GENDER DIFFERENCES IN SEXUAL DREAMING, DISINHIBITION, AND NUMBER OF COITAL PARTNERS

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ABSTRACT

This study attempts to determine if various self-reported evaluations of a person's dreams can explain significant unique variance in the number of coital partners he or she has experienced. A number of gender differences were found. While promiscuous females were most ashamed of their sexual dreams, promiscuous males were least ashamed. Although males reported significantly more coital partners than females, more variance was explained in the female model than in the male model. Disinhibition was the most powerful predictor of number of partners for both sexes. As predicted by evolutionary theory, gender differences in sexual dreaming and behavior reflect gender-differentiated reproductive strategies as predicted by evolutionary theory.

INTRODUCTION

The examination of gender differences in sexual behavior and attitudes has a long history in the behavioral and biological sciences (Alcock 1998; Buss 1994; Geary 2000; Oliver & Hyde 1993). Gender differences in dream content have also attracted researchers (Beck 2002; Kolchakian & Hill 2002), but research combining the two domains is virtually absent. We combine these two gender-difference domains and examine the relationships among gender, disinhibition, and various aspects of the dream content and evaluation. Although dreaming is an intensely private affair, it is strongly influenced by biology and culture (Halton 1992).

Sigmund Freud (1953) saw dreams as the royal road to the unconscious, and hence to self-knowledge. He saw dreams as resulting from intrapsychic conflicts, primarily between the instinctual urges of the id and the proscriptions of the superego. Sexual and other such urges that impinge on the conscious minds of adequately socialized individuals are quickly relegated to the unconscious mind, but these denied urges strive for recognition during sleep via their dreams. Although the superego was less vigilant during sleep, it nevertheless managed to censor our dreams through distortions of meaning. In Freud's formulation, dreams served to disguise rather than reveal the dreamer's wishes and concerns.

Modern neurophysiological explorations of the dream process disagree with Freud's notion, characterizing dreaming as a function of relatively haphazard firings of neurons as the neocortex takes the opportunity provided by rapid eye movement (REM) sleep to purge itself of irrelevant information (Pinel 2000). The only "conflict" taking place is that between interacting excitatory and inhibitory neurons. The bizarre nature of many dreams is attributed to random firings from which the brain does its best to make sense of these firings rather than any attempt to censor dream content (Peterson 1997). The dreamer's sensorymotor system is value-neutral, not censorious, and simply provides a framework "into which ideational, volitional, or emotional content may be projected to form the integrated dream image" (Hobson & McCarley 1977 1347). Likewise, Beck (2002) contends that when external stimuli are withdrawn (as in the sleep state) the person's cognitive patterns derived from experience shape the content of his or her dreams.

According to this conceptualization of dreaming, the subjective content of the dreamer's mind imposes order out of the chaos of chance neuronal firings in much the same way that different people see different patterns in amorphous cloud formations. Because cerebral activity is unconstrained by sensory input during sleep, the content of dreams is likely to reflect the thoughts, memories, and emotions of individual dreamers. Winson (1990 95) notes that dreams "take note of life's experiences" and react according to their own "scheme of interpretation." Thus, the content of dreams reflect the private logic of the dreamer and provides insight to his or her desires, motives, and experiences (Slaviik 1994). Given the absence of outside sensory input, the dreamer's subjectivity has free rein to organize and structure the neurochemical activity taking place in the cortex, thus infusing neurophysiology with meaning (Pinel 2000).

A person's dreams about sexual activity

are likely prompted by memories of sexual activity. Unless a person has significant memories related to a particular activity, there will be few neuronal traces in the hippocampus to be called upon during REM sleep to be manifested in his or her dreams (Pinel 2000; Ogawa, Hiroshi, & Tadao 2002). On the other hand, Kuiken also points out that

> recent developments suggest that dreams mirror our *conceptions* of our actions and feelings rather than what we *actually* do (1987 225)

which suggests that dreams may symbolically reflect and express our desire-states, feelings, and emotions, both fulfilled and unfulfilled.

