

Original Article

**VARIATION IN REPRODUCTIVE STRATEGIES
INFLUENCES POST-COITAL EXPERIENCES WITH
PARTNERS**

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Abstract

The Post-Coital Time Interval (PCTI) may be particularly important for pair-bonding and establishing relationship commitment. Women have greater incentives for establishing relationship commitment than men because of their greater necessary investment in offspring and the benefits of long-term paternal investment. Thus, sex differences in PCTI experiences may emerge based on sex differences in reproductive strategies. We generated 16 items to assess PCTI experiences and extracted three factors related to: 1) satisfaction and bonding, 2) a desire for more signals of bonding and commitment from one's partner, and 3) romantic partners having a greater interest in talking about relationship issues. Consistent with our predictions, women's satisfaction with PCTI experiences was inversely related to the extent to which they desired greater bonding and commitment signals from their partner, whereas men's satisfaction with PCTI experiences was inversely related to the extent to which their partners' had greater interests in talking about relationship issues. These dimensions were also related to other indicators of reproductive strategies, including attachment style.

Keywords: Sex differences, reproductive strategies, commitment, attachment, life history

Introduction

This study investigated experiences with partners during the time interval immediately following sexual intercourse. There is a tremendous volume of research on human sexuality, and in recent decades, evolutionary researchers have generated a large body of literature on variance in human reproductive strategies (see Buss, 2005). Much of this literature has focused on differences between male and female reproductive strategies and how these differences are represented in psychology and behavior. In comparison to

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topics such as mate selection preferences, courting behavior, and sexual activities prior to full sexual intercourse, there has been relatively little attention paid to psychology and behavior following acts of sex in the evolutionary literature. Others have noted that discussions of the time spent together after sex has been conspicuously absent in the mass market products on sexuality and also underrepresented in the initial empirical literature (Halpern & Sherman, 1979).

We believe that the Post-Coital Time Interval (PCTI), the time in which couples spend together after sexual intercourse before one partner leaves or falls asleep, is an important component of sexual relationships. Specifically, we argue that sex differences in PCTI experiences reflect divergence in the evolved reproductive strategies of men and women. We also predict that individual variation in PCTI experiences within each sex is related to other psychological aspects of variation in life history strategy, particularly tendencies towards engaging in committed long-term monogamous relationships. We designed an exploratory investigation of PCTI experiences and tested predictions derived from evolutionary theory regarding the psychology of human sexuality.

Sex Differences in Reproductive Strategies

The differential costs and benefits for various aspects of reproduction result in partially divergent reproductive strategies for women and men (Buss & Schmitt, 1993; Gangestad & Simpson, 2000). Women's average reproductive investment considerably outweighs average male investment (Fisher, 1992). Because women are obligated to a greater minimal investment in offspring than men, and are much more limited in the number of offspring they can produce, they tend to be more selective of sexual partners, and tend to place more emphasis on pair-bonding and having more enduring romantic relationships (Trivers, 1985). On the other hand, men have larger returns on reproductive success from having a greater number of mating partners (Bateman, 1948), and thus men tend to show a greater desire for a higher number of sexual partners and more variety in these partners (Gangestad & Simpson, 2000). Men have less of an incentive to commit to long-term monogamous relationships than women, as this would foreclose on multiple partnerships that could enhance their reproductive success more so than for women.

Although men's average investment in offspring is considerably outweighed by women's average investment, it is still relatively high amongst mammalian males, particularly primates (Fisher, 1992). Substantial paternal investment may be necessary because of the extended development of offspring, who are far more altricial than those of closely related species (Fisher, 1992). Paternal investment is generally thought to enhance offspring reproductive success (Geary, 2005) and children who are raised with a father present have lower mortality rates in foraging cultures (Hill & Hurtado, 1996). Women seek male partners who have the ability and willingness to sustain long-term relationships with substantial contributions of resources (Buss, 1989, 1994). A mate who abandons his partner would remove paternal resources and care that are important for offspring survival (Gallup & Suarez, 1983).

