

Interrelationships Between Sexual Responsiveness, Birth, and Breast Feeding

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Full Text: There is a tendency in our society to place special emphasis on the types of female sexual behavior that are of particular pertinence to adult men. Thus women's responses in coitus are singled out for considerable attention while discussion and research on the psychophysiologic aspects of their other reproductive behavior tends to be muted. Full understanding of female sexuality, however, requires consideration of all their reproductive responses. Males can form reproductive relationships only with females. Their adult reproductive behavior is limited to one act-coitus. Adult females, on the other hand, have at least three acts of interpersonal reproductive behavior-all three involving the participation of two human beings. These behavior patterns are (1) coitus, (2) parturition, (3) lactation. Here we will consider the close interrelation of these three psychophysiologic functions. In practical terms, this implies that what occurs on the delivery table is very pertinent to what will transpire later in the marital bed and that mother-baby relationship without enjoyable lactation is in a somewhat similar psychophysiologic position as a marriage without enjoyable coitus. Before discussing characteristics common to all three reproductive interpersonal acts, the similarities between coital behavior and birth behavior, and between coital behavior and lactation behavior will be discussed.

RELATION OF BIRTH BEHAVIOR TO COITAL ORGASM The relation of birth behavior to coital behavior becomes apparent when accounts of uninhibited reproductive actions are reviewed. Some years ago in reading Read's observations of natural childbirth (1944, 1949, 1950a, 19506) and Kinsey, Pomeroy, Martin, and Gebhard's detailed descriptions of orgasm behavior (1953) I was impressed by the similarity of the reactions manifested in both behaviors. Indeed, uninhibited, undrugged childbirth and sexual excitement are similar in the following characteristics: Breathing Vocalization Facial expression Uterine reactions Cervical reactions Abdominal muscle reactions Position Central nervous system reactions Strength and flexibility Sensory perception Emotional response The Kinsey et al. data (1953) came from interviews, from scientifically trained persons observing human sexual activities, and from reports of physiologic experiments. The Read data came from his report of 516 consecutive labors published in Lancet (1949), as well as from his books (1944, 1950a, 19506). He made every effort to keep women free from fear or disturbance in labor and thus uninhibited. Much of the birth data is also corroborated by films taken of women undergoing natural childbirths or, more recently, of women using a similar technique called psychoprophylaxis. Since in this country it is the custom to move, strap down, and otherwise disturb even unmedicated women as they approach the birth climax, the behavior noted by Read is not so frequent nor so pronounced here. My analysis (Newton 1955) of the Read (1944, 1949, 1950a 19506) and Kinsey et al. (1953) data specifically showed these comparisons:

UNDISTURBED, UNDRUGGED SEXUAL EXCITEMENT
CHILDBIRTH

Breathing

In the first stage of labor breathing becomes deeper during contractions.

During the early stages of sexual excitement, breathing becomes faster and deeper.

Second stage labor brings on very deep breaths with breath holding.

As orgasm approaches, breathing may sometimes be interrupted.

Vocalization

There is a tendency to make noises, grunts in the second stage of labor.

There is also tendency to make gasping, sucking noises as orgasm approaches.

Facial expression

During the second stage of labor, the face gets intense, a stressed look, which makes observers often assume the woman is suffering great pain. As birth climax approaches, the face looks like that of an athlete undergoing great strain.

As orgasm approaches, face gets what Kinsey et al. call a "tortured expression"—mouth open, glassy eyes, tense muscles. The face looks like that of an athlete under great physical strain.

Uterine reactions

The upper segment of the uterus contracts rhythmically during labor.

The upper segment of the uterus contracts rhythmically during sexual excitement.

Cervical reactions

Loosening of mucus plug from os of cervix is one of the standard signs of early labor.

In sexual excitement, cervical secretion may loosen mucus plug which ordinarily lies at os of cervix thus opening it for spermatozoa.

Abdominal muscle reactions

These contract periodically in second stage labor; a strong urge to bear down develops as delivery approaches.

During sexual excitement, abdominal muscles contract periodically.

Position

The usual position for delivery in our society is with the woman flat on her back with legs wide apart and bent.

