

## Biologic perspective on early erotic development

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Neurobiologic researchers can understand children's sexuality in less moral and more biologic terms. Genetically programmed levels of neurotransmitters and hormones establish a baseline trajectory of erotic interest and activity across the lifespan. Environmental influences also contribute. Intense early stimulation can affect the brain and create a condition of hypereroticism, whereas too little stimulation can limit the ability to bond and impair the sexual response. Children who are erotically challenged or challenging are viewed correctly as having a brain imbalance, rather than as victims or as being morally deficient. This should pave the way for more humane, objective, and effective interventions.

Woman, observing that her mate went out of his way to make himself entertaining, rightly surmised that sex had something to do with it. From that she logically concluded that sex was recreational rather than procreational. (The small hardy band of girls who failed to get this point were responsible for the popularity of women's field hockey.)

J Thurber and EB White, *Is Sex Necessary?* New York: Queen's House; 1977.

### Healthy or pathologic?

The erotic interests and behaviors of infants, toddlers, and prepubescent children are viewed widely as unhealthy or destructive. This occurs despite studies that link early or current sexual activity with well-being and life satis-

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faction in adolescents and adults [1–3]. More than a decade ago, the World Health Organization stated that: “Sexuality is a fundamental quality of human life, important for health, happiness, individual development, and indeed for the preservation of the human race ” [4]. Should this statement apply to children as well? This article discusses what is known and not known about sexual development and suggest paths for future research.

### **Social and cultural perspective**

In less developed nations and in isolated, rural areas of developed nations, adults are not as concerned about children’s sexuality as they are in Western society. In societies where youngsters go naked, their genitals are stimulated by everyday contacts, such as crawling over objects, being straddled on the hip, or licked by a friendly puppy. In many less developed nations, adults intentionally rub, tickle, or orally stimulate the genitals to soothe infants or stop them from crying [5–7]. Less commonly, adults rub or pull infant genitals, molding them so they will be more sexually attractive later on [8]. These practices are not the same as sexual abuse because adults do not participate for their own sexual pleasure. Genital stimulation usually is abandoned after the child is less fussy and able to walk.

Nonhuman primates engage in casual and playful sexual activity and use various sexual behaviors as a way to relieve tension. “Rehearsal” play among young primates is essential for adult sexual function [9]. In some human societies, sex play is considered normal, acceptable activity [5,10]. Initially, youngsters engage in play that is heterosexual and homosexual, but as time goes on, heterosexual play predominates. Sex play becomes increasingly sophisticated with age and as children observe sexual activity in older children and the media. Oral sex and attempts at intercourse are not uncommon [7]. Societies that permit early sex play are said to have fewer adult sexual dysfunctions and paraphilias [10].

Across various cultures, the custom of punishing children for sexual activity is associated with adult sexual restrictions and abstention from intercourse [11]. Ample skin-to-skin contact between mother and infant is associated with a sexual approach rather than avoidance pattern in adults. whereas restricted skin-to-skin contact is associated with problematic intimacy and warlike or aggressive behavior [12–14].

### **Biologic perspective**

Sexuality exerts a broad and powerful influence throughout life and fosters tenderness, dependency, suggestibility, competition, and exploration. Levels of sexual interest and activity tend to remain constant over time; this suggests that

the propensity for sexual responsiveness is innate [15–19].<sup>1</sup> Individuals who display robust erotic interest in childhood are apt to be sexually active in adult life and to remain active into old age. In each age group, males appear more active and interested in sex than females, perhaps because of higher levels of testosterone. Testosterone could affect behavior directly or indirectly by promoting maturation and sexual attractiveness [17]. The heightened erotic interest of 2- to 4-year-old youngsters may be fostered by the high levels of hormones that persist during that period [17]. Hormone levels diminish after age 5 and remain low until prepuberty; this could be a basis for the lesser erotic interest that is observed during those years.

