

Childbirth pain, attachment orientations, and romantic partner support during labor and delivery

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Abstract

Attachment anxiety is associated with greater perceived physical pain, whereas social support is associated with lower pain perceptions. Few studies, however, have examined the *joint* effects of attachment and support on acute physical pain in a dyadic context. In this study, first-time expectant mothers ($N = 140$) and their male partners completed romantic attachment measures (prenatally) and postnatal assessments of women's pain and men's emotional support during labor and delivery. More securely attached women benefited from emotional support in terms of reduced pain, more avoidantly attached women reported greater pain when given more support, and more anxiously attached women reported greater pain, regardless of their partners' support. These results advance our understanding of which women are most vulnerable to painful childbirth.

Labor and delivery is one of the most intense, acutely painful experiences that most women will ever face (Melzack, 1993). Considering that nearly 4 million births occur in the United States each year (Martin, Hamilton, Osterman, Curtin, & Mathews, 2015) and up to 95% of new mothers experience acute pain within 24 hr of childbirth (Eisenach et al., 2008), the incidence of labor and delivery pain is high. In addition to being inherently unpleasant and a cause of potentially needless suffering, childbirth pain is also associated with long-term negative outcomes such as postpartum

depression (Ding, Wang, Qu, Chen, & Zhu, 2014), posttraumatic stress symptoms (PTSD; Garthus-Niegel, Knoph, von Soest, Nielsen, & Eberhard-Gran, 2014), and negative evaluations of the birth experience (Niven & Murphy-Black, 2000; Waldenström, 1999, 2003, 2004; Waldenström, Hildingsson, Rubertsson, & Rådestad, 2004). These outcomes, in turn, are linked to women's future reproductive decisions (Gottvall & Waldenström, 2002; Hildingsson, Radestad, Rubertsson, & Waldenström, 2002) and increased risk of childbirth PTSD¹ (Denis, Parant, & Callahan, 2011; Garthus-Niegel et al., 2014; Goutaudier, Séjourné, Rousset, Lami, & Chabrol, 2012; Soet, Brack, & Dilorio, 2003).

Incidence rates of severe/extreme childbirth pain vary widely in expectant women (e.g., 11%–46%), suggesting that there is a great

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1. Childbirth PTSD is included in the *Diagnostics and Statistics Manual for Mental Disorders*, Fourth Edition, Text Revision (*DSM-IV-TR*) as an anxiety disorder that can develop in the aftermath of trauma in which an individual suffers a threat to his or her physical integrity.

deal of variability in women's pain experiences (Eisenach et al., 2008; Melzack, 1984, 1993; Nielsen, Staud, & Price, 2009; Norr, Block, Charles, Meyering, & Meyers, 1977). Although many demographic variables (e.g., race, age, and parity status), aspects of the birth experience itself (e.g., labor duration, medical complications, and mode of delivery), and psychosocial factors (e.g., social support and personal controllability) can influence the perception of pain during labor and delivery (Dannenbring, Stevens, & House, 1997; Eisenach et al., 2008; Fridh, Kopare, Gaston-Johansson, & Norvell, 1988; Gjerdingen, Froberg, & Fontaine, 1991; Norr et al., 1977; Tinti, Schmidt, & Businaro, 2011), less attention has been paid to the role of personality factors in shaping women's pain experiences.

A growing body of research has demonstrated the utility of applying attachment theory (Bowlby, 1969, 1973, 1980) to the study of individual differences in physical pain responses in the laboratory (Andrews, Meredith, & Strong, 2011; Eisenberger et al., 2011; Macdonald & Kingsbury, 2006; Meredith, Strong, & Feeney, 2006b; Wilson & Ruben, 2011). Attachment theory is an appropriate lens through which to examine variability in pain experiences because it proposes that individual differences in emotion regulatory responses to pain and other threats—responses such as seeking proximity to or support from relationship partners (i.e., attachment figures) when threatened—affect the maintenance or reestablishment of distressed individuals' emotional stability (Mikulincer & Shaver, 2007; Simpson & Rholes, 1994). By reducing negative emotions, successful threat management via use of attachment-based emotion regulatory strategies should benefit individuals by minimizing the potentially damaging psychological and physical effects of sustained negative affect (Cooper, Shaver, & Collins, 1998; Repetti, Taylor, & Seeman, 2002). Given that pain is subjective and involves an emotional component (International Association for the Study of Pain, 1979), attachment-based differences in how women respond to negative affect should inform predictions of who is most (and least) susceptible to experiencing

increased childbirth pain and associated negative outcomes.

To our knowledge, however, only two studies have applied attachment theory to the prediction of women's childbirth pain. The first study examined insecure attachment and analgesic consumption—a potential indicator of greater pain—among a sample of nulliparous and parous Portuguese women (Costa-Martins et al., 2014). The second study examined attachment, recalled labor pain severity, and postpartum acute traumatic stress symptoms in a sample of first-time English mothers (Quinn, Spiby, & Slade, 2015). However, neither study examined the influence of romantic partners on women's pain experiences.²

Partner influence is relevant to the link between attachment orientations and childbirth pain for several reasons. First, childbirth typically occurs within the context of a romantic relationship given that romantic partners today are increasingly likely to be present and/or available immediately before, during, and/or soon after delivery (Keirse, Enkin, & Lumley, 1989). Thus, most partners function (or are expected to function) as primary support providers during this significant life event. Second, prior research has established the importance of social support to women's experience of pain during labor and delivery (Gjerdingen et al., 1991; Hodnett, Gates, Hofmeyr, & Sakala, 2013; Hofmeyr, Nikodem, Wolman, Chalmers, & Kramer, 1991; Niven, 1985). Third, although partners' attachment orientations should influence their provision of support to women, women's attachment orientations should also influence their perceptions of support actually received (Collins & Feeney, 2004; Ognibene & Collins, 1998; Simpson, Rholes, & Nelligan, 1992; Wilson, Rholes, Simpson, & Tran, 2007). For these reasons, this study included romantic partners to investigate attachment-based differences in women's labor and delivery experiences. Specifically, we examined the joint influences

2. Perceived "staff support" was examined in the form of women feeling respected and treated with consideration by staff members. Avoidance was negatively correlated with feeling respected; no other relations between attachment and "staff support" variables were found.

of attachment orientations and support perceptions in both women and their romantic partners in determining variability in women's labor and delivery pain perceptions. Our aim was to extend prior research on attachment and acute pain by applying a *dyadic approach* to understanding women's pain experiences in a common, ecologically valid context.

Attachment orientations and physical pain

Attachment orientations are stable traits that develop from prior interactions with caregivers/attachment figures (Bowlby, 1969, 1973, 1980), which then guide behaviors, thoughts, and feelings in subsequent interactions with attachment figures in adulthood (e.g., romantic partners; Hazan & Shaver, 1987; Simpson, 1990). Attachment orientations are systematically associated with specific patterns of emotion regulation and coping (Hazan & Shaver, 1987; Simpson, 1990). For instance, attachment security, characterized by a history of having available and consistently responsive attachment figures, is associated with the primary emotion regulation strategy of seeking proximity to relationship partners and making direct support requests of them (Mikulincer & Shaver, 2007). Based on a history of inconsistently available or intermittently responsive attachment figures, attachment anxiety is associated with hyperactivation strategies (e.g., rumination, threat magnification, and emotion-focused coping) intended to gain the attention of attachment figures. Avoidant attachment, characterized by a history of consistently unavailable and/or unresponsive caregiving, is associated with deactivation strategies (e.g., distraction, denial, and ignoring/minimizing threats) aimed at maintaining self-reliance and independence from others.

