Predicting Depressive Symptoms after Miscarriage: A Path Analysis Based on the Lazarus Paradigm

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ABSTRACT

Twenty percent of all pregnancies end in miscarriage. Findings are mixed about who is most at risk for a depressive response. The purpose of this study was to develop and test a theory-based path model that would enable prediction of the intensity of women’s depressive symptoms at 4 months and at 1 year after miscarriage. The model is based on Lazarus’s theory of emotions and adaptation. Model constructs examined included stage I contextual variables (gestational age, number of miscarriages, number of children, maternal age, perceived provider caring at the time of loss, and family income), stage II interceding variables (perceived social support, emotional strength, and subsequent pregnancy/birth), stage III primary appraisal of meaning (personal significance of miscarrying), stage IV secondary appraisal (active or passive coping), and stage V emotional response (depressive symptoms). Path analysis employing a series of stepwise, multiple regression equations was used to test the hypothesized model. The sample consisted of 174 women whose pregnancies ended prior to 20 weeks gestation (mean = 10.51, SD = 3.32). The model accounted for 63% of the variance in women’s depressive symptoms at 4 months and 54% at 1 year. Findings support the utility of the Lazarus model and confirm that women most at risk for increased depressive symptoms after miscarriage are those who attribute high personal significance to miscarriage, lack social support, have lower emotional strength, use passive coping strategies, have lower incomes, and do not conceive or give birth by 1 year after loss.

INTRODUCTION

MISCARRIAGE, THE SPONTANEOUS ABORTION of a fetus before the expected point of viability, has been estimated to occur in 20% of all pregnancies.1 Women’s responses range from relief to devastation. There have been multiple attempts to discern who is most at risk for adverse emotional outcomes, yet few conclusions can be drawn about the demographic characteristics, obstetrical histories, care management styles, or personal and environmental constraints predictive of increased depression after miscarriage.

Historically, research pertaining to miscarriage has been of three types: qualitative inquiry describing what is like to miscarry, descriptive studies of the incidence of distressing emotional outcomes, and correlational investigations of antecedents to grief, depression, anxiety, and difficulty coping. Noticeably lacking are theoretically derived models to predict intensity of responses subsequent to early pregnancy loss. Therefore, for
this investigation, the Lazarus emotions and adaptation paradigm\textsuperscript{2} was applied and tested in order to explore its utility for understanding women’s diverse responses to miscarriage.

**THEORETICAL FRAMEWORK**

Lazarus theorizes that provoking situations, such as miscarriage, take on meaning based on transactions between individuals and their environment. Events are appraised differently based on the demands, constraints, and resources surrounding the event both as it occurs and as time passes.\textsuperscript{3} Lazarus and Folkman refer to meaning assessment as the primary appraisal or personal evaluation of “what’s at stake for the person.”\textsuperscript{4, p315} Through primary appraisal, the individual confronts (or recalls) an event and experiences either a benign or a stressful response. Benign responses arise when the event is perceived as neutral or somewhat irrelevant. Stressful responses occur when a situation is appraised as personally significant in a harmful (loss), threatening (impending loss), or challenging way.

Co-occurring with the appraisal of personal significance is a secondary appraisal of how to manage the situation. Coping, be it active or passive, involves engagement in a process aimed at dealing with the stressful event and the distressing emotions evoked by the experience. Active coping might include problem solving, changing the situation, seeking support, or changing something about the self in order to deal with the situation. Passive coping might involve wishful thinking, self-blaming, or ignoring the situation. With the passage of time, transpiring events (e.g., new opportunities, compounding losses) may change how the precipitating event is subsequently experienced. Hence, the appraisal, reappraisal, and emotions are in flux and evolve with the passage of time.

The purpose of this study was to develop and test a theory-based path model that would enable prediction of the intensity of women’s depressive symptoms at 4 months and at 1 year after miscarriage. The model, based on Lazarus’s theory of emotions and adaptation,\textsuperscript{2} was examined via secondary analysis of data from the Miscarriage Caring Project (MCP), a longitudinal investigation of the effects of counseling on women’s recovery during the first year after miscarriage.\textsuperscript{5} It was proposed that at 4 months and at 1 year after miscarrying, women’s appraisals and depressive responses would be associated with not just contextual variables at or near the time of loss but also with the buffers and interceding events experienced in the months after miscarriage. The Lazarus framework\textsuperscript{2} and previous investigations of antecedents to depressed responses after perinatal loss guided constructs chosen for possible examination. Ultimately, actual variables selected for model testing were pragmatically determined by availability in the MCP dataset and by variability within the available data (e.g., limited diversity in ethnicity and marital status precluded their inclusion).