Sexual expression is influenced by personality characteristics that are determined, to a large extent, by genetics [20]. Spirited youngsters who enjoy taking a chance are less likely to be influenced by sanctions against sexual activity than are shy, inhibited children. Environmental forces also are important. They include “nonsexual” elements, such as the presence of parents who are able to spend time with their offspring and who relate with understanding and warmth. The sexual response is only one aspect of an integrated system that requires adequate levels of oxytocin and dopamine. If these biologic necessities are present in the context of a positive attachment, individuals can develop the capacity to affiliate, interact socially, fall in love, form a pair relationship, and respond sexually [18,21]. This serves to enhance and stabilize intimate relationships later on in life.

Genetic factors largely determine the levels of neurotransmitters, peptides, and hormones that influence the sexual response. Dopamine and serotonin act reciprocally to enhance sexual responsiveness and promote satiety [21], whereas oxytocin increases satisfaction and pair bonding [22]. Successful coupling increases the reward transmitter, dopamine, which promotes further sexual activity [23]. Although prepubescent children have lower levels of gonadal hormones than adults and less sexual knowledge or opportunity, it is presumed that the same mechanisms apply.

In animal experiments, early genital stimulation alters the structure of the somatosensory cortex [24]. Stimulation evokes strong recruitment of neurons and augmentation of neuronal function. This produces long-lasting changes in synaptic function, learning, and memory [25]. Further study in primates showed that stimulation expands the genital representation in the somatosensory cortex and reorganizes subcortical structures, including the brainstem and thalamus [26]. Animal studies also showed that sexual reinforcement (learning) strongly influences sexual behavior. The role of learning has been ignored largely in human studies.

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<sup>1</sup> The use of the terms “sexual” and “erotic” may be confusing to the reader. In general, sexual refers to the objective and instrumental aspects of possessing and using sexual equipment (eg, genitals), whereas erotic refers to fantasies, perceptions, and feelings (eg, desire). Thus, a person may respond erotically to a pornographic video but sexually when taking a medication for impotence. Clearly the two terms overlap, because it is unusual to have one without the other.

If learning is as significant a contributor to sexual function in humans as it is in animals, then the manner in which diapers are changed or infants are straddled on a caregiver's hip, may permanently affect sexual function. Deficient learning experience, with or without biologically-induced central inhibition [27] in the brain, would increase the risk for sexual dysfunction in adults. Conversely, sexual function would be protected in adults who had engaged in early experiences, such as normative, pleasurable sex play.

Too much early experience, as often occurs in sexual abuse, can foster a persistent state of hypereroticism. Hypererotic youngsters experience severe consequences, such as placement disruption, punishment, and social ostracism [29]. Early sexual abuse affects processes of neurogenesis, neural plasticity, and myelination. Major consequences include reduced size of the midportions of the corpus callosum; attenuated development of the left neocortex, hippocampus, and amygdala; and abnormal frontotemporal electrical activity [30]. Permanent changes in the hard-wiring of the brain may explain why hypererotic behavior is so highly resistant to treatment.

If too much stimulation creates a condition of hypereroticism and too little stimulation increases the fragility of the sexual response, then parents must be concerned about too little as well as too much. Either condition has life-long consequences. This concept is novel and may be unacceptable or repugnant to many individuals.

In animal experiments, body warmth, licking, touching, suckling, and skin-to-skin contact, is necessary for the young to develop affiliative behaviors and the sexual response. Stimulation promotes stress resistance, synaptogenesis, central oxytocin, increased memory, and spatial learning [31]. Well-parented animals grow to become good parents themselves [32]. Research on attachment suggests that the same factors operate in humans [33]. Parents who stimulate infants by touch, smell, and taste increase stress resistance, the propensity for social connectedness, and the capacity to respond sexually.

## **Trends in research**

Between 1930 and 1980 child analysts published detailed case reports on normal sexual development. After the focus shifted to sexual abuse in the late 1970s, the terms "normal" and "sexual" were seldom associated [5], except in a few longitudinal studies of development [34,35,57]. Studies that assessed normal children directly were few in number but included Goldman and Goldman's [36] research in 1982 on children's sexual knowledge across cultures; Martinson's [37] extensive interviews with children in 1994; and several articles that compared abused and nonabused children's response to dolls with genitals [38,39]. Cognitive and affective processes that are related to erotic experience and the formation of a sexual self have not been explored in the post-analytic era [40]. Since 1990, studies of early erotic development have relied upon the observations of parents and teachers because of the concern that

children could become frightened or overstimulated if asked directly about sex. In the last decade, society has come to accept sexual dysfunction and homosexuality as largely biologic in nature but the view of childhood sexuality remains the same.

