

Original Article

TENDENCIES TO FALL ASLEEP FIRST AFTER SEX ARE ASSOCIATED WITH GREATER PARTNER DESIRES FOR BONDING AND AFFECTION

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Abstract

Despite the large literature on human reproductive strategies, research on psychology and behavior following acts of sex is scarce. The Post-Coital Time Interval (PCTI) may be particularly important for pair bonding and establishing relationship commitment. This study examined how desires for long-term partner expressions of affection and emotional bonding relate to self-reports of sleep onset patterns between couples. We also examined whether sex differences existed in self-reports of sleep onset following sexual intercourse versus when falling asleep together after not engaging in sex. Participants ($N = 456$) completed an online inventory assessing bonding, affection, communication, focus of attention, satisfaction, and responsiveness during the PCTI and reported their perceptions of relative sleep onset after having sex and when not having sex. Participants' desires for partner expressions of emotional bonding, physical affection, and communication were higher when their partners' had greater tendencies to fall asleep first after sex. In contrast, responses to comparison items (e.g., humor) did not exhibit this effect. Men reported that their partners were more likely to fall asleep first when going to bed without having sex, but there was no sex difference in reports of relative sleep onset after having sexual intercourse.

Keywords: Sleep onset, bonding, sexual relationships

Introduction

In recent decades, evolutionary researchers have generated a large body of literature on variance in human reproductive strategies (see Buss, 2005), mostly describing differences between male and female reproductive strategies. In comparison to topics such as mate selection preferences, courting, and other behaviors preceding sexual

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intercourse, there has been little attention paid to the study of the psychology and behavior following acts of sex. We believe that the Post-Coital Time Interval (PCTI) is an important component of sexual relationships (Kruger & Hughes, 2010; Hughes & Kruger, 2011). Pair bonding and establishing relationship commitment may be especially salient relationship goals during the time spent together after sex (Halpern & Sherman, 1979), goals that women have greater incentives for in evolutionary terms (Fisher, 1992). Reducing the time before sleep onset following sexual intercourse would curtail commitment conversations and interfere with opportunities for promoting emotional connectedness, and may lead to greater partner desires for bonding and expressions of commitment from their partner.

Sex Differences in Human Reproductive Strategies

Men and women have partially divergent reproductive strategies reflecting the differential costs and benefits for various aspects related to reproduction. Although men's average parental investment is relatively high amongst mammalian males, it is less than women's average investment (Fisher, 1992). Because women invest more in offspring than men invest, and are much more limited in the number of offspring they can produce, they tend to be more selective of sexual partners (Trivers, 1985). Women prefer men who have the ability and willingness to sustain long-term relationships with substantial contributions of resources (Buss, 1989, 1994). This preference is understandable because of the tremendous investment necessary for successfully rearing children, who are far more altricial than offspring of other animal species (Fisher, 1992). Children in foraging cultures who grow up with a father present have lower mortality rates (Hill and Hurtado, 1996), and paternal investment is generally thought to enhance offspring reproductive success (Geary, 2005). A mate who abandons his partner would remove paternal resources and care that is important for offspring survival (Gallup & Suarez, 1983).

Males also have greater returns on reproductive success from having a greater number of mating partners (Bateman, 1948). Men 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, as this would foreclose on other mating opportunities. The time that couples spend together after sex may be especially important for bonding and promises of long-term commitment. For instance, engaging in activities such as cuddling and professing one's love to their long-term partner are seen as more important after sex than prior to sexual intercourse by both sexes (Hughes & Kruger, 2010). However, tensions due to divergent reproductive strategies may make relationship issues especially salient in the PCTI. Ackerman, Griskevicius, & Li (2011) found that men reacted more positively than women do to a pre-sex confession of love but not to a post-sex confession. Thus, the authors concluded that pre-sex confessions may signal interest in advancing a relationship to include sexual activity, whereas a post-sex confession may signal more of a desire for long-term commitment.