Previous models of sex differences in human sexuality are consistent with the expected consequences of sexual selection. For example, Hatfield, Sprecher, Pillemer, and Wexler (1989) describe the main goal of women's sexual behavior as expressing affection to another person in a committed relationship. In contrast, the main goal of men's sexual behavior is described as physical gratification. Likewise, preferences for certain activities during sex were consistent with this model. Compared to women, men

were less concerned about receiving indications of love from their partner during intercourse, and more concerned about variety of sexual experiences and partner initiative (Hatfield, et al., 1989).

Pair Bonding in the Post-Coital Time Interval

Halpern and Sherman (1979) believe that the potential for bonding and sharing may be at its peak in the post-coital period, and satisfaction with this experience is the most important aspect of a sexual relationship. Despite women's efforts in screening and selecting partners prior to first sexual intercourse, women's feelings of uncertainty in the future of the relationship are likely due to the differential costs and benefits for commitment described above. Women's desires for expressions or signals of relationship bonding and commitment by one's partner may be particularly salient in the PCTI. One woman in her 30s remarked, "I think women have always known how important afterplay is. Many marriages have died because men don't." (Halpern & Sherman, 1979, p. 3). Indeed, in possibly the first empirical investigation on the topic, women reported greater desires for more loving behavior and less physical separation after intercourse than men, whereas men reported not enjoying "excessive" expression or affection after intercourse (Halpern & Sherman, 1979). Denny, Field, and Quadagno (1984) reported that women wanted to spend more time engaging in both foreplay and afterplay activities than their partners, with this being especially the case for afterplay. Women also had higher valuations for both verbal and physical affectionate behavior, whereas men were more likely to report enjoying sexual intercourse itself (Denny et al., 1984). Furthermore, it appears that certain hormones contribute to sex differences in desires for pair bonding; sexual activity is associated with a rise in oxytocin levels (thought to be important for pair bonding), and women have more neuronal oxytocin receptors than men (Hiller, 2004).

Kissing is often thought of as an activity that can increase sexual arousal and receptivity and may also serve as a mechanism by which pheromones and sebum are exchanged to induce bonding. It has been shown that men tend to use kissing so as to increase sexual arousal and the likelihood that intercourse will occur, whereas women tend to use kissing more for promoting bonding (Hughes, Harrison, & Gallup, 2007), particularly during the PCTI. For instance, women rated both kissing after sex (Hughes, et al. 2007) and sleeping next to their partner after sex (Hughes, Harrison, & Gallup, 2004) as being more important than did men. In addition, both sexes indicated that women are usually the ones to initiate sleeping together after sexual intercourse (Hughes et al., 2004). Sleeping next to a romantic partner following copulation may serve multiple functions, including reducing the likelihood of philandering or abandonment by each partner, promoting greater paternity confidence through mate guarding, increasing sperm retention by remaining in a horizontal position after sex, and perhaps increasing the likelihood of pair-bonding after sex (Hughes et al., 2004).

Hypotheses for Sex Differences in Post-Coital Time Interval Experiences

Hypothesis 1: As women have greater incentives for establishing long-term relationship commitments than do men because of sex differences in minimal obligatory parental investment, we predict that women will report a greater desire for signals of bonding and commitment from their partner in the PCTI than will men.

Hypothesis 2: Men, on the other hand, will be more likely to report that their partner is more interested in talking about relationship issues than they are during the PCTI.

Hypothesis 3: Because individuals' levels of satisfaction with their PCTI experiences should stem from the sexual divergence in commitment incentives, we predict that women's satisfaction with PCTI experiences will be inversely related to the extent to which they desire higher levels of bonding and commitment signals from their partner than what is currently being given.