### **Erotic development**

William Masters was an obstetrician before he became a sex researcher. He devised a game that he played while waiting for an infant to be born. He would bet that, if it were a boy, he could deliver the infant before the child could produce an erection. He won the game only half of the time [41]. Now, sonograms regularly reveal erections in utero, as early as the seventeenth week of gestation and vaginal lubrication can be observed shortly after birth. Infant boys regularly produce erections in response to cleansing of the genitals, feeding, and at times of distress [37,42]. An absolute lack of genital eroticism in infancy is remarkably rare and usually is secondary to a catastrophe, such as severe birth injury or debilitating disease. Erotic activity in infancy can be curtailed sharply by affective deprivation, rejection, or other serious problems within the primary relationship. Later on, erotic activity can be inhibited by ambiguous messages about the body and punishment for sex play or masturbation [43].

Erotic behavior in infants and children has been well-documented [16,17, 44–46]. Terminology is confusing because the “sensual” response of infants often is believed to differ from the “sexual” responsiveness of children and adolescents. To date, no clear demarcation between sensual and sexual response has been established.

Hungry infants respond to the breast with intense arousal and furious sucking. Oxytocin secretion in the nursing mother stimulates milk ejection and uterine contractions. Some mothers respond sexually to nursing, even to the point of orgasm [16,47,48]. Mothers who enjoy nursing tend to sink into a reverie of pleasant, but not necessarily erotic, thoughts [47].

Children recognize erotic sensations, assign them a value, and (ideally) integrate them within the concept of self. The eroticization process is the mechanism by which children learn to express and harness sexuality. It contributes to an internal formation of a sexual self and an external definition of how to (or not to) behave in a sexual manner. The eroticization process is the environment’s contribution to sexuality, superimposed upon the child’s biologic givens. The eroticization process may begin in utero as the fetus responds to the currents of amniotic fluid, the smoothness of the mucosal sack, and the genitals rubbing against the umbilical cord [47]. After birth, it continues through skin-to-skin contact with care givers, cuddling, sucking, and rocking [37,47].

Although there is little research in this area, the distance that parents place between children’s bodies and their own is likely to affect the eroticization process [48]. In Western cultures, the existence of small, affluent families should allow parents more time to hold and care for infants; yet, both parents are likely

to be employed and infants are placed in day care at an early age. The parents' bedroom is off limits to most youngsters, whereas most other societies allow children access to the room and often the bed [5,49]. In addition, infants frequently are encapsulated in baby carriers, car seats, strollers, and play pens. Parents are likely to look at and talk to encapsulated youngsters instead of holding them.

From the time children are 3 or 4 years old, Western parents restrict how, where, and when children can touch them [50,51]. Parents are apprehensive if they think there is too much contact, especially with boys [52], and they also worry about body contact between siblings. Rademakers et al [52] found that although 8- and 9-year-old children enjoy cuddling, 5 out of 30 children said that they never cuddled with parents and 10 were unable to associate pleasure with any body part. Parents described themselves as cuddling, bathing, and romping with the same youngsters who denied that it ever happened. The bias against pleasurable body contact must influence the eroticization process but this has not been studied. When parents enjoy touching and bathing children, the children become more comfortable with their bodies and with talking about sex [53,54].

### **Genital play and masturbation**

Many infants begin to grasp the genitals as they are being diapered and clearly enjoy the washing and application of lotion to the genitals. Some infants comfort themselves by rocking and rubbing the genitals against pillows or toys. Genital stimulation has been noted as early as 2 months of age [44] but this is highly unusual. Most boys begin to play with the genitals at about 6 or 7 months and girls begin at 10 or 11 months [55]. Genital play differs from masturbation in that there is no intentioned progress toward orgasm. Parents tend to view early genital play as part of the child's need to explore [47].