Thus, contemporary models of dreaming do not view the process as reflecting conflict between innate urges and culturally imposed morality. Rather, they view these twin determinants of behavior operating in tandem to produce the content of our dreams; the brain's neurotransmitter secretion patterns providing raw materials, and the individual dreamer painting pictures with them that fit his or her own subjectivity. Dreams mirror the dreamer's private psychological world and reflects his or her waking life (Schredl, Sahlin, & Schaefer 1998). The interpretations we place on our sexual dreams—whether or not we enjoy them or are ashamed of them, as well as how real and vivid they appear to be—say something about our sexual attitudes, and perhaps even our sexual behavior. That is, people who have vivid sexual dreams and who enjoy them can be expected to be more sexually active in terms of number of sexual partners than people who are ashamed of their sexual dreams.

DISINHIBITION

Some dream research suggests a relationship between personality and dream content (Cann & Donderi 1986; Pinel 2000; Wang et al 2000). One such personality trait is disinhibition, which has been succinctly defined by Rosenblitt and his colleagues (2001 398) as "the desire for uninhibited behavior in social situations." Such uninhibited behavior would include a casual attitude toward sex, binge drinking, and drug abuse (Walsh 1995). Disinhibition is a component of the more general trait of sensation-seeking, a trait that describes a person's attempt to provide the optimal level of stimulation for his or her self (Zuckerman, Eysenck, & Eysenck 1978). Some people have very low thresholds for stimulation, others have very high thresholds and are constantly seeking new experiences. Those individuals with high thresholds tend to be extroverts, adventure seekers, and easily bored. In addition to a wide range of impulsive and acting-out behaviors, high sensation-seekers of both sexes report a greater range of sexual activities with more partners than do low sensation-seekers (Zuckerman, Buchsbaum, & Murphy 1980; Walsh 1993). Because the disinhibition subscale of the sensation-seeking scale has been found to most strongly to differentiate the genders in England (Daitzman & Zuckerman 1980), the United States (Rosenblitt et al 2001), and China (Wang et al 2000), we limit ourselves to this trait.

Although not discounting socialization effects for significant differences between the genders on disinhibition, Daitzman & Zuckerman (1980) found that high disinhibitors had significantly higher levels of testosterone (T) ($r = .43$), and that T levels correlated significantly with interest in erotica ($r = .40$), dominance ($r = .31$), and number of coital partners ($r = .43$). T is the hormonal mediator of sexual arousal in both men and women (Udry 2000), and it has been asserted that T switches women off their "safety first approach [to sexual activity] and onto a more masculine approach" (Nyborg & Boeggild 1989 29). In other words, T levels beyond the normal female range has the effect of biasing female behavior in the direction of a more male-like casual approach to sexuality (Fisher 1998; Geary 2000).

A number of theorists speculate that there is more sociosexual variation among women than among men (Gangestad & Simpson 1990; Walsh 2000). One behavior genetic study based on Australian Twin Registry data reported heritability coefficients of .20 and .60 for the sociosexuality scale for males and females, respectively (Bailey 1997). These different coefficients suggest that the genes underlying male sociosexuality have almost gone to fixity, while there is still abundant genetic variation among females, leading us to hypothesize that disinhibition among women may have a greater affect on their sexual behavior than it will among men.

This study explores various correlates of number of coital partners. The hypothesis

Table 1 - Correlation (r) Matrix, Means, and Standard Deviations of All Variables For Male and Female Subsamples

Variable	Dis	Age	SR	SA	Sen	SMR	Mean	S.D.	Sample
Part.	.48***	.12	.28**	-.13	.52***	.48***	12.39	11.36	Male
	.70***	.44***	.39***	.27***	.33***	.07	7.07	7.55	Female
Dis.		-.09	.17	-.41***	.07	.35***	9.09	1.57	Male
		.42***	.39***	.27***	.32***	.13	8.52	1.35	Female
Age			-.09	.27*	.34**	.14	30.23	10.83	Male
			.18**	.12	.19**	.07	28.08	8.24	Female
SR				.23*	.37***	.48***	5.87	2.43	Male
				.03	.33***	.33***	6.31	2.40	Female
SA					.00	-.09	0.33	0.47	Male
					.08	-.00	0.40	0.49	Female
Sen						.52***	0.37	0.49	Male
						.22**	0.36	0.48	Female
SMR							1.09	0.72	Male
							0.78	0.76	Female

*p< .05; **p<.01; ***p<.001

Underlined correlations are those significantly different at p<.05 (Fisher's r to Z test) or means between males and females significantly different at p<.05 (t-test).