Hypothesis 4: On the other hand, we anticipate that men's satisfaction with PCTI experiences will be inversely related to the extent to which they are less interested in discussing relationship issues than their partners.

Variation in Reproductive Strategies

We also predict that PCTI experiences will be associated with several psychological constructs that have been proposed to underlie or mediate human sexual strategies. For instance, there is considerable empirical evidence documenting the relationship between attachment styles and reproductive strategies (see Del Giudice, 2009). Specifically, Bowlby (1969) noted the relationship between attachment insecurity and unstable romantic relationships. Belsky, Steinberg, and Draper (1991) view the attachment process as an evolved psychological mechanism to evaluate social conditions and choose an effective reproductive strategy for those conditions. This model proposes that insecure attachment may be a response to environmental cues where long-term monogamous relationships are not the most viable strategy.

Attachment avoidance is characterized by having discomfort with being close to partners and hiding true feelings from them. Del Giudice (2009) recently proposed that avoidant attachment styles are a component of high mating effort reproductive strategies (i.e., those with relatively low parental investment, and an emphasis on short-term and uncommitted mating), and are particularly related to variation in male reproductive strategies. Women may adopt avoidant strategies when conditions are particularly harsh and paternal investment is very unlikely, and adopt anxious attachment styles when environmental risk is moderate. Attachment anxiety is characterized by worries about being abandoned by one's partner and worries that one's feelings for a partner are not reciprocated. Attachment anxiety may be a mechanism to elicit relationship commitments and additional investment from mates and/or alloparents such as close kin. On average, men tend to have higher avoidance scores and lower anxiety scores than women (for a review, see Del Giudice, 2009).

Figueredo and colleagues (e.g., Figueredo, Vásquez, Brumbach, Schneider, Sefcek, Tal, Hill, Wenner, & Jacobs, 2006) believe that a common factor underlies human life history parameters and reproductive, familial, and social behaviors. They propose a continuum of strategies ranging from a focus on short-term gains at the expense of long-term costs, high mating effort, and low parenting effort to long-term strategies with selective mating and high parental effort. This continuum is related to impulsivity, social support, disregard for social rules, and risk taking behaviors. Figueredo et al. (2006) developed the Mini-K Short Form of the Arizona Life History Battery as a brief inventory to assess life history strategy based on a factor analysis of data from the Midlife in the United States (MIDUS) study. Those who score higher on the inventory have greater tendencies for long-term, committed relationships, and thus may be more attentive to their partners in the PCTI and behave in other ways that facilitate emotional bonding.

Hypotheses for Variation in Reproductive Strategies and Post-Coital Time Interval Experiences

Following the models of life history variance in reproductive strategies described above, we predict that such psychological constructs will be associated with PCTI experiences.

Hypothesis 5: We predict that attachment avoidance will be inversely related to the degree of PCTI bonding.

Hypothesis 6: We also predict that attachment avoidance will be directly related to the degree to which they are less interested in discussion relationship issues than their partners.

Hypothesis 7: Similarly, we propose that attachment anxiety will also be inversely related to the degree of bonding during the PCTI.

Hypothesis 8: Attachment anxiety will be directly related to the extent to which participants desire greater levels of signals of bonding and commitment from one's partner. Following Del Giudice's (2009) model, attachment anxiety may be particularly relevant to women, so these relationships may be more evident and pronounced in women than in men.

Hypothesis 9: Those scoring higher on the Mini-K (indicating tendencies for long-term, committed relationships) will report a greater degree of bonding in the PCTI.

Hypothesis 10: Those scoring higher on the Mini-K will also be less likely to report that their partner is more interested in talking about relationship issues following sex than they are.