Model constructs examined included stage I contextual variables (gestational age, number of miscarriages, number of children, maternal age, perceived midwife or physician caring at the time of loss, and family income), stage II interceding variables (perceived social support, emotional strength, and subsequent pregnancy/birth), stage III primary appraisal of meaning (personal significance of miscarrying), stage IV secondary appraisal (active or passive coping), and stage V emotional response (depressive symptoms). Stage I data refer to events prior to or surrounding the time of loss. Stages II through V data were gathered at 4 months and 1 year after loss. The review of literature is centered on those variables selected for testing the theoretical model.

**RELATED LITERATURE**

During the last 30 years, two predominant strategies have been used to explore women’s sadness subsequent to miscarriage and other forms of prenatal loss. From a transitional framework, symptoms of depression or grief or both have been measured as one of several markers that indicate healing and progress through an adaptive response to a crisis or loss situation. Alternatively, clinical case-finding frameworks have been used to screen for those most at risk for pathological grief responses or the onset of clinical depression.\textsuperscript{6} Elevated depressive symptoms have been documented immediately after miscarriage.\textsuperscript{7–11} Findings from longitudinal investigations of responses to miscarriage provide evidence that the sense of loss may be ongoing. Increased depression has been documented at 2,\textsuperscript{12,13} 4,\textsuperscript{14} 6,\textsuperscript{7,10,15,16} 12,\textsuperscript{17,18} and 18 weeks,\textsuperscript{19} as well
as 6 months, 16,18,20,21 8 months, 17 and 1 year after loss. 9,18

Personal, environmental, and cultural contexts surrounding both the pregnancy and its untimely ending have been shown to contribute to the personal significance of miscarrying. In a survey of women who were less than 10 years after loss (n = 414), Swanson et al. 22,23 included one open-ended question. Please summarize your experience of miscarrying in one word or phrase. Responses, coded into six inductively derived categories, were reported in the order of most to least impact. The first response, “aching/hurt” (n = 46, 11.1%), involved words that described miscarriage as being like a crushing, physical assault (a punch in the gut). Most commonly, women who, in addition to their miscarriage, also had a history of stillbirth or neonatal death used these words. The second, “cheated or unfairly taken away” (n = 45, 10.9%), suggested women felt purloined or robbed by miscarriage. Women with a history of infertility frequently used these words. The third, “disconnected-self” (n = 27, 6.5%), suggested women felt guilty (What’s wrong with me?) or self-blame (What did I do to deserve this?). This was one of two responses most frequently used by women with a history of elective abortion. The fourth, “woe-filled, grieving” (n = 171, 41.3%), included the words most commonly chosen by women to describe their loss. These words included sad, depressed, loss, lost baby, and grieving. The fifth and next most common response was “life goes on” (n = 103, 24.9%). These words implied that although miscarriage was a hard thing to go through, resolution was possible. The sixth and final category, “valuable life experience” (n = 22, 5.3%), suggested miscarriage was experienced as a good thing (i.e., relief, reprieve, or major learning experience). This was the other response most commonly provided by women with a history of elective abortion. 22

Qualitative investigators have described the toll that miscarriage can take on women’s lives. Common experiential themes identified include (1) uncertainty, astonishment, and dread in realizing impending loss, (2) multiple meanings attributed to loss, (3) feelings ranging from relief to confusion, disbelief, emptiness, guilt, grief, and lack of control, (4) the need to be listened to, supported, and honestly informed about what is happening and what will come next, (5) failure of others, especially healthcare providers, to solicit, recognize, and validate women’s experiences, and (6) fear and vulnerability in future childbearing. 24–29

Hutti and dePacheco 30 surveyed 186 women who miscarried prior to 16 weeks gestation and found that the pregnancy and baby within were perceived as “real.” Moderate to intense grief responses were experienced by almost three fourths of their sample, and 39% grieved for 6 months or longer. When comparing grief following later versus earlier gestation loss, the duration is generally longer with later perinatal losses. 13,31–33 However, when gestational age at loss is measured only among women whose pregnancies end prior to 20 weeks, length is usually not associated with intensity or duration of grief, anxiety, or depression. 7,11,12,16,19,20,34 One exception is the study of Beutel et al., which clarified that later miscarriage was correlated with extended grieving but not with prolonged depression.

Several attempts have been made to examine associations between demographic and obstetrical variables and ensuing emotional turmoil. For the most part, maternal age has not been significantly associated with grief, depression, or both. 7,9,11,12,20,34,35 Two exceptions are studies that found that younger women grieved more. 32,36 However, both samples were mixed on types of perinatal loss and length of time since loss. Although marital status has generally not been associated with emotional disturbance after miscarriage. 7,9,11,12,20,35 Friedman and Gath found the incidence of psychiatric morbidity significantly higher for single (n = 7 of 9, 78%) versus married women (25 of 58, 43%). 14 Their data, however, were gathered within 1 month of loss. Hence, it is possible that single women lacked pragmatic support, having no one to take over during their early recovery.