The birth position is commonly used for coitus—a woman on her back with legs bent and wide apart.

Central nervous system reactions

Women tend to become uninhibited during parturition, particularly as the baby descends the birth canal. Veneers of conventional behavior disappear in the later stages of labor.

During coitus, inhibitions and psychic blockages are relieved and often eliminated.

Strength and flexibility

Delivery of the baby through the narrow passage calls for unusual strength and body expansion.

In sexual excitement unusual muscular strength develops. Many persons become capable of bending and distorting their bodies in ways they could not otherwise.

Sensory perception

In labor the vulva becomes anesthetic with full dilation so that the woman often must be told of the birth of the baby's head.

In coitus the whole body of the sexually aroused person becomes increasingly insensitive even to sharp blows and severe injury.

During undrugged labor, uninhibited by fear, there is a tendency to become insensitive to surroundings as delivery approaches. Amnesia develops.

As sexual orgasm approaches, loss of sensory perception is nearly complete—sometimes leading to moments of unconsciousness.

Suddenly, delivery complete, the woman becomes wide awake.

After sexual orgasm there is a sudden return of sensory acuity.

Emotional response

After the birth of the baby there is a flood of joyful emotion. Read describes it as "complete and careless ecstasy."

After coital orgasm there is often a strong feeling of well-being.

Another physiologic similarity was pointed out to me recently. While speaking at an Ob-Gyn Postgraduate Course at the American College of Surgeons 1970 Annual Clinical Meeting, I mentioned that it is possible for women to have a marked emotional reaction to birth. After the talk Dr. Evan Evans of Ogden, Utah, came up to me. He said he had noted in some of his patients marked clitoral engorgement which begins about the time the cervix is 8 or 9 cm dilated and lasts until about the time the episiotomy is sewed up. He has noticed this phenomenon especially since he has encouraged husbands to be in the delivery room. His patients deliver, after having attended parents' classes. They receive paracervical and pudendal block, which is sufficient without other medication to carry them through the last part of labor. Such observable clitoral engorgement has also been reported to occur in some women during sexual excitement by Masters and Johnson (1966). They reported that observable tumescence of the glans does not develop until sexual tensions have progressed well into the excitement phase of the sexual response cycle and it persists throughout the remainder of the sexual response cycle or for as long as any significant degree of sexual stimulation is maintained. Masters and Johnson (1966) also noted that sexual excitement can occur during birth. They have reported on twelve women, who during the second stage of labor experienced "grossly intensified versions of the sensations identified with this first stage of subjective progression through orgasm [p. 136]." All of these women had delivered babies on at least one occasion without anesthesia or analgesia. THE RELATION OF BREAST FEEDING BEHAVIOR TO COITAL ORGASM The similarity between lactation and coital response is equally clearly defined. The survival of the human race, long before the concept of "duty" evolved, depended upon the satisfactions gained from the two voluntary acts of reproduction-coitus and breast feeding (Newton & Newton 1967). These had to be sufficiently pleasurable to ensure their frequent occurrence. Thus it is not surprising to find the following marked psychophysiological similarities between lactation and coitus: 1. Uterine contractions occur both during suckling (Moir 1934; Newton & Newton 1950) and during sexual excitement (Kinsey et al. 1953; Masters & Johnson 1966). 2. Nipple erection occurs both during nursing and sexual excitement. Masters and Johnson (1966), studying nipple erection as part of sexual excitement, observed an increase of 0.5-1.0 cm in nipple length that was due to stimulation. Günther (1955), in a study of nipple protractility of breast-feeding mothers (measured with suction), found that those whose total nipple protractility was 2.5 cm usually experienced successful breast feeding, whereas those with just 0.25 to 0.50 cm less protractility were notably less successful in establishing breast feeding. 3. Breast stroking and nipple stimulation occur both during breast feeding and in sexual foreplay. Under conditions of unrestricted, uninhibited sucking which characterize many traditional, historic, and preliterate human cultures, the young infant stimulates the breast many times during the day and may sleep near the approachable nipple at night, intermittently sucking throughout the sleeping hours (Mead & Newton 1967; Newton 1971). As the infant grows older he shows eager body responses to nursing. Rhythmic movements of hands, feet, fingers and toes may occur. The mother's breast may often be stroked by the infant's hand as he moves. Erection of the penis is common in male babies. After feeding there is often a relaxation that is characteristic of the conclusion of satisfactory sexual response (Newton & Newton 1967). 4. Emotions aroused by sexual contact and by breast-feeding contact both involve skin changes. Sexual excitement causes

