

# UCLA

## UCLA Previously Published Works

### Title

Coping during pregnancy: a systematic review and recommendations

### Permalink

<https://escholarship.org/uc/item/2vn9n6sg>

### Journal

Health Psychology Review, 8(1)

### ISSN

1743-7199

### Authors

Guardino, Christine M  
Schetter, Christine Dunkel

### Publication Date

2014-01-02

### DOI

10.1080/17437199.2012.752659

Peer reviewed

This article was downloaded by: [University of California, Los Angeles (UCLA)]  
On: 09 January 2013, At: 15:01  
Publisher: Routledge  
Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered  
office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## Health Psychology Review

Publication details, including instructions for authors and  
subscription information:

<http://www.tandfonline.com/loi/rhpr20>

### Coping during pregnancy: a systematic review and recommendations

Christine M. Guardino<sup>a</sup> & Christine Dunkel Schetter<sup>a</sup>

<sup>a</sup> Department of Psychology, University of California, 1285A Franz  
Hall, Los Angeles, CA, 90095, USA

Version of record first published: 08 Jan 2013.

To cite this article: Christine M. Guardino & Christine Dunkel Schetter (2013): Coping during pregnancy: a systematic review and recommendations, Health Psychology Review, DOI:10.1080/17437199.2012.752659

To link to this article: <http://dx.doi.org/10.1080/17437199.2012.752659>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.tandfonline.com/page/terms-and-conditions>

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

## REVIEW

### Coping during pregnancy: a systematic review and recommendations

Christine M. Guardino\* and Christine Dunkel Schetter

*Department of Psychology, University of California, 1285A Franz Hall, Los Angeles, CA 90095, USA*

*(Received 19 January 2011; final version received 21 November 2012)*

Extensive evidence documents that prenatal maternal stress predicts a variety of adverse physical and psychological health outcomes for the mother and baby. However, the importance of the ways that women cope with stress during pregnancy is less clear. We conducted a systematic review of the English-language literature on coping behaviours and coping styles in pregnancy using PsycInfo and PubMed to identify 45 cross-sectional and longitudinal studies involving 16,060 participants published between January 1990 and June 2012. Although results were often inconsistent across studies, the literature provides some evidence that avoidant coping behaviours or styles and poor coping skills in general are associated with postpartum depression, preterm birth and infant development. Variability in study methods including differences in sample characteristics, timing of assessments, outcome variables and measures of coping styles or behaviours may explain the lack of consistent associations. To advance the scientific study of coping in pregnancy, we call attention to the need for a priori hypotheses and greater use of pregnancy-specific, daily process, and skills-based approaches. There is promise in continuing this area of research, particularly in the possible translation of consistent findings to effective interventions, but only if the conceptual basis and methodological quality of research improve.

**Keywords:** pregnancy; stress; coping; systematic review

Although many women report that pregnancy is a joyful and happy period in their lives, the demands and changes associated with this reproductive period, and the social context within which pregnancy takes place, can produce high levels of stress and anxiety for many expectant mothers. Pregnancy requires many adjustments in physiological, familial, financial, occupational and other realms which may evoke emotional distress for women, especially women of low income who are prone to experience more stress with fewer resources (Norbeck & Anderson, 1989; Ritter, Hobfoll, Lavin, Cameron, & Hulsizer, 2000). Pregnant women may also worry about the health of their babies, impending childbirth, and future parenting responsibilities (Lobel, 1998; Lobel, Hamilton, & Cannella, 2008). *Stress* can be defined as demands appraised as taxing or exceeding the resources of the individual (Lazarus & Folkman, 1984). Such demands can be generated or exacerbated by the social environmental context in which pregnancy takes place. For example, the experience of early pregnancy may differ as a function of whether the pregnancy was unplanned or planned, and whether it occurs with or without family support. Variation in stress

---

\*Corresponding author. Email: crobbins@ucla.edu

among pregnant women can be substantial but by all reports, a large proportion of children born today are exposed to high levels of maternal stress during gestation.

Furthermore, increasingly strong evidence points to many negative consequences of stress that occurs in pregnancy. For example, women with high stress are less likely to maintain optimal health behaviours during pregnancy, and they are more likely to smoke and be sedentary (Lobel et al., 2008; Weaver, Campbell, Mermelstein, & Wakschlag, 2008). Moreover, expecting mothers who experience high stress or anxiety during pregnancy are at risk of preterm birth and giving birth to low-birth-weight infants (for reviews see Dunkel Schetter, 2009, 2011; Dunkel Schetter & Glynn, 2010; Dunkel Schetter & Lobel, 2012). Internationally, fifteen million babies are born preterm each year and complications due to preterm birth account for 14% of child deaths under five years of age (March of Dimes, PMNCH, Save the Children, & WHO, 2012). These adverse birth outcomes are a pressing public health issue in some countries, such as the United States where the national rates of preterm birth and low birth weight average 13% and 8%, respectively (Martin et al., 2010).

Certain maternal characteristics (African-American race, low socio-economic status (SES), and medical conditions such as infections during pregnancy) are associated with the occurrence of adverse birth outcomes. Yet, sociodemographic and biomedical approaches alone have not sufficiently identified those women who later deliver their babies too small or too soon (Lu & Halfon, 2003), which has led to the development of multilevel models (Dunkel Schetter & Lobel, 2012; Misra, Guyer, & Allston, 2003) and greater focus on psychosocial risk and resource factors including stress exposure. Traumatic events including nuclear disasters, terrorist attacks, hurricanes, earthquakes or floods when they occur during pregnancy have been associated with poorer pregnancy outcomes (Glynn, Wadhwa, Dunkel-Schetter, Chicz-DeMet, & Sandman, 2001; Lederman et al., 2004; Xiong et al., 2008), as have major life events like job loss, the death of a family member when they occur just preceding pregnancy or during gestation (Hedegaard, Henriksen, Secher, Hatch, & Sabroe, 1996; Messer, Dole, Kaufman, & Savitz, 2005; Whitehead, Hill, Brogan, & Blackmore-Prince, 2002). Other studies examining the impact of life events, stress appraisals or perceived stress have often also shown adverse effects on birth outcomes (Dole et al., 2003; Zambrana, Dunkel-Schetter, Collins, & Scrimshaw, 1999). Furthermore, accumulating evidence points to *pregnancy-related anxiety* as particularly potent in effects on mothers and their offspring (DiPietro, Hawkins, Hilton, Costigan, & Pressman, 2002; Huizink, Robles de Medina, Mulder, Visser, & Buitelaar, 2002b; Lobel, Cannella, et al., 2008; Mancuso, Dunkel-Schetter, Rini, Roesch, & Hobel, 2004; Orr, Reiter, Blazer, & James, 2007). In a large prospective cohort study of preterm birth, Kramer et al. (2009) utilised numerous stress and distress measures, and found that only pregnancy-related anxiety was consistently and independently associated with spontaneous preterm birth. The fact that the association persisted after adjustment for medical and obstetric risk factors, perceptions of pregnancy risk and depressed affect suggests that the risk is not due to anxiety caused by one's medical risk factors alone and has other origins. Because pregnancy anxiety and stress have been linked to adverse birth outcomes, understanding how women cope with stress in pregnancy, and especially with pregnancy-specific concerns such as impending labour and delivery, infant health and parenting, is of paramount importance. It may offer an opportunity to influence pregnancy, birth and later infant and maternal outcomes (Alderdice, Lynn, & Lobel,

2012). Perhaps for this reason, studies of stress and coping in pregnancy have proliferated.

The good news is that not every woman who experiences a major life event or faces chronic strain during pregnancy gives birth to a preterm or low-birth-weight infant or one with developmental adversities. Why do some women fare better than others when confronted with stressors during pregnancy? A resilience approach may shed light on this important issue (Zautra, Hall, Murray, & the Resilience Solutions Group, 2008). For example, variability in coping behaviour and in coping efficacy or skill should contribute to differences in the psychological and physiological effects of stress exposure during pregnancy (Dunkel Schetter, 2011; Dunkel Schetter & Dolbier, 2011). Thus, a review of what we know and do not know about coping in pregnancy seemed worth doing.

### Conceptual background in stress and coping theory

*Coping* is defined as constantly changing cognitive and behavioural efforts aimed at dealing with the demands of specific situations that are appraised as stressful (Lazarus & Folkman, 1984). In the context of pregnancy, coping efforts may influence birth outcomes by serving to minimise or prevent negative emotional, behavioural, cognitive and physiological responses to stressors. As a result, the ability to select and implement an appropriate coping response could serve as a resilience resource that buffers expectant mothers and their children from the potentially harmful effects of prenatal stress exposure. For example, those who cope by seeking emotional support or taking action to resolve the problem may have fewer deleterious effects of stress, whereas those who avoid dealing with the stressor or engage in adverse health behaviours such as smoking to reduce distress would have heightened vulnerability. Indeed, a large epidemiological study of 1898 African-American and White women in North Carolina found that avoidant coping styles were associated with an increased risk of preterm delivery (Dole et al., 2004; Messer et al., 2005), fueling our examination of coping during pregnancy.

As prolific leaders in the study of stress and coping, Lazarus and Folkman (1984) defined stressors as demands that *are appraised* as personally significant and as taxing or exceeding the resources of the individual. According to this cognitive approach to the study of stress, how a woman appraises events during her pregnancy may shape her emotional and behavioural responses, and influence how she copes. Although dominant conceptions define coping as cognitive and behavioural attempts to manage a particular situation, usually labelled *coping behaviour* (Lazarus & Folkman, 1984), a few researchers have been interested in *coping styles*, which refer to more consistent tendencies to cope in particular ways such as through approach or avoidance (Miller, 1987; Steptoe & O'Sullivan, 1986). This alternate conception treats coping as a relatively stable trait and contrasts with the contextual approach to coping, which views coping processes as situation specific and dynamic (Folkman & Moskowitz, 2004; Lazarus & Folkman, 1984).

In describing specific coping efforts and more general coping styles, theorists have traditionally distinguished between problem-focused and emotion-focused coping. *Problem-focused coping* is aimed at the stressor itself, and may involve taking steps to address or resolve the situation. It is most frequently used when the stressor is something an individual appraises as controllable. *Emotion-focused coping*,

in contrast, is aimed at reducing feelings of distress associated with stressful experiences, and is more likely to be used if the person views the stressor as uncontrollable (Carver, 1997; Lazarus & Folkman, 1984). Researchers may also distinguish between *approach or engagement coping*, referring to efforts aimed at dealing with the stressor itself, either directly or indirectly, as compared to *avoidance or disengagement coping* which refers to efforts to escape from having to deal with the stressor (Roth & Cohen, 1986; Suls & Fletcher, 1985). Avoidance coping is usually thought of as a form of emotion-focused coping because it may involve attempts to evade or escape from the feelings of distress associated with the stressor (Carver, 2007). These binary classification systems aggregate many theoretically distinct ways of coping and thereby may be obscuring the nature of relationships between specific coping behaviours and various dependent variables, but they have been utilised frequently in the literature and yielded some useful findings.

### **Purpose and hypotheses**

Given a strong theoretical and sufficient empirical basis for research on coping in pregnancy, we conducted a systematic review of studies examining coping in the context of pregnancy. The goals were to (a) describe and methodologically critique the published studies on coping by pregnant women; (b) identify key findings that emerge from this collection of studies; (c) situate this review within the context of the larger literature on stress and coping theory, with particular attention paid to the possible moderating role of coping behaviours and styles; and (d) to consider how the field can move forward in the study of how pregnant women manage stress with an ultimate goal of better assisting women who experience significant demands during pregnancy.

We expected that the findings would be strongest or least equivocal when examining the most methodologically rigorous studies – that is, those with theoretically grounded a priori hypotheses tested in sufficiently large sample sizes using well-validated measures of coping and outcome measures. Based on coping theories that emphasise contexts in which stress occurs, we also anticipated that the strongest findings would be in studies that examined how women cope with specific stressors experienced during their pregnancies as compared to studies of general coping styles or coping behaviours.

### **Methods**

A systematic review of the literature from January 1990 to June 2012 was conducted using PsycInfo and PubMed. Empirical investigations on coping in human pregnancy were located by searching PsycInfo using the search terms all(coping) AND all((pregnan\* OR prenatal)) and limiting results to scholarly journals or books, human populations, English language, and publication dates January 1990 and June 2012. We also searched PubMed using “Pregnancy”[Mesh] AND “coping”[All Fields] AND (“1990/01/01”[PDAT]: “2012/06/30”[PDAT]) AND “humans”[MeSH Terms] AND English[lang]. Because of the unique stressors associated with adolescent pregnancy, we limited our review to studies conducted in adult populations (over 18 years of age). Searches for publications of researchers known to study coping during pregnancy were completed, and lists of citations for all retrieved articles were examined to locate additional studies meeting inclusion criteria. This

search yielded papers published in peer-reviewed journals with null findings; thus, we were not particularly concerned about publication bias and excluded unpublished dissertations and studies. All papers were abstracted to characterise samples, methods and major findings and classified according to study design and objectives, with cross-sectional studies described first (Supplemental Table 2), followed by longitudinal studies that are further categorised by outcome variable as follows: prenatal psychological outcomes (Supplemental Table 3), postpartum psychological outcomes (Supplemental Table 4), biological, birth and infant development outcomes (Supplemental Table 5). The coauthors independently conducted searches and abstracting; the few discrepancies were resolved by discussion until a consensus was reached. When necessary, we contacted authors of papers with insufficient or unclear information for clarification of study methods and results. Because our goal was to review and evaluate evidence on associations of coping to psychological and physical health outcomes, we also excluded papers that tested only the antecedents (e.g., race, education) or concomitants (e.g., spirituality) of coping (Balcazar, Krull, & Peterson, 2001; Balcazar, Peterson, & Krull, 1997; Borchering, 2009; Mahoney, Pargament, & DeMaris, 2009; Ortendahl, 2008).