The Importance of the Post-Coital Time Interval in Sexual Relationships

Halpern and Sherman (1979) proposed that the opportunity for bonding and sharing between sexual partners peaks after sexual intercourse and that satisfaction with the post-coital period is the most important aspect of a sexual relationship. We recently

conducted an initial investigation of the Post-Coital Time Interval (PCTI) based on the theoretical framework of evolutionary psychology (Kruger & Hughes, 2010). The results of this study confirmed most of our predictions, focusing on individual differences and aggregate sex differences in PCTI experiences.

Both women and men were more satisfied with their PCTI experiences when their partners were providing stronger signals of bonding and commitment. Those higher in attachment avoidance were less interested in talking about relationship issues after sex than their partner. In particular, women higher in attachment anxiety were less satisfied with their PCTI experiences and desired stronger signals of bonding and commitment from their partner. Men's satisfactions with PCTI experiences were inversely related to the degree to which they thought their partner was more interested in talking about relationship issues than they were (Kruger & Hughes, 2010). We argue that PCTI experiences are important for relationship satisfaction in both women and men, and sex differences in PCTI experiences reflect divergence in the evolved reproductive strategies of men and women (Kruger & Hughes, 2010; Hughes & Kruger, 2010).

Sleep Onset After Sexual Intercourse

Falling asleep before one's partner may be a non-conscious mechanism that forecloses on any commitment conversation occurring after sexual intercourse. Because women have greater verbal ability on average (Halpern, 1992) and greater density of neurons in brain areas associated with language processing (Witelson, Glezer, & Kigar, 1995), they may have an advantage in these commitment negotiations. If men actively avoid commitment promises in post-coital conversation, this could increase the likelihood of women ending the relationship due to perceptions of undesirable partner characteristics and/or uncertainty about the future of the relationship. Hastening sleep onset may evade this adverse effect.

Women rated sleeping with their partner following sex as more important than did men, and both women and men indicated that women are usually the ones to initiate sleeping together (Hughes, Harrison, & Gallup, 2004). Sleeping together may be an anti-philandering strategy that reduces the likelihood of abandonment. Sleeping together may also increase the likelihood that a man will provision and care for a woman and her offspring by promoting greater paternity confidence (Hughes, Harrison, & Gallup, 2004). Some have suggested that the sedative effects of sexual intercourse serve to increase sperm retention (Gallup & Suarez, 1983), a mechanism that may hasten sleep onset in females.

Whereas a sex difference in the latency of sleep onset after sex has been noted previously (Halpern & Sherman, 1979), there is very little empirical evidence directly addressing this topic (Leyner & Goldberg, 2006). Leyner and Goldberg (2006) demonstrate popular interest in this issue with the name of their mass market book, "Why do men fall asleep after sex?: More questions you'd only ask a doctor after your third whiskey sour," although they devote a mere seven paragraphs to addressing the eponymous question. The authors suggest that hormonal mechanisms associated with orgasm, such as oxytocin, prolactin, gamma amino butyric acid (GABA), and endorphins are responsible for a sex difference. They also include the notion (as stated by a grandmother in-law) that men exert more physical effort during sex, and presumably are more exhausted afterwards.

Oxytocin, which is related to pair bonding, is elevated as a result of sexual intercourse (Hiller, 2004). Oxytocin plays a role in regulating corticotropin-releasing hormones, which regulate a variety of processes within the brain, including sleep (Lancel, Kromer, & Neumann, 2003). Under conditions of low stress, elevated oxytocin levels promote sleep onset (Lancel, Kromer, & Neumann, 2003). This could be part of the underlying neuro-hormonal mechanism facilitating sleep onset after sexual intercourse. Furthermore, other chemicals such as prolactin increase after coitus (substantially more than after masturbation) and post-orgasmic prolactin increase reflects sexual satiety (Brody & T. H. C. Kruger, 2006). Therefore, time spent with partner immediately following orgasm could represent a shared experience of this sexual satiety.