marked vascular changes in the skin, and breast feeding raises body temperature as measured in the submammary and mammary skin area. In fact, this is such a key phenomenon in lactation that the milk supply has been found to be significantly and highly correlated with rise in the mammary skin temperature during nursing (Abolins 1954). 5. Milk let-down or the milk-ejection reflex may be triggered not only by breast feeding but by sexual excitement. Masters and Johnson (1966) reported that in two out of three lactating women observed under experimental conditions, milk was observed to run from both nipples simultaneously during and immediately subsequent to an orgasmic experience. The involuntary leakage was noted to occur during both coital and automanipulative activity. Campbell and Petersen (1953) have reported that the degree of milk ejection appears to be related to the degree of sexual response in coitus. Their major source of data was a woman with an inadequate nipple sphincter on her left breast, so that the milk-ejection reflex could be easily noticed. The observability of the milk depends not only on the triggering of the milk-ejection reflex but also on the action of the nipple sphincter which may hold back the flow. 6. The emotions experienced during sexual arousal and the emotions experienced during uninhibited, unrestricted breast feeding may be closely allied. Masters and Johnson's (1966) study group included 24 women who nursed their babies two months or more. The women reported sexual stimulation induced by suckling their infants frequently to plateau tension levels and, on three occasions, to orgasm. Even in this relatively uninhibited study group, guilt feelings were expressed by six of the women when reporting sexual feelings related to nursing. It is possible that this type of hesitancy may have been a factor in Hytten, Yorston, and Thomson's (1958) report that none of 32 primigravidas who breast fed for three months or more found it physically or emotionally pleasurable. On the other hand, Newson and Newson (1962), using questions that probed beyond the conventional answers, found that 66 percent of the mothers who breast fed for two weeks or more actively enjoyed the experience, often describing feelings of tenderness and closeness engendered by the breastfeeding act. 7. An accepting attitude toward sexuality may be related to an accepting attitude toward breast feeding. Sears, Maccoby, and Levin (1957) found that mothers who had breast fed were significantly more tolerant of sexual matters such as masturbation and social sex play. Masters and Johnson (1966) noted that for the first three months after delivery, the highest level of sexual interest was reported by the nursing mothers. As a group, they reported interest in as rapid a return as possible to active coition with their husbands. Feelings of aversion for the breast-feeding act appear to be related to dislike of nudity and sexuality. Newson and Newson (1962) after interviewing more than 700 English mothers, commented: "For many mothers, modesty and feeling of distaste form a major factor in their preference for the artificial methods [p. 1745]." Salber, Stitt, and Babbot (1959), in studying reasons given for not attempting to nurse, found that an emotional barrier was the most common reason given, expressed by 55.8 percent of women. "Women who had an emotional barrier to breast-feeding included those who were disgusted at the thought of feeding or who were extremely embarrassed by the idea because of excessive modesty. Some could not explain their feelings but knew very strongly they did not want to breast feed [p. 311]." The reason the sensuous nature of breast feeding is so seldom recognized in our society may be the same reason birth orgasm is so seldom seen. Current social patterns are very effective in inhibiting the psychophysical reciprocity of lactation. Mother and infant are usually separated except for brief contacts during their hospital stay. Rigorous rules about duration and timing of each sucking period have been invented and are enforced by persons who usually have never successfully breast fed even one baby. Probably most people in our society would be willing to concede that we would cause coital frigidity if we prescribed the act only at scheduled times and laid down rules concerning the exact number of minutes intromission should last. Motherbaby interactions can be similarly disturbed by similar types of rules. SIMILARITIES BETWEEN ALL THREE REPRODUCTIVE INTERPERSONAL ACTS We have been discussing the psychophysiological similarities between coital response and lactation and parturition responses. However, possibly far more important is the thread of similarity between all three aspects of the triad. Coitus, birth, and breast feeding have similar biologic roles, since all three involve reproductive relationships between two individuals. They may share the following three

basic characteristics: 1. They are based in part on closely related neurohormonal reflexes. 2. They are sensitive to environmental stimuli, being easily inhibited in their early stages. 3. All three appear, under certain circumstances, to trigger caretaking behavior which is an essential and important part of mammalian reproduction.