## Results

In total, we identified 45 studies and 53 publications meeting inclusion criteria (see Figure 1). Sample sizes ranged from 30 participants (Mikulincer & Florian, 1999) to 2761 participants (Tiedje et al., 2008) and timing of assessments ranged from very early in pregnancy (four weeks gestation) to post-term (41 weeks). Studies were conducted in geographic regions including Europe, North America, Asia and Australia. Although all of these studies utilised convenience samples predominantly recruited from childbirth preparation classes or prenatal clinics, some studies recruited samples of low-income, minority women that are typically under-represented in health research (e.g., Borders, Grobman, Amsden, & Holl, 2007; Rodriguez et al., 2010), or large and diverse samples more reflective of the populations under study (e.g., Dole et al., 2004; Tiedje et al., 2008). We report the measure used to assess coping in each paper, as well as how the measure was used because there was some variability in the instruction sets across studies. For example, some studies asked participants to report their general coping styles ( $n = 19$ ), others assessed coping behaviours during pregnancy ( $n = 7$ ), still others assessed coping with pregnancy-related stressors ( $n = 15$ ) and a few assessed coping skills ( $n = 6$ ). We also present a count for each paper of the number of statistically significant findings out of the total tests conducted (or eligible for testing based on the product of the number of ways of coping assessed and the number of dependent variables included in the analyses).

## Coping instruments and measures

Before discussing the findings, we describe briefly the instruments used. We identified a total of 22 different measures used in the literature to assess coping during pregnancy (see Supplemental Table 1). Studies of how women cope with stress during pregnancy have typically employed a generic coping instrument intended for use in the general population, but have sometimes designed or adopted a pregnancy-specific coping questionnaire, or used a measure of general coping skills.

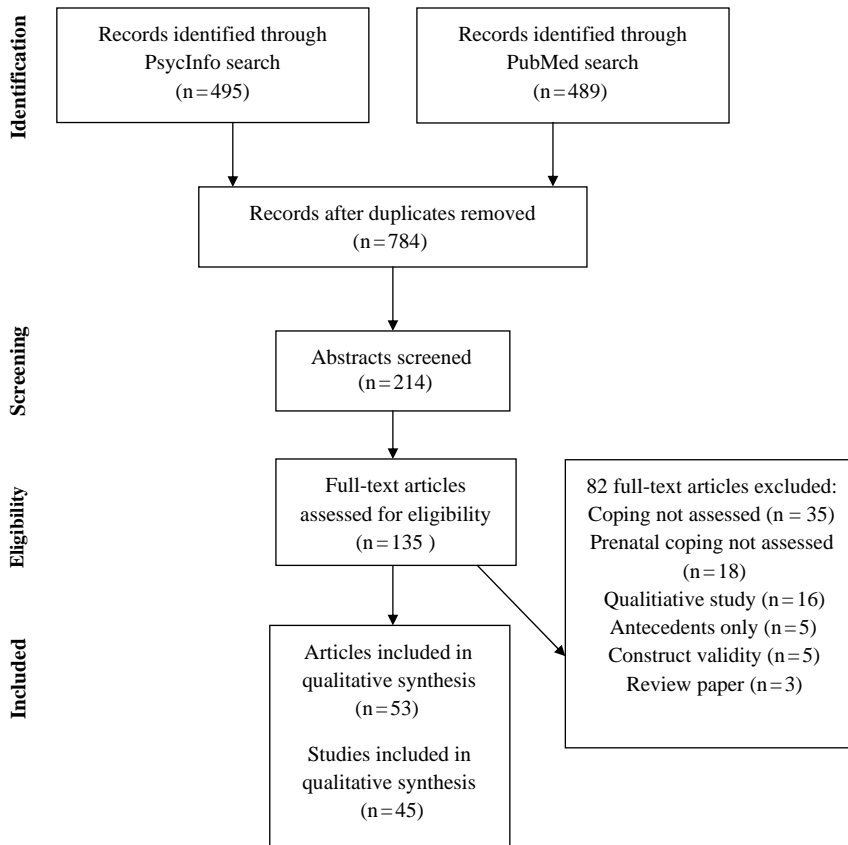


Figure 1. PRISMA diagram.

### *General measures of coping behaviour and style*

As shown in Supplemental Table 1, there is a great variability in the generic instruments used to assess coping during pregnancy, as well as in the number and types of subscales included in each measure. Fourteen different coping measures that were developed for the general population have been used in the pregnancy studies. None of the papers presented findings concerning convergent and discriminant validity of these general measures for use in pregnancy, although they often referred the reader to the original publication for further information about the measure's validity and reliability in the general population. The most commonly used of these measures are the *Ways of Coping* (WOC; Folkman & Lazarus, 1988), the *COPE* (Carver, 1997) and the *Brief COPE* (Carver, Scheier, & Weintraub, 1989), all of which are well validated for use in the general population. When Cronbach's alphas are reported for the subscales of these measures, they indicated acceptable reliability during pregnancy in general (Gotlib, Whiffen, Wallace, & Mount, 1991; Honey, Morgan, & Bennett, 2003; Levy-Shiff, Lerman, Har-Even, & Hod, 2002; Lowenkron, 1999; Mikulincer & Florian, 1999; Pakenham, Smith, & Rattan, 2007; Soliday, McCluskey-Fawcett, & O'Brien, 1999). Another validated general coping



measure that has been used in a number of large studies of birth outcomes is the *John Henryism Coping Scale* (James, Hartnett, & Kalsbeek, 1983), which assesses the extent to which individuals attempt to actively control behavioural stressors through hard work and determination. However, reliability coefficients for this scale were not reported for any of the pregnancy studies using this measure. Two studies used the *Miller Behavioural Style Scale* (Miller, 1987), which assesses coping behaviours by asking participants how they would likely cope with four hypothetical uncontrollable stressful situations, such as a fear of flying.

There is also variation in whether these general coping measures were used to assess coping behaviours (efforts) or styles. In most studies, participants were asked to report how they *generally* cope with stress in order to assess coping traits or dispositional coping styles, rather than to indicate cognitive or behavioural efforts to manage specific stressful situations. In this format, participants were typically asked to report the extent to which they tended to respond in certain ways to *stress in general*, or to *stress during pregnancy*. Alternatively, researchers might ask participants to situate their responses within the context of pregnancy and to report the ways in which they tended to cope with *pregnancy demands* over a specified period of time such as during the current trimester. A few researchers asked participants to respond to generic coping inventories with respect to *specific stressors encountered during pregnancy*. For example, pregnant women in one study were asked to think about a stressful event that occurred over the previous two months and report how frequently they used each strategy in attempting to cope with the stressor (Spirito, Ruggiero, Bowen, & McGarvey, 1991). Thus, there is remarkable range in how general coping instruments have been used in pregnancy.

### *Measures of coping skills*

A small number of studies assessed *coping skills* rather than specific coping styles or behaviours. As individuals have different levels of skills for responding to life's challenges and demands, these studies are concerned with understanding the effects of an individual's perceived ability to deal with stress. For example, Borders et al. (2007) measured coping skills using the *State Hope Scale* (Snyder et al., 1996), an instrument that includes items such as 'if I should find myself in a jam, I could think of many ways to get out of it' and 'there are lots of ways around any problem that I am facing right now'. However, other items on the scale such as 'right now, I see myself as being pretty successful' and 'at this time, I am meeting the goals I have set for myself' may reflect other concepts and not coping skills per se. A Cronbach's alpha coefficient would indicate the internal consistency of this scale but it was not reported, nor was any other construct validity information. Two additional studies assessed participants' appraised resources to deal with stress using the *Stress Coping Inventory* (Ryding, Wijma, Wijma, & Rydhstrom, 1998; Soderquist, Wijma, Thorbert, & Wijma, 2009). This unvalidated measure asks participants to rate how able they are to cope with 41 different stressful situations. These studies are reviewed in detail below, but the measures of coping skills used were each designed to assess something else (i.e., hope, self-efficacy, sense of coherence), which raises questions about the meaning of the results.

### ***Coping measures developed specifically for pregnancy***

In contrast to adopting generic coping instruments and adapting them to pregnancy or using a general coping skills measure, Yali and Lobel (1999) developed a pregnancy-specific measure, the 36-item *Prenatal Coping Inventory* (PCI). This instrument is designed to capture coping behaviours that are specific to stressors encountered by pregnant women (e.g., ‘prayed that the baby will be healthy’, ‘felt lucky to be a woman to experience pregnancy’, and ‘asked doctors or nurses about the birth’). Women are asked to report how often they used each method of coping ‘to try to manage the strains and challenges of being pregnant’ during a given time frame on a scale ranging from 0 (never) to 4 (almost always). In the first published report utilising this scale, Yali and Lobel (1999) identified four internally consistent coping subscales in a sample of 167 medically high-risk women assessed at mid-pregnancy: (1) Preparation for motherhood (8 items; e.g., ‘planned how you will handle the birth’,  $\alpha = 0.83$ ), (2) Avoidance (6 items; e.g., ‘avoided being with people in general’,  $\alpha = 0.75$ ), (3) Positive appraisal (5 items, e.g., ‘felt that being pregnant has enriched your life’,  $\alpha = 0.80$ ) and (4) Prayer (2 items; e.g., ‘prayed that the birth will go well’,  $r = 0.74$ ). These same four stable, internally consistent factors were also found by factoring a 42-item version called the *Revised Prenatal Coping Inventory* (NuPCI) developed for use in the repeated assessment of coping strategies over the course of pregnancy (Yali & Lobel, 2002). Based on a review of the questionnaire items, the acceptable reliability coefficients, and patterns of correlations with related constructs (e.g., distress, optimism) obtained in studies using these pregnancy-specific instruments, the PCI and NuPCI, appear to be reliable and valid.

### **Cross-sectional studies of coping**

As shown in Supplemental Table 1, we located 25 cross-sectional studies that assessed coping in the context of pregnancy. We describe these studies below, providing summaries of findings related to direct and moderated effects of coping on physical and mental health.

### ***Mental and physical health associations***

The most consistent set of findings are on avoidant coping styles or behaviours. These have been associated with many adverse mental health outcomes in pregnancy including lower general psychological well-being, increased distress, higher depressed mood, more anxiety, higher perceived stress, less positive attitudes towards cystic fibrosis screening and greater child abuse potential (Blechman, Lowell, & Garrett, 1999; Faisal-Cury, Savoia, & Menezes, 2012; Fang et al., 1997; Giurgescu, Penckofer, Maurer, & Bryant, 2006; Hamilton & Lobel, 2008; Lobel, Yali, Zhu, DeVincent, & Meyer, 2002; Lowenkron, 1999; Rodriguez, 2009; Rudnicki, Graham, Habboushe, & Ross, 2001; Spirito et al., 1991) as well as physical health correlates such as greater daily glucose variability among women with gestational diabetes (Spirito et al., 1991). Latendresse and Ruiz (2010) also found that a general avoidant coping style was associated with higher maternal levels of corticotrophin-releasing hormone of placental origin (pCRH), which has been implicated in the timing of delivery and aetiology of preterm birth (Challis et al., 2000; Mancuso et al., 2004; McLean et al.,

1995; Sandman et al., 2006). Substance use is another potentially harmful means of coping with stress during pregnancy. In one study, coping with pregnancy through alcohol or tobacco use was associated with greater pregnancy-related distress and prenatal depression (Yali & Lobel, 1999), whereas coping by using tobacco to deal with emotions or problems was associated with greater risk of continuing to smoke during pregnancy (Lopez, Konrath, & Seng, 2011). However, avoidant coping may be beneficial in certain situations, as one small study found that pursuing a competing activity was associated with a reduced likelihood of relapse among pregnant smokers who were attempting to quit (Ortendahl & Nasman, 2007). Thus, avoidant coping may be beneficial when a pregnant woman is trying to distract herself from the desire to engage in an adverse health behavior.

By contrast, some coping responses have been linked to indicators of more favourable psychological well-being. Coping with pregnancy through positive appraisal – which involves efforts to create positive meaning by focusing on personal growth – has been associated with better maternal attachment, fewer depressive symptoms and lower global and pregnancy-related distress (Pakenham et al., 2007; White, McCorry, Scott-Heyes, Dempster, & Manderson, 2008; Yali & Lobel, 1999). Furthermore, in a recent study of 230 predominantly low-income women enrolled in a programme for pregnant smokers, a specific type of spiritual coping style focused on surrendering one's problems to god was associated with lower levels of stress during pregnancy (Clements & Ermakova, 2012). The results of this small set of studies suggest that coping efforts involving positive appraisal or religious faith are associated with better psychological adjustment during pregnancy.

The findings of studies measuring problem-focused coping in pregnancy are mixed. Three studies found that problem-focused coping styles, such as problem-solving, planning and preparation, are associated with greater pregnancy-related distress (Faisal-Cury et al., 2012; Hamilton & Lobel, 2008; Yali & Lobel, 1999), whereas another found that active coping styles were associated with fewer depressive symptoms (Wells, Hobfoll, & Lavin, 1997) and two studies reported null effects of engagement coping (Blake et al., 2009; Blechman et al., 1999). John Henryism, an effortful coping style, has been linked to greater likelihood of exercise during pregnancy among African-American pregnant women (Orr, James, Garry, & Newton, 2006), but it was also more strongly associated with bacterial vaginosis than any other stress-related measure in 1587 pregnant women in North Carolina (Harville, Savitz, Dole, Thorp, & Herring, 2007). The results of the latter study suggest a link between coping processes and immune function, although this association was no longer statistically significant in analyses that controlled for age, income and race.

In sum, consistent with the findings in the larger coping literature, avoidant coping styles and behaviours appear to be associated with psychological distress, whereas active problem- and emotion-focused styles and behaviours are generally, although not entirely consistently, associated with indicators of well-being.

### ***Moderated effects***

Most extant studies have examined the direct effects of maternal coping on physical or mental health outcomes and not tested moderation. However, conceptual approaches found in the broader coping literature that emphasise coping as a

moderator of the effects of stressors on health suggest that it would be beneficial to test this in research on coping with stress during pregnancy.

Only three cross-sectional studies sought to test stress-moderating effects of coping (Pakenham et al., 2007; Spirito et al., 1991; Wells et al., 1997). Within a sample of 242 first-time mothers in Australia, Pakenham and colleagues (2007) found an association between pregnancy-related threat appraisal and depression during the third trimester of pregnancy only among women who reported high wishful thinking to cope with pregnancy-related stress. Another study of 92 pregnant women also found limited evidence of a stress-moderating effect of coping. Drawing on Conservation of Resources Theory (Hobfoll, 1988, 1989), Wells and colleagues (1997) found that greater stress, which was operationalised as recent setbacks in domains including childcare, employment, marriage and daily routine, was associated with greater depression only if the participant did not report a cautious action coping style. There were no other interactions between coping styles and resource loss in predicting depression, and no evidence that any of the coping strategies buffered the effect of resource loss on anger. Finally, Spirito and colleagues (1991) examined the correlates of engagement (including problem-solving, cognitive restructuring, social support and emotional expression) and disengagement coping behaviours (avoidance, wishful thinking, self-criticism and social withdrawal). The authors did not find evidence to support their hypothesis that active coping with a recent stressor would be more strongly associated with well-being in the women who were dealing with the unexpected health-related stressor of diabetes versus those who were not. Taken together, the lack of significant interactions between stress and coping in these three studies does not support the hypothesis that coping modifies or buffers the association of stress with mental health outcomes.