Findings are mixed about associations between previous reproductive loss and responses to miscarriage. Several investigators have found no association between women’s responses to miscarrying and previous losses. 20,34,35 However, in one survey of 446 women within 10 years of their most recent miscarriage, it was determined that women attributed significantly greater meaning to miscarriage if their loss was coupled with histories of late gestation losses or three or more miscarriages. 37 Others have identified no association between previous elective abortions and psychological distress after miscarriage. 14,20 However, previous miscarriages have been associated with
increased anxiety within 24 hours of dilatation and curettage and with enhanced depression at 4 weeks after loss. The lack of other children seems to magnify the toll miscarriage takes on women. Having no other children has been associated with increased meaning attributed to miscarriage and enhanced depression right after loss and at 4 weeks, 3 months, and 1 year after loss. Being childless has been associated with heightened anxiety right after loss, at $4^{1/2}$ months after loss, and in subsequent pregnancies. Increased anxiety in pregnancies after loss has been correlated with concerns about the pregnancy itself and the baby’s well-being. Although women are more anxious in subsequent pregnancies, being pregnant again or giving birth has been associated with diminished grief at 1–2 years after loss.

The association between family income and responses to miscarriage is mixed. Although Thapar and Thapar and Neugebauer et al. found no association between socioeconomic status (SES) and emotional response, Toedter et al. found that lower SES was associated with increased grief, difficulty coping, and increased despair after perinatal loss. Finally, higher distress has been measured for women who received care at public clinics versus private offices, suggesting that women who are unable to afford private care may be at greater risk for a depressive response after loss.

Receipt of social support subsequent to miscarriage has consistently been shown to provide a buffering effect on the impact of loss. One major factor in coping subsequent to miscarriage is receiving partner support. A lack of such support, both around the time of loss and at 2 years after loss, has been associated with increased emotional disturbance. Similarly, the importance of ongoing partner support has been linked to women’s ability to emotionally and physically get through pregnancies after loss. Partners, however, are not the only sources of support women rely on. Conway, in a study of 24 women, found that 70% of women’s friends and 67% of relatives were supportive and that female friends were more likely than spouses to discuss the loss. Madden, in a study of 65 women 4 months after miscarriage, found that emotional intensity was higher in the presence of lower social support from others. The failure of providers to offer caring has also been examined, with evidence suggesting that doctors and nurses frequently undervalue the psychosocial toll miscarriage imposes and, consequently, may fail to inquire how women are coping. Brier determined that women who were not given an opportunity to discuss the personal significance of miscarriage with their physician harbored anger and were often dissatisfied with the care received.

Diminished emotional resources have been consistently associated with adverse responses to miscarriage. A preloss history of mental health problems has been associated with higher depression immediately after loss, enhanced psychiatric morbidity at 4 weeks, increased grief and despair at 6 weeks, and increased grief, despair, and difficulty coping at 2 years after loss. According to the Lazarus emotions and adaptation paradigm, coping strategies, be they active (e.g., changing behaviors, seeking information, soliciting support) or passive (e.g., keeping to oneself, wishing it would all go away, self-blaming), are all mechanisms for regulating emotional responses to difficult events. Some coping mechanisms seem more effective than others in regulating adverse emotional responses. For example, after miscarriage, lower self-esteem and higher depression have been found in women who claim greater responsibility for their loss. Furthermore, Hutti demonstrated that women most distressed 12–18 months after loss were those who felt the least effective in diminishing the gap between how they believed a miscarriage should feel and how their experience actually unfolded.

In summary, considerable evidence exists that miscarriage has a profound effect on some women. For the most part, prior studies have focused on describing the meaning of miscarrying, confirming the incidence of emotional disturbance (depression, anxiety) after miscarriage, and determining the antecedents to such responses. This investigation makes a unique contribution to the pregnancy loss literature because of its theoretic grounding and focus on the linkages among context of loss, appraisals of meaning, coping, and emotional response.

**HYPOTHESIS**

At 4 months and at 1 year after loss (Fig. 1), many hypothesized direct and indirect paths between variables were tested. For the most part,
associations (direct paths) between variables were hypothesized based on findings of previous investigators. However, because this study was based on a theoretical model that claims the influence of background variables (such as gestational age) on depression is threaded through appraisals of meaning and coping, some hypothesized paths may appear contrary to previous empirical findings. For example, most prior studies have determined either no association between age and depression or a possible tendency for younger women to be more depressed after miscarriage. Yet my clinical observation has been that although a sense of loss is not tied to age, the experiences of threat or challenge or both are greater for older women who fear that their childbearing options are diminishing. Hence, it was hypothesized that older women would attribute greater personal significance to miscarrying. Likewise, empirical evidence is mixed about the associations between prior loss and depression subsequent to miscarrying. For this study, it was proposed that as the number of prior pregnancy losses increased, the personal significance of miscarrying would be greater. The rationale for this claim is that each unsuccessful pregnancy outcome would, at the very least, constitute an increased challenge to achieving a desired goal. Finally, the evidence is fairly consistent that for women who have miscarried, the length of gestation is not associated with the intensity or duration of depressive responses. Nonetheless, a positive association with personal significance was hypothesized, the rationale being that it has been my clinical observation that the longer a pregnancy is carried, the more confident a woman becomes that the pregnancy is healthy. When pregnancies end, especially after hearing the heartbeat or viewing an ultrasound, the loss is quite unexpected, and women often feel quite betrayed.