Related Neurohormonal Reflexes Although the physiology of the neurohormonal reflexes involved in coitus, parturition, and lactation is currently only fragmentarily understood, there is still considerable experimental evidence suggesting that similar physiologic processes may be involved. A classic experiment conducted by Debackere, Peeters, and Tuytens (1961) in Ghent, Belgium, illustrates this interrelationship. These investigators joined the circulatory systems of pairs of sheep. Plastic tubes were used to connect the jugular vein of one animal with the jugular vein of the other. A ram was joined with a lactating ewe. The seminal vesicles and ampullae of the ram were massaged often to the point of emission. After a minimum of 30 seconds there was often a sharp rise of pressure in the udder of the connected ewe, indicating that the milkejection mechanism had been triggered by the blood of the sexually stimulated ram. Two ewes were also joined together. The vagina of one member of the pair was repeatedly distended with a balloon. The stimulation of the vagina in the one ewe often caused signs of milk ejection to occur in the other ewe. It should be noted in this connection that vaginal dilation occurs normally in both coitus and parturition. This experiment demonstrates the interrelatedness of sexual excitement, lactation, and birth on a neurohormonal level, in which oxytocic substances appear to be involved.

Inhibition through Environmental Disturbance Another similarity in all three interpersonal reproductive acts is that they appear to be easily inhibited in their initial phases by environmental disturbances. There may be a sound biological reason why this is so. Coitus, labor, and lactation leave the participants particularly vulnerable to outside dangers during the period reproductive action is taking place. Coitus involves a lessening of sensory acuity as orgasm approaches, making the participants less aware of environmental changes. Parturition is a time of maximal defenselessness for both female and young. The female with a fetus in her birth canal cannot move with normal efficiency. The newly emerged young are in a peak state of helplessness. During milk exchange the same type of vulnerability is also present. Mother and offspring, united in the nursing act, are not in an optimum position for fight or flight. Survival, therefore, would be most likely to occur in those individuals and those species that are able to regulate reproductive acts so that they occur in relatively safe surroundings which elicit calm emotions. It is not surprising that folkways and cultural patterns have long recognized that coitus, parturition, and lactation proceed most smoothly when the surroundings are particularly sheltered or considered to be relatively safe.

Inhibition of Sexual Functioning Coitus is usually patterned to proceed with minimal environmental disturbance. Even people of preliterate human societies of the type that accept extensive premarital and extramarital coitus usually still have a tendency to withdraw during the sexual act into the semiisolation of the palm grove, the garden patch, or the shelter of darkness (Ford & Beach 1951). The effect of environmental factors in inhibiting sexual response in human beings is thoroughly recognized in the treatment techniques of Masters and Johnson (1970) for dealing with human sexual inadequacy in modern American society. Environmental factors also influence the sexual performance of domestic animals. This has been particularly noted in the case of cattle, sheep, swine, horses, and dogs (Hafez 1962). Domestication involves a selective process fostering reproduction and genetic survival in individuals and species that do not easily become sexually inhibited under the disturbances of captivity. It is likely that sexual functioning is more inhibited by environmental disturbances in mammals not so selectively bred.