CODING: Part. = number of sexual partners. SS = sensation seeking. SR = rating of sex dreams as "real and vivid" (responses scaled from 1 to 10). SA = "ashamed of sexual dreams" 0=no, 1=yes. Sen = "enjoy sexual dreams" 0=no, 1=yes. SMR = "dreams more sexual than romantic" 0=no, 1=undecided, 2=yes

being tested is whether a person's sexual activity is reflected in the content and self-evaluation of his or her dreams. An additional hypothesis is that persons high on the disinhibition scale will report a significantly greater number of coital partners, and that they will be more positive in their evaluations of their sexual dreams than will persons low on the trait.

METHODS

The data consist of 302 white college students (212 females and 88 males) who responded to in-class questionnaires. Means and standard deviation and coding for all variables used in this study are shown in Table 1. There were 108 married students, 32 divorcees, and 176 singles. Three non-white students were eliminated from the analysis because of insufficient numbers.

Dream Content was measured by asking subjects to respond to a variety of questions relating to their dreams (see, Kolchakian & Hill 2002; Martinetti 1989). Of interest to this study were questions relating to (a) how "real and vivid" on a 10-point scale they experienced their sexual dreams to be, (b) whether or not they enjoyed their sexual dreams, (c) whether or not their sexual dreams made them feel ashamed, and (d) whether their dreams were more sexual than romantic. These latter three questions were dispersed among a number of other dream related questions of no interest to the present study (see Table 1 for coding).

Disinhibition was measured by the disinhibition sub-scale of Zuckerman's sensation-seeking scale. Zuckerman, Buchsbaum, and Murphy (1980) report a reliability coefficient of .87 for this scale.

Each student was also asked to indicate the number of coital partners they had experienced. Values ranged from 0 to 30, with an overall mode of 1, and a median of 5; both the mode and median for the male subsample were 10, and for the female subsample they were 1 and 4, respectively (means are shown in Table 1). As seen in Table 1, the mean age of these students is considerably greater (range = 18 - 57) than is usual for studies using student samples, perhaps reflecting the greater proportion of non-traditional students in urban-centered universities, and perhaps the greater propensity of non-traditional students to take summer courses. This wider than usual age range is viewed as a plus, since it implies a wider range of life experiences among our subjects.

Table 2 - Regression Models of all Significant Predictors of Number of Coital Partners

	Entire Sample				Females Only				Males Only			
Variable	**b**	**s.e.**	**beta**	**t**	**b**	**s.e.**	**beta**	**t**	**b**	**s.e.**	**beta**	**t**
Dis	3.05	.29	.474	10.63***	2.82	.31	.502	8.97***	3.20	.57	.433	5.63***
Age	.12	.04	.111	2.57**	.18	.05	.186	3.64**	n.s.			
Gender	-3.50	.83	-.178	-4.23**								
Sen	4.02	.84	.214	4.80**	1.30	.79	.084	1.65*	11.14	1.77	.488	6.34***
SA	n.s.				2.04	.73	.134	2.79**	n.s.			
SR	.38	.18	.095	2.12*	.41	.17	.122	2.36*	n.s.			
(a)	-23.03	2.71		-8.51	-25.90	2.39		-10.83	-20.84	5.23		-3.99
	Adj. R = .473				Adj. R = .517				Adj. R = .442			
	F=48.25, p<.00001				F=47.81, p<.00001				F=38.58, p<.0001			

*p<.05; **p<.01;***p<.001. See Table 1 for variable labels and coding.

FINDINGS

Table 1 presents a correlation matrix of all variables included in this study and their means and standard deviations for male (above) and female (below) subsamples. Underlined correlations indicate significant differences between male and female correlations (Fisher's r to Z transformation). Disinhibition has the strongest correlations with number of partners for both males and females. Males had a significantly greater number of coital partners than females (t = 4.82, p < .0001). The present sample is consistent with national means for males (12.26) but overestimates national means for females (3.32) based on a NORC representative sample of 1,401 adult Americans (Smith 1991).

The different effects of the variables in the matrix on number of coital partners across genders are noteworthy. Disinhibition, age, and being ashamed of sexual dreams, have significantly greater positive affects for females on number of partners than they do for males. Only the "dreams more sexual than romantic" variable is significantly more powerful for males (r = .48) than for females (r = .07) in predicting number of partners.