Hypothesis

Desires for partner's signals of bonding and commitment may be particularly salient in the Post-Coital Time Interval (PCTI). We predict that the likelihood of participants' partners falling asleep first after sex will be directly associated with participants' desire for greater partner expressions of affection and emotional bonding after sex. Due to sex differences in reproductive strategies, we predict that male partners will have a greater tendency to fall asleep before their partners after having sexual intercourse compared to when not having had sexual intercourse.

Methods

Participants were 456 (295 females, 161 males) ethnically diverse undergraduates from two public Midwestern universities, (M age = 20, SD age = 3) who completed anonymous surveys at their convenience over the Internet. Participants reported their relationship status as single (40%), dating casually (9%), in a committed relationship (48%), and engaged or married (2.9%). We excluded respondents who reported not yet having full sexual intercourse ($n = 163$) as well as those who reported being equally or more attracted to others of their own sex ($n = 18$). There was no significant sex difference in age. We presented 18 items that assessed experiences and desires with one's partner in the post-coital time interval (PCTI), adapted from the previous 16-item inventory (Kruger & Hughes, 2010). General themes for the items measured included bonding, affection, communication, focus of attention, satisfaction, and responsiveness. We also included comparison items such as desires to "have more sex," and for partners to "tell funny jokes" during PCTI. The online survey software presented these items in a randomized order. Participants reported their preferences for experiencing more or less of certain behaviors by their partner following intercourse compared to current interactions. Participants then indicated "Who falls asleep first after sex?" and "Who falls asleep first when going to bed not after sex?" using a 5-point scale: "I always do" (1), "I usually do" (2), "We do equally" (3), "My partner usually does" (4), "My partner always does" (5).

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. The 18 PCTI items reduced to three multi-item dimensions and three singleton items (Hang out with friends, Make me something to eat, Fall asleep). We identified these dimensions as Bonding and Communication, Humor, and Physical (e.g., have more sex). We used partial correlations

to assess the relationship between the relative likelihood of falling asleep first after sex and the factors derived from the Principal Axis Factoring, controlling for tendencies to fall asleep first when they did not have sexual intercourse.

Results

Table 1. Summary Statistics of Each Sex's Reports of Partner Sleep Onset

Item	Men			M - W	Women		
	<i>M</i>	<i>SD</i>	<i>95% CI</i>	<i>d</i>	<i>M</i>	<i>SD</i>	<i>95% CI</i>
Who falls asleep first after sex?	3.03	0.93	2.88-3.17	-.02	3.05	0.87	2.95-3.15
Who falls asleep first when going to bed not after sex?	3.31	1.04	3.15-3.47	.29	3.01	1.03	2.89-3.13

Note: Higher values indicate an increasing likelihood that partners will fall asleep first.

There was a significant interaction for the relative timing of sleep onset between participant sex and whether or not sexual intercourse preceded sleep, $F(1, 452) = 12.62, p < .001$, largely driven by men reporting to be more likely to fall asleep first after having had sex than when no sex occurred (see Table 1 and Figure 1). For women, reports of who they thought fell asleep first were consistent regardless of whether intercourse had occurred or not. There was also a main effect for partners falling asleep first, $F(1,452) = 7.07, p = .008$, however this appeared to be a result of the differences in sleep onset when no sex occurred.

Table 2. PCTI Desire Scales' Internal Consistencies and Relationships to Participants' Partners' Likelihood of Falling Asleep First After Sex Controlling for Likelihood of Falling Asleep First in General

Factor/Item	<i>Cronbach's α</i>	<i>r</i>	<i>p</i>
Bonding and Communication*	.887	.221	.001
Humor*	.858	.041	.386
Physical (e.g., have more sex)*	.250	.068	.147
Relative sleep onset when not after sex		-.139	.003

*Note: *Controlling for tendencies to fall asleep first in general*

We examined the relationship of participants' partners' tendencies for falling asleep first after sex with the three PCTI dimensions (See Table 2). We also analyzed relationship of participants' partners' tendencies for falling asleep first after sex with the singleton item “fall asleep,” given the relevance to the experimental hypothesis. The pattern was consistent for women and men, so the data were pooled. Participants whose partners tended to fall asleep first after sex indicated that they would prefer that this

happened less often and expressed a greater desire for more expressions of emotional bonding and communication from their partner (See Table 2). In contrast, responses to comparison items (e.g., Humor) did not exhibit this effect. These effects held when controlling for tendencies to fall asleep first in general.

