, 12% minority). The final sample consisted of 82 women, nine of whom lived a distance away from the researchers. Women at a distance were sent materials by mail and contact was made via telephone and e-mail.

Obstetric histories of the participants varied on number of pregnancies ($M = 4.3$, $SD = 1.99$), number ($M = 2.1$, $SD = 5.15$) and gestational age of one or more losses ($M = 11.1$, $SD = 5.15$), elective abortions ($M = .18$, $SD = .50$), living children ($M = 1.0$, $SD = 1.03$), infertility ($M = 0.5$, $SD = 1.87$), years since loss ($M = 2.3$, $SD = 2.82$), and medical risk status ($M = 0.87$, $SD = .94$). The medical risk conditions in this sample, scored with one point each, were diethylstilbestrol (DES) exposure or incompetent cervix, diabetes, cardiac disease, hypertension, uterine abnormality, blood disorders (sensitivity and clotting), and medication use. The possible range of scores was 0-5.

Women in the sample ($N = 82$) entered the study during their 10th-17th week of gestation ($M = 12.5$ weeks, $SD = 1.93$). Four of these women lost the current pregnancy and three did not respond to our attempts at contacting them, resulting in a Time 2 ($M = 22.2$ weeks, $SD = 1.29$) sample of 75. Pregnancy complications and preterm births reduced the Time 3 sample to 70 ($M = 32.3$ weeks, $SD = 1.14$), resulting in an 85.4% retention across pregnancy.

Significance level was set at $[\alpha] = .05$ for all analyses.

Specific Aims

Specific Aim 1. Pearson product-moment correlation coefficients were analyzed between all Time 1 measures of threat appraisal, coping, emotional states, mean gestational age of loss (log transformation), total number of losses, mean fetal personhood, stress in life, and stress in pregnancy (Table 1). Pregnancy anxiety was correlated significantly with threat appraisal, emotion-focused coping, relative coping, affect (positive and negative), and stress from pregnancy. Threat appraisal was correlated with the same variables as pregnancy anxiety with the addition of gestational age of loss and fetal personhood. Notably, assigned fetal personhood was associated with threat appraisal, but not with pregnancy anxiety. Patterns of relationships between stress in life and stress from pregnancy were different; stress from pregnancy mirrored relationships with pregnancy anxiety. Mean gestational age of losses was significantly correlated with threat appraisal and assigned fetal personhood.

Table 1: Correlation Matrix of Time 1 Main Study Variables and Select Obstetric Variables (N = 82)

	1	2	3	4	5	6	7	8	9	10	11
1. Pregnancy anxiety	1.00										
2. Threat appraisal	.728**	1.00									
3. Emotion-focused coping	.419**	.095	1.00								
4. Problem-focused coping	.119	.045	.516**	1.00							
5. % Problem-focused coping	-.242**	-.248**	-.347**	.583**	1.00						
6. Negative affect	.522**	.502**	.383**	.218*	-.077	1.00					
7. Positive affect	-.359**	-.359**	-.081	.185	.228*	-.074	1.00				
8. Stress in life	.079	.095	.060	.109	.086	.234*	-.094	1.00			
9. Stress from pregnancy	.582**	.614**	.373**	.080	-.211	.356**	-.299**	.178	1.00		
10. Total number of losses	.24*	-.005	.166	-.053	-.191	.004	-.044	-.115	.157	1.00	
11. Fetal personhood (mean)	.163	.307**	.024	-.022	-.069	.146	-.094	.121	.189	.037	1.00
12. Gestational age of loss (mean)	.093	.222*	-.101	-.066	-.013	-.015	-.180	-.088	.211	.066	.390**

Note. * $p \leq .05$. ** $p \leq .01$.