Inhibition of Milk Ejection It has long been recognized that lactation is sensitive to environmental disturbance. Successful dairy farming depends upon the knowledge that a cow will not easily "let down" or eject her milk to a stranger, nor if she is milked in a strange barn. Even preliterate peoples have developed elaborate techniques for inducing the inhibited milkejection reflex to function (Amoroso & Jewell 1963). Ely and Peterson (1941) experimentally studied the inhibition of milk let down. During milking, cats were placed on the backs of cows, and paper bags were blown up and burst to make loud noises. Under these conditions less milk was obtainable from the udder than usual. However, milk flow was restored to normal by the administration of

pitocin, the natural form of the hormone oxytocin. Ely and Peterson (1941) postulated a neurohormonal mechanism regulated in part by central nervous system factors. The primary stimulus is sucking applied to the nipple, which triggers the discharge of oxytocin, from the posterior pituitary gland, that is carried to the breast in the blood. The oxytocin acts on the myoepithelial cells around the alveoli, causing them to contract, thus pushing out the milk into the larger ducts, where it is more easily available to the baby. The psychological importance of the milk-ejection reflex in human beings was first emphasized by Waller in his book, *Clinical Studies in Lactation*. He used case histories to illustrate the fact that milk ejection can be inhibited by embarrassment and can be conditioned so that it is set off by the mere thought of the baby far away. Michael Newton and I (1948) experimentally inhibited the milk-ejection reflex in a mother through distractive techniques that did not appear to disturb the baby. These consisted of placing the mother's feet in ice water, painfully pulling her toes, and asking her the solution of mathematical problems, punishing mistakes with electric shocks. Table 1 shows how the amount of milk obtained by the baby varied. On control days, when there was no disturbance, the baby obtained significantly more milk than when the mother was subjected to disturbance. The amount of milk rose to near normal, however, when oxytocin was injected to artificially set off the milk-ejection reflex. The relation of the reflex as set off by natural stimuli to the overall availability of milk was studied experimentally (Newton & Newton 1950). The baby was first allowed to nurse fully to set off the milk-ejection reflex. Then, the breasts were each pumped for five minutes. Finally, 3 units of oxytocin (Pitocin) were injected, and each breast was pumped again for five minutes. Mothers who subsequently breast fed successfully had all but 27 percent of their milk available to the baby or the breast pump, thus showing minimal inhibition of the milk-ejection reflex. However, mothers who were unsuccessful in their attempts to breast feed adequately showed marked milk-ejection inhibition. In their cases 47 percent of the milk in their breasts was not available to baby or breast pump until milk ejection was artificially triggered by the injection of oxytocin. The difference between the two groups was statistically significant ($p < .01$).

TABLE 1

Effect of maternal disturbance and oxytocin on the amount of milk obtained by the baby.

<i>Maternal Disturbance</i>	<i>Mean Amount of Milk Obtained by Infant During Standardized Feeding (gm)</i>
No distractions—no injection	168
Distraction—saline injection	99
Distraction—oxytocin injection	153

The milk-ejection reflex appears to be very sensitive to small differences in the oxytocin level, suggesting that minor psychosomatic changes may influence the degree to which the milk is available to the baby. Wiederman, Freund, and Stone (1963) found that the intravenous threshold dose of oxytocin needed for response was 0.25 to 10 m μ . Inhibition of Fetus Ejection The deleterious effect of fear and disturbance on labor has also long been recognized in a general way. Eastman and Hellman (1961) in their textbook have written of the harmful influence of fear on labor. Veterinary and animal behavior literature indicates recognition of the same phenomenon (Bleicher 1962; Freak 1962; Hafez 1962). In an effort to study these important clinical observations in a controlled manner, Foshee, Peeler, M. Newton, and I carried out a series of experiments on CFI-strain mice. Since "labor sitting" in mice proved to be tedious, we developed a method of getting a high proportion of "dated" pregnancies in one night of exposure (Newton & Newton 1968). To test the inhibitory effects of environment on labor, we alternated pregnant mice at term between two different types of environment (Newton, Foshee, & Newton 1966a). One environment was a cage with a nesting box similar to that in which the mice had been housed since birth. The other environment was a small glass fish bowl imbued with