Extending attachment to the context of pain, prior research has linked attachment anxiety with its characteristic pattern of hyperactivation and threat magnification to perceptions of greater chronic and acute pain (Forsythe, Romano, Jensen, & Thorn, 2012; Macdonald & Kingsbury, 2006; McWilliams, Cox, & Murray, 2000), pain catastrophizing (McWilliams & Asmundson, 2007; Meredith et al., 2006b;

Tremblay & Sullivan, 2010; Wilson & Ruben, 2011), pain-related disability (Davies, Macfarlane, McBeth, Morriss, & Dickens, 2009), fear of pain (McWilliams & Asmundson, 2007), pain-related anxiety (Krahé, Paloyelis, Sambo, & Fotopoulou, 2014), and lower perceptions of control over pain (Meredith, Strong, & Feeney, 2006a) in nonchildbirth samples. In the two recent studies of attachment and pain surrounding labor and delivery, women who scored higher in attachment anxiety reported more severe labor pain recalled 1–5 weeks after birth (Quinn et al., 2015) and greater pain and analgesic consumption during childbirth (Costa-Martins et al., 2014). Thus, a consistent connection has been found between greater attachment anxiety and greater acute pain perceptions.

In contrast, prior results linking avoidance and pain have been mixed. Avoidance has predicted greater pain tolerance (Andrews et al., 2011; Wilson & Ruben, 2011), and both aversion to pain-related emotional support and preference for pain-related distraction (Krahé et al., 2014), consistent with the expected link between avoidance and threat minimization. In other studies, however, avoidance produced no associations (Forsythe et al., 2012; Macdonald & Kingsbury, 2006; McWilliams & Asmundson, 2007) or a positive association (Costa-Martins et al., 2014; Davies et al., 2009; McWilliams & Asmundson, 2007; Meredith, Strong, & Feeney, 2005) with pain-related variables. One possible explanation for these mixed findings is that fearful avoidance (i.e., high attachment anxiety and high avoidance) and dismissive avoidance (i.e., low attachment anxiety and high avoidance) are often examined together but may in fact have differential effects. For instance, fearful avoidance was positively correlated with pain intensity and self-reported pain behaviors in one study of chronic pain sufferers, whereas dismissive avoidance was unrelated to these variables (Forsythe et al., 2012). More recently, insecure pregnant women who were primarily fearful avoidant reported higher pain and higher analgesic consumption during childbirth relative to more securely attached women (Costa-Martins et al., 2014). Thus, although labeled “avoidant,” insecure women

in these studies displayed heightened pain perceptions, which is consistent with the hyperactivating emotion regulatory pattern characteristic of high-anxiety women.

Social support and pain

Attachment orientations should not only predict pain perceptions directly but also moderate the well-documented relation between social support and pain. For instance, support typically leads to reduced acute pain perceptions in the laboratory³ on thermal pain tasks in which the support condition (e.g., holding the partner's hand and viewing the partner's photograph) is contrasted with a nonsupport provider condition (e.g., holding a stranger's hand and holding an object; Eisenberger et al., 2011; Master et al., 2009; Younger, Aron, Parke, Chatterjee, & Mackey, 2010). Individuals who receive either active or passive support also report reduced pain on a cold pressor task (CPT) when compared to those in a distraction or alone condition (Brown, Sheffield, Leary, & Robinson, 2003). Similarly, individuals who are emotionally supported by a peer display reduced CPT pain relative to those who are alone or in the presence of a noninteracting peer (Roberts, Klatzkin, & Mechlin, 2015).

Similar results have been found outside the laboratory as well. For instance, highly supported married patients recovering from coronary bypass surgery (i.e., those whose spouses visit them frequently in the hospital) use less pain medication, spend less time in intensive care, and are discharged from the hospital sooner than unmarried patients and married patients with less support (i.e., those whose spouses visit infrequently; Kulik & Mahler, 1989). With regard to childbirth pain, women who receive greater support from caregivers during labor and delivery use fewer labor pain medications and analgesics (Gjerdengen et al., 1991; Hodnett et al., 2013; Kennel, Klaus, McGrath, Robertson, & Hinkley, 1991; McGrath & Kennel, 2008; Sauls, 2002), suggesting that they have a less painful experience. Among women interviewed 1–3

days following delivery, recalled pain during labor and delivery is negatively correlated with support from both husbands and hospital staff (Norr et al., 1977). Greater caregiver support, on the other hand, is associated with less severe pain during and within 48 hr of labor and delivery (Hofmeyr et al., 1991; Niven, 1985).

Attachment and social support

However, attachment insecurity may render some women less able to reap the benefits of social support in coping with pain. Prior research suggests that securely attached individuals (i.e., those with low anxiety and low avoidance scores), who typically have confident expectations regarding partner supportiveness (Mikulincer & Shaver, 2003), render more positive appraisals of partner support (even when low quality) and experience less distress when supported (Collins & Feeney, 2004; Rholes et al., 2011; Simpson, Winterheld, Rholes, & Oriña, 2007). In contrast, anxiously attached individuals, who characteristically worry that they are undeserving of their romantic partners' love and that partners may abandon them, typically harbor negative support perceptions (Ognibene & Collins, 1998; Wilson et al., 2007) and perceive less support than is actually available based on both partner (Rholes, Simpson, Campbell, & Grich, 2001) and observer (Collins & Feeney, 2004) accounts. Unsurprisingly, they are also less satisfied with the support they perceive to be getting (Bartholomew, Cobb, & Poole, 1997; Iles, Slade, & Spiby, 2011; Wallace & Vaux, 1993). For all of these reasons, anxiously attached individuals should benefit less from social support, even when it is made available to them. Corroborating this view, studies have shown that more anxious individuals fail to benefit from partner support in terms of reduced distress or fear, regardless of the type of support (informational or emotional) available to them (Girme, Overall, Simpson, & Fletcher, 2015; Mikulincer & Florian, 1997; Simpson et al., 1992; Wilson et al., 2007). Importantly, the pattern for anxious individuals differs markedly from securely attached individuals, who are able to benefit from both emotional

3. Some acute pain research has shown the opposite effect (e.g., McClelland & McCubbin, 2008).

and informational forms of support, as well as avoidant individuals, who show limited ability to benefit from (primarily informational) support (Mikulincer & Florian, 1997).

Extending this pattern of results to the context of labor and delivery, we expect to find that women higher in attachment anxiety will report greater childbirth pain, regardless of how much emotional support their romantic partners provide due to: (a) use of hyperactivating emotion regulation strategies (which lead to magnified threat appraisals) and (b) negative support perceptions (which should prevent them from reaping the pain-reducing effects of social support). In contrast, women who score lower on attachment anxiety—particularly women who also score low on avoidance (i.e., more securely attached women)—should benefit from greater partner support in terms of reduced childbirth pain, given their propensity to trust their partners' goodwill and to rely on their partners when distressed.

Allowing oneself to show vulnerability and depend on others is contrary to avoidant individuals' goals of self-sufficiency and independence (Mikulincer & Horesh, 1999; Mikulincer & Shaver, 2007). Such vulnerability and dependence are implied by the receipt of emotional support, which frequently involves communicating empathy and understanding to the support recipient. Because emotional support may involve or imply the acknowledgment, discussion, and/or disclosure of personal vulnerabilities and distress-related feelings, avoidant individuals should find it more aversive than support that is relatively objective or impersonal in nature such as informational (i.e., problem solving) or tangible (i.e., material) support (Simpson et al., 2007). Consequently, most prior studies show few if any benefits of emotional support for highly avoidant individuals (e.g., Mikulincer & Florian, 1997; although see Girme et al., 2015, and Simpson et al., 1992, for two exceptions). In some cases, avoidant individuals—unlike those who are secure or anxious—show an adverse (more distressed) reaction to emotional support compared to being alone (Mikulincer & Florian, 1997), although they do benefit from informational support in terms of lower distress (Mikulincer & Florian, 1997; Simpson

et al., 2007). One recent study suggests that increasing amounts of low to moderate levels of emotional support may result in greater distress for highly avoidant individuals, whereas increasing amounts of high-level emotional support may lessen their distress (see Girme et al., 2015, Study 3). In contrast, less avoidant individuals displayed reduced distress regardless of whether romantic partners provided higher or lower levels of support (whether emotional or informational in nature; see Girme et al., 2015, Studies 1–3).