Males were significantly more disinhibited than females (t = 3.12, p < .01). Although the correlation between disinhibition and age among males is not significant, it is negative (r = -.09); among females it is positive and significant (r = .42). Among males, the more disinhibited they are the less they are ashamed of their sexual dreams, but the correlation is positive for females, which may reflect the greater stigma attached to female sexual behavior (Walsh 1999). Disinhibition is also significantly and positively related to rating of dreams as "real and vivid," and to "enjoy sexual dreams" for both genders. Consistent with previous findings that disinhibition differentiates the genders more than other sensation-seeking subscales, all the male/female correlations between it and the other variables are significantly different from one another.

Males rated their dreams significantly more sexual than romantic than did females (t= 3.29, p < .001). Although the correlations between "enjoy sexual dreams" and "dreams more sexual than romantic" were positive and significant for both genders, the male correlation (.52) is significantly greater than the female correlation (.22) at <.05.

Table 2 presents all significant variables regressed on number of coital partners. In the full model (total sample), only "dreams more sexual than romantic" failed to enter the model. The most powerful predictor of number of sex partners is disinhibition (β = .474). Other variables impact only minimally on the criterion variable given the presence of disinhibition in the model. The full model accounts for 47.3 percent of the variance in number of sexual partners.

In the gender-specific models, disinhibition is again the most powerful predictor for females, while "enjoy sexual dreams" was slightly more powerful for males. Although males are more disinhibited than females, disinhibition impacts more strongly on number of coital partners for females. Disinhibition and "enjoy sexual dreams" are the only variables to affect number of coital partners significantly across both subsamples. Age, ashamed of sexual dreams, and rating of sexual dreams affects number of partners among females but not among males, and "enjoy sexual dreams" is the only variable other than disinhibition that significantly ef-

Table 3 - Assessing Mean Differences Between Variables Based on Median Split on Disinhibition

		Females				Males			
Variable	**Disinhib. Level**	**Mean**	**s.d.**	**t**	**eta²**	**Mean**	**s.d.**	**t**	**eta²**
Number Coital Partners	Low	3.03*	3.44	-9.04	.284	9.44*	11.45	-2.45	.065
	High	10.92*	8.45			15.31*	10.75		
Sexual Dream Rating	Low	5.25	2.45	-6.28	.187	5.62	1.60	-1.33	n.s.
	High	7.27*	1.85			6.23*	6.23		
Dreams More Sexual	Low	.68	.66	-2.75	.035	.89	.75	-2.19	.053
	High	.96*	.83			1.23*	.70		
Enjoy Sexual Dreams	Low	.21*	.41	-4.86	.011	.44*	.50	.56	n.s.
	High	.52	.50			.38	.49		
Ashamed Sexual Dreams	Low	.27*	.45	-2.96	.040	.56*	.50	3.26	.110
	High	.48*	.50			.23*	.42		

*means that differ < .05 by gender within disinhibition category; e.g., the low female disinhibition category's mean number of sex partners (3.03) differs significantly from the low male disinhibition category mean (9.44).

fects number of partners for males. The female model explained 7.5 percent more of the variances (51.7% vs. 44.2%) in number of sexual partners than the male model.

Curiously, being ashamed of sexual dreams is associated with having *more* sexual partners among females. We would expect that women who are ashamed of their dream sexuality would be least likely to be very sexually active, as indeed is the case among males. What may be reflected in this finding is female ambivalence about sexual activity given that the social mores define very sexually active males positively ("studs") and very active females negatively ("whores"). Seventy percent of the highly sexually active females (defined as women having a number of sexual partners greater or equal to twice the female median) stated that they were ashamed of their sexual dreams, compared to 49.5 percent of the virgins, and 29.4 percent of the remaining females. The corresponding percentages for males were 27.2, 33.3, and 44.4, which is exactly the reverse ordering. It might be conjectured that some of the more sexually active females feel that they have to be sexually active as a prerequisite to becoming romantically involved (Guttentag & Secord 1983; Hrdy 1999; Walsh 1993), but their behavior may be a cause of subjective concern for them due to the negative image society has of females who are sexually active with many partners.

