

April 10, 2007

Birds Do It. Bees Do It. People Seek the Keys to It.

By [NATALIE ANGIER](#)

Sexual desire. The phrase alone holds such loaded, voluptuous power that the mere expression of it sounds like a come-on — a little pungent, a little smutty, a little comical and possibly indictable.

Everybody with a pair of currently or formerly active gonads knows about sexual desire. It is a near-universal experience, the invisible clause on one's birth certificate stipulating that one will, upon reaching maturity, feel the urge to engage in activities often associated with the issuance of more birth certificates.

Yet universal does not mean uniform, and the definitions of sexual desire can be as quirky and personalized as the very chromosomal combinations that sexual reproduction will yield. Ask an assortment of men and women, "What is sexual desire, and how do you know you're feeling it?" and after some initial embarrassed mutterings and demands for anonymity, they answer as follows:

"There's a little bit of adrenaline, a puffing of the chest, a bit of anticipatory tongue motion," said a divorced lawyer in his late 40s.

"I feel relaxed, warm and comfortable," said a designer in her 30s.

"A yearning to kiss or grab someone who might respond," said a male filmmaker, 50. "Or if I'm alone, to call up exes."

"Listening to [Noam Chomsky](#)," said a psychologist in her 50s, "always turns me on."

For researchers in the field of human sexuality, the wide variance in how people characterize sexual desire and describe its most salient features is a source of challenge and opportunity, pleasure and pain. "We throw around the term 'sexual desire' as though we're all sure we're talking about the same thing," said Lisa M. Diamond, an associate professor of psychology at the [University of Utah](#). "But it's clear from the research that people have very different operational definitions about what desire is."

At the same time, the researchers said, it is precisely the complexity of sexual desire, the depth, richness and tangled spangle of its weave, that call out to be understood.

An understanding could hardly come too soon. In an era when the rates of [sexually transmitted diseases](#) continue to climb; when schools and parent groups spar bitterly over curriculums for sex education classes; when the [Food and Drug Administration](#) angers both religious conservatives and women's groups by approving the sale of the morning-after pill over the counter but then limiting those sales to women 18 years or older; and when deviations from the putative norm of monogamous heterosexuality are presented as threats to the social fabric — at such a time, scientists argue that the clear-eyed study of sexual desire and its consequences is vital to public health,

public sanity, public comity.

“Sexual desire may be complicated, but that doesn’t mean it’s chaotic,” said Julia R. Heiman, director of the Kinsey Institute for Research in Sex, Gender and Reproduction in Bloomington, Ind. “We can make an honest attempt to understand what sexual desire is and what it is not, and that it is important to do so.”

Meredith L. Chivers, a researcher at the Center for Addiction and Mental Health in Toronto, concurs. “Sexuality is such a huge part of who we are. How could we not want to understand it?”

Unabashed about acting on their academic appetites, sexologists have gained a wealth of new and often surprising insights into the nature and architecture of sexual desire. They are tracing how men and women diverge in their experience, and where they converge. They are learning how and why people pursue the erotic partners they do, and the circumstances under which those tastes are either fixed or fluid.

Some researchers are delving into the neural, anatomical and emotional mechanisms that modulate and micromanage sexual desire and sexual arousal; others are exploring the role that culture plays in plucking or muffling the strings of desire. The pragmatists in sexology’s ranks are seeking better bedside medicines — new ways to help people who feel they suffer from an excess or deficit of sexual desire.

One recent standout discovery upends the canonical model of how the typical sex act unfolds, particularly for women but very likely for men as well.

According to the sequence put forward in the mid-20th century by the pioneering sex researchers William H. Masters, Virginia E. Johnson and Helen Singer Kaplan, a sexual encounter begins with desire, a craving for sex that arises of its own accord and prods a person to seek a partner. That encounter then leads to sexual arousal, followed by sexual excitement, a desperate fumbling with buttons and related clothing fasteners, a lot of funny noises, climax and resolution (I will never drink Southern Comfort at the company barbecue again).

A plethora of new findings, however, suggest that the experience of desire may be less a forerunner to sex than an afterthought, the cognitive overlay that the brain gives to the sensation of already having been aroused by some sort of physical or subliminal stimulus — a brush on the back of the neck, say, or the sight of a ripe apple, or wearing a hard hat on a construction site and being surrounded by other men in similar haberdashery.