With regard to pain, a recent set of studies found associations between avoidance and less self-reported benefit from pain-related support in general and an aversion to pain-related emotional support in particular (Krahé et al., 2014). Prior research also indicates that avoidant women partnered with men who enact emotion-focused coping strategies (i.e., highly anxiously attached men) have lower acute pain thresholds in a tourniquet task compared to avoidant women partnered with men who offer other types of support (Wilson & Ruben, 2011). Similarly, avoidant individuals subjected to laboratory thermal pain perceive greater pain in the presence of a stranger instructed to empathize with them than in an alone condition (Sambo, Howard, Kopelman, Williams, & Fotopoulou, 2010). Taken together, prior evidence suggests that emotional support should have a positive association with pain for highly avoidant individuals. Thus, we expect to find that women higher in avoidance will report greater childbirth pain when their romantic partners' emotional support is high, but less pain when their partners' emotional support is low. In contrast, women who score lower in avoidance—particularly those who also score lower in anxiety (i.e., more secure women)—should report less pain when partners provide more emotional support.

The current study

Heterosexual couples expecting their first child were asked to complete self-report surveys at two different time points—approximately 6 weeks before (Time 1 [T1]) and 2 weeks following (Time 2 [T2]) childbirth. At T1, both

partners completed attachment measures and background questionnaires (e.g., personality and demographic variables). At T2, women reported their postnatal perceptions of pain and support received from their partners during labor and delivery, while men reported their support provision to partners. Attachment was examined as a predictor of pain and as a moderator of the expected association between support and pain.

Although two sources of emotional support were examined in this study, no explicit hypotheses were made regarding the effects of women's perceived support versus men's enacted support on women's pain. On the one hand, women's support perceptions should more strongly predict women's pain (an actor effect) than should men's self-reported support provision (a partner effect). However, based on the well-documented benefits of invisible support in coping with stress (Bolger & Amarel, 2007; Bolger, Zuckerman, & Kessler, 2000), it is also possible that women may benefit from their partners' supportive behavior even if they (women) fail to detect it, which could occur if women are more self-focused or focused on the labor and delivery experience itself than they are on their partners' actions. Alternately, because men are also in an unusual situation during labor and delivery, men's detection or recollection of enacted support may be influenced by the distracting hospital environment, pressure to be a good support provider, concern for their partner and baby, and their own feelings of excitement and stress. For these reasons, and because the comparison between perceived and enacted support was not the primary focus of this study, we derived no explicit hypotheses regarding this comparison in predicting women's pain; instead, we examined the interactive effects of *both* sources of support with attachment orientations in an exploratory fashion.

Hypotheses

First, we predicted that greater support—whether: (a) men's reported support provision or (b) women's perceptions of support received—should predict reduced labor and delivery pain (H1). We also predicted that

women who scored higher in attachment anxiety should report greater labor and delivery pain, independent of their partners' support, suggesting an anxiety main effect (H2a). However, women lower in anxiety (i.e., more secure women) should benefit from support in terms of reduced perceived pain, suggesting a possible anxiety by support interaction in which high anxiety is associated with greater pain, but the link between low anxiety and pain depends on level of partner support (H2b).

We also expected that higher attachment avoidance should interact with (emotional) support to predict labor and delivery pain, such that women higher in avoidance should report greater pain when their partners' emotional support is greater, but reduced pain when their partners' emotional support is at lower levels. The opposite pattern should be true for women lower in avoidance (i.e., reduced pain when partner support is higher, but greater pain when partner support is lower). Thus, a two-way interaction between avoidance and support is expected (H3).

Finally, lower scores on both attachment anxiety and avoidance (i.e., more secure attachment) should predict the greatest benefit from partner support. Thus, we expect that women who score lower on both attachment dimensions and who receive more support during labor and delivery will, in turn, report reduced labor and delivery pain relative to similar women who receive less support, and relative to highly supported women who are less securely attached (i.e., who score higher on either attachment dimension). In other words, an interaction between women's anxiety and avoidance with support is predicted (H4).

Method

Participants

Mothers expecting their first child ($N = 140$) and their male romantic partners participated in this study. These participants were part of a larger sample of 191 transition-to-parenthood couples that completed Time 1 (T1; prenatal) and Time 2 (T2; 2-week postnatal) measures (see Wilson et al., 2007) after removing 48 couples in which the female

gave birth via cesarean section (and thus did not experience vaginal delivery pain) and 1 couple in which the male was absent (and could not provide support) during childbirth. Two additional couples did not complete the postnatal measures. All couples received \$50 for completing T1 measures and a baby T-shirt as compensation for completing T2 measures. Additional outcomes from the original transition-to-parenthood data set have been reported elsewhere (Kohn et al., 2012; Rholes, Kohn, & Simpson, 2014; Rholes et al., 2011; Wilson et al., 2007).

The average relationship length was 3.39 years ($SD = 2.79$) for the married couples ($n = 135$) and 2.05 years ($SD = 2.77$) for the unmarried cohabitating couples ($n = 5$). Average ages of women and men were 26.5 years ($SD = 4.0$) and 28.2 years ($SD = 4.2$), respectively. The sample was 80% White, 9% Asian, 7% Hispanic, and 4% Other/Unreported. Approximately 72% of women and 73% of men had a bachelor's degree or higher, with 22% of women and 28% of men having a master's or PhD degree. Approximately 14% of couples earned annual incomes of less than \$25,000, 47% earned \$25,000–\$54,999, 34% earned \$55,000–\$99,000, and 5% earned over \$100,000. Eighty-five percent of the mothers reported having a spinal or epidural block during labor and delivery, and 43% took some type of pain medication during labor. Five couples reported experiencing a major medical problem during pregnancy or delivery. Twenty-six percent of couples reported having an unplanned birth.

Procedures

Couples (both partners) were recruited via announcements made at local childbirth classes and flyers distributed at area hospitals in a Southwestern city in the United States. Female and male romantic partners were separately mailed a set of T1 surveys approximately 6 weeks before their baby's due date. Participants were asked to complete the survey privately and return it via U.S. mail to the experimenter using separate, prepaid mailing envelopes. Along with informed

consent information, both partners' T1 surveys included questions concerning demographic variables, personality and relationship beliefs, and attachment orientations. Approximately 2 weeks after the baby's birth, each partner was mailed a short T2 survey regarding their childbirth experience. They were asked to complete all items privately before returning the completed surveys to the experimenter in separate, prepaid mailing envelopes via U.S. mail. Women reported their postnatal perceptions of childbirth pain, details surrounding labor and delivery, and their perceptions of support received from partners during labor and delivery. Men reported their postnatal perceptions of the support they provided to women during labor and delivery. All participant survey responses were identified only by a randomly assigned identification number, and all procedures were approved by the university Institutional Review Board.