If this is the case, it is reasonable to assume that it is among divorced women that the link between sexual activity and being ashamed of one's sexual dreams would be most strong because it has been shown that divorced women tend to be more sexually active than married or never-married women (Zinn & Eitzen 1987; Smith 1991). ANOVA results show that divorced women (n = 28) had significantly more sexual partners than either married or never-married women, with a mean number of sexual partners of 12.29 ($F = 15.48$, $p < .0001$). The relationship between number of partners and being ashamed of sexual dreams is much stronger among divorced women than among marrieds or never marrieds (r's of .56, .32, and .10, respectively).

Given the gender differences reported, and given the powerful influence of disinhibition, it was decided to dichotomize disinhibition into high and low categories with a median split and explore its effect on other variables separately for men and women. Only those variables that are significantly different between disinhibition categories for one or both genders are addressed. Because "enjoy sexual dreams" and "ashamed of sexual dreams" are dummy coded, the reported means represent the proportion of cases that are affirmative on each variable.

Table 3 shows that disinhibition explains about 4.4 times more variance in female sexual activity ($\eta^2 = .284$) than it does in male sexual activity ($\eta^2 = .065$), although males had more partners in each category. Males high on the disinhibition scale (Mean= 15.31) had significantly more coital partners (as indicated by the asterisk in the table) than highly disinhibited females (Mean = 10.92). However, females high on disinhibition had more

sexual partners than low disinhibited males (Mean = 9.44), but the difference is not statistically significant.

High disinhibition women rated their dreams more real and vivid than did low disinhibition women, but there was no difference between the categories for males. For both men and women, the highly disinhibited rated their dreams as more sexual than romantic than the low disinhibited. More highly disinhibited women reported that they enjoyed their sexual dreams than did the low disinhibited women, but no difference was found among the men.

Finally, we see that "ashamed of sexual dreams" operates in different directions for males and females. It is the highly disinhibited among the females who are the most ashamed; among the males it is the low disinhibited. Gender differences are significant across both disinhibition categories. As shown in Table 1, the zero-order correlations between disinhibition and "ashamed" for males and females are -.41 and .22, respectively, and between number or partners and ashamed are -.13 and .27, respectively. Thus, males who are ashamed of their sexual dreams are less disinhibited and have fewer sexual partners, but the more ashamed females are the more disinhibited they are, and the more sexual partners they have had.

DISCUSSION

The results of this study offer modest support for the hypothesis that dreams are a "mirror of the mind," reflecting, not distorting or censoring, one's experiences, wishes, desires, and attitudes (Beck 2002). The more coital partners reported, the more subjects rated their dreams as real and vivid, the more they enjoyed their dreams, and the more their dreams were sexual rather than romantic. The latter finding is true for males only, which perhaps reflects the separation of sex and romance among males and the intimate connection of sex and romance among females (Oliver & Hyde 1993; Walsh 1999).

It cannot be determined from these data whether dreams are thus rated *because* of plentiful sexual experiences, or if both the experiences and the evaluation of dream content arise from a common cause, namely a strong subjective interest in sexual behavior. While it may be true that the brain plucks images from long-term memory storage in response to eye movements during REM sleep, those memories may well be neurologically-entrenched fantasy rather than memories of actual experiences. Given the links between disinhibition, T, MAO levels, gender, and number of coital partners (Daitzman & Zuckerman 1980; Bogeart & Fisher 1995; Udry 2000), the possibility that physiological differences may be impacting both dream content and number of coital partners should be considered.

Gender differences were quite evident in his study. For males, the enjoyment of sexual dreams was the best predictor of number of partners when entered into the regression equation, eclipsing even disinhibition, the most powerful overall predictor. This may be a consequence of a stronger interest in sexual behavior among males (see Oliver & Hyde 1993 for a meta-analysis of gender differences in sexual interest), in terms of both behavior and fantasy, which is reflected in their dreams. The strength of this interest may, in turn, be a function of higher levels of circulating T (Bogaert & Fisher 1995; Udry 2000).