MATERIALS AND METHODS

Sample
Institutional review for protection of human subjects was obtained from the project site and
all referring institutions. Participants were conveniently recruited via obstetrical and emergency care providers from throughout the Puget Sound area. Referring providers were selected based on their willingness to post a notice about the study at their practice sites and agreement to hand out pamphlets inviting women to participate in the MCP. Of the 248 women who volunteered, 242 met eligibility criteria (at least 18 years of age, within 5 weeks of loss, able to speak and write English, and had an unplanned, unexpected loss of pregnancy prior to 20 weeks gestation). Qualifying data were ascertained by phone at recruitment. Research data used for this secondary analysis were collected via mailed surveys at 4 months and 1 year after loss. A total of 185 participants completed their total study protocol (overall attrition = 24%). The sample for this secondary analysis was further restricted to those 174 women who received care from a physician or midwife or both at loss. All but 11 subjects (6.3%) were married or partnered. The average family income was approximately $53,000. The majority of the women were Caucasian (n = 164, 94.3%). The rest were Native American (n = 1, 0.6%), Asian/Pacific Islander (n = 2, 1.1%), African American (n = 3, 1.7%), and Latina (n = 4, 2.3%). Participants had from one to six prior miscarriages (mean = 1.44, SD = 0.81) and zero to six children (mean = 0.77, SD = 0.96). Maternal age ranged from 19 to 45 years (mean = 32.76, SD = 5.43), and the average gestational age at loss was 10.41 weeks (SD = 3.27).

Concepts/measures

Depressive symptoms were measured via the depression subscale of Thompson and Budzynski’s Symptoms of Stress (SOS) Inventory. It is an 8-item Likert-type self-report measure (0 = never to 4 = very frequently) of the occurrence of symptoms of depression. Based on data derived from 415 (70% female) attendees at a stress management clinic, developers report a Cronbach alpha internal consistency of .88. They report evidence of construct validity by virtue of strong significant associations with other standardized indices of depression: SCL-90 (r = .70–.86), POMS (r = .51–.78), CES-D (r = .63), and Beck (r = .48). For this study, the Cronbach alpha was .87 at 1 year after loss, and it correlated with the POMS depression (r = .59, p ≤ 0.001). Actual scores at 4 months ranged from 0 to 28 (mean = 10.23; SD = 6.4) and from 0 to 32 at 1 year (mean = 9.45, SD = 5.58).

Coping was measured via an adapted version of the Folkman and Lazarus Revised Ways of Coping Inventory. Coping consists of emotion-focused or problem-focused ways of dealing with stressors. The Folkman and Lazarus scale consists of 67 self-report 4-point Likert-type items comprising several factor analytic derived subscales: focusing on the positive, seeking social support, self-blame, keeping to myself, detachment, problem solving, and wishful thinking. For the adapted measure used in this study, 39 items were retained and used in two scales, passive coping (17 items from the detachment, self-blame, keep to myself, and wishful thinking subscales) and active coping (22 items from the focusing on the positive, seeking social support, and problem-focused subscales). Cronbach alpha reliability coefficients for the two adapted coping scales were .83 (passive) and .86 (active). Actual passive coping scores at 4 months ranged from 0 to 42 (mean = 15.19, SD = 8.01) and at 1 year from 0 to 39 (mean = 14.28, SD = 7.79). Active coping scores at 4 months ranged from 0 to 59 (mean = 28.14, SD = 9.84) and at 1 year from 0 to 58 (mean = 27.63, SD = 10.44).

Personal significance was measured via the Personal Significance subscale of Swanson’s impact of Miscarriage Scale (IMS). The IMS was developed in three phases. (1) Twenty women who were less than 4 months after loss provided 105 emic statements about what it was like for them to miscarry. Their statements were turned into 4-point items that respondents could rate as to the relevancy of each item to their experience. (2) In a mailed survey, 446 women completed the 105-item IMS. Items with low relevance (as indicated by user comments or incomplete data), minimal variance, or poor item-to-total correlations were eliminated, thus yielding 30 psychometrically sound items with a Cronbach alpha of .93. (3) Factor analysis of data from 188 participants in the MCP led to the latest version of the IMS. It is now a 24-item measure of the impact of miscarriage on women’s lives and has four subscales (lost baby, devastating event, personal significance, and isolated). Personal significance has a Cronbach alpha of .83 and is used to appraise the extent to which miscarriage is still experienced as a personally meaningful setback. A higher personal significance score would indicate that the women was still viewing her miscarriage...
as a painful experience that continues to evoke emotional pain. The 7 items that comprise the scale are published elsewhere.\(^5\) Three items pertain to whether or not the women is still dealing with the miscarriage, 1 focuses on the lost chance to be a mother, another focuses on the sense that her body has betrayed her, and 2 focus on the emotional pain associated with miscarriage. Personal significance scores at 4 months ranged from 7 to 28 (mean = 16.7, SD = 5.1) and at 1 year from 7 to 27 (mean = 15.83, SD = 5.17).