Measures

Attachment orientations (T1)

The 17-item Adult Attachment Questionnaire (AAQ; Simpson, Rholes, & Phillips, 1996) assesses global romantic attachment on a 9-item attachment anxiety and an 8-item avoidance subscale. Example items are: "I often want to merge completely with others, and this desire sometimes scares them away" (anxiety), and "I don't like people getting too close to me" (avoidance). Responses were made on Likert-type scales anchored 1 (*strongly disagree*) to 7 (*strongly agree*). Women's and men's coefficient α s were .84 and .77 for anxiety and .84 and .74 for avoidance, respectively.

Neuroticism (T1)

Participants' neuroticism, a well-known positive correlate of attachment anxiety (Karney & Bradbury, 1997), was assessed as a control variable using a seven-item subscale of the Big Five Inventory (John & Srivastava, 1999). Items included "I worry a lot" and "I am emotionally stable, not easily upset" (reverse scored) and were assessed on a 5-point Likert-type scale anchored 1 (*disagree*

strongly) and 5 (*agree strongly*). Coefficient α s were .84 for women and .71 for men, indicating good internal consistency.

Relationship satisfaction (T1)

Participants' satisfaction with their romantic relationship was assessed as a control variable using the 10-item satisfaction subscale from the Dyadic Adjustment Scale (DAS; Spanier, 1976). Items included: "In general, how often do you think that things between you and your partner/spouse are going well?" and "How often do you discuss or have you considered divorce, separation, or terminating your marriage/relationship?" (reverse scored). Seven items were assessed on a 6-point Likert-type scale anchored at 1 (*never*) and 6 (*all the time*), and one item each used scales anchored at 1 (*never*) to 5 (*every day*), 0 (*extremely happy*) to 6 (*perfect*), and 1 (*I want desperately for my relationship to succeed, and would go to almost any length to see that it does*) to 6 (*My relationship can never succeed, and there is no more I can do to keep it going*). Coefficient α s were .85 for women and .87 for men, indicating good internal consistency.

Depressive symptoms (T1)

Given the well-known comorbidity of depression and pain (Bair, Robinson, Kataon, & Kroenke, 2003), and that women's self-reported prenatal depression is associated with greater childbirth pain specifically (Dannenbring et al., 1997), the frequency of participants' prenatal depressive symptoms during the past week was assessed as a control variable using the Center for Epidemiologic Studies Depression Scale (CESD; Radloff, 1977), a 20-item measure developed for nonclinical populations. Example items included "I felt depressed" and "I was bothered by things that don't usually bother me." Responses were given using a 4-point Likert-type scale anchored 1 (*rarely or none of the time: less than 1 day*) and 4 (*most or all of the time: 5–7 days*). Coefficient α s were .87 for women and .89 for men, indicating good internal consistency.

Labor and delivery pain (T2)

Two weeks following childbirth, women's perceptions of labor and delivery pain were assessed with three items from the Present Pain Intensity (PPI) section of the McGill Pain Questionnaire (Melzack, 1975) that were modified to reflect labor pain:⁴ "How painful was your labor and delivery at its worst?" "How painful was your labor and delivery at its least?" and "How painful was the entire labor and delivery in general?" Responses were made on Likert-type scales anchored 1 (*mild*) and 5 (*excruciating*). The "worst" and "in general" pain items were strongly correlated and thus were averaged to form an "overall pain" index (coefficient $\alpha = .73$). Maximum and average pain scores have been similarly combined in prior research (Flink, Mroczek, Sullivan, & Linton, 2009).

Support (T2)

Women's perceptions of emotional support received from their partners and men's perceptions of emotional support given during labor and delivery were assessed using a 12-item measure developed for this study. Example items for women included: "During labor and delivery, how emotionally supportive was your husband?" and "How much did your husband actually comfort you?" Corresponding items for men included: "During labor and delivery, how emotionally supportive were you toward your wife?" and "How much did you actually comfort your wife?" Responses were made on Likert-type scales anchored 1 (*not at all*) and 7 (*a great deal*). A principal components analysis (PCA) was conducted using varimax rotation and resulted in an initial two-factor solution (eigenvalues >1) that explained 67.8% of the total variance. Three of the 12 items, however, loaded onto the second factor, which accounted for only 10.9% of the variance and had poor internal consistency (coefficient $\alpha = .16$). Thus, the PCA was rerun after dropping these three items. A single-factor solution emerged from

4. The original PPI asks individuals to describe pain "at its worst," "at its least," and "right now." Because our pain items were answered 2 weeks following childbirth, the latter item was changed to pain "in general."

the remaining 9 items and explained 70.2% of the total variance (see Table 1). Factor loadings ranged from .75 to .92 and coefficient α was .94, indicating very good internal consistency. Overall scores for women's support perceptions were created by summing their responses across all 9 items.

A similar PCA of men's perceptions of support provision produced an unreliable factor (coefficient $\alpha = .32$) composed of the same three items noted above, so the PCA was rerun after dropping these three items. A two-factor solution emerged in which eight items explained 61.9% of the total variance after dropping one cross-loading item (see Table 1).⁵ Factor 1 (labeled "enacted emotional support") contained five items (including the two previously listed ones) and explained 46.5% of the variance. Factor 2 (labeled "support motivation") contained three items (e.g., "During labor and delivery, how much did you want to help and be supportive?" and "How important was it to you to 'be there' for your wife?"), which explained 15.4% of the variance. Coefficient α s were .76 and .84, respectively, indicating good internal consistency. Separate scores for men's enacted emotional support and for men's support motivation were created by summing men's responses across the five-item and three-item subscales, respectively.

Childbirth experience (T2)

Women reported on additional features of their labor and delivery experience by providing dichotomous (yes/no) answers to questions concerning use of a spinal/epidural block, labor pain medications, problems during pregnancy, and medical complications during delivery. They also reported the type of delivery method

used (vaginal vs. cesarean section), duration of labor and delivery, and whether the birth was planned or unplanned.

Results

Preliminary analyses

Descriptive statistics for all continuous variables are presented in Table 2. Independent-samples *t* tests were first run to test the effects of the dichotomous control variables (i.e., spinal/epidural block, labor medication, pregnancy problems, delivery problems, and unplanned birth) on women's perceptions of pain and their attachment scores. Importantly, neither women's attachment scores nor their pain responses were related to their use of spinal/epidural blocks, problems during pregnancy or delivery, or having an unplanned birth. However, women who took labor pain medications scored significantly higher on avoidance, $t(138) = 3.13$, $p = .002$, and reported significantly higher levels of average pain, $t(138) = 2.12$, $p = .035$, than did women who did not take medications. Not surprisingly, women's neuroticism scores and prenatal depression symptoms were each positively correlated with both attachment anxiety ($r = .41$, $p < .001$ and $r = .23$, $p = .005$, respectively) and avoidance ($r = .25$, $p = .003$ and $r = .22$, $p < .009$, respectively). Women's relationship satisfaction scores were negatively associated with attachment anxiety ($r = -.30$, $p < .001$) and avoidance ($r = -.37$, $p = .001$). Thus, all significant regression results (see below) were retested controlling for women's decision about whether or not to take labor pain medications, women's neuroticism, women's depressive symptoms, and women's relationship satisfaction scores. To maximize statistical power, control variables were checked individually (one at a time) rather than entering all of them into regression models simultaneously. All results remained significant or marginally significant ($p < .10$) when control variables were included unless otherwise noted. In addition, the remaining control variables were also checked and had no effect on the regression results reported below unless otherwise noted.

5. Men know their actual level of motivation to be supportive, whereas women cannot directly know their partner's actual level of motivation for providing support during labor and delivery, a very strong, role-governed situation for men in particular. Therefore, it is not surprising that a two-factor solution emerges for men's support perceptions whereas a single-factor solution emerges for women's perceptions of support, suggesting that women do not differentiate between their partner's level of motivation and his actual support provision.