### *Summary of cross-sectional studies*

In summary, almost half of the total number of coping studies that we identified had cross-sectional designs that provided data only on the frequency and correlates of different coping strategies or styles in pregnancy. Although coping through avoidance was associated with several indicators of poor psychological well-being, conclusions about the causality of these effects cannot be drawn. For example, an avoidant coping style may lead to disengagement with one's social environment and contribute to the onset of depressive symptoms during pregnancy or postpartum, or a depressed pregnant women may be more likely to cope through avoidance because of the low energy and negative affect associated with depression. Third variable causation is also possible. The longitudinal studies reviewed in the following section address some of these questions regarding directionality of effects.

### **Longitudinal studies of prenatal coping**

Twenty-eight longitudinal studies examined the effects of how women cope with stress during pregnancy (see Supplemental Tables 2–4). These studies explored (a) how coping changes over the course of pregnancy, (b) effects of coping at one time point on adjustment later in pregnancy, (c) effects of coping during pregnancy on postpartum outcomes and (d) effects of coping on biological, birth and infant development outcomes.

### ***Longitudinal studies on psychological outcomes during pregnancy***

Two studies examined whether coping during early pregnancy predicted affective states later in pregnancy (Huizink, Robles de Medina, Mulder, Visser, & Buitelaar, 2002a; Yali & Lobel, 2002). Although these studies replicated associations between coping and concurrent distress found in the cross-sectional studies described above, there was no evidence that coping predicted psychological outcomes later in pregnancy when controlling for baseline distress. Four longitudinal studies explored general coping styles in the context of prenatal testing, a potentially threatening experience in pregnancy because such tests can reveal abnormalities in the developing foetus (Brisch et al., 2002; Tercyak, Johnson, Roberts, & Cruz, 2001; Van Zuuren, 1993; Zlotogorski et al., 1995). However, none of these four studies found significant effects of coping style on subsequent psychological distress. Taken together, this set of five studies provides surprisingly little evidence to support the hypothesis that coping styles or behaviours predict psychological distress later in pregnancy.

### ***Coping as a predictor of postpartum mood***

Does the way that a woman copes with stress during pregnancy have implications for her mood after birth? The largest of the studies that sought to answer this question included 730 pregnant women who completed the WOC questionnaire with respect to a recent stressor of their choosing and were assessed for depressive diagnostic status at 23 weeks gestation and at 4.5 weeks postpartum (Gotlib et al., 1991). After controlling for depressive symptoms during pregnancy, none of the eight WOC subscales predicted recovery from prenatal depression or onset of depression during the postpartum.

In contrast to these null findings, two other prospective studies (see Supplemental Table 3) found that women who reported avoidant coping styles during pregnancy were at heightened risk for postpartum depression. Among 306 pregnant women giving birth for the first time, avoidant coping style assessed during the last trimester predicted higher depressive symptoms and greater likelihood of postpartum depression at approximately six weeks postpartum, controlling for history of depression (Honey, Bennett, & Morgan, 2003; Honey, Morgan, et al., 2003). The association between avoidant coping style during pregnancy and postpartum depressive symptoms was also documented in a study of 210 pregnant Latinas, a majority of whom were affected by intimate partner violence (Rodriguez et al., 2010). Avoidant coping style predicted depressive symptoms over time in a multivariate repeated-measures mixed-effects model, suggesting that the women who cope through avoidance during pregnancy face a heightened risk of postpartum depression. Additionally, coping by blaming others or using substances during late pregnancy was associated with depressed mood at four to eight weeks postpartum in a sample of 277 French women (de Tychey et al., 2005).

Avoidant coping may negatively affect postpartum mood; in contrast, active, problem-focused forms of coping during pregnancy have been associated with both lower (Besser & Priel, 2003; Morling, Kitayama, & Miyamoto, 2003) and higher levels (Soliday et al., 1999) of postpartum depression. However, the two studies that found an inverse relationship between active coping and postpartum depressive

symptoms both suggest that active coping may only be helpful for certain individuals (Besser & Priel, 2003; Morling et al., 2003). In a study conducted with a sample of 146 Israeli women having their first births (Besser & Priel, 2003), approach-oriented coping (measured by a Hebrew version of the WOC questionnaire) 'with pregnancy-related problems' during the third trimester predicted reduced postpartum depressive symptoms but only among 'self-critical' participants. Cultural context may also modify the effectiveness of active coping attempts. Morling et al. (2003) explored coping strategies used by 94 Japanese and 56 American pregnant women in response to common pregnancy concerns such as the baby's health and well-being, their relationship with their partner, their labour and delivery and the amount of weight they were gaining in pregnancy. For American women, higher acceptance correlated with less distress over time, better prenatal care and less weight gain, but these results did not hold for Japanese women.

Finally, a small but interesting set of studies examined the impact of coping skills or coping efficacy on psychological adjustment during the postpartum period. These studies assessed participants' perceived ability to effectively deal with stress and negative emotions, rather than particular types of coping behaviour. Four of these studies addressed the characteristics of the small proportion of women who suffer from post-traumatic stress disorder (PTSD) or post-traumatic stress symptoms following a difficult experience of childbirth, a topic of growing interest in clinical research (Olde, van der Hart, Kleber, & van Son, 2005). In the largest of these three studies with a sample of 1224 women in Sweden, low levels of perceived coping ability during early pregnancy were associated with increased risk of elevated PTSD symptoms at one month postpartum (Soderquist et al., 2009). Poor coping skills during pregnancy were also associated with increased risk of postpartum post-traumatic stress in three other studies (Borders et al., 2007; Ford, Ayers, & Bradley, 2010; Soet, Brack, & Dilorio, 2003).

In sum, 13 studies attempted to establish associations between coping styles during pregnancy and postpartum psychological states, but variation in the samples, coping measures, outcome variables and timing of assessments makes it difficult to draw conclusions. As was the case in the cross-sectional studies, the most consistent set of findings are those that document a relationship between greater avoidant coping and greater psychological distress. Four studies report that poor coping skills during pregnancy predicted post-traumatic stress symptoms during the postpartum period. However, coping skills were assessed with a wide variety of measures originally developed to operationalise hope, sense of coherence and self-efficacy, which makes it impossible to determine whether these effects are actually due to coping skills or other related but distinct psychological resources.

### ***Coping and biomarkers during pregnancy***

As shown in Supplemental Table 4, two large studies explored associations between active, effortful coping and levels of maternal pCRH. Neither of these studies found a relationship between participants' scores on the John Henryism Active Coping Scale, which assesses the extent to which individuals attempt to actively control behavioural stressors through hard work and determination, and levels of pCRH or cortisol measured during pregnancy (Chen et al., 2010; Harville, Savitz, Dole, Herring, & Thorp, 2009). In a third study with measures of blood pressure, no

relationship was found between John Henryism and maternal vascular functioning (Tiedje et al., 2008). In sum, we did not locate any evidence of significant associations between coping style and physiological markers during pregnancy.

### ***Coping as a predictor of birth outcomes***

As noted, an epidemiological study called the Pregnancy, Infection, and Nutrition study provides among the strongest evidence that coping in pregnancy is important to study by showing an association with birth outcomes. Dole and colleagues (2004) found a prospective association between general use of distancing and avoidant coping mechanisms as reported on the WOC questionnaire and preterm delivery in 724 African-American and 1174 White women. Interestingly, these associations varied by race, with African-American women who distanced from problems having modestly higher risk of preterm birth than women with lower use of this strategy, whereas White women had an increased risk for preterm birth when they were either moderately or very likely to cope with problems through escape/avoidance. Thus, this one large epidemiological study indicates that the coping behaviours of pregnant women are associated with the timing of delivery but these associations may vary by race. In a much smaller study of 80 married pregnant women in Canada, women who reported greater distractible coping style had more labour and delivery difficulties, whereas emotional coping during the second trimester was associated with larger infant birth weight (Da Costa, Dritsa, Larouche, & Brender, 2000). However, another large study of 2761 non-Hispanic White and African-American pregnant women did not find a relationship between effortful coping during pregnancy and preterm delivery in multivariate analyses (Tiedje et al., 2008). There are too many differences among these few studies to be certain why effects differ.

Coping skills may also be related to pregnancy outcomes. Poor coping skills, as assessed using the State Hope Scale during pregnancy, were associated with low birth weight in a sample of 294 welfare recipients (Borders et al., 2007). Furthermore, a retrospective study of 97 Swedish women who delivered by emergency caesarean section reported poorer coping abilities at 32 weeks gestation compared to 194 women who did not experience delivery complications (Ryding et al., 1998). The findings of this set of studies suggest that women who have poor coping skills or use avoidant coping strategies may have a higher risk of experiencing adverse pregnancy outcomes but more research is needed.

### ***Coping as a predictor of infant development***

As shown in Supplemental Table 5, two studies conducted by Levy-Shiff and colleagues (Levy-Shiff, Dimitrovsky, Shulman, & Har-Even, 1998; Levy-Shiff et al., 2002) explored the effects of prenatal coping on infant developmental outcomes. The earlier study of 140 first-time mothers examined the effects of stress and coping in pregnancy and the postpartum period on adjustment to parenthood and infant development (Levy-Shiff et al., 1998). Increases in problem-focused coping efforts from pregnancy to one month postpartum predicted better maternal adjustment to parenting, including enhanced maternal well-being, parenting efficacy, caregiving behaviours and affiliative behaviours. The second study by this team evaluated coping responses to pregnancy-related stress using the WOC checklist in a sample of

153 pregnant Israeli women who had pre-gestational diabetes, gestational diabetes or were non-diabetic (Levy-Shiff et al., 2002). Greater use of problem-focused coping strategies during pregnancy was associated with better infant cognitive development at one year of age, as measured by scores on the Mental Development Index of the Bayley Scales of Infant Development – 2nd Edition (Bayley, 1993), whereas emotion-focused coping was unrelated to infant development. Furthermore, pre-gestational and gestational diabetic mothers' use of problem-focused coping strategies during pregnancy predicted infant psychomotor development (assessed by the Psychomotor Development Index of the BSID-II) at one year postpartum, whereas no relationship was found in the non-diabetic group. The results of this interesting study indicate that use of particular coping strategies may be particularly important in the context of high-risk pregnancies. Women who are coping with the additional stressor of a medical risk condition requiring extensive management through a regimen of health behaviours (e.g., diet restriction, medication adherence) appear to use different coping strategies with different consequences at least for diabetes risk where the stressor is amenable to problem-focused strategies.

### ***Summary of longitudinal studies of coping in pregnancy***

In reviewing the 35 longitudinal studies conducted to date, the largest portion of this literature was composed of the seven studies that examined the effects of prenatal coping on maternal psychological adjustment later in pregnancy (see Supplemental Table 2) and the 17 studies that examined the effects of prenatal coping on maternal psychological adjustment during the postpartum period (see Supplemental Table 3). Only four studies examined the prospective effects of coping during pregnancy on infant birth weight or gestational age at delivery (Borders et al., 2007; Dole et al., 2004; Messer et al., 2005; Tiedje et al., 2008). There were also two studies on infant development (Levy-Shiff et al., 1998, 2002) and two studies on maternal biological markers relevant to infant health (Chen et al., 2010; Harville et al., 2007).

In general, the most consistent evidence from methodologically sophisticated longitudinal studies leads to the conclusion that coping behaviours directed at avoiding or distancing from stressors have negative consequences for maternal and child health including evidence regarding preterm birth and postpartum depression (Dole et al., 2004; Gotlib et al., 1991; Honey, Morgan, et al., 2003; Messer et al., 2005). Poor coping skills during pregnancy were also associated with an increased risk of low birth weight (Borders et al., 2007), delivery by emergency caesarean section (Ryding et al., 1998) and maternal post-traumatic stress during the postpartum (Ford et al., 2010; Soderquist et al., 2009). However, these results were not replicated consistently across studies since we located several papers reporting null effects (Chen et al., 2010; Da Costa, Larouche, Dritsa, & Brender, 2000; Harville et al., 2009; Soet et al., 2003; Tercyak et al., 2001; Tiedje et al., 2008; Yali & Lobel, 2002).

One explanation for the inconsistent effects across studies is the variability in study methods that we observed such as differences in sample characteristics, timing of assessments, outcome variables and measures of coping styles or behaviours. The ramifications of the large amount of variability in research methods are particularly evident when coping strategies are operationalised differently across studies and are then given the same label, such as in the assessment of emotion-focused coping. For



example, items labelled emotion-focused coping in a study by Huizink et al. (2002a) concerned emotional expression and support seeking, whereas the items from the WOC questionnaire used by Cote-Arsenault (2007) for emotion-focused coping relate to avoidance, self-blame and wishful thinking. This inconsistency is an example of how the same label may be applied to very different sets of coping behaviours, contributing to difficulties in making sense of results and comparing them across studies.

### **Commentary and recommendations**

Despite over 50 published studies on how adult pregnant women cope, more and better research needs can be conducted to gain a better understanding of the issues. Among the tasks are that we need to delineate the types of stressors that are most relevant to women during pregnancy, consider how distinct subgroups of women cope most effectively with those particular sources of threat or challenge, verify the replicable effects of particular ways of coping, coping styles or skills, and then examine the mechanisms underlying any effects on maternal and child health. In the remainder of the paper, we offer some recommendations for approaching some of the conceptual issues, namely (a) discrepancies between stress and coping theories and the methodologies used to test them in pregnancy, (b) the importance of viewing pregnancy as a unique health context and (c) possible applications of descriptive research for interventions.

### **Specifying a priori hypotheses**

A major concern that emerged in this review stems from the large number of independent and dependent variables included in many of the studies of coping during pregnancy. Many researchers utilised coping measures with numerous subscales, and also examined multiple outcome variables but without specifying any a priori hypotheses about the variables. If participants' scores on each of the coping subscales were then tested for an association with all of the dependent variables, the total number of tests was often very large and researchers rarely corrected for number of tests conducted. Indeed, as shown in Supplemental Tables 2–5, the number of tests performed in any given study ranged as high as 28. Testing such a large number of associations increases an investigator's chances of obtaining at least one significant finding by chance and inflates the probability of Type I errors. We recommend that researchers utilise theory and existing research to formulate a priori hypotheses relating specific ways of coping to specific outcomes and in specific populations. This approach will also reduce participant response burden because interviews or questionnaires could be limited to the coping strategies that test the hypotheses of greatest interest to the researcher, and may also yield more useful results.