Method

Participants and Procedure

Ethnically diverse (52% indicated some non-Western European ancestry) undergraduates (analytical sample $N = 160$, 93 female) completed anonymous surveys at their convenience over the Internet to either fulfill a course requirement or simply on a voluntarily basis to partake in a research study. Additional respondents who reported not yet having full sexual intercourse ($n = 97$; 34% of total participants) as well as those who reported being equally or more attracted to others of their own sex ($n = 19$; 7% of total participants) were excluded from our sample and analyses. Participants included students in the introductory Psychology pool at a large public Midwestern research university ($n = 103$) and evening Psychology students at a small private Mid-Atlantic liberal arts college ($n = 57$). Age of respondents ($M = 23$, $SD = 7$) ranged from 18 to 67 years. There was no significant sex difference in age. Respondents described their ethnic descent as Western European (47%), Eastern European (25%), African American (7%), Latino/Latina (6%), South Asian (2%), East Asian or Pacific Islander (2%), Native American (1%), and Other (11%). Respondents identified themselves as Christian (51%; including Catholic, 6%, Protestant, 21%, and Orthodox, 3%), Jewish (15%), Hindu (2%), Muslim (1%), and “Other” religious affiliation (8%).

Measures

We generated 16 items that assessed experiences with one’s partner in the post-coital time interval (PCTI). Some items were positively worded, (e.g., “It is easy for us to have a heart-to-heart talk after sex,”), whereas other items were negatively worded, (e.g., “The time we spend together after sex feels like a chore,” others were framed as desires “I wish that my partner were more loving and caring with me after we have sex.”) General themes for the items measured included bonding, affection, communication, focus of attention, satisfaction, and responsiveness. The survey presented these items in a randomized order.

Additional questionnaire measures included five items from each of the avoidant attachment and attachment anxiety dimensions of the Experiences in Close Relationships (ECR) inventory (Brennan, Clark, & Shaver, 1998) and the 20 items of the Mini-K life history strategy inventory (Figueredo et al., 2006). The brief versions of the ECR scales were developed with data from a previous study ($N = 807$, 51% female, M age = 19, SD age = 1): attachment avoidance Cronbach’s alpha = .820, $r(807) = .923$ with full scale score; attachment anxiety Cronbach’s alpha = .855, $r(807) = .883$ with full scale score. Demographic items included age, sex, race/ethnicity, religion, sexual orientation, and whether respondents have had full sexual intercourse with their partners.

Analyses

We used Principal Axis Factoring to reduce the novel PCTI items into dimensional factors and rotated factors with the Varimax Method using Kaiser Normalization. Items that loaded above .40 on a factor and did not load above .30 on any other factor were retained to calculate scale scores. Independent samples t -tests evaluated

Hypotheses 1 and 2, and Pearson correlations assessed the relationships predicted in the remaining hypotheses.

Results

We extracted three factors from the 16 PCTI items (see Table 1 for scale descriptives). The first factor identified was “Satisfaction and Bonding,” (SB, Cronbach’s alpha = .870) and the four items unique to this factor included “I am satisfied with the amount of time that my partner and I spend together immediately after intercourse,” “It is easy for us to have a heart-to-heart talk after sex,” and “The time spent together after sex is an important bonding experience.” The second factor identified was “Longing for Connection,” (LC, Cronbach’s alpha = .910), with four items unique to this factor including “I wish that my partner were more romantic with me after we have sex,” “I wish that my partner would communicate with me more after we have sex,” and “I wish that my partner were more loving and caring with me after we have sex.” The third factor identified was “Partner Neediness,” (PN, Cronbach’s alpha = .615) and the two items unique to this factor included “After we have sex, my partner wants to talk about our future more than I would like to” and “After we have sex, my partner always wants to talk about our relationship.”