Table 1. Pattern matrix factor loadings from principal component factor analysis using varimax rotation

Item	Women	Men	
	Factor 1	Factor 1	Factor 2
1. During labor and delivery, how emotionally supportive was your husband (were you toward your wife)?	.92	.74	.20
2. During labor and delivery, how much did your husband (you) want to help and be supportive?	.85	.27	.70
3. During labor and delivery, how understanding and sympathetic was your husband (were you toward your wife)?	.86	—	—
4. During labor and delivery, how concerned was your husband about you (were you about your wife)?	.80	.52	.03
5. During labor and delivery, how much did your husband (you) actually comfort you (your wife)?	.75	.71	.24
6. During labor and delivery, how loving and affectionate was your husband toward you (were you toward your wife)?	.82	.77	.26
7. During labor and delivery, how much did your husband (you) want to “be there” supporting you (your wife)?	.82	.22	.91
8. During labor and delivery, how important was it to your husband (you) to “be there” for you (your wife)?	.82	.15	.93
9. To what extent did your husband (you) support you (your wife) during labor and delivery to show his love for you (your love for her)?	.89	.71	.26

Note. Factor loadings $>.40$ are bolded. Items dropped from final solution due to cross-loadings are denoted by “—.” Item wording outside parentheses represents phrasing for women’s perceptions of support. Modified wording for men’s support perceptions is included within parentheses. Factor 1 for men was labeled “enacted emotional support.” Factor 2 for men was labeled “support motivation.”

Correlational analyses

Zero-order correlations between all predictors and pain variables are provided in Table 3. Although women’s attachment anxiety did not correlate with the overall pain composite, it was significantly associated with heightened perceptions of pain at its worst. Women’s avoidance was uncorrelated with pain, although women who had more avoidant male partners reported significantly less labor and delivery pain in general. Women who scored higher in anxiety (or avoidance) reported significantly lower perceptions of partner support. More anxious women also had partners who reported providing significantly less emotional support and less motivation to provide support during labor and delivery. Men partnered with more avoidant women reported

providing marginally lower emotional support. Finally, men higher on either avoidance or anxiety reported significantly less motivation to provide support to their romantic partners, although they did *not* show differences in their reported levels of emotional support provision.

Regression analyses

In the initial regression models, the two pain dependent variables (i.e., the overall pain score and least pain) were independently regressed onto both partners’ attachment dimensions (women’s and men’s anxiety and avoidance) and women’s perceived support, after first centering all predictor variables. Not surprisingly, time spent in labor and delivery was positively correlated with overall pain ($r = .29, p = .001$)

Table 2. Means and standard deviations for predictor, control, and dependent variables

Variable type	Women <i>M</i> (<i>SD</i>)	Men <i>M</i> (<i>SD</i>)
Dependent variables		
Worst pain	3.76 (0.98)	—
Least pain	1.31 (0.57)	—
General pain	2.71 (0.86)	—
Overall pain score	3.24 (0.82)	—
Predictor and control variables		
Attachment anxiety	2.83 (1.11)	2.48 (0.86)
Attachment avoidance	2.94 (1.08)	3.03 (0.91)
Women's support perceptions	59.61 (6.56)	—
Men's enacted support	—	31.41 (3.36)
Men's motivation to provide support	—	20.46 (1.15)
Time spent in labor/delivery (hours)	11.71 (7.31)	—
Neuroticism	2.87 (0.80)	2.21 (0.65)
Relationship satisfaction	4.51 (0.37)	4.45 (0.47)
Depressive symptoms	1.69 (0.42)	1.38 (0.37)

Note. $N = 140$ women and men.

but not least pain, so we statistically controlled for this variable in Step 1 of the overall pain regression. To test the first three hypotheses, the potential main effects (i.e., women's perceived support and women's and men's attachment scores) were entered together in Step 2, and the two-way interactions between women's anxiety and support, and between women's avoidance and support, were tested one at a time in Step 3. This initial set of models was run twice, once for each dependent measure. To test H4, the same support and attachment predictors were entered in Step 2, but all possible two-way interactions between women's attachment dimensions and perceived support were included in Step 3 in order to test the expected three-way interaction (i.e., Women's Anxiety \times Avoidance \times Support) in Step 4. This model was also run twice, once for each dependent measure. In a second set of analyses, the original support predictor variable—women's perceived support—was replaced by men's enacted support and the original regression models were rerun as described above. In the final set of analyses, the support predictor was replaced by men's support motivation.

Perceptions of overall pain

No main effects of support (regardless of type) or women's attachment anxiety emerged in predicting overall labor and delivery pain, contrary to our first two hypotheses, H1 and H2a. There were also no main effects of women's avoidance or men's attachment anxiety, although a main effect of men's avoidance did emerge, $\beta = -.18$, $t(133) = -2.04$, $p = .044$. Women whose partners were more avoidant perceived significantly less overall pain. Consistent with H2b, we found marginally significant interactions between women's anxiety and women's perceptions of support ($p = .073$) and between women's anxiety and men's enacted support ($p = .064$), both of which became significant when women's relationship satisfaction was statistically controlled, $\beta = .23$, $t(131) = 2.42$, $p = .017$ and $\beta = .22$, $t(131) = 2.47$, $p = .015$, respectively. Because the two interaction patterns were virtually identical, only the pattern for men's enacted support is displayed (see Figure 1). Simple slopes tests show that as women perceived and men provided greater support, perceptions of overall pain decreased significantly for women who scored lower on anxiety, $t(131) = -2.17$, $p <$

Table 3. Correlations between predictor and dependent variables for women and men

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Women's anxiety	1.0										
2. Women's avoidance	.29***	1.0									
3. Men's anxiety	.12	.18*	1.0								
4. Men's avoidance	.24**	.06	.27**	1.0							
5. Women's perceived support	-.26**	-.22**	.04	.00	1.0						
6. Men's enacted support	-.32***	-.15†	-.07	-.13	.41***	1.0					
7. Men's support motivation	-.17*	-.09	-.20*	-.17*	.44***	.50***	1.0				
8. Worst pain	.17*	-.07	-.03	-.07	-.10	-.20*	-.13	1.0			
9. Least pain	.00	.00	.05	-.01	-.08	-.20*	-.12	.21*	1.0		
10. General pain	-.09	-.09	-.06	-.17*	-.02	.02	.00	.57***	.37***	1.0	
11. Overall pain composite	-.06	-.09	-.05	-.13	-.07	-.11	-.08	.90***	.32***	.87***	1.0

† $p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

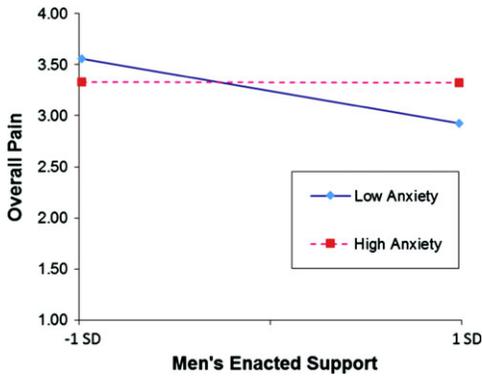


Figure 1. Women's anxiety by men's enacted support predicting women's perceptions of overall pain. Note that all interactions are plotted at 1 *SD* above and below the mean for predictor variables.

.05 and $t(131) = -2.88$, $p < .05$, respectively. Simple slope tests were not significant for women who scored higher on anxiety, $t(131) = 0.43$, $p > .10$ and $t(131) = -0.01$, $p > .10$, respectively. Thus, consistent with predictions, women who scored higher on attachment anxiety reported greater pain, regardless of how much support they perceived or their partners reported providing, whereas women who scored lower on attachment anxiety (i.e., more secure women) appeared to benefit from greater perceived and enacted support in terms of reduced overall pain.