The fact that males had statistically significantly more sexual partners than females, even after adjusting for age and other relevant variables, a ubiquitous finding in the literature on gender differences (Oliver & Hyde 1993), requires comment. Phillis and Gromko (1985) have commented that male and female means must be equal (each unique partner for a male necessarily means a unique partner for a female) and that statements to the contrary should be viewed with some suspicion. While this logic is undeniable in terms of overall population means, it does not preclude the notion that *most* females are much less sexually active than *most* males. Ellis points out that

> extremely active females (e.g.., prostitutes, 'nymphomaniacs') are not fairly represented in colleges where most surveys are conducted. (1989/1990 28; see also Roche 1986)

Some males may be obtaining partners from the ranks of very sexually active females who exist in small enough numbers to preclude their likelihood of inclusion in typical college surveys.

Given the ease with which females may obtain sexual partners relative to males (Wilson 1983; Walsh 1999), females who are

disposed to having sex with numerous partners will have more impact on the female mean than will males who are similarly disposed. In the present sample, the coefficients of skewness for the male and female distributions of number of partners are .298 and 1.345, respectively. These coefficients indicate that atypically sexually active females do indeed contribute more to the female mean (pulling it further toward the tail of a positively skewed distribution) than do atypically sexually active males.

Women who had the most coital partners (divorcees and the highly disinhibited) were most ashamed of their sexual dreams, while males showed the opposite effect. Evolutionary theorists might explain this by pointing out that sexually promiscuous women are not following the "female-typical" reproductive strategy, while sexually promiscuous males are following the "male-typical" strategy (Hrdy 2000; Walsh 1991). We may speculate that highly sexually active women are ashamed of their dreams because they are (unconsciously or otherwise) ashamed of their conduct. On the other hand, highly sexually active males are not ashamed of their sexual dreams because, from an evolutionary perspective, they are following their evolved reproductive strategy. If there is such a thing as an "optimal" reproductive strategy for females, it would be to be sexually pragmatic, conservative, and discriminating because of their greater parental investment (Geary 2000; Hrdy 2000).[1]

Although some may balk at such an explanation, it is consistent with evolutionary theory and is well grounded in an empirical literature which has consistently found male and female attitudes about love and sex to be quite different (see Buss 1994, and Oliver & Hyde 1993, for reviews). In general, males tend to believe and behave in a manner evolutionary theorists would predict (game playing with a variety of partners), and females tend to believe and behave conservatively and pragmatically (Udry 2000; Walsh 1993). When females are observed to conform more to the male reproductive strategy, it tends to occur during time periods in which females outnumber males. A licentious mating environment is produced during such periods, whereas during periods when the male/female ratio is reversed, men tend to conform to the female strategy, and a less lusty and more romantic dating and mating environment evolves (Barber 2000; Geary 2000; Guttentag & Secord 1983). Thus mating tactics depend on current environmental conditions and individual differences as well as evolved species traits.

In summary, the present data support the notion that dreams reflect experience, and that the interpretations of these experiences, as manifested in dreams and how they are evaluated, differ across the genders. Although based on a relatively small sample, and with due recognition of the difficulty inherent in attempting to measure dream evaluations, these findings are interesting enough to prompt further research. Unfortunately, we omitted to inquire about the sexual orientation and drug usage of our respondents, both of which are known to influence sexual activity and dreaming (Walsh 1995). These variables should be included in future research. Future research relating number of coital partners and dream content would be particularly useful if T levels were actually assayed rather than using disinhibition as a proxy as it was in the present study. While we have reviewed studies relating to the relationships between T, sexual activity, and disinhibition, we could locate no study in which these variables were examined in conjunction with dream experiences. An elaboration of the relationships among T, other biological mechanisms, social-psychological factors, and the sexual content of dreams should prove most useful.

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ENDNOTE

1. The term parental investment has nothing to do with individual differences, but rather with the sex-differentiated reproductive strategies char-

acteristic of all mammals. The so-called *Bateman's rule,* that states the sex with the least parental investment is always the most promiscuous, is the closest thing that biology has to a law. Among mammals, parenting effort is primarily a female strategy, & mating effort is primarily a male strategy. The reason for this gender asymmetry rests with the different levels of obligate parental investment. The only biologically *obligatory* investment of males is limited to the time & energy spent copulating. Males can increase their reproductive success in proportion to the number of females they can copulate with, & they have an evolved propensity to seek multiple partners. Female parental investment requires an enormous expenditure of time, energy, & resources, & thus females have evolved a tendency to be much more careful & choosey about with whom they will mate.