Specific Aim 2. One-way repeated-measures analysis of variance were calculated comparing each main variable at three points in time (descriptive statistics of each variable at three time points can be seen on Table 2). A significant effect of time was found with pregnancy anxiety [$F(2, 68) = 12.95, p < .001$]. Follow-up protected t tests (with a significance level of .017 to reduce Type I error; Cronk, 2004) revealed that pregnancy anxiety decreased significantly over time. Time did not affect threat appraisal [$F(2, 68) = 1.02, p > .05$], problem-focused coping [$F(2, 68) = 2.3, p > .05$], emotion-focused coping [$F(2, 68) = 0.18, p > .05$], relative coping [$F(2, 68) = 2.01, p > .05$], negative affect [$F(2, 68) = 0.40, p > .05$], or positive affect [$F(2,68) = 0.08, p > .05$].

Table 2: Descriptive Statistics of Study Variables over Time

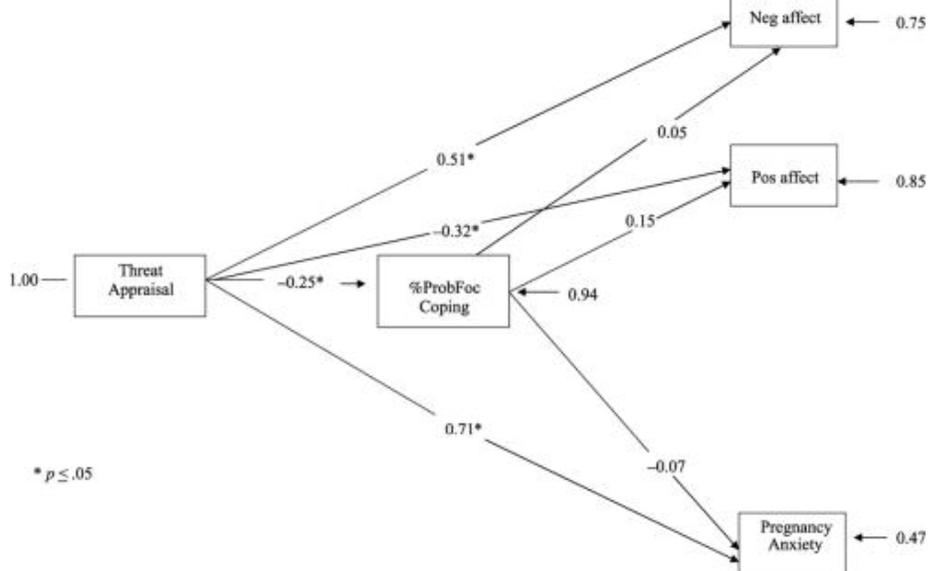
	Time 1 (n = 82)	Time 2 (n = 75)	Time 3 (n = 70)	Possible Range of Scores	Actual Range of Scores
Threat appraisal	42.45 (8.9)	43.2 (8.8)	42.0 (8.1)	15-75	23-71
Emotion-focused coping	1.43 (0.45)	1.42 (0.43)	1.40 (0.45)	0-3	0.35-2.3
Problem-focused coping	1.60 (0.54)	1.70 (0.54)	1.68 (0.49)	0-3	0.33-2.6
Negative affect	5.0 (5.27)	4.52 (5.57)	4.73 (5.47)	0-37	0-27
Positive affect	8.97 (6.6)	8.69 (6.6)	9.00 (6.23)	0-29	0-27
Pregnancy anxiety	47.46 (20.8)	39.4 (20.0)	34.1 (18.43)	0-100	2.2-87.9
Stress from life	43.87 (25.1)	51.51 (26.5)	47.2 (25.9)	0-100	0-100
Stress from pregnancy	50.4 (27.1)	45.4 (25.8)	40.76 (26.8)	0-100	0-98

Note. Values are expressed as mean (SD), unless otherwise indicated

Specific Aim 3. Lisrel 8.71 was used to conduct a path analysis to determine the causal effects among the variables of threat appraisal, coping, and emotional states. Only Time 1 data were used in this analysis due to their relative stability over time. Coping was computed as relative scores (% of problem-focused coping); emotional states (negative affect, positive affect, and pregnancy anxiety) were the outcome variables. The data fit the model satisfactorily (GFI = .96; AGFI = .80; Figure 2). All of the direct effects of threat appraisal (independent variable) on the dependent variables were statistically significant and in the expected direction. Coping has no significant direct effect on any emotional state variables. None of the indirect effects through coping were significant. Relative coping did not mediate the effects of threat appraisal on emotional states.