In a series of studies at the University of Amsterdam, Ellen Laan, Stephanie Both and Mark Spiering demonstrated that the body’s entire motor system is activated almost instantly by exposure to sexual images, and that the more intensely sexual the visuals, the stronger the electric signals emitted by the participants’ so-called spinal tendious reflexes. By the looks of it, Dr. Laan said, the body is primed for sex before the mind has had a moment to leer.

“We think that sexual desire emerges from sexual stimulation, the activation of one’s sexual system,” she said in a telephone interview.

Moreover, she said, arousal is not necessarily a conscious process. In other experiments, Dr. Spiering and his colleagues showed that when college students were exposed to sexual images too fleetingly for the subjects to report having noticed them, the participants were nevertheless much quicker to identify subsequent sexual images than were the control students who had been flashed with neutral images.

“Our sexual responsiveness can be activated or enhanced by stimuli we’re not even aware of,” Dr. Laan said.

By reordering the sexual timeline and placing desire after arousal, rather than vice versa, the new research fits into the pattern that neurobiologists have lately observed for other areas of life. Before we are conscious of wanting to do anything — wave at a friend, open a book — the brain regions needed to perform the activity are already ablaze. The notion that any of us is the Decider, the proactive plotter of our most lubricious desires, scientists say, may simply be a happy and perhaps necessary illusion.

The new findings also suggest that in some cases, the best approach for treating those who suffer from low sex drive may be to focus on enhancing arousability rather than desire — to forget about sexy thoughts and to emphasize sexy feelings, the physical cues or activities that arouse one’s sexual circuitry. The rest will unwind from there, with the ease of a weighted shade.

Researchers have also gathered considerable evidence that the sensations of sexual arousal, desire and excitement are governed by two basic and distinctively operating pathways in the brain — one that promotes sexual enthusiasm, another that inhibits it. An originator of this novel concept, Erick Janssen of the Kinsey Institute, compares these mechanisms to the pedals of a car.

“If you let go of the gas pedal, you’ll slow down,” he said, “but that’s not the same as stepping on the brakes.”

In any given individual, each pedal may be easier or harder to press. One person may be quick to become aroused, but equally quick to stifle that response at the slightest distraction. Another may be tough to get started, but once galvanized “will not lose sexual arousal even if the ceiling comes down,” Dr. Janssen said. Still another may be saddled with both a feeble sexual accelerator and an overzealous sexual inhibitor, an unenviable pairing most likely correlated with a taste for beige pantsuits and the music of Loggins and Messina.

Dr. Janssen and his colleagues have developed extensive questionnaires to measure individual differences in sexual excitability and inhibition, asking participants how strongly they agree or disagree with statements like “When I am taking a shower or a bath, I easily become sexually aroused” and “If there is a risk of unwanted [pregnancy](#), I am unlikely to get sexually aroused.”

The researchers have also explored the physiological, emotional and cognitive underpinnings associated with high scores and low. In one recent study, they recruited 40 male undergraduates and determined by questionnaire the subjects’ relative degree of sexual excitability and inhibition. Each participant was then ushered into a plush, private room with low lighting, a comfortable recliner and a television monitor and instructed in how to place the aptly named Rigiscan device on his genitals.

Thus outfitted, the students watched a series of erotic film clips, some classified as “nonthreatening” and depicting couples engaged in mutually animated consensual sex, others of a “threatening” variety featuring coercive, violent sex.

Analyzing the excitability and inhibition variables separately, the researchers found that the men who had scored high on the questionnaire in sexual excitability showed, on average, a swifter and more robust penile response to all the erotic films than did the low scorers, regardless of the comparative violence or charm of the material viewed.

More intriguing still were the divergent sexual responses between men who ranked high on the inhibition scale and those who scored low. Whereas both groups reacted to the nonthreatening sex scenes with an equivalently hearty degree of tumescence, only the low scorers — those whose answers to the questionnaire indicated they had scant sexual inhibition — maintained an enthusiastic physiological response when confronted with film clips of sexual brutality.

The results suggest that having a good set of sexual brakes not only dampens the willingness to commit rape or sexual abuse, but the desire as well, giving the lie to notions that “all men are the same” and would be likely to rape their way through the local maiden population if they thought they could get away with it.

The researchers have also found a link between sexual inhibition and sexual risk-taking: men who are low in inhibition do not necessarily engage in more or kinkier sex than do their high-inhibition counterparts, but the odds are greater that they will forgo condoms if they indulge.