### **Ecological momentary assessment and daily process designs**

In general, the studies included in this review focused on between-person rather than within-person differences in coping responses, and rarely explored the dynamic nature of coping efforts over time. However, stress researchers working in other contexts are showing greater interest in daily and even momentary assessments of

coping efforts (Tennen, Affleck, Armeli, & Carney, 2000). Daily process designs, including daily diary recordings (Stone, Lennox, & Neale, 1985), ecological momentary assessment (EMA) (Stone & Shiffman, 1994) and experience sampling (Csikszentmihalyi & Larson, 1987), have proliferated in recent years and have begun to yield valuable insights into the complex and dynamic associations between coping efforts, mood and physical health outcomes in samples of individuals with chronic pain, for example (e.g., Carson et al., 2006; Conner et al., 2006; Litt, Shafer, & Napolitano, 2004; Tennen, Affleck, & Zautra, 2006). Yet, these daily process approaches have not yet made their way into the pregnancy literature with the exception of two studies, each of which demonstrated that an EMA-based measure of negative affect completed in pregnancy was associated with higher salivary cortisol concentrations throughout the day, but neither measured coping efforts (Entringer, Buss, Andersen, Chicz-DeMet, & Wadhwa, 2011; Giesbrecht, Campbell, Letourneau, Kooistra, & Kaplan, 2012). Although daily or momentary coping assessments can be expensive methodologies, they could be a fruitful direction for pregnancy research. They are most appropriate for use in samples of highly motivated study participants who are comfortable with using technology, but pregnant women often have to self-monitor other aspects of their condition and most are highly motivated to have healthy pregnancies, so they offer potential for future research.

### **Skills-based approaches**

Because the effectiveness of a particular coping strategy depends on the stress context in which attempts are enacted, it is difficult to study coping in general and in pregnancy specifically. Focussing on a person's coping skills or coping resources may be a more useful direction of study. Measures such as the Coping Self-Efficacy Scale (Chesney, Neilands, Chambers, Taylor, & Folkman, 2006), developed to study the effects of a Coping Effectiveness Training intervention for depressed HIV-seropositive men with depressed mood, might be useful to pregnancy researchers. This 26-item measure asks respondents about their degree of confidence that they can perform certain behaviours relevant to adaptive coping such as finding solutions or seeking support from friends and family. Our research team has recently developed a measure of coping skills similar to this for use in a large-scale prospective study of a diverse sample of women and it is administered during an inter-pregnancy interval along with pregnancy-specific coping measures during the subsequent pregnancy.

### **Context-specific approaches**

One of the most prominent methodological weaknesses in the studies reviewed is the use of research methods and designs that do not address the context of pregnancy as it shapes stressors and the nature of efforts to cope with stress. This neglect of the contextual and transactional nature of stress and coping is not unique to pregnancy coping research. As noted by Somerfield and McCrae (2000), a common criticism of the broader coping literature centres on 'the gap between the elegant transactional, process theories of stress and adaptation and the methodology of coping research' (p. 621). These transactional theories emphasise that coping behaviours occur in response to specific stressors. Thus, between-person comparisons of coping are

uninformative when participants are reporting how they cope with entirely different types of stress.

Research to date has pinpointed which specific forms of stress are most closely associated with pregnancy outcomes. That is, life events and chronic stress both contribute significantly to low birth weight, whereas pregnancy anxiety is a risk factor for preterm birth (Dunkel Schetter, 2009; Dunkel Schetter & Lobel, 2012), but how women cope with each of these distinct forms of stress has not yet been studied. Future studies can address this complex issue by first using qualitative or mixed-method approaches to determine the specific stressors faced by specific subgroups of pregnant women at risk of adverse outcomes. It is difficult to capture the full story of a woman's cognitions, emotions and behaviour during pregnancy using brief inventories with closed-ended items rated on Likert scales. In contrast, narrative approaches would allow women to tell their stories in a way that could develop a fuller understanding of their experiences (Stephens, 2011). For example, in a recent qualitative study of a small sample of low-income, ethnically diverse men and women, participants identified racism, finances, relationships, violence, unemployment and substance abuse as significant sources of stress in their communities (Abdou et al., 2010). After identifying the specific sources of stress in a given study population, researchers can then ask questions about coping behaviours in the context of those stressors. Because such stressors are usually relevant only to subgroups of a population, researchers would need to screen and select participants with shared environments and experiences.

Finally, focusing on women's pregnancy-specific coping efforts seems like the most fruitful avenue for future research. Because the evidence suggests that pregnancy-related anxiety may be particularly potent in effects on mothers and their offspring, it is important to understand the ways that women attempt to manage their anxiety, as well as the demands and strains associated with pregnancy. In the studies reviewed above, certain pregnancy-specific coping strategies (particularly avoidance and positive appraisal) were associated with a variety of less-than-optimal outcomes, including prenatal distress or depressive symptoms (Giurgescu et al., 2006; Hamilton & Lobel, 2008; Huizink et al., 2002a; Levy-Shiff et al., 2002; Lowenkron, 1999; Pakenham, Smith, & Rattan, 2007; Rudnicki et al., 2001; Yali & Lobel, 1999, 2002), prenatal physical symptoms (Chang, Yang, Jensen, Lee, & Lai, 2011; Levy-Shiff et al., 2002), postpartum depression or depressive symptoms (Besser & Priel, 2003; Levy-Shiff et al., 1998; Soliday et al. 1999) and infant developmental difficulties (Levy-Shiff et al., 1998, 2002). Future studies could build upon these findings by exploring whether pregnancy-specific coping strategies moderate the effect of pregnancy-specific stress or anxiety on maternal and child health outcomes. For example, researchers could test the hypothesis that coping with pregnancy-specific stress through avoidance strengthens the association between stress and birth outcomes, or that positive reappraisal attenuates the relationship between pregnancy-specific stress and postpartum depression. Using measures of pregnancy-specific stress may also address concerns about the reliability of coping self-reports, because items that specifically reference pregnancy, birth and parenting concerns should yield more accurate recall and reporting of coping efforts. For example, a pregnant woman may respond differently to a pregnancy-specific item such as 'asked doctors or nurses about the birth' than to a similar but less-specific item taken from general coping scales such as 'talked to someone to find out more about the

situation'. Thus, situation-specific measures of coping have the potential to provide a richer and more reliable portrait of how women cope during pregnancy.

### **Pregnancy-specific considerations**

Although the broader field of stress and coping research provides many insights that can inform the study of these processes in maternal and child health, it is also critical to recognise that pregnancy is a unique health experience. Unlike other health and illness contexts studied by health psychologists such as cancer or heart disease, pregnancy is not an illness and is commonly associated with positive psychological experiences. Yet, many women may be coping with an unintended pregnancy, bothersome physical symptoms, medical risk conditions or other chronic life strains. Pregnancy, which typically spans 40 weeks, is also time limited in nature. The finite nature may influence how women appraise and cope with at least some pregnancy-specific stressors.

By its very nature, pregnancy is also embedded within a broader interpersonal context and, therefore, it is particularly important to understand the influence of an expecting mother's close personal relationships on her coping effectiveness (Monnier & Hobfoll, 1997). A recent study by Tanner Stapleton and colleagues (2012) examined the maternal relationship with a baby's father in detail and found that paternal support during pregnancy predicted maternal prepartum and postpartum distress, as did the quality of their relationship. This suggests that a woman's coping skills regarding soliciting family support especially from partners may be one area in which to focus attention. Models of dyadic coping developed in other populations suggest that a partner's ways of coping with stress affects the other partner's coping methods, as well as the effectiveness of his or her coping (DeLongis, Capreol, Holtzman, O'Brien, & Campbell, 2004; O'Brien, DeLongis, Pomaki, Puterman, & Zwicker, 2009). Studying the coping of fathers or partners, as well as mothers, could be an important contribution to our understanding of stress and coping during pregnancy.

### **Implications for interventions**

The descriptive studies on coping during pregnancy reviewed here have often been carried out with the intention of informing intervention efforts to help pregnant women who are experiencing high levels of stress. By gaining an understanding of how coping differs between women who experience adverse outcomes and those who do not, this body of research aims to identify optimal ways for women to avoid the negative effects of stressful experiences. After reviewing this literature, however, we concluded that the evidence base is insufficient to inform the development of prenatal stress management or coping enhancement interventions. For example, there are no theory-derived, empirically based predictive models to guide such intervention plans although experts recommend having one (West & Aiken, 1997). Evidence in studies we reviewed suggests that approach-oriented forms of coping may be more adaptive than avoidant responses, yet some pregnant women may be facing chronic and too often intractable environmental stressors requiring acceptance whereas others are experiencing more controllable demands with greater resources. Because the ways that women cope with pregnancy stress are shaped by a

broad range of influences including personality traits and resources, interpersonal relationships, culture and the nature of stressful conditions, trying to change the ways that women respond to stress may be challenging, not always beneficial, and arguably even be harmful in some cases. Therefore, we believe that it is imperative to gain a better understanding of the various specific types of stressors that specific at-risk subgroups of women encounter during pregnancy (e.g., being low SES, experiencing racial or sexual discrimination), and to develop predictive models of stress and coping for pregnancy-specific contexts, and then tailor interventions to meet the needs of these subgroups.

## Conclusion

Does coping help pregnant women to manage the negative effects of stress? Undoubtedly it does, but research has yet to show us how (Dole et al., 2004; Levy-Shiff et al., 1998, 2002). Firm evidence of mediational mechanisms and for relevant moderating factors should be established before implementing interventions that are based on teaching women how to better cope during pregnancy. Looking ahead, researchers should develop a greater understanding of the particular challenges that women face and must cope with during pregnancy and across the lifespan, use strong and consistent instrumentation and conduct longitudinal studies in large samples. A more rigorous approach to the study of coping during pregnancy could provide evidence needed to develop empirically based interventions targeting modifiable risk factors for adverse pregnancy outcomes.

## Acknowledgements

Ms. Guardino received fellowship support from NIMH training grant MH15750 Biobehavioral Issues in Mental and Physical Health. Thank you to Dunkel Schetter and Stanton research labs as well as Dr. Kathie Records for constructive comments.

## References

- Abdou, C. M., Dunkel Schetter, C., Roubinov, D., Jones, F., Tsai, S., Jones, L., . . . Hobel, C. (2010). Community perspectives: Mixed-methods investigation of resilience, stress and health. *Ethnicity and Disease, 20*(S2), 41–48.
- Alderdice, F., Lynn, F., & Lobel, M. (2012). A review and psychometric evaluation of pregnancy-specific stress measures. *Journal of Psychosomatic Obstetrics and Gynecology, 33*(2), 62–77.
- Balcazar, H., Krull, J. L., & Peterson, G. (2001). Acculturation and family functioning are related to health risks among pregnant Mexican American women. *Behavioral Medicine, 27*(2), 62–70.
- Balcazar, H., Peterson, G. W., & Krull, J. L. (1997). Acculturation and family cohesiveness in Mexican American pregnant women: Social and health implications. *Family & Community Health, 20*(3), 16–31.
- Bayley, N. (1993). *Manual for the Bayley scales of infant development* (2nd ed.). New York, NY: The Psychological Corporation.
- Besser, A., & Priel, B. (2003). Trait vulnerability and coping strategies in the transition to motherhood. *Current Psychology, 22*(1), 57–72.
- Blake, S. M., Murray, K. D., El-Khorazaty, M. N., Gantz, M. G., Kiely, M., Best, D., . . . El-Mohandes, A. A. (2009). Environmental tobacco smoke avoidance among pregnant African-American nonsmokers. *American Journal of Preventive Medicine, 36*(3), 225–234.

- Blechman, E. A., Lowell, E. S., & Garrett, J. (1999). Prosocial coping and substance use during pregnancy. *Addictive Behaviors, 24*(1), 99–109.
- Borcherding, K. E. (2009). Coping in healthy primigravidae pregnant women. *Journal of Obstetric, Gynecological, and Neonatal Nursing, 38*(4), 453–462.
- Borders, A. E. B., Grobman, W. A., Amsden, L. B., & Holl, J. L. (2007). Chronic stress and low birth weight neonates in a low-income population of women. *Obstetrics and Gynecology, 109*(2), 331–338.
- Brisch, K. H., Munz, D., Bemmerer-Mayer, K., Terinde, R., Kreienberg, R., & Kachele, H. (2003). Coping styles of pregnant women after prenatal ultrasound screening for fetal malformation. *Journal of Psychosomatic Research, 55*(2), 91–97.
- Carson, J. W., Keefe, F. J., Affleck, G., Rumble, M. E., Caldwell, D. S., Beaupre, P. M., ... Weisberg, J. N. (2006). A comparison of conventional pain coping skills training and pain coping skills training with a maintenance training component: A daily diary analysis of short-and long-term treatment effects. *The Journal of Pain, 7*(9), 615–625.
- Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the Brief COPE. *International Journal of Behavioral Medicine, 4*(1), 92–100.
- Carver, C. S. (2007). Stress, coping, and health. In H. S. Friedman & R. C. Silver (Eds.), *Foundations of health psychology* (pp. 117–144). New York, NY: Oxford University Press.
- Carver, C. S., Scheier, M. F., & Weintraub, J. K. (1989). Assessing coping strategies: A theoretically based approach. *Journal of Personality and Social Psychology, 56*(2), 267–283.
- Challis, J., Sloboda, D., Matthews, S., Holloway, A., Alfaidy, N., Howe, D., ... Newnham, J. (2000). Fetal hypothalamic-pituitary adrenal (HPA) development and activation as a determinant of the timing of birth, and of postnatal disease. *Endocrine Research, 26*(4), 489–504.
- Chang, H. Y., Yang, Y. L., Jensen, M. P., Lee, C. N., & Lai, Y. H. (2011). The experience of and coping with lumbopelvic pain among pregnant women in Taiwan. *Pain Medicine, 12*(6), 846–853.
- Chen, Y., Holzman, C., Chung, H., Senagore, P., Talge, N. M., & Siler-Khodr, T. (2010). Levels of maternal serum corticotropin-releasing hormone (CRH) at midpregnancy in relation to maternal characteristics. *Psychoneuroendocrinology, 35*(6), 820–832.
- Chesney, M. A., Neilands, T. B., Chambers, D. B., Taylor, J. M., & Folkman, S. (2006). A validity and reliability study of the coping self-efficacy scale. *British Journal of Health Psychology, 11*(3), 421–437.
- Clements, A. D., & Ermakova, A. V. (2012). Surrender to god and stress: A possible link between religiosity and health. *Psychology of Religion and Spirituality, 4*(2), 93–107.
- Conner, T. S., Tennen, H., Zautra, A. J., Affleck, G., Armeli, S., & Fifield, J. (2006). Coping with rheumatoid arthritis pain in daily life: Within-person analyses reveal hidden vulnerability for the formerly depressed. *Pain, 126*(1–3), 198–209.
- Cote-Arsenault, D. (2007). Threat appraisal, coping, and emotions across pregnancy subsequent to perinatal loss. *Nursing Research, 56*(2), 108–116.
- Csikszentmihalyi, M., & Larson, R. (1987). Validity and reliability of the experience-sampling method. *Journal of Nervous and Mental Disease, 175*(9), 526–536.
- Da Costa, D., Dritsa, M., Larouche, J., & Brender, W. (2000). Psychosocial predictors of labor/delivery complications and infant birth weight: A prospective multivariate study. *Journal of Psychosomatic Obstetrics & Gynecology, 21*(3), 137–148.
- Da Costa, D., Larouche, J., Dritsa, M., & Brender, W. (2000). Psychosocial correlates of prepartum and postpartum depressed mood. *Journal of Affective Disorders, 59*(1), 31–40.
- DeLongis, A., Capreol, M., Holtzman, S., O'Brien, T., & Campbell, J. (2004). Social support and social strain among husbands and wives: A multilevel analysis. *Journal of Family Psychology, 18*(3), 470–479.
- de Tychey, C., Spitz, E., Briancon, S., Lighezzolo, J., Girvan, F., Rosati, A., ... Vincent, S. (2005). Pre- and postnatal depression and coping: A comparative approach. *Journal of Affective Disorders, 85*(3), 323–326.
- DiPietro, J. A., Hawkins, M., Hilton, S. C., Costigan, K. A., & Pressman, E. K. (2002). Maternal stress and affect influence fetal neurobehavioral development. *Developmental Psychology, 38*(5), 659–668.