Social support was measured via Brandt and Weinert’s Personal Resource Questionnaire.\(^6^2\) This standardized 25-item self-report Likert-type measure (1 = strongly agree to 7 = strongly disagree) measures the amount of general support individuals rate as available to them. It has been used extensively in studies of social support across many events and conditions. The investigators report a Cronbach alpha of .89. At 1 year after loss, for this investigation, the internal consistency was .92. Divergent criterion validity for this study was supported by a negative correlation with the isolated subscale of the IMS (\(r = -.48; p \leq .001\)). Actual social support scores at 4 months ranged from 75 to 175 (mean = 143.01, SD = 21.14) and at 1 year from 70 to 175 (mean = 143.23, SD = 20.83).

Pregnancy status was scored based on the sum of childbearing experiences since miscarrying. Points were assigned: −1 = miscarried again, 0 = not pregnant, 1 = possibly pregnant, 2 = ≤12 weeks gestation, 3 = ≤20 weeks, 4 = >20 weeks, and 5 = given birth. For example, if a woman miscarried again but was now 8 weeks pregnant, her score would be (−1 + 2 = 1). Because one woman returned her 4-month questionnaire a bit late, actual scores ranged from −1 to 4 (mean = 0.51, SD = 1), and at 1 year scores ranged from −1 to 5 (mean = 1.76, SD = 2.21).

Emotional strength was measured via an investigator-developed measure of how emotionally resourceful a woman rates herself. It is a subscale of the Successful Self Scale (SSS). Items for the SSS were derived from responses of 36 women of childbearing age to the probe: Name five attributes of a successful woman.\(^6^3\) These emic statements were turned into items/statements that women could rate as being “like them” on a negative (no, not at all = 1) to positive (yes, definitely = 5) scale. Items were submitted to 193 women 1 year after miscarriage (participants in the MCP). Items with low relevance (as indicated by user comments or incomplete data), minimal variance, or poor item-to-total correlations were eliminated, thus yielding 12 psychometrically sound items. These were submitted to principal components factor analysis with varimax rotation. Two subscales were identified (not dissatisfied and emotional strength) that accounts for 56% of the total variance in the scale and had eigen values greater than 1. There are 8 items in the Emotional Strength subscale (I am . . . emotionally strong, well-balanced, cheerful, energetic; I make . . . conscious choices, a positive contribution to the world; I consider alternatives; and I take care of the things that matter most to me). Emotional Strength correlates with Rosenberg’s Self-Esteem scale\(^6^4\) (\(r = .69, p \leq .001\)), thus providing support for convergent criterion validity. At 1 year after loss, Cronbach alpha estimate of internal consistency was .83. At 4 months after loss, actual scores ranged from 17 to 40 (mean = 31.34, SD = 4.41) and at 1 year from 16 to 40 (mean = 31.21, SD = 4.5).

Provider caring was measured via the Caring Professional Scale (CPS), an investigator-developed paper and pencil questionnaire for consumers to rate healthcare providers on their practice relationship style.\(^6^5\) Caring is defined as “a nurturing way of relating to a valued other toward whom one feels a personal sense of commitment and responsibility.”\(^6^6\) Items were designed to reflect the subcategories (knowing, being with, doing for, enabling, and maintaining belief) from Swanson’s caring theory.\(^5^5–6^8\) The CPS consists of 14 items constructed on a 5-point Likert-type scale. Sample items include: Was the provider who just took care of you . . . comforting? informative? technically skilled? supportive? an attentive listener? clinically competent? aware of your feelings? etc. The CPS correlates with the empathy subscale of the Barret-Lennart Relationship Inventory (\(r = .61, p \leq .001\)), thus supporting concurrent criterion validity. Cronbach alpha estimates of internal consistency for the MCP, where it was used to rate multiple providers, were advanced practice nurses (\(r = .74\) to .96), nurses (.97), and physicians (.96). For this investigation if women received care from both a physician and midwife at loss, the average score was entered into analysis. At the time of loss, actual scores ranged from 14 to 70 (mean = 56.92, SD = 13.16).

Obstetrical and demographic variables were all self-report. Gestational age at loss was recorded...
as the number of weeks between the onset of the last menstrual period and the day pregnancy ended. Maternal age was recorded in years. Family income data were gathered in increments of $10,000.