Kinsey et al [15] observed the capacity for orgasm in nine male infants in the first year of life; and Rutter [55] reported orgasm in 5-month-old boys. Masturbation usually is not observed until the second or third year of life, most often commencing between 15 and 19 months of age [55]. Signs of arousal include rhythmic thrusts, grunting, flushing, and rapid breathing. When infants first begin to pleasure themselves, they try to maintain body contact with the parent but most parents discourage this. Contact seeking is replaced soon by the familiar inward gaze [35]. After children have established a certain mode of masturbation, the format persists and is resistant to change [42]. It is not known if the many children who abandon masturbation before entering school resume the original format later on in life. Genital contact is believed to facilitate the integration of the genitals into the sense of self.

In 1949, Spitz and Wolf [56] showed that early genital play is associated with good parenting, whereas an absence of genital play signifies problems in the relationship with the mother. They studied three groups: foundling home infants,

mother–infant pairs in a prison nursery, and normal mother–infant dyads. The well-nurtured infants, without exception, enjoyed touching themselves. whereas the poorly-nurtured infants, almost without exception, did not. This finding has been supported by clinicians and researchers [19,35].

Kinsey et al [15,16] interviewed university students about their sexual activity and found that 13% of female and 17% of male students reported prepubertal masturbation. In a recent survey of college students 40% of females and 38% of males recalled prepubertal masturbation [58]. The number of females that reported masturbation was now about the same as males.

Parents who were unconcerned about infants playing with the genitals react strongly when they see young children masturbate, although they may not understand why they are upset. Martinson [37] analyzed studies of parent attitudes from 1957 to 1985 and concluded that, although many parents think that masturbation is healthy, they experience disgust when they witness their son or daughter masturbating. Parents may need to explore their own early-life sexual experiences in order to gain perspective.

### **Naming the genitals**

Parents rarely say anything positive about children's genitals [58] and usually they view them as unimportant. A few parents teach preschool children correct names for the genitals; more parents do not name the genitals; and many others apply colloquial terms [59]. Parents virtually never apply a name to girls' external genitals [60] although they may give a nonspecific name to the entire area. Parents who do name the genitals are likely to be better educated, practice nudity in the home, and allow children to sleep in their bed. Names assigned to boys' genitals often are diminutive, such as "dickie," "peetie," "twinkie," "flipper," "pickle," and "wienie" [47,59,61]. Names assigned to girls' genitals are nonspecific, such as "down there," "your privates," and "your bottom." When the term "vagina" is used, it usually refers to the entire external apparatus, including the anus. Even colloquial terms, such as "tushie" are applied in nonspecific fashion [47].

It is easy for boys to see, feel, and appreciate the penis [47]. The penis has an approved and observable function—urination—and clothing is designed with a special aperture to facilitate urination. Parents commend boys when they steady the penis by using the hand as they urinate. Girls are unable to see the genitals, even when they are washed. Prepubescent girls often confuse the genitals with the anus. Girls are told to use toilet paper rather than direct hand contact when they wipe and parents may act as if wiping is a necessary, but distasteful, task. Girls may suspect that the genitals are permanently contaminated with feces. Even young girls who masturbate tend to learn little about the body because they most often use indirect methods, such as thigh pressure or rubbing the genitals against pillows or toys [35]. The lack of genital differentiation in girls has not been studied but it could have an adverse effect on sexual function [47].