Regression results indicate that threat appraisal significantly predicts pregnancy anxiety, $R^2 = .530$, $R^2_{adj} = .524$, $F(1, 80) = 90.32$, $p < .001$. Relative coping did not predict pregnancy anxiety when threat appraisal was in the equation.

Figure 2: Path analysis of main study variables Time 1, including path coefficients.



Specific Aim 4. Problem-focused coping was the dominant form of coping at all three time points in pregnancy, respectively ($t = 3.125$, $p < .01$; $t = 5.172$, $p < .001$; $t = 4.655$, $p < .001$). Because emotion-focused coping (EFcope), problem-focused coping (PFcope), positive affect, and negative affect did not change over time, hierarchical multiple regressions were calculated for Time 1 data only with a sample of 82. Three separate regression analyses were conducted with EFcope and PFcope as independent variables, entered into the equation separately; dependent variables were pregnancy anxiety, negative affect, and positive affect. Coping did predict both pregnancy anxiety (16.8%) and negative affect (12.5%), but did not predict positive affect. The unique contribution of EFcope on pregnancy anxiety was significant ($R^2 = .18$; $p < .001$) and on dysphoria was significant ($R^2 = .10$; $p = .003$). However, emotion-focused coping

did not contribute significantly to positive affect. Problem-focused coping did not contribute significantly to pregnancy anxiety, dysphoria, or positive affect. In summary, emotion-focused coping predicted negative emotions (both pregnancy anxiety and negative affect) but problem-focused coping did not predict any emotional states.

Relative coping significantly predicted positive affect and pregnancy anxiety but not negative affect. These findings indicate that total coping was a more useful view of coping; in this instance, more problem-focused coping predicted greater positive affect and was related negatively to pregnancy anxiety. These findings match the theoretical predictions (Table 2).

DISCUSSION

The results of this longitudinal study of women in PAL indicate that women appraise their pregnancies as a moderate threat, on average, but with much variability across this sample. This threat appraisal remained heightened across pregnancy, which is inconsistent with the common societal view that sense of threat disappears after the gestational age of previous losses is surpassed. Degree of threat reported here is comparable to that reported in women at risk for preterm delivery (Hatmaker & Kemp, 1998). As theorized, threat appraisal did predict emotional state, most notably pregnancy anxiety, explaining 52.4% of its variance. Appraisal of threat is not related always to a determined medical risk but is based more likely on an individual's subjective data (Gupton, Heaman, & Cheung, 2001). Findings in this study are consistent with this statement with low medical risk but moderate appraisal of threat.

Coping styles did not change over time. Lazarus and Folkman (1984) claim that coping mechanisms, when effective, are used consistently in similar situations. As Lazarus (2000) pointed out in his later work: “the same act may have more than one function and usually does” (p.205). “[I]n virtually all stressful encounters the person draws on both functions (problem- and emotion-focused coping)” (p. 206). Coping would not change over time unless original ways of coping were ineffective; if they work, women would continue to use them. Problem-focused coping was used more than emotion-focused coping. As theorized, problem-focused coping was predictive of positive affect, and emotion-focused coping predicted negative affect. Emotion-focused coping and problem-focused coping are correlated ($r = .516$) and explain more variance in pregnancy anxiety with relative weights than either type of coping separately. It is reasonable that both problem- and emotion-focused coping were utilized in PAL because the women were trying to gather objective data about themselves and their fetus that could change their current situation (problem-focused coping), and there was persistent ambiguity and lack of control in pregnancy that warranted emotion-focused coping. Sittner et al. (2005) found three major themes of psychosocial impact coping with high-risk pregnancy: mixed emotions, adjustment and support, and informative care. These qualitative themes include both problem-focused and emotion-focused coping lending support to the notion of use of both types of coping.