- Dole, N., Savitz, D. A., Hertz-Picciotto, I., Siega-Riz, A. M., McMahon, M. J., & Buekens, P. (2003). Maternal stress and preterm birth. *American Journal of Epidemiology*, *157*(1), 14–24.
- Dole, N., Savitz, D. A., Siega-Riz, A. M., Hertz-Picciotto, I., McMahon, M. J., & Buekens, P. (2004). Psychosocial factors and preterm birth among African American and white women in central North Carolina. *American Journal of Public Health*, *94*(8), 1358–1365.
- Dunkel Schetter, C. (2009). Stress processes in pregnancy and preterm birth. *Current Directions in Psychological Science*, *18*(4), 205–209.
- Dunkel Schetter, C. (2011). Psychological science on pregnancy: Stress processes, biopsychosocial models, and emerging research issues. *Annual Review of Psychology*, *62*(1), 531–558.
- Dunkel Schetter, C., & Dolbier, C. (2011). Resilience in the context of chronic stress and health in adults. *Social and Personality Psychology Compass*, *5*(9), 634–652.
- Dunkel Schetter, C., & Glynn, L. M. (2010). Stress in pregnancy: Empirical evidence and theoretical issues to guide interdisciplinary research. In R. Contrada & A. Baum (Eds.), *Handbook of stress* (pp. 321–344). New York, NY: Springer.
- Dunkel Schetter, C., & Lobel, M. (2012). Pregnancy and birth: A multilevel analysis of stress and birth weight. In T. A. Revenson, A. Baum, & J. Singer (Eds.), *Handbook of health psychology* (2nd ed., pp. 431–464). London: Psychology Press.
- Entringer, S., Buss, C., Andersen, J., Chiciz-DeMet, A., & Wadhwa, P. (2011). Ecological momentary assessment of maternal cortisol profiles over a multiple-day period predicts the length of human gestation. *Psychosomatic Medicine*, *73*(6), 469–474.
- Faisal-Cury, A., Savoia, M. G., & Menezes, P. R. (2012). Coping style and depressive symptomatology during pregnancy in a private setting sample. *The Spanish Journal of Psychology*, *15*(1), 295–305.
- Fang, C. Y., Dunkel-Schetter, C., Tatsugawa, Z. H., Fox, M. A., Bass, H. N., Crandall, B. F., & Grody, W. W. (1997). Attitudes toward genetic carrier screening for cystic fibrosis among pregnant women: The role of health beliefs and avoidant coping style. *Women's Health*, *3*(1), 31–51.
- Folkman, S., & Lazarus, R. S. (1988). *Manual for the ways of coping questionnaire*. Palo Alto, CA: Mind Garden Inc. for Consulting Psychologists Press.
- Folkman, S., & Moskowitz, J. T. (2004). Coping: Pitfalls and promise. *Annual Review of Psychology*, *55*, 745–774.
- Ford, E., Ayers, S., & Bradley, R. (2010). Exploration of a cognitive model to predict post-traumatic stress symptoms following childbirth. *Journal of Anxiety Disorders*, *24*(3), 353–359.
- Giesbrecht, G., Campbell, T., Letourneau, N., Kooistra, L., & Kaplan, B. (2012). Psychological distress and salivary cortisol covary within persons during pregnancy. *Psychoneuroendocrinology*, *37*(2), 270–279.
- Giurgescu, C., Penckofer, S., Maurer, M. C., & Bryant, F. B. (2006). Impact of uncertainty, social support, and prenatal coping on the psychological well-being of high-risk pregnant women. *Nursing Research*, *55*(5), 356–365.
- Glynn, L. M., Wadhwa, P. D., Dunkel-Schetter, C., Chiciz-DeMet, A., & Sandman, C. A. (2001). When stress happens matters: Effects of earthquake timing on stress responsivity in pregnancy. *American Journal of Obstetrics and Gynecology*, *184*(4), 637–642.
- Gotlib, I. H., Whiffen, V. E., Wallace, P. M., & Mount, J. H. (1991). Prospective investigation of postpartum depression: Factors involved in onset and recovery. *Journal of Abnormal Psychology*, *100*(2), 122–132.
- Hamilton, J. G., & Lobel, M. (2008). Types, patterns, and predictors of coping with stress during pregnancy: Examination of the revised prenatal coping inventory in a diverse sample. *Journal of Psychosomatic Obstetrics and Gynecology*, *29*(2), 97–104.
- Harville, E. W., Savitz, D. A., Dole, N., Herring, A. H., & Thorp, J. M. (2009). Stress questionnaires and stress biomarkers during pregnancy. *Journal of Women's Health*, *18*(9), 1425–1433.
- Harville, E. W., Savitz, D. A., Dole, N., Thorp, J. M., & Herring, A. H. (2007). Psychological and biological markers of stress and bacterial vaginosis in pregnant women. *British Journal of Obstetrics and Gynaecology*, *114*(2), 216–223.

- Hedegaard, M., Henriksen, T. B., Secher, N. J., Hatch, M. C., & Sabroe, S. (1996). Do stressful life events affect duration of gestation and risk of preterm delivery? *Epidemiology*, *7*(4), 339–345.
- Hobfoll, S. E. (1988). *The ecology of stress*. Washington, DC: Hemisphere.
- Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist*, *44*(3), 513–524.
- Honey, K. L., Bennett, P., & Morgan, M. (2003). Predicting postnatal depression. *Journal of Affective Disorders*, *76*(1–3), 201–210.
- Honey, K. L., Morgan, M., & Bennett, P. (2003). A stress-coping transactional model of low mood following childbirth. *Journal of Reproductive and Infant Psychology*, *21*(2), 129–143.
- Huizink, A. C., Robles de Medina, P. G., Mulder, E. J., Visser, G. H., & Buitelaar, J. K. (2002a). Coping in normal pregnancy. *Annals of Behavioral Medicine*, *24*(2), 132–140.
- Huizink, A. C., Robles de Medina, P. G., Mulder, E. J., Visser, G. H., & Buitelaar, J. K. (2002b). Psychological measures of prenatal stress as predictors of infant temperament. *Journal of the American Academy of Child & Adolescent Psychiatry*, *41*(9), 1078–1085.
- James, S. A., Hartnett, S. A., & Kalsbeek, W. D. (1983). John Henryism and blood pressure differences among black men. *Journal of Behavioral Medicine*, *6*(3), 259–278.
- Kramer, M. S., Lydon, J., Séguin, L., Goulet, L., Kahn, S. R., McNamara, H., . . . Sharma, S. (2009). Stress pathways to spontaneous preterm birth: The role of stressors, psychological distress, and stress hormones. *American Journal of Epidemiology*, *169*(11), 1319–1326.
- Latendresse, G., & Ruiz, R. J. (2010). Maternal coping style and perceived adequacy of income predict CRH levels at 14–20 weeks of gestation. *Biological Research for Nursing*, *12*(2), 125–136.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York, NY: Springer.
- Lederman, S., Rauh, V., Weiss, L., Stein, J., Hoepner, L., Becker, M., & Perera, F. (2004). The effects of the World Trade Center event on birth outcomes among term deliveries at three lower Manhattan hospitals. *Environmental Health Perspectives*, *112*(17), 1772–1778.
- Levy-Shiff, R., Dimitrovsky, L., Shulman, S., & Har-Even, D. (1998). Cognitive appraisals, coping strategies, and support resources as correlates of parenting and infant development. *Developmental Psychology*, *34*(6), 1417–1427.
- Levy-Shiff, R., Lerman, M., Har-Even, D., & Hod, M. (2002). Maternal adjustment and infant outcome in medically defined high-risk pregnancy. *Developmental Psychology*, *38*(1), 93–103.
- Litt, M. D., Shafer, D., & Napolitano, C. (2004). Momentary mood and coping processes in TMD pain. *Health Psychology*, *23*(4), 354–362.
- Lobel, M. (1998). Pregnancy and mental health. In H. Friedman (Ed.), *Encyclopedia of mental health* (Vol. 3, pp. 229–238). San Diego, CA: Academic Press.
- Lobel, M., Cannella, D., Graham, J., DeVincent, C., Schneider, J., & Meyer, B. (2008). Pregnancy-specific stress, prenatal health behaviors, and birth outcomes. *Health Psychology*, *27*(5), 604–615.
- Lobel, M., Hamilton, J. G., & Cannella, D. T. (2008). Psychosocial perspectives on pregnancy: Prenatal maternal stress and coping. *Social and Personality Psychology Compass*, *2*(4), 1600–1623.
- Lobel, M., Yali, A. M., Zhu, W., DeVincent, C., & Meyer, B. (2002). Beneficial associations between optimistic disposition and emotional distress in high-risk pregnancy. *Psychology & Health*, *17*(1), 77–96.
- Lopez, W. D., Konrath, S. H., & Seng, J. S. (2011). Abuse-related post-traumatic stress, coping, and tobacco use in pregnancy. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, *40*(4), 422–431.
- Lowenkron, A. H. (1999). Coping with the stress of premature labor. *Health Care for Women International*, *20*(6), 547–561.
- Lu, M. C., & Halfon, N. (2003). Racial and ethnic disparities in birth outcomes: A life-course perspective. *Maternal and Child Health Journal*, *7*(1), 13–30.
- Mahoney, A., Pargament, K. I., & DeMaris, A. (2009). Couples viewing marriage and pregnancy through the lens of the sacred: A descriptive study. *Research in the Social Scientific Study of Religion*, *20*, 1–45.



- Mancuso, R. A., Dunkel-Schetter, C., Rini, C. M., Roesch, S. C., & Hobel, C. J. (2004). Maternal prenatal anxiety and corticotropin-releasing hormone associated with timing of delivery. *Psychosomatic Medicine*, *66*, 762–769.
- March of Dimes, PMNCH, Save the Children, & WHO. (2012). *Born too soon: The global action report on preterm birth*. Geneva: World Health Organization.
- Martin, J. A., Hamilton, B. E., Sutton, P. D., Ventura, S. J., Mathews, T., Kirmeyer, S., & Osterman, M. J. K. (2010). Births: Final data for 2007. *National Vital Statistics Reports*, *58*(24), 1–125.
- McLean, M., Bisits, A., Davies, J., Woods, R., Lowry, P., & Smith, R. (1995). A placental clock controlling the length of human pregnancy. *Nature Medicine*, *1*(5), 460–463.
- Messer, L. C., Dole, N., Kaufman, J. S., & Savitz, D. A. (2005). Pregnancy intendedness, maternal psychosocial factors and preterm birth. *Maternal and Child Health Journal*, *9*(4), 403–412.
- Mikulincer, M., & Florian, V. (1999). Maternal-fetal bonding, coping strategies, and mental health during pregnancy - The contribution of attachment style. *Journal of Social and Clinical Psychology*, *18*(3), 255–276.
- Miller, S. M. (1987). Monitoring and blunting: Validation of a questionnaire to assess styles of information seeking under threat. *Journal of Personality and Social Psychology*, *52*(2), 345–353.
- Misra, D. P., Guyer, B., & Allston, A. (2003). Integrated perinatal health framework: A multiple determinants model with a lifespan approach. *American Journal of Preventative Medicine*, *25*(1), 65–75.
- Monnier, J., & Hobfoll, S. E. (1997). Crossover effects of communal coping. *Journal of Social and Personal Relationships*, *14*(2), 263–270.
- Morling, B., Kitayama, S., & Miyamoto, Y. (2003). American and Japanese women use different coping strategies during normal pregnancy. *Personality and Social Psychology Bulletin*, *29*(12), 1533–1546.
- Norbeck, J. S., & Anderson, N. J. (1989). Life stress, social support, and anxiety in mid- and late-pregnancy among low income women. *Research in Nursing & Health*, *12*(5), 281–287.
- O'Brien, T., DeLongis, A., Pomaki, G., Puterman, E., & Zwicker, A. (2009). Couples coping with stress: The role of empathic responding. *European Psychologist*, *14*(1), 18–28.
- Olde, E., van der Hart, O., Kleber, R., & van Son, M. (2005). Posttraumatic stress following childbirth: A review. *Clinical Psychology Review*, *26*(1), 1–16.
- Orr, S. T., James, S. A., Garry, J., & Newton, E. (2006). Exercise participation before and during pregnancy among low-income, urban, Black women: The Baltimore Preterm Birth Study. *Ethnicity and Disease*, *16*(4), 909–913.
- Orr, S. T., Reiter, J. P., Blazer, D. G., & James, S. A. (2007). Maternal prenatal pregnancy-related anxiety and spontaneous preterm birth in Baltimore, Maryland. *Psychosomatic Medicine*, *69*(6), 566–570.
- Ortendahl, M. (2008). Coping mechanisms actually and hypothetically used by pregnant and non-pregnant women in quitting smoking. *Journal of Addictive Diseases*, *27*(4), 61–68.
- Ortendahl, M., & Nasman, P. (2007). Use of coping techniques as a predictor of lapse when quitting smoking among pregnant and non-pregnant women. *The American Journal on Addictions/American Academy of Psychiatrists in Alcoholism and Addictions*, *16*(3), 238–243.
- Pakenham, K. I., Smith, A., & Rattan, S. L. (2007). Application of a stress and coping model to antenatal depressive symptomatology. *Psychology, Health, Medicine*, *12*(3), 266–277.
- Ritter, C., Hobfoll, S. E., Lavin, J., Cameron, R. P., & Hulsizer, M. R. (2000). Stress, psychosocial resources, and depressive symptomatology during pregnancy in low-income, inner-city women. *Health Psychology*, *19*(6), 576–585.
- Rodriguez, C. M. (2009). Coping style as a mediator between pregnancy desire and child abuse potential: A brief report. *Journal of Reproductive and Infant Psychology*, *27*(1), 61–69.
- Rodriguez, M. A., Valentine, J., Ahmed, S. R., Eisenman, D. P., Sumner, L. A., Heilemann, M. V., & Liu, H. (2010). Intimate partner violence and maternal depression during the perinatal period: A longitudinal investigation of Latinas. *Violence Against Women*, *16*(5), 543–559.
- Roth, S., & Cohen, L. J. (1986). Approach, avoidance, and coping with stress. *American Psychologist*, *41*(7), 813–819.