Most of the studies on the autonomy of sexual brakes and accelerators have been done on men, but scientists lately have begun applying the dual-control model to their studies of female sexuality as well. At first they used a slightly modified version of the excitement/inhibition questionnaire that had proved valuable for assessing men, but they soon realized that their menu of sex situations and checklist of physical arousal cues might be missing large swaths of a woman’s sexual persona.

What was the feminine equivalent of an erection anyway? Was it vaginal swelling and lubrication, or something else entirely? Women are generally smaller and less muscular than men. What might the feeling of being physically threatened do to enhance or hamper a woman’s sexual appetite?

“We started putting together focus groups, asking women to tell us the various things that might turn them on and turn them off sexually, and how they know when they’re sexually aroused,” said Stephanie A. Sanders of the Kinsey Institute and [Indiana University](#). “They mentioned a heightened sense of awareness, genital tingling, butterflies in the stomach, increased heart rate and skin sensitivity, muscle tightness. Then we asked them if they thought the female parallel to an erection is genital lubrication, and they said no, no, you can get wet when you’re not aroused, it changes with the menstrual cycle, it’s not a meaningful measure.”

Through the focus groups, Dr. Sanders and her colleagues compiled a new, female-friendly but admittedly cumbersome draft questionnaire that they whittled down into a useful research tool. They asked 655 women, ages 18 to 81, to complete the draft survey and scrutinized the results in search of areas of concurrence and variability.

The researchers have identified a number of dimensions on which their beta testers agreed. For example, 93 to 96 percent of the 655 respondents strongly endorsed statements that linked sexual arousal to “feeling connected to” or “loved by” a partner, and to the belief that the partner is “really interested in me as a person”; they also concurred that they have trouble getting excited when they are “feeling unattractive.”

But women’s tastes varied widely in many of the finer details of seduction and setting. “Some women say they find the male body odor attractive, others repulsive,” Dr. Sanders said. “Some women are turned on by the idea of having sex in an unusual or unconcealed place where they may be caught in the act, while others have a hard time getting aroused if they think others may hear them, or the kids will walk in.”

Conventional wisdom has it that a woman's libido is stifled by unhappiness, anxiety or anger, but the survey showed that about 25 percent of women used sex to lift them out of a bad mood or to resolve a marital spat.

Women also differed in the importance they accorded a man's physical appearance, with many expressing a comparatively greater likelihood of being aroused by evidence of talent or intelligence — say, while watching a man deliver a great speech.

The researchers are now trying to correlate women's sexual inhibition and excitement ratings to their sexual behavior and sexual self-image— whether they are likely to engage in risky sex, dissatisfying sex or no sex at all.

Other scientists have devised surveys of their own to plumb the depths and contours of sexual desire. Richard A. Lippa, a professor of psychology at [California State University](#) in Fullerton, for months invited anybody with the time and interest to take his online survey, in which he asked people to rate their reactions to statements like “I frequently think about sex,” “It doesn't take much to get me sexually excited,” “I fantasize about having sex with men,” “I think a woman's body is sexy” and “If I were looking through a catalog with sexy swimsuits, I'd spend more time looking at the men in the pictures than the women.”

Dr. Lippa has collected responses from more than 200,000 people around the world, and, though he has yet to complete his analysis of the data, a number of salient findings shine through. Whether the test-takers live in North America, Latin America, Britain, Western Europe or Japan, he said, men on average report having a higher sex drive than women, and women prove comparatively more variable in their sex drive.

“Men have a consistently high sex drive,” he said, “while in women you see more low sex drive and more high sex drive.”

Women's sexual fluidity extends beyond the strength of desire, he said, to encompass the objects of that desire. In his survey, heterosexual women who rated their sex drive as high turned out to have an increased attraction to women as well as to men.

“This is not to say that all women are bisexual,” Dr. Lippa said. “Most of the heterosexual women would still describe themselves as more attracted to men than to women.” Still, the mere presence of a hearty sexual appetite seemed to expand a heterosexual woman's appreciation of her fellow women's forms. By contrast, the men were more black-and-white in their predilections. If they were straight and had an especially high sex drive, that concupiscence applied only to women; if gay, to other men.

Dr. Diamond of the University of Utah also has evidence that women's sexual attractions are, as she put it, “more nonexclusive than men's.”

One factor that may contribute to women's sexual ambidextrousness, some researchers suggest, is the intriguing and poorly understood nonspecificity of women's physical reactions to sexual stimuli. As Dr. Chivers of the Center for Addiction and Mental Health and other researchers have found, women and men show very divergent patterns of genital arousal while viewing material with sexual content.