## **Sex play**

Erotic play adds to the eroticization process by enabling youngsters to recognize sexual sensations, assign them a value, and (ideally) integrate them within the concept of self. The earliest play may be the fondling or tweaking of the mother's nipple but this is not sexual in nature. Between the twelfth and fifteenth month, infants like to play with the urinary stream [38,54]. They are curious about how others urinate and they enjoy faucets and squirting devices. Boys are proud of the penis and its urinary function. Preschool boys may ask a parent to rub the penis because it feels good. Girls are more likely to indirectly entice the parent by strutting, lifting the skirt, dancing provocatively, and giggling, using the body as a whole rather than focusing on the genitals. Observing the erotic activities of adults, other children, and animals stimulates further sexual activity. Parents see children scratching the crotch, walking around nude, kissing nonfamily adults, showing sex parts to adults, touching breasts, sitting with crotch exposed, or trying to look at others undressing or on the toilet [62,63]. Friedrich et al [62,64] associated erotic activity that was observed in older, school-aged children with behavioral problems; older children who openly express their sexuality may care little about rules or the feelings of others—symptoms that suggest a behavior disorder.

Two- to 4-year-old children who bathe together may fondle one another's genitals and they enjoy watching others urinate and defecate [45]. At this age, children are fascinated by the genitals of dogs and other animals [45,63]. Outside the home they usually play with a special friend, of whom they are extremely fond. Erotic play often is preceded or accompanied by caressing, cuddling, kissing, hugging, sitting close together, feeling sorrow when separated, and giving each other gifts [46,65,66]. The play itself is spontaneous, invigorating, and noncoercive. It often consists of looking at one another's genitals or touching or rubbing against them. Boys and girls are particularly fascinated with the genitals of boys [65], perhaps because they are larger, more accessible, and can do "tricks," such as change size.

From about age 4 until age 6 years children may use themes, props, and role assignment in games such as "doctor" and "make a baby." Boys most often do not understand how to make a baby but they have fun anyway. Penile erections are commonplace in young boys, even in response to nonsexual stimuli, such as anxiety or stage fright, and orgasm without ejaculation can occur during sex play [37]. Boys also engage in games of competitive urinating with peers [45].

By age 5 years, children are sensitive to reactions from persons outside the home. Peers tease children mercilessly if the panties show or if the fly is unzipped. Despite these negative messages, almost all children develop an interest in getting married. Between the ages of 10 and 12 years, most children say they have a sweetheart; by age 12, five out of six children claim to have been kissed by a peer [67].

Sex play diminishes gradually between ages 3 and 6 years [62] and children begin to exhibit modesty [68]. A pronounced decrease in erotic activity occurs



around the time that children enter school, maybe because of lower levels of gonadal hormones, fear of apprehension, and an increase in shame and guilt [69]. Boys who have been active usually remain more active than other boys but less active than they were earlier. Few girls are willing to participate in sex play—one girl to every seven boys [15,16,67].

The 1998–99 Kinsey Institute data indicated that about 60% of university students recalled sexual experiences in grade school and junior high school [18]. Most frequently reported are nongenital contact (eg, kissing), almost a third involved genital contact, and only a few recalled oral or genital intercourse. A slow, steady increase in activity occurred across time in most categories with little difference between males and females. There was, however, a dramatic increase in boys' recollection of genital contact in junior high school. In contrast with the data that Kinsey [15] collected 50 years ago, now as many prepubertal girls masturbate as boys and they begin at about the same age [18].

During the years from age 6 until puberty, children remain interested in sexual topics. When games occur, as they do occasionally, they are built around group consensus [45–47]. “Spin the bottle” and “strip poker” are examples. Others are modeled after board games or television programs like “Wheel of Fortune”. In “truth, dare, and consequences” participants are asked ambiguous questions, such as “Who is the prettiest girl in class?” Because group members are certain to disagree with any opinion, the child who is “it” must pay the consequences, which may mean running around a bush with pants down or touching another child's buttocks or genitals. Games are exciting and they provide a forum where the body is accepted and sexual feelings are validated. In the year or two before puberty, hormones increase and erotic interests escalate. Children begin to entertain explicit erotic fantasies [69,70] but they are not likely to act them out. Boys and girls develop different styles and interests. They split into gender-specific groups that avoid the other or relate through taunts and ridicule.

