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The Role of Psychosexual Factors in  
Postcoital Test Results

Jacky Boivin

A Thesis  
in  
The Department  
of  
Psychology

Presented in Partial Fulfillment of the Requirements  
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## Abstract

The Role of Psychosexual Factors in  
Postcoital Test Results

Jacky Boivin

Previous research has provided correlational evidence that the female's enjoyment level of the sexual encounter engaged in for the purpose of the postcoital test (PCT) is related to the physiological results of this test. However, methodological flaws undermine the validity of this evidence. The objectives of this study were to replicate and expand on these past findings, and to determine whether the quality of the PCT sexual encounter varies as a function of the time when intercourse occurs, the night prior to or the same morning as the PCT. Before being examined for the PCT, 71 women completed a 15 minute questionnaire that inquired into the quality of their sexual functioning in general and specifically during the PCT sexual encounter. After questionnaire completion, PCT and cervical scores were assessed by the physician. Sexual functioning and physiological results did not differ between women who engaged in intercourse the night prior to the PCT and those who engaged in intercourse the morning of the PCT. Performing for the PCT however, was found to have a negative impact on women's sexual functioning. Moreover, the incidence of poor PCTs was found to be higher among sexually dissatisfied women than among sexually satisfied women. Sexual arousal and

satisfaction levels were also found to be significant predictors of unfavorable PCT results. Based on these findings it was concluded that the demands of the PCT can negatively affect sexual functioning which in turn can influence PCT results. The theoretical and clinical implications of this study are discussed.

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## Introduction

Although the social pressure on married couples to have children seems to have lessened in recent times, the low incidence of voluntary childlessness (5%) among the world population of married couples, indicates that the vast majority of couples today do intend to have children (Van Keep & Schmidt-Elmendorff, 1975). Parenthood is perceived as a source of personal and marital fulfillment as well as a significant goal in adulthood (Erikson, 1950). Population statistics indicate however, that one in five couples of child-bearing age are unable to reproduce because of an infertility problem (Aral & Oates, 1983). The realization that one cannot achieve a long desired and expected goal has a negative effect on most couples personal, marital and sexual relationship (McEwan, 1985).

In addition to these effects, couple's must also face the emotional challenges posed by the medical investigation undertaken to determine the cause of their fertility problem. Research has shown that the infertility investigation is stressful for most couples (Daniluk, 1988, McGrade & Tolor, 1981, Takefman, Brender, Tulandi & Boivin, in press). The investigation is a long-term project requiring an unusual degree of participation and cooperation. The investigation may last from several months to more than a year and in some cases may never yield a conclusive diagnosis. The tests are demanding physically and emotionally and require the couple to subordinate their lives to their infertility (Mazor, 1978).

Sexual functioning is one aspect of couple's relationship most affected by the requirements of an infertility investigation. Several of the diagnostic tests impose restrictions on the nature and timing of couples' sexual activities, shifting the emphasis to the reproductive aspect of intercourse to the detriment of the 'love-making' aspects. Of the diagnostic tests that have been shown to have effects on couple's sexual functioning, the Sims-Huhner or postcoital test (PCT) has been particularly implicated (De Vries, Degani, Eibshitz, Oettinger, Zilberman, & Sarf, 1984, Drake & Grunert, 1979). It requires couples to perform sexually at a specified time with the knowledge that the results of their coital activity will be graded by a third party. Therefore, in addition to the negative effects on sexuality that accompany being infertile, the investigation itself may compound couples sexual difficulties. Such strains on sexual functioning may in turn exacerbate a couple's infertility problem by interfering with coital capacity or by affecting physiohormonal mechanisms (Sarrel, 1986).

This study is concerned with the effects of performing for the PCT on couple's sexual functioning and in turn, the impact of the dimensions of this encounter on the physiological results of the PCT.

#### I. Medical Aspects of the Infertility Investigation

In the absence of contraception 25% of sexually active

couples will conceive after one month, 63% within six months and 85% will have achieved a pregnancy after one year. The remaining 15% of couples will have a diminished chance of conceiving without treatment and it is these couples who are considered to have an infertility problem (Behrman & Kistner, 1975).

The rationale of the infertility investigation is to determine whether ova and sperm are being produced and whether there is some barrier to their union. The routine infertility work-up includes the evaluation of both spouses with the female spouse undergoing the majority of tests. The evaluation of semen quality is the single most important, and often only test, performed on the male. The male produces an ejaculate and the specimen is evaluated to determine whether sperm volume, morphology and motility are adequate for impregnation. For approximately 40-50% of infertile couples, abnormalities in sperm production or function will be found to be a direct or contributing cause of the infertility problem (American Fertility Society (AFS), 1986).

The first step in the evaluation of the female spouse is to determine if ovulation occurs. Disorders of ovulation account for approximately 15% of all infertility problems (AFS, 1986). Since ovulation is difficult to pinpoint, most evaluations are based on indirect evidence of its occurrence. One of the most simple and inexpensive means of obtaining such information is provided by basal body temperature (BBT)

charts. The female is requested to note and record her temperature daily. A normal bi-phasic chart is characterized by low temperature levels during the initial or follicular phase of the menstrual cycle and higher temperatures during the luteal phase. The BBT chart can also be used to time intercourse with the anticipated day of ovulation.