No evidence was found for H3, the predicted two-way interaction between women's avoidance and support. However, consistent with H4, a significant three-way interaction emerged between women's attachment scores and men's motivation to provide support, $\beta = -.26$, $t(129) = -2.68$, $p = .008$ (but not with women's perceived support or men's enacted support). For low-avoidant women who also scored lower in anxiety (i.e., more secure women; see Figure 2a), men's greater motivation to provide support was associated with significantly reduced perceptions of overall pain, $t(129) = -2.94$, $p = .004$. No other tests of simple slopes were significant ($ps > .20$). A test of the *difference* in simple slopes, which is recommended for interpreting three-way interactions (Dawson, 2014), showed that the pattern for more secure women was

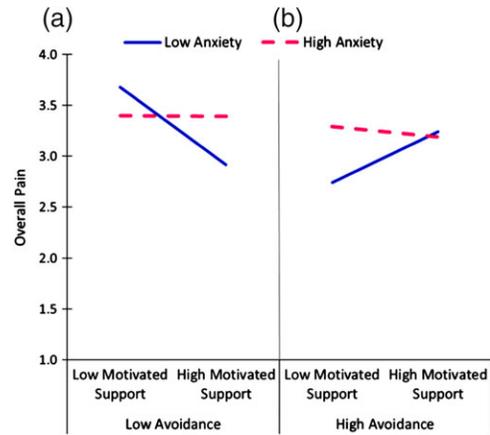


Figure 2. Women's anxiety by men's motivation to provide emotional support predicting women's perceptions of overall pain when women's avoidance is low (a) or high (b). Note that all interactions are plotted at 1 *SD* above and below the mean for predictor variables.

significantly different, $t(129) = 2.16$, $p = .033$, from that of low-avoidant women who scored higher in anxiety (i.e., anxiously attached women), who reported higher levels of overall pain that did not vary as a function of men's motivated support. The pattern for securely attached women was also significantly different from that of high-avoidant women (see Figure 2b), regardless of whether their anxiety scores were lower, $t(129) = 2.82$, $p = .006$, or higher, $t(129) = 2.17$, $p = .032$. Whereas highly avoidant women who scored lower on anxiety (i.e., dismissive avoidant women) reported greater overall pain as men's greater motivation to provide support increased, highly avoidant women who scored higher on anxiety (i.e., fearful avoidant women) reported higher levels of pain that varied little as a function of men's motivated support. No other comparisons of simple slopes were significant.

Overall, this interaction pattern indicates that, consistent with H4, women who were more securely attached benefited the most from men's motivated support in that they showed the greatest reduction in pain between high- and low-support motivation situations. Women who scored higher in avoidance reported greater pain as men's support motivation increased, although this was true

only for women who also scored lower on anxiety (i.e., dismissive avoidant women), indicating partial support for H3. Finally, women who scored higher on anxiety (regardless of their avoidance scores) reported similar levels of higher overall pain, regardless of whether men's support motivation was higher or lower, consistent with H2b as well as the two-way interaction patterns reported previously (i.e., Anxiety \times Women's Perceived Support, and Anxiety \times Men's Enacted Support).

Perceptions of least pain

Consistent with H1, a main effect of men's enacted support (but not women's perceived support or men's support motivation) emerged, $\beta = -.22$, $t(134) = -2.49$, $p = .014$, indicating that women whose partners reported providing greater support during childbirth perceived significantly less minimum pain. Contrary to H2a, a main effect of women's anxiety was not found, nor were any main effects of women's avoidance or men's attachment dimensions. In addition, no evidence of two-way interactions between women's anxiety or avoidance and support (regardless of type) was found, contrary to H2b and H3. However, a significant two-way interaction did result between women's attachment scores, $\beta = .18$, $t(133) = 2.15$, $p = .033$, which was qualified by the expected three-way interaction between women's attachment scores and men's enacted support, $\beta = -.20$, $t(130) = -2.02$, $p = .045$.

Consistent with H4, less avoidant women who scored lower in anxiety (i.e., secure women) reported significantly steeper declines in their perceptions of minimum pain as men's enacted support increased, $t(130) = -2.16$, $p = .033$ (see Figure 3a). Interestingly, women who scored higher in both anxiety and avoidance (i.e., fearful-avoidant women) showed similar significant declines with increasing enacted support, $t(130) = -2.23$, $p = .028$.⁶ All other

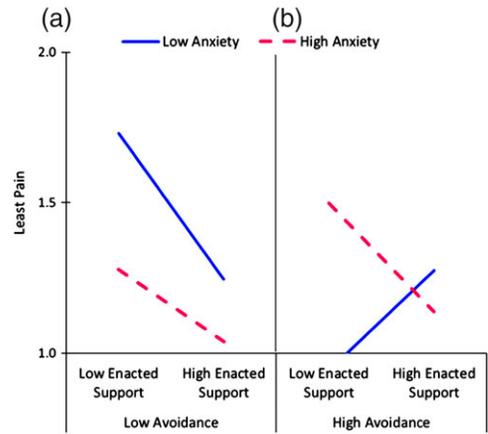


Figure 3. Women's anxiety by men's enacted support predicting women's perceptions of least pain when women's avoidance is low (a) or high (b). Note that all interactions are plotted at 1 *SD* above and below the mean for predictor variables

simple slopes tests were nonsignificant ($ps > .23$). Tests of the differences between simple slopes showed that the pattern for more secure women was significantly different, $t(130) = 2.15$, $p = .033$, from that of highly avoidant women who scored lower in anxiety (i.e., dismissive avoidant women), who tended to report higher minimum pain as men's enacted support increased (see Figure 3b). However, the slope of the interaction for more secure women was not significantly different from that of women who scored higher in anxiety (i.e., whether low or high in avoidance), who showed less steep declines in minimum pain as men's support increased. The pattern for dismissive avoidant women, however, was also significantly different from that of highly avoidant women who scored higher in anxiety (i.e., fearful avoidant women), $t(130) = -2.19$, $p = .030$, and marginally different from less avoidant women who scored higher in anxiety (i.e., anxious women), $t(130) = 1.69$, $p = .093$. No other significant differences between simple slopes emerged.

Overall, this interaction pattern provides partial support for H4 in that more securely

6. This result does not match theoretical predictions for either women scoring higher in avoidance or for women scoring higher in anxiety. It is also inconsistent with our findings for women's overall pain, in which more fearful-avoidant women reported higher levels of pain regardless of men's levels of support. Thus, this result will not be interpreted further as it may be the result

of Type I error and requires further replication before additional consideration.

attached women appeared to benefit the most from men's enacted support in terms of reduced perceptions of minimum pain, particularly when compared to more dismissively attached women. In contrast, highly avoidant women perceived greater minimum pain when men reported providing more support if such women also scored lower in anxiety (i.e., dismissive avoidant women), partially supporting H3. Although men's increased support was associated with somewhat lower pain scores for women who scored higher in anxiety, anxiously attached women in particular (i.e., women who scored higher in anxiety but lower in avoidance) showed the least variation in their perceptions of minimum pain as a function of men's enacted support, providing partial support for H2b.

Both interactions and the support main effect remained significant when each of the control variables was independently tested with three exceptions. First, the three-way interaction became nonsignificant when statistically controlling for women's neuroticism, which independently predicted greater minimum pain, $\beta = .24$, $t(134) = 2.62$, $p = .010$. Second, the three-way interaction became marginally significant ($p = .092$) when controlling for women's relationship satisfaction, which also independently predicted reduced minimum pain, $\beta = -.24$, $t(134) = -2.56$, $p = .012$. Third, controlling for women's satisfaction rendered the two-way interaction between women's attachment scores nonsignificant. Finally, scores on the least pain dimension were positively skewed, so an inverse linear transformation was applied and the regression models were retested. The main support effect and two-way interaction remained significant, whereas the three-way interaction became marginal ($p = .091$).