Children who are discovered while engaging in sex play suffer intense personal shame and public humiliation [40,47]. They can be ostracized by neighbors and teased mercilessly by peers. Boys, especially, may be viewed as perpetrators (eg, 6-year-old Jonathan Prevette who kissed a classmate on the cheek and was subsequently suspended from school and charged with sexual harassment; NY Times, 9/27/1996). The definition of sexual abuse has become increasingly broad and emotionally charged. Adults, who never were comfortable with children's sexuality, are more confused and frightened now. Children who play sex games together, parents who go nude in front of children, and fathers who kiss older children can be judged abusive [71]. Adult anxieties are likely to be transmitted to children although the effects have not been studied [72,73]. Parents who find a middle ground that makes sense are less anxious and in a better position to guide their children.

Parents may ask the pediatrician or child psychiatrist how they should respond to children's sexual behavior. Parents need to learn what sexual activities can be expected—something that most parents do not know. Then they must look within

and discuss the issue with significant others to determine which activities are acceptable and under what circumstances. They need to deal with the particular youngster nonjudgmentally and with as little residual anxiety as possible. If the child has been seen masturbating in preschool, parents may validate the erotic sensation as good, but at the same time, should provide guidelines for acceptable behavior (eg, “I’m glad that you can feel good when you touch yourself but the best place to do that is in your bedroom.”).

### **Parental reactions**

After age 4 or 5 years, most youngsters hide erotic activity and they are unlikely to talk about sex to an adult. They know that sex is “dirty” and they regard the genitals as bad or nasty [40,47,55]. Children notice how others react when they are seen naked or on the toilet [68]. When parents allow nudity within the home, children display greater self-esteem, less discomfort with body contact, and more normative sexual behavior at all age levels [73]. Overall, exposure to parents who are nude or engaged in sexual activities seems to be more beneficial than harmful [74]. The scientific literature does not support a connection between nudity or cosleeping [5,75] and emotional damage.

Parents are probably as ambivalent about erotic play as they are about masturbation and for many of the same reasons. Parents who report more child sexual behaviors tend to be better educated [76], earn more money, attend fewer religious services, and have more liberal attitudes about sex [75]. Less educated, working-class mothers in Western society are less likely to educate children about sex and are more likely to suppress children’s erotic interests and activities, while mothers who earn more money and are better educated are more apt to neutralize children’s interests by identifying and talking about them [77]. Parents of all classes tend to maintain children’s innocence by keeping them ignorant and by inhibiting sexual exploration [78].

Play is more acceptable to adults if it can be viewed as exploratory (ie, other than erotic) [47,79]. The concept that play has no erotic meaning is less valid as children grow older or the play becomes more sexually focused. This upsets adults who often react by rejecting or punishing the child [40,80]. Sometimes they consult a child psychiatrist who may proceed with an evaluation that includes a sexual history that is taken directly from the child. If there is no evidence of sexual abuse or major disorders that are associated with hypererotic behavior (bipolar disorder, psychosis, severe character pathology) the psychiatrist can educate the parents about normal erotic development.

### **How common is sex play?**

Eighty-five percent of young university women recalled erotic games and 44% recalled erotic games that involved boys [79]. Most remembered feeling sexually

aroused or excited at the time. Most of the play involved exposing or touching the genitals. Insertion of objects in the vagina and oral contact was distinctly unusual. Other studies confirmed that most young adult students recalled early sex play that they viewed in a positive light as pleasurable and exciting [40,80,81]. Negative responses were associated with feeling coerced, playing with a person of the same sex or with someone other than a friend, and with being discovered by an adult [40,80].

### **Highly-charged learning experiences**

Children learn the most about sex practices and expectations from peers and from television (Time Magazine Poll, 4/8/1998). Although the information often is inaccurate or subject to interpretation, youngsters know far more than they did 12 years ago. The terms that are used and the value that is assigned to various sexual practices also has changed. R-rated videos are available in stores and X-rated movies are shown on the Playboy Channel. The Internet provides sexual information, including the details of President Clinton's extramarital affairs. How children interpret this material is not known. The response may depend upon the parents' reactions, age of the child, stage of moral/cognitive development, and testosterone level. The intense media coverage of President Clinton's affair with Monica Lewinsky and the parents' reaction to terms, such as "oral sex," are apt to affect the eroticization process; it increased sexual interest in some younger children and fantasy construction in older youngsters. It also may have increased the moral condemnation of sexuality.