For men, there is a strong concordance between their physiological and psychological states. If they are looking at images that they describe as sexually arousing, they get erections. When the images are not to their expressed taste or sexual orientation, however, their genitals remain unmoved.

For women, the correlation between pelvic and psychic excitement is virtually nil. Women's genitals, it seems, respond to all sex, all the time. Show a woman scenes of a man and a woman having sex, or two women having sex, or two men, or even two bonobos, Dr. Chivers said, and as a rule her genitals will become measurably congested and lubricated, although in many cases she may not be aware of the response.

Ask her what she thinks of the material viewed, however, and she will firmly declare that she liked this scene, found that one repellent, and, frankly, the chimpanzee bit didn't do it for her at all. Regardless of declared sexual orientation, Dr. Chivers said, "with women, there's a discrepancy between stated preference and physiological arousal, and this discrepancy has been seen consistently across studies."

Again, the why of it remains a mystery. Dr. Chivers and others have hypothesized that the mechanism is protective. Women are ever in danger of being raped, they said, and by automatically lubricating at the mere hint of sex, they may avoid damage during forced intercourse to that evolutionarily all-important reproductive tract.

Regardless of gender or relative genital congestion, people attend almost reflexively to sexual imagery. In an effort to trace that response back to the body's premier sex organ, Kim Wallen and his colleagues at [Emory University](#) in Atlanta have performed brain scans on volunteers as the subjects viewed a series of sexually explicit photographs. The researchers discovered that men's and women's brains reacted differently to the images. Most notably, men showed far more activity than women did in the amygdala, the almond-contoured brain sector long associated with powerful emotions like fear and anger rather than with anything erotic.

Heather Rupp, a graduate student in Dr. Wallen's lab, tried to determine whether the divergent brain responses were a result of divergent appraisals, of men and women focusing on different parts of the same photographs. "We hypothesized, based on common lore, that women would look at faces, and men at genitals," Dr. Wallen said.

But on tracking the eye movements of study participants as they sized up erotic photographs, Ms. Rupp dashed those prior assumptions. "The big surprise was that men looked at the faces much more than women did," Dr. Wallen said, "and both looked at the genitals comparably."

The researchers had also predicted that men would be more drawn than women to close-up views of genitalia, but it turned out that everybody flipped past them as quickly as possible. Women lingered longer and with greater stated enjoyment than did their male counterparts on photographs of men performing oral sex on women; and they noticed more fashion details. "We got spontaneous reports from the women that we never got from the males, comments like 'I would have liked the photos better if the people didn't have those ridiculous '70s hairstyles,'" Dr. Wallen said.

He proposes that one reason men would scrutinize faces in pornographic imagery is that a man often looks to a woman's face for cues to her level of sexual arousal, since her body, unlike a man's, does not give her away.

Some researchers say that on average, male sexual desire is not only stronger than women's, but also more constant from hour to hour, day to day. They point to a significant body of research suggesting a certain cyclic nature to female desire, and some say women only begin to attain masculine heights of lustiness during the few days of the month that they are fertile.

Studies have indicated, for example, that women are likelier to fantasize about sex, masturbate, initiate sex with

their mates, wear provocative clothing and frequent singles bars right around ovulation than at any other time of the month. Women obviously can, and do, have sex outside their window of reproductive opportunity, but it makes good Darwinian sense, Dr. Wallen said, for them to have some extra oomph while they are fertile.

Men, by contrast, are generally fecund all month long, and they are theoretically ever anxious to share that bounty with others, a state of perpetual readiness that Roy F. Baumeister, a psychology professor at [Florida State University](#), described as “the tragedy of the male sex drive.”

Yet some experts argue that such absolutist formulas neglect the importance of age, experience, culture and circumstance in determining the strength of any individual’s sexual desire.

“Baumeister’s ideas may have some validity for people in nonmarried relationships who are under the age of 40,” said Barry W. McCarthy, a sex therapist in Washington and one of the venerable voices in the field. “But as men and women age, they become much more alike in so many ways, including in their sexual desire.”

For women, Dr. McCarthy said, “sex feels more in their control and safer for them,” while the aging man loses the need to imagine himself the “sexual master of the universe.”

As one married male photographer and editor in his mid-50s said, “Jeez, when I was 20, I couldn’t walk straight,” but now he is sexually much looser and “unconcerned.” And while he considers his libido to be of standard dimensions for men his age, he also said it “exactly matches that of my partner.”

Together they walk the line.

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