**Analysis**

Measures of central tendency and dispersion were examined for each variable. Models were tested via path analysis, which involved five separate stepwise multiple regression equations, one for each endogenous variable in the model. A minimum of $p \leq 0.05$ was considered statistically significant. As depicted in Figure 1, endogenous variables are those dependent variables that are pointed at by prior predictor variables. Stepwise multiple regression begins by selecting the predictor variable that shares the greatest amount of statistically significant variance with the dependent variable. More hypothesized predictors are then allowed into a new equation only if they explain additional unique variance in the dependent/endogenous variable (as reflected by a statistically significant increase in the adjusted $R^2$). The standardized, partial correlation of a predictor variable with its dependent variable is displayed as a path coefficient (beta weight). Indirect effects are determined by multiplying the statistically significant beta weights taken from those direct paths that connect a predictor variable to its designated dependent variable. If there exists more than one significant indirect path between a predictor and its dependent variable, products of beta weights are summed to produce the total indirect effect of one variable on another.

**RESULTS**

Depicted in Figure 2 are the hypothesized paths from those predictor variables that made a significant contribution to the explained variance.
in the dependent variables at 4 months after loss, and Figure 3 shows the significant findings for 1 year. Tables 1 and 2 summarize the total effects of each predictor variable on each hypothesized endogenous/dependent variable. Examination of these total effects facilitates explanation of how predictor variables both directly and indirectly influenced dependent variables.

Focusing on the final outcome variable at 4 months after loss, 63% of the variance in depressive symptoms was accounted for by the hypothesized model. Personal significance had the strongest total effect on depressive symptoms (beta = .470), closely followed by the direct effects of passive coping (beta = .433) and the total effect of emotional strength (beta = −.295). Family income had both direct and indirect effects on depressive symptoms (total beta = −.193). The remaining variables, social support (beta = −.222), number of children (beta = −.135), number of miscarriages (beta = .083), maternal age (beta = .081), weeks gestation (beta = .075), and pregnancy status (beta = −.041), influenced depression, but only indirectly.

At 1 year after loss, the hypothesized model accounted for 54% of the variance in depressive symptoms. Once again, personal significance had the strongest total effect on depression (beta = .495). Passive coping had a direct effect on depression (beta = .284), closely followed by an indirect negative effect of social support (beta = −.282) and a direct negative effect of emotional strength (beta = −.256). Higher family income had a combined direct and indirect negative effect on depressive symptoms (total beta = −.175). Active coping (beta = .139) directly affected depressive symptoms. Finally, at 1 year after miscarriage, pregnancy status (beta = −.152), number of children (beta = −.040), and maternal age (beta = −.042) all indirectly affected the intensity of depressive symptoms.

Data in Tables 1 and 2 can also be used to trace...
how each predictor variable contributed to the whole model. For example, at 1 year after loss, family income ultimately had quite a few direct or indirect effects on the examined dependent variables. Its total effect on depression was 2.175 (2.053 was indirect and 2.122 was direct), on passive coping its total effect was 2.062 (all indirect through social support), on active coping it was .049 (indirect through social support), on personal significance it was .044 (indirect through social support), on emotional strength it was .234 (indirect through social support), and on social support it was .193 (all direct). At 4 months after loss, as family income did not significantly affect social support, it had far fewer indirect effects.

### Table 1. Direct and Indirect Effects at 4 Months after Miscarriage

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*p ≤ 0.001.

**DISCUSSION**

As suggested by the Lazarus model, many of the examined paths were significant. However, there were several hypothesized paths that were not supported. The direct contribution of each predictor variable to the explained variance in each of the dependent variables at 4 months and at 1 year after loss are addressed in this discussion.

At both times, as predicted, there was a positive association between number of prior miscarriages and the personal significance attributed to miscarriage, indicating that with each additional loss there was an associated setback. In the opposite direction, and as predicted, the more chil-
Dren a woman had, the less personal significance miscarriage held for her at 4 months and 1 year. Perhaps having a child confirmed the woman’s entitlement to the term mother and offered assurances that she could carry a pregnancy to term.

Although a higher gestational age was associated with enhanced personal significance at 4 months, it was not at 1 year. By 1 year after loss, the number of weeks a woman carried her miscarried pregnancy became less meaningful in terms of the appraised harm, loss, or threat. Conceivably, getting pregnant during that first year after loss and getting past the gestational age of the prior loss may have softened the significance attributed to the length of time the miscarried pregnancy lasted.