Children may be titillated further when they enjoy erotic scenes on prime-time television with their parents. They may be confused later on when the parents avoid a discussion or appear anxious; give clumsy answers; or categorize sex as bad or dangerous [58,69]. Children may ask themselves, "Then why did they watch and why did they smile?" The lack of conversation about sex could make the subject seem irrelevant to everyday life and make it more likely that children place sexuality in a compartmentalized domain apart from life experience [59,69,82]. As adults, these individuals might avoid intimacy entirely or prefer visually- and emotionally-charged, but impersonal, practices such as web sex, lap dancing, or masturbation while viewing pornographic videos. Child psychiatrists need to ask children about programs watched and if the parents also watch. This can pave the way to a broader discussion, first with the child and then with the family.

Single parents may have romantic partners stay overnight or live in the house. Neither the parent nor the partner is likely to talk to the children about what is happening. Nevertheless, sexually-active single parents are sexual role models for the children and increase eroticization and the chance that the children will initiate sex sooner in adolescence [83]. Parents who like to touch one another and who embrace passionately affect children in a similar manner. A clear association exists between family sexuality and children's erotic behavior [75].

Parents may ask child psychiatrists if their romantic relationships will harm the children. The answer is complex; a healthy relationship with a partner who relates well to the children may facilitate development and resolve problems that are related to an overly close parent-child bond. The outcome depends, in large part, upon the quality of the relationship between the partner and children.

### **Sex abuse prevention**

Sex abuse prevention programs may be offered first in kindergarten by concerned community groups. Krivacska [84] described most of these programs as conceptually unsound and possibly traumatizing to children who have engaged in normal sex play. The goal of these programs is to increase children's anxiety about certain aspects of sexuality [85]. Common themes are: (1) stranger danger, (2) say no-go tell, and (3) good touch/bad touch. Productions center upon predominately male figures who do something that is clearly bad and not so clearly sexual. Children do learn the material but because out-of-home molestation is a rare event, no one knows if the programs prevent sexual abuse by strangers [84,85].

How children interpret prevention programs is not known, nor is it known how exposure changes their attitudes toward maleness, femaleness, bodies, or sexuality. Young children have a limited information base and they tend to generalize across situations. After viewing a prevention program, little girls may avoid being hugged by a father or uncle and little boys might be more inclined to dislike the body or inhibit sexual impulses. Child psychiatrists and pediatricians need to ask child patients about their observations and concerns routinely. Children as young as 3 years of age often are relieved to be able to talk about sexual concerns to a nonjudgmental adult [86]. If a parent is present, the dialog gives the parent permission to do the same at home.

### **Hypererotic behavior and sexual abuse**

Child psychiatrists may be called upon to differentiate normal eroticized behavior from that which is secondary to abuse. In conducting the evaluation, the psychiatrist must remember that any sexual behavior that is seen in adolescents and adults also has been noted in prepubescent youngsters. With further information, the behaviors can seem to be benign in the context in which they occur [76,87]. In general, children are not harmed [88] by participation that includes French kissing, coitus, and oral sex. Highly erotic behavior may have been generated by observing farm animals copulate; being involved in extensive sex play; or by peeking at adults who were engaging in coitus, fellatio, or cunnilingus.

Eroticized behavior can indicate past or present abuse. Forty-one percent of young, sexually abused youngsters were highly eroticized compared with 5% of a control group [89]. Abused youngsters are much more apt to engage in sexual play with anatomically-correct dolls [38,39]. Some examiners assume that any erotic behavior means that the child must have been sexually abused. Because child psychiatrists understand development and psychopathology, they are well-equipped to differentiate eroticized from normative behavior and normative behavior from the eroticized behavior of autistic, bipolar, and schizophrenic youngsters.