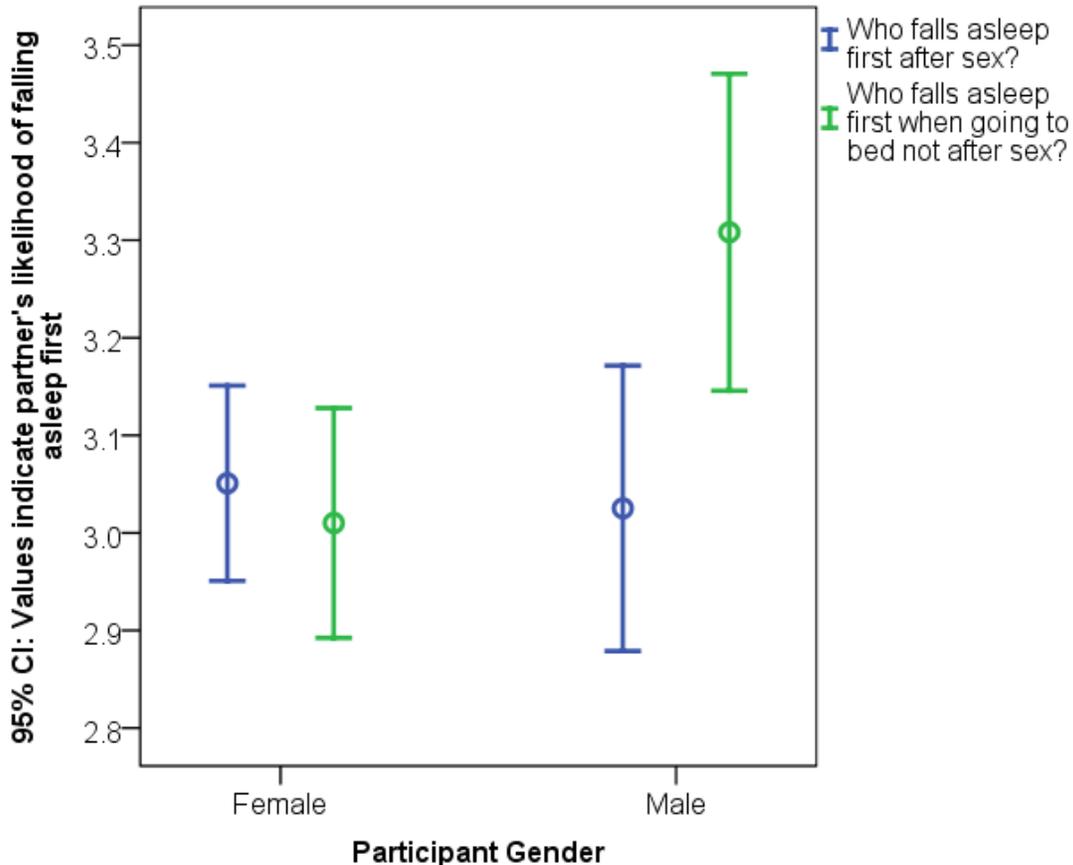


Figure 1. Likelihood of participants' partners falling asleep first. Higher values indicate participants thought their partners were more likely to fall asleep first, and lower values are an indication that participants thought they were more likely to fall asleep first.