the strange odor of cat urine. Mice that had all become pregnant during the same night were moved from the familiar cage to the glass bowl at regular one- and two-hour intervals. During each time period the number of mice in each type of environment was the same. Yet we found the delivery rate in the two environments was not the same. Significantly ($p < .01$) more first deliveries took place in the sheltered familiar cage. Only six first deliveries took place in the glass bowls with cat odor, as opposed to nineteen in the familiar cage with sheltered environment. Significant ($p < .05$) differences were also found in the total number of pups born in each environment; the familiar cage with shelter received the most pups (see Table 2). We also studied the delay in time before the first delivery in mice, all of whom had become pregnant the same night (Newton, Peeler, Newton 1968). In this experiment (see Table 3), one group of mice was moved every two hours between two glass bowls to give them continuous disturbance. Another group was rotated between two familiar cages containing fluffy nesting material under which they usually hid. Those continuously moved between glass bowls with no shelter available delivered their first pups significantly ($p < .05$) later than those who had shelter continuously available. Environment not only influenced the time birth occurred but also was related to pup mortality: 54 percent more dead pups were found born to mice delivering in an environment where no shelter was available than among the controls. This difference was statistically significant ($p = .036$).

TABLE 2

Relation of environment to number of mouse pups delivered

	<i>Number of Pups Born in Familiar Cage with Shelter</i>	<i>Number of Pups Born in Glass Bowls with Cat Odor</i>
Number of first-born pups	19	6
Total number of pups born	138	87

In two other experiments we studied the effect of brief, sudden change on the speed of labor (Newton, Foshee, & Newton 1966b (see Table 4). Mice were systematically disturbed (and presumably frightened) by subjecting them to complete olfactory, kinesthetic, and visual change for one minute after the birth of their second pup. A laboratory assistant gently picked up the mouse and placed it in cupped hands, completely enclosing it for one minute. The control group was not handled. Two types of subjects were used. In Experiment A all the mice used had experienced only routine handling. Experiment B was identical to Experiment A except that all mice in both control and disturbed groups had been previously subjected to fifteen periods of systematic human handling which included hand-cupping. The undisturbed mice delivered their next pups in about 12 to 13 minutes, but the disturbed mice were markedly slower in delivering the next pup. Labor after disturbance was significantly slower ($p < .05$) in both Experiment A and Experiment B. In each experiment the disturbed mice took over eight minutes longer than the controls to produce the next pup, a slowing of labor by about 65 to 72 percent (see Table 4). Based on these experiments, we (Newton et al 1966b Newton, Peeler, Newton 1968) have hypothesized a fetus-ejection reflex similar to the milk-ejection reflex hypothesized by Ely and Petersen (1941). This reflex is thought to be initially triggered by gentle stimulation of the lower genital tract at term, causing the release of oxytocic substances. These, in turn, act to cause uterine contractions of the slowly augmenting type. The fetus-ejection reflex, like the milk-ejection reflex, appears sensitive to cortical influence and can easily be inhibited. It is possible that the fetus-ejection reflex is as important to the management of normal labor as the milk-ejection reflex is to the management of successful lactation and dairy farming.

TABLE 3**Effect of continuous disturbance on time of first delivery and pup mortality**

<i>Group</i>	<i>Hours to first delivery</i>		<i>Total number pups found</i>	
	<i>Mean</i>	<i>Median</i>	<i>Dead</i>	<i>Alive</i>
Familiar cage with nesting material	12.77	10.00	28	321
Glass bowl, no shelter	17.10	18.50	43	306

Triggering of Caretaking Behavior Coitus, labor, and lactation are similar in yet one more respect. All three of them are related to caretaking behavior, an essential element in successful reproduction. All three are interpersonal, psychophysical acts that are psychologically intertwined with affectionate partnership formation and caretaking behavior. Coitus, labor, and lactation alone cannot secure successful reproduction-the caretaking behavior is an essential ingredient in the whole. An overview of societies indicates that the most usual human pattern is that of males caring for women with whom they are cohabiting (Mead & Newton 1967). Each society may channel this urge into different patterns of help but basically the male homo sapiens usually defends and protects his vulnerable child-bearing mate and often gives her considerable economic support. Similarly, females who form satisfying mating relationships with men usually accompany the coital behavior with an urge to care for the man in various other ways-like cooking for him, making a home for him, and being emotionally committed to his well-being. The intense emotions involved in orgasm are, in fact, a perfect model for operant conditioning. The pleasure male and female gain during coitus may tend to condition them to the other partner and to bind them in reproductive partnership so the children are more likely to have two adult individuals on the scene. Operant conditioning, reinforced through coital pleasure, may be the biologic foundation upon which patterns of family life are built.