Inconsistent with the theory, coping did not mediate threat appraisal on emotional state. Although this is a reliable and valid instrument, the Ways of Coping Checklist-Revised is perhaps too nonspecific to the pregnancy issues addressed in this investigation despite instructions for women to think of a particular stressful event in their own pregnancy when completing the instrument. Similar to pregnancy anxiety, these women respond to specific concerns regarding their pregnancies and their babies (Côté-Arsenault et al., 2006) and there are

ways of coping that are specific to pregnancy. Unlike many of the situations under which the instrument was developed and tested, pregnancy is a 9-month period of stress, thus making it a unique type of fluctuating stress. Modification of this checklist may be warranted.

Similar to other quantitative studies of women in pregnancy after perinatal loss, the women in this study were specifically anxious about the outcome of their pregnancy, rather than being generally anxious or depressed. Their pregnancy anxiety mean scores were higher than those of women in low-risk pregnancies after loss ($M = 41$; Côté-Arsenault, 2003) but lower than those of women with preterm labor ($M = 48-58$; Feinstein, 2000). Time and increasing gestational age were predictive of decreased pregnancy anxiety. This makes sense because confidence that term pregnancy will be reached, knowledge that the fetus is healthy, and emotional attachment all increase over time (Armstrong & Hutti, 1998), and all of these factors have an inverse relationship with pregnancy anxiety. Pregnancy anxiety was significantly related to threat appraisal, emotion-focused coping, stress from pregnancy, and total number of losses, but not to any other loss history variables. However, this sample of women reported surprisingly low levels of negative and positive affect on the MAACL-R that was consistent over time as compared with other high-risk pregnant women whose dysphoria decreased over time and with increased gestational age (Maloni et al., 2002). The Stress in Pregnancy one-item instrument, new with this study, was related significantly to other study variables, and, as expected, was sensitive to the specifics of pregnancy and discriminated pregnancy issues from "Stress in Life." This one-item instrument may hold clinical potential as a screening tool during prenatal care.

Significant relationships between some key variables are noteworthy. The meaning of past perinatal losses, operationalized as fetal personhood, was not related to affect, particularly pregnancy anxiety, but was related to threat appraisal. Perhaps computing a mean of assigned fetal personhood is an inadequate way to capture the meaning of a number of past perinatal losses. In past studies, fetal personhood was related to gestational age of loss and pregnancy anxiety (Côté-Arsenault & Dombeck, 2001), but the loss history included only one or two previous losses. It is reasonable to consider that when losses are multiple, emotional investment in a new pregnancy is withheld until the outcome is certain. In any case, as has been found before, gestational age of loss is not a clear indicator of personal impact of perinatal loss, a notion that still persists within clinical practice (Armstrong & Hutti, 1998; Côté-Arsenault & Dombeck, 2001).

This study was strengthened by its prospective, longitudinal design; adequate sample size from multiple sources; women in both low- and high-risk pregnancies; and a representative sample on demographics and obstetric variables. Convenience sampling and a primarily White, married, and educated sample does limit generalizability. The longitudinal design also imposed the inherent limitation of loss of subjects over time, particularly within the pregnant population, thus limiting the interpretation of the findings. Significant attempts were made to overrecruit minority women for participation because they are generally at higher risk for poor perinatal outcomes, but these were generally unsuccessful. It is important to note, however, that no minority women dropped out of the study except when their pregnancy ended in loss.

The study described here is a first attempt at understanding the patterns of threat appraisal, coping, and emotions in pregnancy after perinatal loss. Pregnancy anxiety remains a major

feature of these pregnancies, and now we have specific data to show that appraisal of pregnancy as a threat is antecedent to this specific anxiety. The transactional model of stress, coping, and emotions was helpful in examining this phenomenon; however, measurement of coping requires further refinement for use in this population. The women in this study did not appear to be either depressed or anxious generally but needed to be asked directly about their specific pregnancy worries and fears. Pregnancy anxiety should be anticipated as a normal component of any pregnancy subsequent to loss, unless the woman states otherwise. Anxiety should be addressed at each prenatal visit but most notably early in pregnancy, when it is likely to be at the highest levels. Past losses should not be ignored, as they play a major role in the experience and stress level of current pregnancies, and subsequently, can impact parenting and infant emotional development.

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