Table 1. Scale Descriptives

	α	Women		Men		d	Items
		M	SD	M	SD		
Satisfaction and Bonding	.870	4.13	0.73	3.89	0.78	.32	4
Longing for Connection	.910	2.28	1.05	2.24	0.79	.04	4
Partner Neediness	.615	2.03	0.79	2.44	0.82	.51	2
Avoidance	.856	2.96	1.45	2.87	1.37	.06	5
Anxiety	.900	4.14	1.70	3.79	1.43	.22	5
Mini-K	.751	9.01	1.03	8.07	0.97	.94	20

Hypothesis 1 was not supported; there was no sex difference in the extent to which participants desired greater levels of signals of bonding and commitment from their partner (LC) in the PCTI, $t(158) = 0.380, p = .71$. However, Hypothesis 2 was supported; men were more likely to report that their partner is more interested in talking about relationship issues than they are (PN), $t(158) = 3.10, p = .002$. Desires for greater bonding and commitment signals from one’s partner (LC) were inversely related to satisfaction with PCTI experiences for both sexes (SB, see Table 2), supporting Hypothesis 3. The degree to which respondents thought their partner was more interested in talking about relationship issues than they were (PN) was inversely related to PCTI satisfaction and bonding (SB) for male participants only, supporting Hypothesis 4.

Attachment avoidance was inversely related to the degree of PCTI satisfaction and bonding (SB) for both sexes, supporting Hypothesis 5. Attachment avoidance was directly related to the degree to which respondents felt their partner was more interested in talking about relationship issues than they were after sex, supporting Hypothesis 6. Attachment anxiety was inversely related to the degree of PCTI satisfaction and bonding for female participants only, supporting Hypothesis 7. Attachment anxiety was directly related to the degree of desire for signals of bonding and commitment from one’s partner for female participants only, supporting Hypothesis 8. There was also a substantial positive relationship between degree of desire for signals of bonding and commitment by one’s partner (LC) and reports that they are less interested in discussion relationship issues than their partners (PN) for men only. Both men and women scoring higher on the Mini-K reported a greater degree of satisfaction and bonding (SB) in the PCTI, supporting Hypothesis 9. Results did not support Hypothesis 10, as there was no relationship between Mini-K scores and reports of whether respondents thought their partner was more interested in talking about relationship issues than they were after sex (PN).

Post-hoc analyses on attachment avoidance indicated that the sex X attachment avoidance interaction was the strongest (and only unique) predictor of satisfaction and bonding, $t(273) = 8.11, p < .001$, and partner neediness, $t(273) = 7.24, p < .001$. In both cases, the association with attachment avoidance was stronger for men. The sex X attachment anxiety interaction was the strongest (and only unique) predictor of satisfaction and bonding, $t(273) = 5.06, p < .001$, this relationship was stronger for women (See Table 2).

Table 2. Associations Among Constructs for Female (top) and Male Participants (bottom)

	Satisfaction and Bonding	Longing for Connection	Partner Neediness	Avoidance	Anxiety	Mini-K
Satisfaction and Bonding	-	-.610***	.001	-.380***	-.274**	.397***
Longing for Connection	-.299*	-	.126	.301**	.389***	-.149
Partner Neediness	-.387***	.487***	-	.284**	.037	.083
Avoidance	-.533***	.137	.240*	-	.376***	-.350***
Anxiety	-.118	.182	.152	.489***	-	-.203
Mini-K	.434***	-.067	-.118	-.448***	-.099	-

Note: * indicates $p < .05$, ** indicates $p < .01$, *** indicates $p < .001$.

Discussion

This study provides an initial inquiry in an area of sexual relationships currently underrepresented in psychological research. We believe that the Post-Coital Time Interval (PCTI) is an important aspect of sexual relationships and can reveal variation in

reproductive strategies, particularly differences in strategies between women and men. The results confirmed most of our predictions, which follow from an evolutionary framework for the psychology of human sexuality. The PCTI may be particularly important for pair bonding, and women have a greater incentive to use the PCTI for pair-bonding and as a time to gain commitment promises from their partner because of the differential costs and benefits of mating effort and parental investment.