Contrary to what was predicted, perceived level of provider caring at loss did not significantly affect personal significance at 4 months or 1 year after loss. Selection bias is of possible concern here. This sample was drawn from a group of providers whose very agreement to serve as a referral source may have implied an enhanced awareness of the toll miscarriage can take on women. Some of the healthcare providers actually called the investigator and asked if they could serve as a referral source. Such sensitivity may have led to limited variation in practice style and higher caring ratings and, hence, dampened predictive ability (60% of the CPS scores indicated that the provider’s way was caring most of the time, and 85% indicated that the provider was caring at least 50% of the time). Furthermore, provider caring was also not associated with social support, as was predicted. This lack of predictive ability could, once again, be due to restricted variance in the CPS scores. An alternate explanation could be found in the difference between the constructs of caring and social support. Cobb defines social support as "information that one is cared for and loved; that one is valued and esteemed; and that one belongs to a network of mutual obligation,"70, pp300–301 whereas caring is

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**Table 2. Direct and Indirect Effects at 1 Year after Miscarriage**

<table>
<thead>
<tr>
<th>Outcome variable</th>
<th>Predictor variables</th>
<th>Direct</th>
<th>Indirect</th>
<th>Total</th>
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<td>.193</td>
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</table>

*p ≤ 0.001.

**p ≤ 0.01.
defined by Swanson as “a nurturing way of relating to a valued other toward whom one feels a personal sense of commitment and responsibility.”\textsuperscript{65,p155} This conceptualization of caring acknowledges the sense of valuing, commitment, and concern but emphasizes the notion of responsibility over mutuality. As Norbeck suggests,\textsuperscript{71} the lack of mutual obligation may account for why patients frequently do not include healthcare providers when evaluating their social support resources.

As predicted, increases income was associated with decreased depression at 4 months and 1 year after loss. Its performance in predicting coping and social support, however, was quite mixed. Although income was not associated with social support at 4 months after loss, it was at 1 year. These findings indicate that income was not associated with how supportive others might be at 4 months after loss, but it was predictive of availability of support over the long haul. At 4 months, as predicted, increased family income was associated with decreased passive coping, but contrary to the hypothesized direction, it was also associated with decreased active coping. These data combined with the fact that higher income was associated with less depression would suggest that at 4 months after loss, having more financial resources had a buffering effect on the need to cope and depressive responses. Perhaps at 4 months after loss, those with more income simply had less other demands to cope with in general. At 1 year after loss, income had no direct association with coping.

Maternal age was predicted to be negatively associated with passive coping and positively associated with personal significance, emotional strength, and active coping. As it turned out, at 4 months, its only significant contribution was that older women attributed more significance to miscarrying. However, by 1 year, age was no longer associated with personal significance. Similar to 4 months, at 1 year, it was also not associated with emotional strength or active coping. However, at 1 year after loss, maternal age was negatively associated with passive coping. It is possible that with the passage of time, mature women were less inclined to engage in passive coping strategies, such as keeping to themselves, self-blaming (perhaps they were more likely to view miscarrying as a natural consequence of aging), and less likely to engage in wishful thinking (perhaps they were more jaded by life’s realities). Finally, the lack of association between maternal age and emotional strength would suggest that the tendency to view oneself as emotionally resourceful is not associated with chronological age.

At 4 months and 1 year after loss, as hypothesized, the interceding variable, increased social support, had a negative effect on personal significance and passive coping and was associated with increased emotional strength and enhanced active coping. These data clearly suggest that the presence of supportive others is an important resource to women who miscarry.

Pregnancy status was associated with emotional strength at 4 months but not at 1 year. It may be that being pregnant again at 4 months resulted in feeling stronger, hence, more inclined to rate the self as emotionally strong. Alternatively, those who viewed themselves as having more emotional resources might have been more likely to attempt conception as soon as possible after miscarrying. The lack of association between pregnancy status and emotional strength at 1 year could be due to the variety of emotions women might feel in a pregnancy after loss. Having recently experienced a negative pregnancy outcome, their sense of self as emotionally resourceful could be quite labile along the continuum of expectancy and new motherhood. As predicted, pregnancy status was negatively associated with personal significance at 1 year, indicating that begin pregnant or giving birth in the first year after miscarrying lessened the personal significance of miscarrying. As there was no association between pregnancy status and personal significance at 4 months, it is possible that so soon after miscarrying, even those who had conceived were still too early in their pregnancy to experience any assurance of a positive outcome.

As predicted, higher personal significance was associated with increased depression at 4 months and 1 year after loss. Clearly, if women claim that their miscarriage was still evoking emotional pain, some of those feelings might be symptoms of depression. It was also associated with increased active and passive coping at 4 months and with increased passive coping at 1 year after loss. The 4-month findings would suggest that women engaged in a variety of strategies to deal with the emotional pain of miscarrying. Surprisingly, at 4 months, active coping was not associated with depressive symptoms, indicating that active coping might be a strategy to regulate emo-
tions other than depression, such as anxiety, anger, or confusion. The 1-year findings are quite interesting, as there was no link between personal significance and active coping, but there was a positive association between active coping and depressive symptoms. It is possible that women were engaging in active coping at 1 year after loss for reasons other than the personal significance of miscarriage. Passive coping was strongly associated with depressive symptoms at 4 months and 1 year after loss. Sadly, self-blaming, keeping to oneself, and wishful thinking as ways to deal with the emotional pain of miscarrying may be the only coping strategies available to those women who lack supportive relationships that validate their loss and offer comfort.