TABLE 4**Effects of disturbance on labor speed**

<i>Groups</i>	<i>Minutes Between Birth of Second and Third Pups (Means)</i>	<i>Parturient Mice Involved (Number)</i>
Experiment A:		
Controls	13.2	16
Disturbed	21.8	12
Experiment B:		
Controls	12.0	11
Disturbed	20.7	15

Marriage and divorce statistics are in favor of this thesis. Paul Gebhard (1966) in a study on the relationship of the female orgasm rate to the quality of the marriage, suggests indeed that what clinicians have always suspected to be true is true. Unhappy marriages were characterized by a lower female orgasm rate. Clark and Wallen (1965) reported a similar finding. Decreasing coital responsiveness during the first five years tended to be associated with negative marriages whereas increasing sexual responsiveness during the first five years was associated with marriages positive in quality. Finally, Rainwater (1966) reported a marked statistical association between enjoyment of sex and cooperative marriage relationships. A lower-class sample was used. In this group a high association was found between enjoyable sex and other shared activities. Sixty-four percent of white wives who shared other activities with their husbands reported great enjoyment and interest in sex. Only 18 percent of white wives who did not share their activities with their husbands reported similar sexual enjoyment. Similar, but less marked, results were found for the rest of the sample. More cooperative sharing behavior was accompanied by more enjoyment of sex by Negro wives, white husbands, and Negro husbands,

although in these cases the association was not quite as marked. The relationship between birth and caretaking behavior does not appear to have been extensively studied in humans. The hypothesis that birth can be a maturing experience which tends to orient women toward more responsiveness is supported by Masters and Johnson (1966), who reported that women who have borne children may be more sexually responsive. They found that parous women tend to differ from nonparous women by being more erotic during early pregnancy. Perhaps their major finding, however, concerns the differences between sex skin coloring of women who have borne children and those who have not (Masters & Johnson 1966). Nulliparous women in the plateau phase were found to have sex skin color changes in the labia minora that varied from pink to bright red. Women who had borne children, however, could go some degrees beyond this. Their color changes typically varied from bright red to deep wine color. The degree of color changes appears to be so closely correlated with pelvic and labial varicosity and other sexual reactions that Masters and Johnson state, "It is obvious that the sex skin (labia minora) provides satisfactory clinical evidence of the degree of sexual tension experienced by individual. . . . Generally, the more brilliant and definitive the color change, the more intense the individual's response to the particular means of sex stimulation [p. 42]." The relationship between lactation and caretaking behavior has been more extensively studied. On the human statistical level, maternal interest and behavior and breast feeding have been reported to be correlated in the majority of studies investigating this point. However, since it has been shown that the personality and attitudes of the mother are related to her choosing to breast feed, controlled investigative methods are desirable. Peeler, Rawlins, and I (1968) undertook a study of this problem - on an experimental level in mice, and on a statistical level in human mothers. Since caretaking behavior is known to be related to preceding pregnancy, the duration of lactation, contact with the young, the age of the young, and previous experience and type of family grouping, all these factors were controlled in our study of mice. Nulliparous mice of the CF1 strain were bred and permitted to raise a litter. On the day of weaning, while the maternal nipples were still developed, operations were performed under sodium pentobarbital anesthesia. Test mice had all ten nipples removed, and control mice were given a sham operation near each nipple. The mice were re-bred, using a modification of the Newton dated pregnancy technique. Test and control mice that delivered on the same day were placed in pairs in cages and given a litter of pups belonging to neither of them. Thus, each experimental cage contained one nippleless mouse that had just delivered a litter, one lactating mouse that had experienced a sham operation and had just delivered a litter, and a litter of newborn mice belonging to neither mother. The new mouse families were then left undisturbed for two days. Both the nippleless mice and the mice that were feeding the pups on casual inspection acted very maternally toward the pups. Both mother mice lived in a nest together with the pups, cuddling them most of the time. It should be remembered that both of the mice had successfully raised litters before and therefore were experienced in mothering behavior. Routine tests of maternal behavior applied over the course of ten days, however, showed some differences. In the 14 tests, the lactating mice showed higher mean absolute maternal behavior scores in 13 tests and equal scores on one test. Retrieving tests showed no significant difference between test and control mice, but significant differences were found when barriers were placed between adoptive mother and young in an attempt to measure the strength of the maternal drive. Lactating mice tried significantly more frequently to burrow under a sieve to reach their pups, and significantly more frequently crossed a shock barrier to be with them (Table 5).