We have operationally defined the PCTI as the time partners are awake together following sexual intercourse. This definition prioritizes the importance of communication between partners when pair-bonding issues are especially salient. These interactions would exemplify both the convergent and divergent aspects of female and male reproductive strategies. We acknowledge, however, that one partner could have experiences promoting bonding even if the other partner is asleep. This may influence relationship dynamics despite the lack of reciprocity from the sleeping partner.

There was no sex difference in the reported desire for signals of bonding and commitment in the PCTI. Some may argue that participants may feel that they already have a commitment from their partner because they are in a relationship and thus do not need or seek additional commitment. Yet, the degree of this desire had a stronger relationship to satisfaction with PCTI experiences for women than for men. This finding is consistent with studies showing that women exhibit positive emotional shifts towards their partner following sex so as to promote pair-bonding, whereas men show opposite, negative shifts in affect toward their partner following sex (Haselton & Buss, 2001; Townsend, 1995). The degree to which respondents thought that their partners wanted to talk about relationship issues following sex more than they did was inversely related to male PCTI satisfaction, but was not a predictor of satisfaction for women. Overall, men reported a lesser interest in talking about relationship issues than their partners following sex as compared to women.

Our results also demonstrated several relationships between PCTI concerns and psychological constructs related to variation in reproductive strategies. Each of the three extracted dimensions in this study was significantly associated with attachment style. PCTI satisfaction and bonding was inversely related to both forms of insecure attachment, avoidance and anxiety. Consistent with Del Giudice's (2009) model of attachment styles and reproductive strategies, attachment avoidance was associated with indicators of lower proclivity to establish relationship commitment. We found that women (but not men) who scored higher on attachment anxiety had stronger desires for additional signals of relationship commitment from their partners.

PCTI experiences were also related to an index of life history strategy. Those individuals who were more future-oriented and prone to long-term committed relationships with substantial investment reported a greater degree of PCTI satisfaction and bonding. Curiously, male responses suggested that they would feel a better connection with a partner who was more detached. Because men tend to have a greater proclivity for short-term mating than do women (Buss, 1994), and men are better at avoiding emotional attachment following sex (Townsend, 1995), perhaps men feel more connected to and understanding of women who demonstrate similar tendencies.

We consider these results promising for an initial investigation of the post-coital time interval (PCTI). There are several ways in which future research may enhance understanding of PCTI experiences. For instance, the primary limitation of the current study may be the collection of data from one partner in a pair, and perhaps gathering data from both individuals in a couple may provide a better understanding of relationship

patterns. It may also be the case that the temporal location of a woman's menstrual cycle could reflect variations in PCTI behavior. In addition, the first iteration of our scales of PCTI experiences proved fruitful, however they may be refined considerably. All three scales are quite brief and should be extended, although two of the scales demonstrated excellent inter-item reliability despite their brevity. We also acknowledge the possibility of item associations due to the ways in which items were worded. Whereas we can correct for this potential artifact of design, we maintain that scale items have adequate face validity.

We note that our results are based on samples of college students in the USA. The issues studied in psychological research are influenced by our evolutionary heritage of adaptations from selection pressures across numerous generations, which interact in complex ways with an individuals' socio-developmental environment. There are likely reliable aggregate differences in romantic relationship dynamics between populations which are consistent with selection pressures from the ecologies of the ancestral populations. The patterns of PCTI experiences may be different with groups experiencing endemic father absence, for example. There are groups and cultures with arranged marriages, normative polygyny, polyandry, and even sequential polygynandry. These cultural features and influences may shape PCTI phenomenon in predictable ways and we welcome collaborators who could assist us in addressing cross-cultural issues.

Our results further demonstrate the power and fecundity of an evolutionary framework for understanding human psychology and behavior. Despite the exploratory nature of this study, we were able to generate and support several interconnected a priori predictions. We hope that this paper brings additional attention to an important aspect of sexual relationships which is rarely acknowledged by researchers regardless of theoretical orientation. As our participants reveal to us, fulfillment of goals in sexual relationships does not end with sex.

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