Findings also suggest that not all of the reasons women might be coping or experiencing depressive symptoms at 4 months or 1 year after miscarriage are necessarily attributable to their miscarriage. In other words, women could simultaneously be dealing with other meaningful life events that give rise to coping activities and sad feelings. An alternative explanation for why coping behaviors and feelings may not all be threaded through personal significance could be that women were unable to consciously validate to themselves that their miscarriage had meaning and that it continued to hold personal significance for them. This inability to tie one’s actions and feelings to a miscarriage that occurred 4 months or 1 year ago could possibly be linked to women’s having accepted societal attitudes that discount miscarriage or set expectations that women should get over it. Such sociocultural discourse, as expressed through families, friends, and healthcare providers, may have so potently framed women’s accounts of what a miscarriage should feel like that they are unable to authentically and reflectively discover their own unfolding experience of miscarrying.

Limitations

The positive association between coping (be it active or passive) and increased depressive symptoms raises some interesting theoretical and methodological concerns. One limitation imposed by the design of this study is that it is really not possible to determine if high personal significance actually preceded, co-occurred with, or came after depression and coping. Furthermore, although path analysis is often referred to as a causal modeling technique, in fact, it is best used to determine levels of association. Likewise, the Which came first? questions could also be targeted at the Lazarus model.

The sample for this study poses some concerns. Participants were conveniently recruited through healthcare providers, and the sample is limited in size and diversity in ethnic and marital status. Such limitations potentially hamper both internal validity (statistical power to most effectively test the theory and its derived hypothesis) and external validity (ability to be generalized to other women who miscarry). Nunnally and Bernstein suggest that 30 subjects per variable be employed when conducting research based on regression modeling techniques. Falling short of that ratio sets up a situation where hypothesized relationships may be falsely accepted or rejected. Hence, findings from this investigation should be interpreted and applied with caution.

CONCLUSIONS

The theoretical model tested via this secondary analysis accounted for 63% of the variance in women’s depressive symptoms at 4 months and 54% at 1 year after miscarriage. Interestingly, context of loss variables, with the possible exception of family income, were quite limited in their explanatory contributions. Context variables (stage I), along with interceding variables (stage II), were able to explain only 18% of the variance in primary appraisal of meaning (stage III) at 4 months and 22% at 1 year. Hence, approximately 80% of the variance in personal significance could not be accounted for by the predictor variables. Furthermore, as most of the context variables had minimal and indirect effects on depressive symptoms, it is not surprising that previous investigations have produced conflicting findings about the associations among demographic, obstetrical, and care management variables and levels of depression subsequent to miscarrying.

Of particular interest was the direct contribution of pregnancy status at 1 year to a reduction in personal significance, with consequent indirect reductions in passive coping and depression. Historical clinical debates in the pregnancy loss literature have centered on timing of the subsequent pregnancy and potential emotional consequences for the mother and too soon conceived child. Concern has been raised that moth-
ers who too quickly entered a subsequent pregnancy may not have devoted adequate time to resolution of their loss, thus facing a possible complicated grief response that could potentially interfere with the development of a healthy maternal-infant relationship. Findings from this study, however, concur with the findings of others that women least depressed after miscarriage are those who are pregnant again or who have given birth. Others, however, have demonstrated that pregnancies after loss are characterized by enhanced anxiety that pertains, specifically, to the subsequent pregnancy and its outcome. Therefore, findings from this study and others would suggest that, in addition to assessment of a woman’s physical readiness, providers should also address the woman’s desires for when to try again and her ability to access the kinds of information, support, and healthcare that would be of greatest benefit to her in dealing with worries that are likely to arise in her next pregnancy.

The Lazarus emotions and adaptation paradigm holds considerable promise for understanding the variability in women’s responses to miscarriage. Model constructs (context of loss, interceding variables, primary appraisal, secondary appraisal, and emotional responses) as operationalized through this investigation provided a useful map for predicting the occurrence of depressive symptoms subsequent to miscarriage. Findings would suggest the variables most predictive of depressive symptoms are personal significance, passive coping, social support, emotional strength, family income, and pregnancy status. Clinical implications include the need to assess the personal significance miscarriage holds for each woman, her emotional strength, availability of supportive others, coping style, and pregnancy status. Finally, although information available at the time of miscarriage (such as maternal age, gestational age, income, number of children, and history of loss) may suggest a higher risk for depression, relying on those data alone may prove far less effective than a focused conversation about the meaning miscarriage has to a woman and what she and those she cares about are doing to help her deal with her experience.

ACKNOWLEDGMENTS

I thank the participants in the Miscarriage Car ing Project who shared their deeply personal sto-

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