Hypererotic behavior is observed more often in younger children and is influenced by the duration, frequency, and intensity of the abuse [28,29,64,90,91]. The behavior is highly charged; goal directed; repetitive; and often involves oral, vaginal, or anal penetration [90–93]. The behavior can be aggressive, driven, or compulsive, with exhibitionistic and bullying qualities [28,29,79,91]. Children derive pleasure from erotic activity but the pleasure often is accompanied by anxiety, guilt, or anger, some of which is fueled by postdiscovery family disruption and rejection by foster parents, peers, or neighbors [28,29]. Eroticized youth may become juvenile prostitutes. Hypererotic children often present externalizing problems, such as conduct disorder; however, the eroticized behavior is independent of these other problems [90,94].

Based on this information, it would seem that the eroticization process is the same for sexually abused and nonabused youngsters; however, abused children are more often eroticized on the basis of many intense, highly-reinforcing experiences. This means that the sexual response is, among other things, learned behavior [24,95]. The experience has likely affected hard-wiring in the limbic system, hypothalamus, and frontal and temporal cortex. This explains why these youngsters continue to exhibit sexual behavior through the grade school years and beyond [28,96,97]. Coordinated, broad-based treatment programs fail and the children continue to act in a manner that invites rejection and punishment [29,96,98]. Although this may be, in part, a neurotic, self-destructive pattern, it suggests permanent changes in the brain.

The sex abuse literature ascribes hypererotic behavior to repetition compulsion, reenactment, or traumatic sexualization; it does not attach much importance to learning or biologic influence. These theories cannot explain the highly erotic behavior that is seen in some nonabused children, such as that noted in the 1970s California communes [99] and in the Kibbutz, where sex play among peers is permitted but there is not sexual contact between children and adults.

## **Final word**

A broader perspective is needed—one that views eroticism as a genetic given that can be fostered or inhibited by the environment. At present, society is

concerned legitimately about young teenagers having intercourse too early but this rarely is conceptualized in biologic terms. Yet, early sexual receptivity could be related to improved nutrition in childhood. Girls accumulate more adipose tissue at an earlier age than in years past. This generates higher levels of leptin, that, in turn, precipitates an increase in gonadal hormones, menarche, and pubertal changes in the body and brain. Girls could be at greater risk for early intercourse if they eat well, weigh more, and have the genes that support sexual receptivity. If this were established, such individuals could be identified and prevention programs could be developed. If prevention programs continue to be based on moral precepts rather than science, sexually receptive girls might be viewed as intrinsically defective and in need of correction. Society must bear in mind that sexuality is, for the most part, healthy in that it contributes to life-long well-being and the development of stable and satisfying relationships.

## **Suggestions for future research**

### *Animal experiments*

One or more pups out of a litter (rats, mice) could be sprayed with an attractive scent to ensure preferential grooming by the parent. Animals could be followed to maturity and sexual behavior, affiliative behavior, social dominance, and level of inhibition can be examined. Animal paradigms of anxiety and depression could be applied. Pharmacologic probes, imaging, and gene knock-out animals could be used to explore differences in neurotransmitters, peptides, and hormones between hyper- and hypoerotic animals. Finally, the brain could be examined for changes in organization and structure.

### *Human experiments*

Prospective, naturalistic studies of children in the community are more apt to receive “internal review” approval. Questions about sexual thoughts and experiences could be included in a larger survey that covers factors that include temperament, attachment, parenting style, and physiologic reactivity. Levels of eroticism could be identified, salivary testosterone can be collected, and predictor variables can be considered. Subgroups, such as inhibited children, could be compared with the sample as a whole.

Are children harmed by questions about sexual perceptions and experiences? In a direct interview, children could be asked to agree or disagree with statements such as “I wish I could sleep in bed with Mommy”; “I feel good when my Daddy hugs me;” and “It would be fun to play ‘doctor’ or ‘having a baby’ with friends my own age.” Alternatively, questions from the Computer Assisted Self Interview [18] could be administered directly. A control group would be asked similarly loaded, but nonsexual, questions. Salivary cortisol and testosterone

would be collected and heart rate variability would be recorded at baseline and immediately after the interview. Anxiety, anger, posttraumatic stress disorder symptoms, and behavioral problems could be assessed at intervals following the interview.

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