- Rudnicki, S. R., Graham, J. L., Habboushe, D. F., & Ross, R. D. (2001). Social support and avoidant coping: Correlates of depressed mood during pregnancy in minority women. *Women and Health, 34*(3), 19–34.
- Ryding, E. L., Wijma, B., Wijma, K., & Rydhstrom, H. (1998). Fear of childbirth during pregnancy may increase the risk of emergency cesarean section. *Acta Obstetrica et Gynecologica Scandinavica, 77*(5), 542–547.
- Sandman, C., Glynn, L., Dunkel Schetter, C., Wadhwa, P. D., Garite, T. J., Chicz-DeMet, A., & Hobel, C. (2006). Elevated maternal cortisol early in pregnancy predicts third trimester levels of placental corticotropin releasing hormone (CRH): Priming the placental clock. *Peptides, 27*(6), 1451–1463.
- Snyder, C. R., Sympson, S., Ybasco, F., Borders, T., Babyak, M., & Higgins, R. L. (1996). Development and validation of the State Hope Scale. *Journal of Personality and Social Psychology, 70*(2), 312–335.
- Soderquist, J., Wijma, B., Thorbert, G., & Wijma, K. (2009). Risk factors in pregnancy for post-traumatic stress and depression after childbirth. *British Journal of Obstetrics and Gynaecology, 116*(5), 672–680.
- Soet, J. E., Brack, G. A., & Dilorio, C. (2003). Prevalence and predictors of women's experience of psychological trauma during childbirth. *Birth, 30*(1), 36–46.
- Soliday, E., McCluskey-Fawcett, K., & O'Brien, M. (1999). Postpartum affect and depressive symptoms in mothers and fathers. *The American Journal of Orthopsychiatry, 69*(1), 30–38.
- Somerfield, M. R., & McCrae, R. R. (2000). Stress and coping research: Methodological challenges, theoretical advances, and clinical applications. *American Psychologist, 55*(6), 620–625.
- Spirito, A., Ruggiero, L., Bowen, A., & McGarvey, S. T. (1991). Stress, coping, and social support as mediators of the emotional status of women with gestational diabetes. *Psychology & Health, 5*, 111–120.
- Stephens, C. (2011). Narrative analysis in health psychology research: Personal, dialogical and social stories of health. *Health Psychology Review, 5*, 62–78.
- Stephoe, A., & O'Sullivan, J. (1986). Monitoring and blunting coping styles in women prior to surgery. *British Journal of Clinical Psychology, 25*(2), 143–144.
- Stone, A. A., Lennox, S., & Neale, J. M. (1985). Daily coping and alcohol use in a sample of community adults. In S. Shiffman & T. A. Wills (Eds.), *Coping and substance use* (pp. 199–220). New York, NY: Academic Press.
- Stone, A. A., & Shiffman, S. (1994). Ecological momentary assessment (EMA) in behavioral medicine. *Annals of Behavioral Medicine, 16*(3), 199–202.
- Suls, J., & Fletcher, B. (1985). The relative efficacy of avoidant and nonavoidant coping strategies: A meta-analysis. *Health Psychology, 4*(3), 249.
- Tanner Stapleton, L. R., Dunkel Schetter, C., Westling, E., Rini, C., Glynn, L., Hobel, C., & Sandman, C. (2012). Perceived partner support in pregnancy predicts lower maternal and infant distress. *Journal of Family Psychology, 26*(3), 453–463.
- Tennen, H., Affleck, G., Armeli, S., & Carney, M. A. (2000). A daily process approach to coping: Linking theory, research, and practice. *American Psychologist, 55*(6), 626–636.
- Tennen, H., Affleck, G., & Zautra, A. (2006). Depression history and coping with chronic pain: A daily process analysis. *Health Psychology, 25*(3), 370–379.
- Tercyak, K. P., Johnson, S. B., Roberts, S. F., & Cruz, A. C. (2001). Psychological response to prenatal genetic counseling and amniocentesis. *Patient Education and Counseling, 43*(1), 73–84.
- Tiedje, L., Holzman, C. B., De Vos, E., Jia, X., Korzeniewski, S., Rahbar, M. H., . . . Kallen, D. (2008). Hostility and anomie: Links to preterm delivery subtypes and ambulatory blood pressure at mid-pregnancy. *Social Science and Medicine, 66*(6), 1310–1321.
- Van Zuuren, F. J. (1993). Coping style and anxiety during prenatal diagnosis. *Journal of Reproductive and Infant Psychology, 11*(1), 57–59.
- Weaver, K., Campbell, R., Mermelstein, R., & Wakschlag, L. (2008). Pregnancy smoking in context: The influence of multiple levels of stress. *Nicotine & Tobacco Research, 10*(6), 1065–1073.
- Wells, J. D., Hobfoll, S. E., & Lavin, J. (1997). Resource loss, resource gain, and communal coping during pregnancy among women with multiple roles. *Psychology of Women Quarterly, 21*(4), 645–662.

- West, S. G., & Aiken, L. S. (1997). Toward understanding individual effects in multi-component prevention programs: Design and analysis strategies. In K. J. Bryant, M. Windle, & S. G. West (Eds.), *The science of prevention: Methodological advances from alcohol and substance abuse research* (pp. 167–209). Washington, DC: American Psychological Association.
- White, O., McCorry, N. K., Scott-Heyes, G., Dempster, M., & Manderson, J. (2008). Maternal appraisals of risk, coping and prenatal attachment among women hospitalised with pregnancy complications. *Journal of Reproductive and Infant Psychology, 26*(2), 74–85.
- Whitehead, N., Hill, H. A., Brogan, D. J., & Blackmore-Prince, C. (2002). Exploration of threshold analysis in the relation between stressful life events and preterm delivery. *American Journal of Epidemiology, 155*(2), 117–124.
- Xiong, X., Harville, E. W., Mattison, D. R., Elkind-Hirsch, K., Pridjian, G., & Buekens, P. (2008). Exposure to Hurricane Katrina, post-traumatic stress disorder and birth outcomes. *American Journal of the Medical Sciences, 336*(2), 111.
- Yali, A. M., & Lobel, M. (1999). Coping and distress in pregnancy: An investigation of medically high risk women. *Journal of Psychosomatic Obstetrics and Gynecology, 20*(1), 39–52.
- Yali, A. M., & Lobel, M. (2002). Stress-resistance resources and coping in pregnancy. *Anxiety Stress and Coping, 15*(3), 289–309.
- Zambrana, R. E., Dunkel-Schetter, C., Collins, N. L., & Scrimshaw, S. C. (1999). Mediators of ethnic-associated differences in infant birth weight. *Journal of Urban Health, 76*(1), 102–116.
- Zautra, A. J., Hall, J. S., Murray, K. E., & the Resilience Solutions Group 1. (2008). Resilience: A new integrative approach to health and mental health research. *Health Psychology Review, 2*(1), 41–64.
- Zlotogorski, Z., Tadmor, O., Duniec, E., Rabinowitz, R., & Diamant, Y. (1995). Anxiety levels of pregnant women during ultrasound examination: Coping styles, amount of feedback and learned resourcefulness. *Ultrasound in Obstetrics and Gynecology, 6*(6), 425–429.

All Supplemental Material is available alongside this article on Taylor & Francis Online - go to <http://dx.doi.org/10.1080/17437199.2012.752659>

Supplementary Table 1: Summary of instruments used to measure coping during pregnancy

Measure <i>Source</i>	Items	Number of subscales (subscale labels)	Language(s)
<b><i>Multidimensional Coping Measures</i></b>			
Bernese Coping Instrument (BCI) <i>Heim, Augustiny, Blaser, &amp; Schaffner, 1991</i>	30	3 (emotion, cognition, and action-oriented)	German
Brief COPE <i>Carver, 1997</i>	28	14 (active, planning, positive reframing, acceptance, humor, religion, emotional support, instrumental support, distraction, denial, venting, substance use, behavioral disengagement, self-blame)	French, English
Coping Inventory for Stressful Situations (CISS) <i>Endler &amp; Parker, 1990</i>	44	3 (task, avoidance, and emotion-oriented)	English, French
COPE <i>Carver, Scheier, &amp; Weintraub, 1989</i>	60	15 (positive reinterpretation, mental disengagement, venting, instrumental social support, active coping, denial, religious coping, humor, behavioral disengagement, restraint, use of emotional support, substance use, acceptance, suppression of competing activities, planning)	English
Pregnancy-Related Chronic Pain Coping Inventory (CPCI-PR) <i>adapted from Jensen et al., 2003</i>	16	8 (relaxation, task persistence, exercise/stretching, seeking social support, coping self-statements, guarding, resting, asking for assistance)	Taiwanese
Coping Response Inventory <i>Moos, 1990</i>	48	8 (logical analysis, positive appraisal, seeking support, problem solving, cognitive avoidance, acceptance, alternative rewards, and emotional discharge)	English
Coping Strategies Inventory <i>Tobin et al., 1989</i>	72	2 (engagement, disengagement)	English
Emotional Approach Coping <i>Stanton et al., 2000</i>	8	2 (emotional expression, emotional processing)	English
Intention-Based Coping Inventory <i>Stone &amp; Neal, 1984; Wills, 1986</i>	48	8 (distraction, situation redefinition, direct action, catharsis, acceptance, seeking social support, relaxation, religion)	English
Miller Behavioral Style Scale (MBSS) <i>Miller, 1987</i>	32	2 (monitoring, blunting)	English, Dutch, Hebrew
Prenatal Coping Inventory (PCI)	36	4 (preparation, avoidance, positive	English

<i>Yali &amp; Lobel, 1999</i>		appraisal, prayer)	
Revised Prenatal Coping Inventory (nu PCI) <i>Yali &amp; Lobel, 2002</i>	42	3 (planning-preparation, avoidance, spiritual-positive coping) or 4 (preparation, avoidance, positive appraisal, and prayer)	English
Strategic Approach to Coping Scale (SACS) <i>Hobfoll et al., 1994</i>	48	8 (aggressive action, antisocial action, cautious action, seeking social support, social joining, instinctive action, avoidance, assertive action)	English
Ways of Coping (WOC) <i>Folkman &amp; Lazarus., 1985</i>	67	8 (confrontation, distancing, self-control, seeking social support, accepting responsibility, escape-avoidance, planful problem-solving, positive reappraisal)	English, Hebrew
Utrecht Coping List (UCL) <i>Schreurs et al., 1988</i>	19	2 (problem-focused, emotion-focused)	Dutch
<b><i>Unidimensional Coping Measures</i></b>			
“John Henryism” Active Coping <i>James et al., 1983</i>	8 or 12		English
Surrender Scale <i>Wong-McDonald &amp; Gorsuch, 2000</i>	12		English
<b><i>Coping Skills Measures</i></b>			
Negative Mood Regulation Scale <i>Catanazaro &amp; Mearns, 1990</i>	15		English
Stress Coping Inventory (SCI) <i>Ryding et al., 1998</i>	41		English
Sense of Coherence (SOC) <i>Antonovsky, 1993</i>	29		English
State Hope Scale <i>Snyder et al., 1996</i>	6		English
Self-Efficacy Scale (general self-efficacy subscale) <i>Sherer et al., 1982</i>	17		English