TABLE 5
Behavior of matched pairs of mice

	<i>Lactating Members of Pairs</i>	<i>Nonlactating Members of Pairs</i>	<i>Probabilities by Wilcoxon Matched Pairs Signed Rank Test</i>
Rescue-Retrieving Test			
Mean no. pups carried day 5	4.7	2.5	
Mean no. pups carried day 6	4.3	2.7	
Scatter-Retrieving Test			
Mean no. pups carried test 1, day 7	4.6	3.3	
Mean no. pups carried test 2, day 7	3.9	3.9	
Burrowing Behavior–Sieve-Barrier Test			
Mean no. min. burrowing-day 3	4.1	0.5	<.01
Mean no. min. burrowing-day 4	3.8	0.4	<.01
Mean no. min. burrowing-day 9	4.1	0.9	
Mean no. min. burrowing-day 10	3.8	0.7	
Location in Cage-Sieve-Barrier Test			
Mean no. min. away from litter-day 3	45.4	48.4	
Mean no. min. away from litter-day 4	43.6	49.9	
Mean no. min. away from litter-day 9	44.0	46.3	
Mean no. min. away from litter-day 10	45.8	48.0	<.02
Shock-Barrier Test–Day 12			
Mean no. min. spent with pups	20.1	9.5	<.01
Mean no. times crossed towards pups	8.6	3.5	<.01

Human data, collected along with the mouse data, suggested a similar relationship. Totally lactating mothers were paired with nonlactating mothers. They were matched for education and parity. The lactating and nonlactating mothers showed one significant difference ($p < .01$) in the four behavior dimensions studied. Seventy-one percent of the nursing mothers and only twenty-six percent of the nonnursing mothers encouraged physical contact between themselves and their babies by sometimes or often having the baby in bed with them (Table 6). Lactation may influence maternal behavior in selective ways. Operant conditioning may be one factor involved. CONCLUSION In conclusion, we can say that women have a more varied heritage of sexual enjoyment than men. Their reproductive behavior repertoire involves three intense interpersonal reproductive acts. In any discussion concerning sexuality of women or their role in life, full account needs to be taken of the marked intercorrelations and interrelationships between coital response, parturition response, and lactation response. In the management of reproductive behavior, the underlying similarities of all three should be kept in mind. It is of biological and clinical significance that coitus, birth, and lactation appear to have a common neurohormonal base and share the tendency to be inhibited by environmental disturbance. All three appear, under some circumstances, to trigger caretaking behavior, which is an essential part of mammalian reproduction.

TABLE 6**Behavior of matched pairs of humans**

	<i>Lactating Members of Pairs (%)</i>	<i>Nonlactating Members of Pairs (%)</i>
Mother sometimes or often sleeps or rests in bed with baby	71	26
Mother definitely states baby not spanked	87	95
Mother holds baby ½ hour or more when not eating	57	62
Mother in different building from baby less than 3 hours daily	95	86

Sidebar This article first appeared in Joseph Zubin and John Money (Eds.), *Contemporary Sexual Behavior: Critical Issues in the 1970s*, Baltimore, MD: The Johns Hopkins University Press, 1973, Pp. 77-98. It is reprinted with the permission of the press. This is the second in our series of "golden oldies" that both have substantially influenced the history of pre-and perinatal psychology, and are out of print or hard to access. This review was supported in part by The John R. and Doris J. Haire Foundation. References

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