Discussion

We hypothesized that women's attachment anxiety and avoidance would not only predict labor and delivery pain, but that attachment would also moderate the effect of romantic partner support during labor and delivery on women's pain perceptions. Specifically, we predicted (and found) that more highly

anxious women were least responsive to partner support, reporting higher levels of overall and minimum pain during labor and delivery that were effectively independent of romantic partner supportiveness. In contrast, the pain perceptions of women who scored lower on anxiety (and avoidance) varied as a function of support during labor and delivery. Importantly, the effects on overall pain for highly anxious women still emerged when statistically controlling for men's attachment orientations, and whether women's perceptions of support received or men's perceptions of support provided were assessed. Presumably due to their use of hyperactivating and emotion-focused coping strategies (e.g., rumination), which magnify sources of distress (Mikulincer & Shaver, 2007), highly anxious women were less able to benefit from their romantic partners' attempts to provide comfort and support. This finding is consistent with past research showing that anxiously attached individuals typically fail to derive support from their support providers, even when dealing with psychological stressors (Mikulincer & Florian, 1997; Simpson, Rholes, Campbell, Tran, & Wilson, 2003; Simpson et al., 1992). The current results are also consistent with findings from prior studies of nonchildbirth samples in which attachment anxiety correlated positively with perceptions of chronic and acute pain (Macdonald & Kingsbury, 2006; McWilliams et al., 2000), pain catastrophizing (McWilliams & Asmundson, 2007; Meredith et al., 2006b; Tremblay & Sullivan, 2010; Wilson & Ruben, 2011), and pain-related disability (Davies et al., 2009) as well as with lower perceptions of control over pain (Meredith et al., 2006a).

We also expected (and found) a very different pattern for highly avoidant women. Despite their greater tendency to take pain reduction medications during labor in this study, more dismissive avoidant women reported greater minimum levels of pain when their partners were *more* versus less emotionally supportive, and reduced overall and minimum pain relative to other women under conditions of low partner motivation to provide support and low partner support provision, respectively. Thus, more dismissively avoidant women appeared to benefit in terms of reduced pain when romantic

partners provided *lower* versus higher levels of emotional support during labor and delivery.

This finding is consistent with prior research showing that avoidant individuals confronted with stress become even more upset when given emotional support compared to those in control conditions (Mikulincer & Florian, 1997), and it corroborates prior research in which avoidance predicts lower pain thresholds and greater pain perceptions when exposed to emotion-based coping strategies or empathetic conditions, respectively (Sambo et al., 2010; Wilson & Ruben, 2011). Because high levels of support often signal that the support provider is attentive and aware of the support recipient's need, highly avoidant women should find having a supportive partner during a stressful event particularly aversive because it conflicts with their goal of being self-reliant, autonomous, and independent (Mikulincer & Horesh, 1999). Consistent with this expectation, avoidant individuals have reported an aversion to emotional support during pain episodes in recent studies (Krahé et al., 2014). Moreover, the provision of high levels of support by a partner who is monitoring one's painful circumstances may interfere with avoidant women's use of deactivation strategies, limiting their ability to dismiss, ignore, or reappraise the childbirth experience in less threatening terms. This inability, combined with the knowledge that they appear vulnerable and may need support, may add to avoidant women's subjective pain experience. It is also possible that some partners conveyed emotional support and affection to women via physical touch (e.g., hand-holding, hugging) rather than relying solely on verbal and facial expressions of support. Prior studies have demonstrated that attachment avoidance, especially dismissive avoidance, is associated with greater touch aversion and less positive responses to cuddling and other forms of bodily contact with romantic partners, particularly under stressful circumstances (whereas both secure and anxiously attached individuals show the opposite pattern; Brennan, Wu, & Loev, 1998; Chopik et al., 2014; Simpson et al., 1992). Although our support measures did not assess the extent of physical contact perceived or enacted by partners, avoidant women whose partners conveyed support

using physical means should have found such support attempts to be particularly aversive, presumably increasing these women's subjective pain experience. Ironically, our findings suggest that avoidant women might be better served by having romantic partners who are *less* emotionally supportive during very painful experiences, at least in the short term. Further research should investigate the possibility that avoidant women may benefit more from nonemotional types of support—particularly appraisal support that involves advice or problem-solving guidance (Girme et al., 2015; Mikulincer & Florian, 1997; Simpson et al., 2007)—as well as nonphysical expressions of support, especially during labor and delivery.

We also predicted (and found) that more securely attached new mothers reported experiencing reduced pain when they had more supportive partners during labor and delivery. Importantly, this finding emerged whether women's perceptions of support received, men's reports of support provided, or men's self-reported motivation to provide support were examined. Thus, more securely attached women appeared to benefit the most from their romantic partners' supportiveness, regardless of how it was assessed, in terms of having a less painful birth experience. These results indicate that secure individuals' ability to cope with psychological stressors (Mikulincer & Florian, 1997; Mikulincer & Shaver, 2007; Simpson et al., 1992) extends to the physical realm, which also implies that future pain research should include this important personality variable—attachment orientation—in pain perception studies examining real-life contexts (Porter, Davis, & Keefe, 2007). For example, a recent study documented lower labor pain and lower analgesic consumption in securely attached Portuguese women relative to a primarily fearful avoidant comparison group, although partner attachment orientations and supportiveness were not assessed (Costa-Martins et al., 2014). The current results also corroborate recent experimental studies showing that attachment security is associated with reduced perceptions of acute pain in the laboratory (Eisenberger et al., 2011; Wilson & Ruben, 2011) and with reduced activity in pain-related regions of the

brain (Coan, Schaefer, & Davidson, 2006; Eisenberger et al., 2011).

Viewed together, our results indicate that the benefits of support in acute pain reduction may not apply equally to all people. Consistent with past research on coping and secure attachment, securely attached women are able to reap the benefits of available partner support with regard to alleviating pain during childbirth. This suggests that encouraging their romantic partners to attend childbirth classes/training and to be present in the delivery room is highly advisable for these women. This may be particularly important since securely attached women are also most susceptible to increased perceptions of pain if their partners were *not* supportive. Increased pain during labor and delivery is not only undesirable in its own right; greater childbirth pain contributes to a more negative evaluation of the entire birth experience (Niven & Murphy-Black, 2000; Waldenström, 2003, 2004; Waldenström et al., 2004), which itself is a predictor of increased risk of childbirth PTSD (Denis et al., 2011; Goutaudier et al., 2012; Soet et al., 2003). Perceptions of a negative birth, influenced by women's experience of pain, have also been shown to influence future reproductive decisions (Gottvall & Waldenström, 2002; Hildingsson et al., 2002). Thus, more securely attached women, although most able to benefit from partner-provided support, may be at increased risk of undesirable outcomes related to childbirth if they have a less supportive partner.

In contrast to secure women, highly anxious women appear to be at greater risk for childbirth pain because they are less apt to benefit from partner support, even when their partners claimed it was available. These results offer a potential mechanism to explain the positive links between women's attachment anxiety and PTSD found at 6 weeks and 3 months postpartum in a recent study (Iles et al., 2011). More specifically, women who report greater pain during delivery are especially likely to develop childbirth PTSD symptoms 6 weeks postpartum if they also report having more negative emotions at childbirth (Goutaudier et al., 2012). Because attachment anxiety and its characteristic pattern of hyperactivating

emotion regulation are associated with increased negative affect (Mikulincer & Shaver, 2007), and highly anxious women in our study reported heightened perceptions of pain, these women may be especially vulnerable to experiencing childbirth as a traumatic event. Although highly anxious and highly avoidant women in this study perceived receiving less support from their partners, and their partners reported providing less support to them, high attachment anxiety did *not* interact with support to predict the pain responses of highly anxious women. Therefore, the heightened pain reports of more anxious women appear to be driven primarily by their own personality and pattern of emotional regulation, rather than by what their romantic partner is or is not doing.