Discussion

This study investigates an area of sexual relationships currently underrepresented in psychological research. Consistent with our predictions informed by evolutionary theory, the more one's partner was likely to fall asleep first after sex, the stronger the desire for greater partner expressions of affection and emotional bonding after sex. Our results indicate that fulfillment of goals in sexual relationships does not end with the act of sex and post-coital preferences and behaviors reveal important information about mating strategies. These results were consistent for women and men.

We did not find support for the prediction that men would tend to fall asleep first after sex. In contrast, previous research had demonstrated this relationship (Halpern & Sherman, 1979), consistent with conventional wisdom. It is possible that this phenomenon is an unfounded stereotype, but it is also possible that our retrospective self-report measures are not sensitive enough to uncover the predicted pattern. Observational

methods or use of devices such as an Actiograph may provide higher quality data to assess this hypothesis.

As for sleep onset after not having sex, our data show that men reported a greater tendency to fall asleep after their partners. Perhaps men may stay awake longer as an artifact of mate guarding, ensuring that their partner does not secretly leave them for another man. Men may also remain awake longer in attempts to entice their partners to engage in sex. As the costs and benefits of sexual acts are different for men and women, women may have an incentive to fall asleep earlier to decrease the likelihood of sexual acts in most circumstances.

The question remains as to whether the inclination to fall asleep after intercourse/orgasm is more a result of psychology or physiology. Previous investigations have found no empirical support for the presumed hypnotic effect of orgasm when tested in laboratory conditions using polysomnograph monitoring after masturbation (Brissette, Montplaisir, Godbout, & Lavoisier, 1985). However, the authors noted that reports of sleepiness after orgasm may also be influenced by the type of sexual activity (e.g., coitus versus masturbation) and their study had only examined the effects of orgasm after masturbation (Brissette et al., 1985). Likewise, it has been shown that prolactin levels (which are linked to sleepiness) are seen in levels four times greater following coitus than masturbation (Brody & T. H. C. Kruger, 2006), which may be a physiological reason for couples' sleepiness after sex.

Kinsey (1953, p. 638) reported vast individual differences in experiencing either sleepiness or hyper-alertness after orgasm. Many people fall promptly asleep immediately following the termination of sexual activity (especially if it occurs in the evening after already being fatigued), whereas others are able to engage in any type of vigorous exercise or mental activity within a matter of seconds or minutes after the cessation of orgasmic spasms. Furthermore, Kinsey (1953) believed that there were no data to substantiate sex differences in how quickly physiological sexual excitement recedes for males and females after sex.

Mate retention (see Buss, 1988; Buss & Shackelford, 1997) may be another factor influencing relative sleep onset. For example, men may keep themselves awake after having had sex as a way of bonding with their mate, behaving in a way that is consistent with the mate's preferences. This would be most likely to happen for men in committed relationships or long-term relationships. We divided participants into those reporting being in a committed relationship and those who did not report being in a committed relationship and conducted post-hoc data analyses to examine this explanation.

We conducted a 2 (committed vs. uncommitted) x 2 (participant sex) x 2 (before vs. after sex) ANOVA for Mixed Designs on the relative timing of participants and partners falling asleep. There was no 3-way interaction or 2-way interaction for before vs. after sex and committed vs. uncommitted. We also split the data by sex and did not find a 2-way interaction for before vs. after sex and committed vs. uncommitted for either men or women. We conducted independent samples *t*-tests on timing of participants and partners falling asleep by commitment status, there were no significant effects for committed vs. uncommitted for either males or females for the relative timing of participants and partners falling asleep either when after sex or when not after sex. The issue of mate guarding would be better addressed in a subsequent study with a more specific methodological focus on the topic.

This study was an exploratory attempt to document perceived sleep patterns of couples after having had sex and not having had sex based upon self-report. Future

investigations could improve upon the actual documentation of sleep patterns by having participants keep sleep records to enhance the recall of this information. However, this study does demonstrate how perceptions of sleep patterns after having sex relate to perceptions and desires of couple bonding during the PCTI.

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Sleep onset timing

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