Supplementary Table 2: Cross-Sectional Studies

Publication	Sample	Timing of Assessment	Measure <i>Type of coping measured</i>	Dependent Variable(s)	No. significant tests/ Total no. of tests	Major Findings
Clements & Ermakova 2012	230 predominantly low-income pregnant women in a state-funded program for pregnant smokers	First trimester	Surrender Scale <i>General coping style</i>	Prenatal stress	1/1	Coping by surrendering to God associated with lower prenatal stress, controlling for age, marital status, education and number of children ( $\beta=0.15$ , $R^2\Delta=0.02$ ).
Faisal-Cury et al 2012	312 Brazilian pregnant women attending a private clinic	After 20 weeks gestation	WOC <i>General coping style</i>	Prenatal depression	4/8	Women with high scores on confronting, accepting responsibility, escape-avoidance, and problem-solving subscales more likely to be depressed ( <i>ORs</i> ranged from 7.89 to 8.23).
Chang et al 2011	140 Taiwanese healthy pregnant women with pregnancy-related lumbopelvic pain recruited from outpatient obstetrics-gynecology clinic	35-41 weeks gestation	CPCI-PR <i>Coping with pregnancy-related pain</i>	Average pain intensity, worst pain intensity, overall pain interference	9/ 24	Greater worst pain intensity correlated with coping through rest and asking for assistance (Spearman's $\rho=0.17$ ). Greater overall pain interference correlated with asking for assistance, resting, guarding, coping self-statement, relaxation, and seeking social support (Spearman's $\rho$ s ranged from 0.20 to 0.29 except as noted).
Lopez, Konrath & Seng 2011	1547 pregnant women recruited from maternity clinics including 1159 nonsmokers, 191 quitters, and 197	Less than 28 weeks gestation	Author-constructed items assessing use of alcohol, tobacco, and illicit drugs to "cope with emotions or problems"	Smoking during pregnancy	1/3	Use of tobacco "to cope with emotions and problems" doubled odds of continuing to smoke during pregnancy after controlling for socioeconomic stress and history of post-

	current smokers					traumatic stress disorder ( $OR=2.26$ , $R^2 \Delta=0.03$ ).
Chen et al 2010	671 non-Hispanic Whites and 545 African-Americans recruited from clinics	15-27 weeks gestation	“John Henryism” Active Coping scale <i>General coping style</i>	CRH levels	0/2	Active coping unrelated to CRH levels in full sample or in sub-cohort with uncomplicated pregnancies.
Latendresse & Ruiz 2010	85 pregnant women recruited from university-operated community prenatal clinics	14-20 weeks gestation	Brief COPE <i>General coping styles</i>	Elevated CRH (15 pg/ml and above)	2/14	Women with religion or disengagement coping styles were more likely to have high levels of CRH ( $\beta$ s=1.95, 2.70; $Exp(\beta)$ s=7.00 and 14.96, respectively).
Blake et al 2009	450 low-income, black nonsmokers enrolled in prenatal care with partners, household/family members, or friends who smoked	Average of 19 weeks gestation	Negative Mood Regulation Scale <i>Skills for coping with negative affect or mood states</i>	Environmental tobacco smoke exposure	0/1	Significant bivariate association between greater use of cognitive-behavioral coping strategies and avoidance of environmental tobacco exposure ( $d=-0.25$ ); relationship not significant in controlled multivariate analyses.
Hamilton & Lobel 2008	321 ethnically and socioeconomically diverse women recruited from university hospital public prenatal clinic	17, 26 and 36 weeks gestation	Revised PCI <i>Coping with pregnancy</i>	State anxiety, pregnancy-specific distress	12/18	Planning-preparation associated with anxiety at early and late pregnancy ( $r$ s ranged from 0.13 to 0.15) and pregnancy-specific distress at all 3 timepoints ( $r$ s ranged from 0.23 to 0.35). Avoidance associated with anxiety ( $r$ s ranged from 0.46 to 0.52) and pregnancy-specific distress ( $r$ s ranged from 0.52 to 0.54) at all three time points. Spiritual-positive coping associated with pregnancy-specific distress at late pregnancy only ( $r=0.15$ ).

Rodriguez 2008	77 pregnant mothers recruited from parenting websites	One online assessment during pregnancy	CRI <i>Coping in relation to a stressful event from the last 12 months</i>	Child abuse potential	SEM	Latent passive coping factor composed of cognitive avoidance and emotional discharge subscales mediated association between low pregnancy desire and greater child abuse potential.
White et al 2008	87 pregnant women in Northern Ireland hospitalized for pregnancy-related complications	During admission to hospital at or after 24 weeks gestation	PCI <i>Coping with pregnancy</i>	Quality and intensity of maternal-fetal attachment	2/6	Positive appraisal associated with quality of maternal-fetal attachment ( $\beta=0.42$ ) and intensity of maternal-fetal attachment ( $\beta=0.61$ ). No effect of prayer, preparation, or avoidance.
Cote-Arsenault 2007	82 women pregnant after loss recruited through private practices, perinatal center, flyers, newspapers and networking	10-17 weeks gestation	WOC-Revised <i>Coping behavior in relation to current stressor</i>	Positive affect, negative affect, pregnancy anxiety	3/6	Emotion-focused coping associated with concurrent pregnancy anxiety ( $r=0.42$ ), negative affect ( $r=0.38$ ), but not positive affect. Problem-focused coping associated with concurrent negative affect ( $r=0.58$ ) but not pregnancy anxiety or positive affect, stress in life or stress from pregnancy.
Harville et al 2007	897 pregnant women recruited from prenatal care clinics in North Carolina who provided a genital tract sample	27 weeks gestation	“John Henryism” Active Coping scale <i>General coping style</i>	Bacterial vaginosis at 15-19 weeks or 24-29 weeks	1/1	Higher scores on John Henryism coping scale associated with increased odds of bacterial vaginosis in uncontrolled analyses only (adjusted $OR=1.7$ ).
Ortendahl & Näsman 2007	20 pregnant and 20 non-pregnant smokers in Bulgaria who intended to quit smoking	Day 14 of two week study period	Author constructed 11-item scale assessing techniques used to quit smoking (e.g. distraction,	Lapse when quitting smoking assessed daily for two weeks	1/11	Pursuing some other activity in smoking tempting situations associated with reduced likelihood of relapse ( $\beta=1.060$ ,



			avoiding difficult situations, substituting other substances)			Exp( $\beta$ )=2.89).
Pakenham, Smith & Rattan 2007	242 women pregnant for the first time recruited from antenatal clinic in Australia	Third trimester	Selected items from WOC and Billings and Moos (1981) measures; EAC <i>Coping in relation to pregnancy</i>	Prenatal depressive symptoms	2/8	Greater wishful thinking and lower positive appraisal coping associated with greater depressive symptoms ( $\beta$ s=0.60 and -0.16, respectively). Coping through wishful thinking moderated the association between stress and depressive symptoms ( $\beta$ =0.20) such that wishful thinking exacerbated effect of stress.
Giurgescu et al. 2006	105 high-risk pregnant women recruited from university-based medical clinics	24-36 weeks gestation	PCI <i>Coping with pregnancy</i>	Psychological well-being	1/4	Avoidance associated with psychological distress ( $\beta$ =-0.67) and mediated the effect of uncertainty on psychological well-being, accounting for 94% of the total effect of uncertainty on well-being. No effect of preparation, positive interpretation, or prayer on well-being.
Orr et al. 2006	922 pregnant African-American women enrolled at hospital-based prenatal clinics	First prenatal visit	“John Henryism” Active Coping scale <i>General coping style</i>	Exercise participation	1/1	Greater proportion of women with higher levels of active coping engaged in exercise during pregnancy than those with lower levels of active coping (effect size not reported).
Lobel et al. 2002	167 high-risk pregnant women	Approximately 24 weeks	PCI <i>Coping with</i>	Prenatal maternal	3/4	Avoidance and prayer associated with greater distress

	receiving private prenatal care at a university facility	gestation	<i>pregnancy</i>	distress		( $r_s=0.59$ and $0.17$ , respectively). Positive interpretation associated with less distress ( $r=-0.22$ ). Relationship between optimism and distress partially mediated by avoidant coping.
Rudnicki et al. 2001	150 healthy pregnant lower income, minority women recruited from obstetrics clinic at urban hospital	Third trimester	Avoidant coping subscales of COPE <i>Coping behavior in relation to stress experienced during pregnancy</i>	Depressed mood	1/1	Avoidant coping associated with depressed mood controlling for SES, pregnancy intendedness, and social support ( $\beta=0.42$ , $R^2 \Delta=0.15$ ).
Lowenkron 1999	50 women experiencing premature labor during pregnancy recruited through home care agency	Prior to 34 weeks gestation	WOC <i>Coping behavior in relation to premature labor</i>	Perceived stress	2/8	Perceived stress correlated with accepting responsibility ( $r=0.53$ ) and escape/avoidance ( $r=0.45$ ). No correlation between perceived stress and the six other coping subscales.
Blechman et al. 1999	83 pregnant inner-city residents recruited from urban outpatient prenatal care clinic (38 substance users and 45 nonusers)	Around 4 months gestation	Intention-Based Coping Inventory <i>General coping style</i>	Depressive symptoms	1/2	Disengaged coping associated with greater depressive symptoms for both users and non-users ( $r=0.35$ ). Engaged coping not correlated with depressive symptoms.
Yali & Lobel 1999	167 high risk pregnant women recruited from prenatal care clinic	Average of 24 weeks gestation	PCI <i>Coping with pregnancy</i>	Pregnancy-specific distress	4/8	Positive appraisal associated with less pregnancy-specific distress ( $\beta=-0.21$ ). Avoidance, preparation for motherhood and substance abuse associated with greater pregnancy-related distress controlling for global distress ( $\beta$ s ranged from $0.17$ to $0.49$ ).
Fang et al.	511 non-Hispanic	First or early	WOC and COPE	Perceived	SEM	Denial associated with greater

1997	White pregnant women with no family history of cystic fibrosis recruited from prenatal clinics	second trimester of pregnancy	(Avoidance –related subscales only) <i>General coping style</i>	vulnerability, perceived barriers, perceived benefits, genetic screening attitudes		perceived barriers and fewer perceived benefits of genetic testing for cystic fibrosis, which were in turn associated with less positive attitudes towards genetic screening (total effect=-0.017). Distancing associated with less knowledge, which was in turn associated with lower perceived vulnerability and increased perceived barriers to testing (total effect=-0.079).
Wells et al. 1997	92 pregnant women recruited “in the middle stages of pregnancy” from obstetrics clinic	Average gestational week not reported	SACS <i>General coping style</i>	Depressive symptoms, state anger	3/16	Women who reported greater assertive action, cautious action, and social joining reported fewer depressive symptoms ( $\beta$ s ranged from 0.20 to 0.27, $R^2\Delta$ ranged from 0.04 to 0.07). No significant interactions between resource loss and coping styles.
Zlotogorski et al. 1995	183 Israeli pregnant women undergoing fetal ultrasound who were randomly assigned to receive high or low feedback from the physician	Before ultrasound at week 4-41 weeks gestation of pregnancy (mean 29.16)	MBSS <i>General coping style</i>	Decrease in state anxiety from before ultrasound to after ultrasound	0/2	No significant interactions of coping style with feedback level or learned resourcefulness. Main effects of coping not reported.
Spirito et al. 1991	72 nondiabetic pregnant women and 125 women with gestational diabetes recruited from prenatal care clinic	Diabetic participants: average of 35 weeks gestation; Controls: average of 37.2 weeks gestation	CSI <i>Coping with stressful event in past two months</i>	Anxious-composed mood, depressed-related mood, daily blood glucose variability	7/12	Engagement coping significantly associated with anxious-composed mood for all participants ( $\beta=0.15$ , $R^2\Delta=0.05$ ). Disengagement coping significantly associated with anxious-composed mood

						( $\beta=-0.18$ , $R^2\Delta=0.03$ ) and depressed-elated mood for all participants ( $\beta=-0.19$ , $R^2\Delta=0.03$ ), as well as greater daily blood glucose variability in diabetic participants ( $R^2=0.04$ ).
--	--	--	--	--	--	---

Note: All studies conducted in the US unless otherwise noted.  $\beta$ s reported are standardized regression coefficients.

Abbreviations in Tables:

- BCI: Bernese Coping Instrument
- CISS: Coping Inventory for Stressful Situations
- CPCI-PR: Pregnancy-Related Chronic Pain Coping Inventory
- CRH: Corticotropin releasing hormone
- CRI: Coping Response Inventory
- CSI: Coping Strategies Inventory
- EAC: Emotional Approach Coping
- PCI: Prenatal Coping Inventory
- MBSS: Miller Behavioral Style Scale
- MOS: Medical Outcomes Study
- RCOPE: Religious COPE
- SACS: Strategic Approach to Coping Scale
- SOC: Sense of Coherence
- SCI: Stress Coping Inventory
- UCL: Utrecht Coping List
- WOC: Ways of Coping

Supplementary Table 3: Longitudinal Studies (Prenatal Outcomes)

Publication	Sample	Timing of Assessment	Measure <i>Type of coping measured</i>	Dependent Variable(s)	No. significant tests/ Total no. of tests	Major Findings
Brisch et al 2003	664 German pregnant women in their second trimesters recruited from prenatal care (497 high-risk, 167 low-risk)	Immediately before ultrasound scanning for fetal malformation during second trimester	BCI <i>General coping style</i>	Change in state anxiety from before ultrasound, 5-6 weeks later and 10-12 weeks later	4/6	Significant bivariate correlations between coping styles and anxiety change scores, such that “negative emotional attitude/disapproval” was associated with increases in anxiety over time ( $r_s=0.33$ and $0.35$ ), whereas “positive emotional attitude/distance” was associated with decreases in anxiety over time ( $r_s=-0.21$ and $-0.25$ ).
Huizink et al. 2002	230 normal-risk pregnant women recruited from university medical clinic in the Netherlands	15-17 weeks (early pregnancy), 17 weeks (mid-pregnancy), and 37-38 weeks gestation (late pregnancy)	UCL <i>Coping style during current period of pregnancy</i>	Pregnancy complaints, distress at early, mid, and late pregnancy	7/20	Cross-sectionally, emotion-focused coping associated with distress at early pregnancy and mid-pregnancy and pregnancy complaints at mid-pregnancy ( $\beta_s=-0.21$ and $-0.27$ , respectively) Problem-focused coping associated with distress and pregnancy complaints at mid-pregnancy ( $\beta_s=0.22$ and $0.28$ , respectively). Prospectively, emotion-focused coping in early pregnancy predicted distress in late pregnancy ( $\beta=-0.19$ , $R^2\Delta=0.17$ ) and pregnancy

						complaints in late pregnancy ( $\beta=-0.24$ , $R^2\Delta=0.04$ ).
Yali & Lobel 2002	163 pregnant women recruited from a university hospital public prenatal care clinic	16 and 26 weeks gestation	Revised PCI <i>Coping with pregnancy</i>	Pregnancy specific distress	5/12	Avoidance associated with greater distress at both time points ( $r_s=0.41$ and $0.61$ ). Positive appraisal associated with less distress at Time 1 ( $r=-0.24$ ) and more distress at Time 2 ( $r=0.17$ ). Preparation associated with more distress at Time 2 ( $r=0.33$ ) Coping not associated with distress over time in prospective structural equation models.
Tercyak et al. 2001	129 pregnant women with one or more genetic risk factors recruited from genetic counseling and testing service at teaching hospital	Prior to genetic counseling	MBSS (Monitoring only) <i>Coping style in relation to hypothetical stressors</i>	State anxiety immediately following genetic counseling, during 2-week waiting period between testing and disclosure, and after receipt of test result	0/3	Coping style (high versus low monitoring) unrelated to anxiety at all time points.
Mikulincer & Florian 1999	30 Jewish, first-time pregnant women recruited from public maternal care clinic in Israel	1 <sup>st</sup> trimester (7-12 weeks gestation); 2 <sup>nd</sup> trimester (22-24 weeks gestation); and 3 <sup>rd</sup> trimester (32-34	44-item shortened Hebrew version of the WOC <i>Coping with "pregnancy-related problems that</i>	Maternal-fetal attachment during 1 <sup>st</sup> trimester; 2 <sup>nd</sup> trimester); and 3 <sup>rd</sup> trimester	3/12	Attachment to fetus correlated with support seeking ( $r=0.36$ ) and emotion-focused coping correlated with attachment to fetus in first trimester ( $r=-0.40$ ). No correlations for

		weeks gestation)	<i>occurred in the last month”</i>			problem-focused coping or distancing coping. No significant associations between attachment to fetus and coping in second or third trimesters.
Van Zuuren 1993	37 women undergoing amniocentesis or chorionic villus sampling in the Netherlands	Prior to prenatal testing	MBSS <i>Coping style in relation to hypothetical stressors</i>	State anxiety assessed twice before the procedure was carried out and a few days prior to provision of diagnostic results	1/6	High monitors were more anxious than low monitors immediately before the testing procedure ( $d=0.74$ ).