Another interesting pattern also emerged. Namely, men's perceptions of enacted support and their motivation to provide it—rather than women's perceptions of support received—more frequently predicted women's pain experiences during childbirth. Most women may have been too distracted by the chaos of labor and delivery (e.g., various instructions from medical staff, medical equipment and monitors being applied, breathing activities, and so on) to closely monitor their partners' level of support, making the amount of partner support less visible to them. Indeed, recent research has shown that less visible forms of support, though going unnoticed by support recipients, can benefit support recipients (Bolger & Amarel, 2007; Bolger et al., 2000; Howland & Simpson, 2010). It is also possible that women's postdelivery sentiment concerning their partner or the relationship affected the accuracy of their support perceptions, given research showing that current relationship-relevant feelings can influence recollections of prior relationship events (Holmberg & Holmes, 1994; although our results did remain significant after controlling for relationship satisfaction). Interestingly, prior research on autobiographical relationship memories and depression suggests that women's memories of their partner during labor and delivery may have been associated with greater negative affect and depressive symptoms if they scored higher in either

attachment anxiety or avoidance, due in part to memory incoherence (Sutin & Gillath, 2009). However, our results also remained significant after controlling for depression. Overall and consistent with these findings, this study indicates the utility of examining partner perceptions of support in explaining variability in women's experience of a painful life event. Nevertheless, it is also important to note that men's enacted support perceptions, while predictive of women's pain experiences in this study, may not be accurate representations of reality due to many of the same factors that may have affected the accuracy of women's perceptions (e.g., the novel situation, the distracting hospital environment, the stress and excitement, and concern for the baby).

Finally, it is also interesting to note that men's attachment avoidance, although not men's anxiety, was associated with women's perceptions of *less* labor and delivery pain. Past research has found that avoidant individuals, as a means of maintaining emotional and psychological distance, are less likely to provide social support (Simpson et al., 2003; Wilson et al., 2007), more likely to derogate strangers and friends who do seek support from them (Wilson, Rholes, & Simpson, 2000), and more likely to view romantic partners as weak, emotionally immature, and excessively needy during childbirth (Wilson et al., 2007). To the extent that women in this study accurately perceived their avoidant male partners' discomfort with providing support, they may have intentionally suppressed their expressions and reports of pain to protect themselves from their partners' expected derogation and disapproval.

Limitations and future directions

This study has some limitations. First, our data are correlational and causal inferences cannot be made. Although we believe our data support the claim that women's attachment orientations and partner support lead to women's childbirth pain, an alternate explanation is that women's experience of pain influences their partners' provision of support. While this latter explanation might explain why dismissive avoidant women reported less pain when partner support was low versus high (e.g., they displayed

low pain, so partners did not need to provide support), it does not adequately account for why securely attached women reported greater pain when partner support was low. In contrast, our previously presented rationale, grounded in attachment theory, explains why dismissive avoidant women should respond negatively to high emotional support provision, and why securely attached women with histories of positive support experiences should respond negatively when partner support is low. Thus, the support-to-pain causal pathway seems to be the more plausible possibility.

Second, women's pain perceptions were assessed 2 weeks after childbirth and could reflect memory biases (Niven & Murphy-Black, 2000). Although some researchers have documented decreases in recalled labor pain over time, others have documented stable test-retest correlations for certain aspects of labor pain (e.g., quantitative vs. qualitative pain, pain intensity, peak and end pain) over periods ranging from several weeks up to 3–4 years (Chajut, Caspi, Chen, Hod, & Ariely, 2014; Niven & Murphy-Black, 2000; Terry & Gijssbers, 2000; Tinti et al., 2011). Remembered pain also appears to be an important predictor in its own right, given that memory for childbirth pain is associated with adverse outcomes such as more negative evaluations of the overall birth experience (Niven & Murphy-Black, 2000; Waldenström, 2003, 2004; Waldenström et al., 2004), a factor known to affect women's decisions to undergo elective cesarean section for subsequent births (Hildingsson et al., 2002) and whether or not to have additional children (Gottvall & Waldenström, 2002). Furthermore, prior studies have shown that individuals tend to recall events in an attachment working-model-congruent fashion. For instance, insecurely attached individuals often recall events as being more negative than their evaluation of the event when it originally occurred, whereas securely attached individuals tend to recall events as being more positive over time (e.g., Feeney & Cassidy, 2003; Simpson, Rholes, & Winterheld, 2010). Therefore, any effects due to potential memory biases may have simply accentuated attachment-based differences in childbirth experiences that initially occurred.

Future researchers should collect both in vivo as well as postpartum pain assessments.

Third, women's and men's support perceptions may also reflect memory biases, with potential inaccuracies due to factors previously discussed (e.g., distracting hospital environment, sentiment override, and so on). Thus, these perceptions may not match more objective, third-party assessments of support. Fourth, our sample was well educated, which may limit generalizability to other populations. Fifth, the majority of participants used an epidural or spinal block during labor and delivery, and nearly half used medications to reduce labor pain. Prior research suggests that women's use of epidural analgesia during labor may be associated with remembering more intense childbirth pain up to 1 year following birth (Waldenström & Irestedt, 2006), although a more recent study using a shorter time frame found a contrasting pattern—that up to 2 months following birth, women who use epidural analgesia recall less intense childbirth than do nonepidural users (Chajut et al., 2014). Nonetheless, virtually all of our results remained statistically significant after controlling for this possible confound in addition to pregnancy and delivery problems, unplanned pregnancies, and women's scores on neuroticism, prenatal depression symptoms, and relationship satisfaction. Our results, however, may generalize most appropriately to women who utilize some form of pain analgesics during childbirth. Future research should consider using a sample of women who use natural childbirth and/or forgo using pain medications to expand generalizability and circumvent this potential confound.

Conclusion

This study provides clear evidence that attachment orientations and perceptions of partner support are systematically associated with women's perceptions of pain during childbirth. Our results not only demonstrate the importance of personality (i.e., attachment orientations) in predicting who will benefit from romantic partner support in terms of labor pain reduction but also underscore the importance of examining the effects of (emotional)

support on pain perception separately for those who differ in the nature of their attachment insecurity (i.e., for those who score higher on anxiety vs. avoidance). To our knowledge, this is the first study to test relations between all three of these variables—attachment, social support, and acute pain—in a dyadic, ecologically valid context in which the effects of *both* partners' personality and support perceptions were taken into consideration. Importantly, our results extend prior research on attachment and support with regard to psychological stressors and laboratory stress inductions to a physical stressor (i.e., acute pain) occurring in conjunction with a significant, real-life event experienced by most romantic couples. Thus, our findings have increased external validity and the potential for widespread implications. Our work also contributes to existing literature on physical pain and psychosocial factors (e.g., social support), which has given limited attention to the role of personality in influencing pain perception. Notably, our effects were found in a community sample of first-time parents, which extends the generalizability of our results beyond the typical undergraduate student population. In addition, most of our results remained robust even when assorted potential confounds such as neuroticism, relationship satisfaction, epidural/medication usage, pregnancy/delivery difficulties, time spent in labor and delivery, and (un)planned pregnancy were statistically controlled.

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