Note: All studies conducted in the US unless otherwise noted.  $\beta$ s reported are standardized regression coefficients.

Abbreviations in Tables:

BCI: Bernese Coping Instrument

CISS: Coping Inventory for Stressful Situations

CPCI-PR: Pregnancy-Related Chronic Pain Coping Inventory

CRH: Corticotropin releasing hormone

CRI: Coping Response Inventory

CSI: Coping Strategies Inventory

EAC: Emotional Approach Coping

PCI: Prenatal Coping Inventory

MBSS: Miller Behavioral Style Scale

MOS: Medical Outcomes Study

RCOPE: Religious COPE

SACS: Strategic Approach to Coping Scale

SOC: Sense of Coherence

SCI: Stress Coping Inventory

UCL: Utrecht Coping List

WOC: Ways of Coping

Supplementary Table 4: Longitudinal studies with postpartum outcomes

Publication	Sample	Timing of Assessment	Measure <i>Type of coping measured</i>	Dependent Variable(s)	No. significant tests/ Total no. of tests	Major Findings
Ford, Ayers & Bradley 2010	138 pregnant women from a public hospital and community antenatal clinics in UK	Third trimester	Self-Efficacy Scale <i>General coping skills</i>	Post-traumatic stress symptoms at 3 weeks and 3 months postpartum	2/2	Higher scores on self-efficacy scale related to fewer post-traumatic stress symptoms at 3 weeks and 3 months postpartum ( $r_s = -0.23$ and $-0.26$ , respectively).
Rodriguez et al. 2010	210 pregnant Latina women recruited from obstetrics clinics, with a majority affected by intimate partner violence	At least 3 months gestation	Avoidant coping items from COPE and WOC <i>General coping style</i>	Postpartum depressive symptoms at 3, 7, and 13 months postpartum	1/2	Avoidant coping style positively associated with depression over time in mixed effects model controlling for interpersonal violence, language, and history of trauma ( $\beta=0.14$ ).
Soderquist et al 2009	1224 pregnant women recruited at first ultrasound examination in Sweden	12-20 weeks gestation	SCI <i>General coping skills</i>	Posttraumatic stress and postpartum depression at 1 month postpartum	1/4	Low levels of stress coping ability during early pregnancy associated with increased risk of post-traumatic stress (adjusted $OR=4.4$ ) but not depression in the postpartum.
De Tychey et al 2005	277 pregnant women recruited from hospital in France	26-35 weeks gestation	French version of the Brief COPE <i>General coping style</i>	Prenatal and postpartum depression at 4-8 weeks postpartum	6/28	Distancing, denial, blame, and substance abuse associated with prenatal depressed mood. Blame and substance use associated with postpartum depressed mood. Effect sizes not provided.
Besser & Priel 2003	146 Israeli low-risk women pregnant for the first time recruited from	24-30 weeks gestation	Hebrew version of WOC Checklist <i>Coping with pregnancy-related</i>	Depressive symptoms at 8 weeks postpartum	1/7	No main effects of approach or avoidance strategies on depressive symptoms. No effect of approach-avoidance,



	prenatal care clinic		<i>problems</i>			self-criticism-avoidance, dependency-avoidance, or dependency-approach interactions. Approach-coping scores moderated self-critical trait vulnerability, reducing self-critical participants' depressive symptoms.
Honey, Morgan & Bennett 2003	306 women pregnant for the first time recruited from two hospital antenatal clinics in U.K.	Average of 34 weeks gestation	Brief COPE <i>General coping style</i>	Depressive symptoms at 6 weeks postpartum	1/4	Avoidant coping style during pregnancy predicted higher postpartum EPDS scores ( $\beta=0.12$ ). No effect of problem-focused coping, support seeking, or venting.
Honey, Bennett & Morgan 2003	306 women pregnant for the first time recruited from two hospital antenatal clinics in U.K.	Average of 34 weeks gestation	Brief COPE <i>General coping style</i>	Depression at 6 weeks postpartum	1/4	Avoidance coping style predicted postnatal depression case status ( $\beta=0.23$ ). Women with highest use of avoidance coping were more likely to be depressed ( $OR=5.0$ ). No effect of problem-focused coping, support seeking, or venting.
Morling et al 2003	62 American pregnant women and 94 Japanese pregnant women recruited from prenatal care	Assessments during 2 <sup>nd</sup> trimester (American women, $M= 5.44$ months; Japanese women $M= 4.06$ months)	Author constructed questionnaire including one item each to assess personal influence, acceptance, and social assurance in response to four common and four hypothetical pregnancy-related concerns	Prenatal distress, perceptions of prenatal care, physical symptoms (early and entire pregnancy), weight gain, labor negative emotions, positive feelings toward newborn	6/21	Acceptance associated with less distress during pregnancy in both samples ( $R^2=0.34$ ). For American women, acceptance associated with better pregnancy outcomes (less distress over time, better prenatal care, and less weight gain) for American women while social assurance predicted a more positive relationship with their newborn for Japanese women (effect sizes not reported).

Soet et al 2003	103 pregnant women recruited from childbirth education classes	Late pregnancy	SOC <i>General coping skills</i>	Posttraumatic stress symptoms at average of 8.76 weeks postpartum	0/1	Coping skills not a significant predictor of posttraumatic stress symptoms in multivariate analyses controlling for maternal characteristics and delivery factors.
Da Costa, Larouche et al 2000	80 pregnant women recruited from obstetrics/ gynecology practices in Canada	Coping assessed at 5 and 8 months gestation	CISS <i>General coping styles</i>	Depressed mood at 5 and 8 months gestation, and 4-5 weeks postpartum	1/6	Greater use of emotional coping during pregnancy associated with higher depressed mood during pregnancy, but was not associated with higher postpartum depressed mood. No effect of task-oriented or avoidance coping.
Soliday, McCluskey-Fawcett & O'Brien 1999	51 expectant couples recruited from physician's offices and childbirth education classes	During pregnancy	COPE (Active Coping, Planning, and Suppression of Competing Activities subscales) <i>Coping behavior in relation to pregnancy stress</i>	Maternal and paternal positive affect and depressive symptoms during first few weeks postpartum	1/4	Combination of three coping subscales predicted maternal postpartum depressive symptoms ( $\beta=0.45$ , $R^2\Delta=0.17$ ), but did not predict maternal positive affect, paternal positive affect, or paternal depressive symptoms.
Monnier & Hobfoll 1997	54 pregnant, inner-city women and their significant others recruited from medical care setting	Second trimester and third trimester	SACS <i>General coping style</i>	Depression at 7-9 weeks postpartum	1/16	Significant others' active-antisocial coping during third trimester associated with reduced concurrent depression, controlling for depression during second trimester ( $\beta=-0.22$ ). No other significant longitudinal associations between significant others' coping and depressive symptoms.

Gotlib et al 1991	730 pregnant women recruited from obstetrics department of large, urban hospital and private practices in Canada	23 weeks gestation	WOC <i>Coping in relation to most stressful event during previous month of pregnancy</i>	Depression at 4.5 weeks postpartum	0/8	None of the coping styles predicted postpartum depression.
----------------------	--	--------------------	---	------------------------------------	-----	--

Note: All studies conducted in the US unless otherwise noted.  $\beta$ s reported are standardized regression coefficients.

Abbreviations in Tables:

- BCI: Bernese Coping Instrument
- CISS: Coping Inventory for Stressful Situations
- CPCI-PR: Pregnancy-Related Chronic Pain Coping Inventory
- CRH: Corticotropin releasing hormone
- CRI: Coping Response Inventory
- CSI: Coping Strategies Inventory
- EAC: Emotional Approach Coping
- PCI: Prenatal Coping Inventory
- MBSS: Miller Behavioral Style Scale
- MOS: Medical Outcomes Study
- RCOPE: Religious COPE
- SACS: Strategic Approach to Coping Scale
- SOC: Sense of Coherence
- SCI: Stress Coping Inventory
- UCL: Utrecht Coping List
- WOC: Ways of Coping

Supplementary Table 5: Longitudinal Studies with Biological, Birth, and Infant Development outcomes

<b>Publication</b>	<b>Sample</b>	<b>Timing of Assessment</b>	<b>Measure <i>Type of coping measured</i></b>	<b>Dependent Variable(s)</b>	<b>No. significant tests/ Total no. of tests</b>	<b>Major Findings</b>
Harville et al 2009	1587 pregnant women recruited from university-based prenatal care clinic	14-19 and 24-29 weeks gestation	“John Henryism” Active Coping scale <i>General coping style</i>	Cortisol and CRH levels at 14-19 and 24-29 weeks gestation	0/4	No correlation between active coping and CRH or cortisol at either timepoint.
Tiedje et al 2008	2018 non-Hispanic White and 743 African-American pregnant women recruited from clinics. Subset of 395 women monitored for ambulatory blood pressure	15-27 weeks gestation	“John Henryism” Active Coping scale <i>General coping style</i>	Prenatal ambulatory blood pressure; preterm delivery subtypes (medically indicated, premature rupture of membranes, spontaneous preterm labor)	0/4	Active coping unrelated to vascular indices and preterm delivery subtypes in multivariate analyses.
Borders et al 2007	294 pregnant women participating in a larger study of welfare recipients	Varied within 6 months prior to each identified delivery	State Hope Scale <i>General coping skills</i>	Low birth weight	1/1	Poor coping skills significantly associated with low birth weight delivery (adjusted <i>OR</i> =3.8).
Messer et al 2005	1908 women recruited from prenatal care clinics	24-29 weeks gestation	WOC <i>General coping style during pregnancy</i>	Preterm birth	1/8	Reporting highest tertile of coping through distancing associated with modestly increased risk of PTB ( <i>RR</i> =1.4). No main effect of any other ways of coping or interactions between ways of coping and pregnancy intendedness.

Dole et al 2004	1898 African-American and white women who used university and public health prenatal clinics	24-29 weeks gestation	WOC <i>General coping style during pregnancy</i>	Preterm birth	2/24	Little evidence of an association between coping style and preterm birth in full cohort. Increased risk of PTB among African American women who reported high use of distancing from problems compared to those with low use of distancing ( $RR=1.8$ ). Increased risk of PTB among white women who were either moderately or very likely to cope with problems through escape or avoidance ( $RR=1.5$ ).
Levy-Shiff et al 2002	153 pregnant Israeli women (pregestational diabetes mellitus, gestational diabetes mellitus, or nondiabetic)	2nd trimester	WOC <i>Coping with pregnancy demands</i>	Prenatal maternal distress (negative pregnancy-related emotions, depressive symptoms, state anxiety, burnout, physical symptoms) infant mental development, infant psychomotor development at 1 year postpartum	8/14	Problem-focused coping correlated with depressive symptoms and physical symptoms ( $r$ s ranged from -0.20 and -0.22, respectively). Emotion-focused coping correlated with all aspects of maternal distress ( $r$ s ranged from 0.23 to 0.36). Problem-focused coping strategies predicted infant mental development ( $\beta=0.22$ ) in the full sample. Problem-focused coping predicted psychomotor development for infants of PGDM mothers only ( $\beta=0.33$ ).

Da Costa, Drista et al 2000	80 married pregnant women recruited from obstetrics/gynecology practices in Canada	Coping assessed at 5 and 8 months gestation	CISS <i>General coping styles</i>	Labor/delivery difficulties; infant birth weight	2/24	Average distractive coping associated with more labor/delivery difficulties ( $\beta=0.21$ , $R^2\Delta=0.03$ ). Second trimester emotional coping associated with infant birth weight ( $\beta=0.30$ , $R^2\Delta=0.05$ ). No significant interaction between stress and coping in predicting labor/delivery complications or infant birth weight.
Levy-Shiff et al 1998	140 women pregnant for the first time recruited through community health facilities in Israeli	7 months gestation and 1 month, 6 months, and 12 months postpartum	WOC <i>Coping styles in response to parenting demands and daily hassles</i>	Maternal well-being, caregiving behaviors, affiliative behaviors, maternal efficacy, infant mental development, psychomotor development, and behavior rating	4/8	Increases in problem-focused coping efforts from pregnancy to 1 month postpartum predicted well-being, efficacy, caregiving, and affiliative behavior. Infant development 1 year was primarily determined by maternal education and adjustment variables at 1 month postpartum, which were in turn predicted by prenatal cognitive appraisals, coping strategies, and social support.
Ryding et al 1998	97 Swedish women who delivered by emergency cesarean section and 194 matched controls recruited from all nine antenatal clinics in a catchment area	32 weeks gestation	SCI <i>General coping skills</i>	Delivery by emergency cesarean section	1/1	Women who subsequently delivered by emergency cesarean section reported poorer stress coping ability during pregnancy ( $d=-0.23$ ).

Note: All studies conducted in the US unless otherwise noted.  $\beta$ s reported are standardized regression coefficients.

Abbreviations in Tables:

BCI: Bernese Coping Instrument

CISS: Coping Inventory for Stressful Situations

CPCI-PR: Pregnancy-Related Chronic Pain Coping Inventory

CRH: Corticotropin releasing hormone

CRI: Coping Response Inventory

CSI: Coping Strategies Inventory

EAC: Emotional Approach Coping

PCI: Prenatal Coping Inventory

MBSS: Miller Behavioral Style Scale

MOS: Medical Outcomes Study

RCOPE: Religious COPE

SACS: Strategic Approach to Coping Scale

SOC: Sense of Coherence

SCI: Stress Coping Inventory

UCL: Utrecht Coping List

WOC: Ways of Coping