Other tests performed on the female include the hysterosalpingogram and the laparoscopy. These tests are used to identify abnormalities or obstructions in the uterine cavity, fallopian tubes and/or ovaries. Tubal disease accounts for or is a contributing cause in approximately 25% of all infertility problems (AFS, 1986). The laparoscopy is considered one of the most accurate diagnostic tests but because it involves surgery it is usually performed after all other tests have been completed.

The only test during the infertility investigation that requires the participation of both spouses is the postcoital test. The PCT is performed during the periovulation phase (midcycle) of the menstrual cycle because cervical mucus is optimal for conception at this time. Couples are requested by their physicians to have intercourse either the same morning or the night preceding their evaluation. Male spouses are instructed to abstain from ejaculation for a minimum of two days prior to the PCT sexual encounter since sperm concentration, volume and total sperm count per ml decreases with frequent ejaculation (Levin, Latimore, Wein & Van

Arsdalen, 1986). During the evaluation, both the cervical mucus and the number of sperm surviving in the mucus are examined. The test provides information concerning the receptivity of cervical mucus to sperm as well as information about the ability of sperm to reach, and survive in, the cervical mucus. Cervical mucus that is hostile to sperm will serve as a barrier, whereas mucus that is receptive will serve to select, nourish and facilitate the migration of spermatozoa from the vaginal pool to the uterine cavity (Roland, 1985).

The length of time mucus quality is optimal is usually two to three days. Quality varies as a function of hormonal influences. Production of the clear, elastic and abundant mucus most conducive to sperm penetration coincides with the high estrogen levels reached just prior to ovulation (Moghissi, 1987). After ovulation, during the luteal phase of the menstrual cycle, the high levels of progesterone provoke the deterioration of the cervical mucus, which becomes opaque and tenacious. Sperm does not survive in this mucus.

Although estrogen and progesterone appear to be the most important hormones for the production of adequate cervical mucus the finding that some women with normal cyclic endocrine profiles have inadequate cervical mucus suggests that other factors may also be important (Sanborn, Kuo, Held, 1978). Two of these are the alkalinity and the hydration of the cervical mucus. Sperm can only migrate through midcycle

mucus that has an appropriate water content and a pH of 7 to 8.5 (McCoshen, 1987). A change in water content of only 5% alters the ability of sperm to move through the cervical mucus (McCoshen, 1987). Prolactin has been hypothesized to be responsible for the hydration of cervical mucus (Sheth, Vaidya, & Raikes, 1976). Ansari, Gould, & Ansari (1980) have also found that acidic cervical mucus interferes with the ability of sperm to survive in it. Therefore, in addition to the hormones that regulate the menstrual cycle, prolactin and pH appear to play an important role in the receptivity of cervical mucus.

For many couples, undergoing the various medical tests involved in an infertility investigation represents a challenge. The tests are intrusive as they require constant probing of the reproductive organs, and the procedures may be experienced as embarrassing and frustrating. Some of the tests can only be performed at specified times which may interfere with couples daily schedules. However, for about 90% of couples who have undergone these medical tests, an organic problem will be found. Of these, approximately 50-60% percent can be helped to achieve a pregnancy (AFS, 1986). Thus, despite the physical and emotional challenges associated with an infertility investigation, these statistics provide couples with the impetus to undergo the medical evaluation.



## II. The Effects of the Infertility Investigation on Sexual Functioning:

Few studies have specifically examined the effects of the investigation on couples sexual relationship. The following section reviews the retrospective and prospective studies available.

### A. Retrospective studies:

Lalos, Jacobsson & von Schoultz (1985) interviewed 30 couples undergoing treatment for infertility to assess the couples' experience of the infertility investigation and its influence on their relationship and sexual life. The results indicated that for all couples, use of basal body temperature charts to determine ovulation and to plan intercourse was experienced as negative. The planning made intercourse a "burden" and sometimes caused sexual aversion, lack of orgasms, frigidity and impotence. Twenty-two percent of the males reported experiencing difficulty in producing an ejaculate for the semen analysis. They reported feelings of embarrassment, shame, degradation and anxiety.

McGrade and Tolor (1981) examined the influence of the investigation on the sexual functioning of 126 couples. Thirty-five percent of couples experienced a decrease in sexual interest during the investigation as well as experiencing significantly less sexual satisfaction. In addition, 22% of couples reported that of the medical

procedures they underwent, the postcoital test had been the most stressful with respect to their sexual relationship.

Although the results of these two studies support the contention that the diagnostic tests have negative effects on couples' sexual relationship, the studies were not without methodological flaws. First, they were retrospective, couples being asked to recall events that took place in some cases several years ago. Second, in the case of the Lalos et al. (1985) study, the data were gathered through clinical interviews, introducing the possibility of bias in data collection and interpretation. The interviews were also conducted before women underwent major surgery as a form of treatment for infertility. The stress of undergoing such a medical procedure may have affected couples' perception of the events that preceded it.

#### B. Prospective studies:

In an attempt to introduce greater scientific rigour into this area, Daniluk (1988) conducted a prospective study of 43 primary infertile couples commencing an infertility investigation. Questionnaires were administered at four separate times; immediately following the initial medical visit, four weeks into the medical investigation, within one week of diagnosis and six weeks after the couples had received a diagnosis. Contrary to previous findings, the level of sexual satisfaction did not differ across the four

testing sessions, nor did it differ as a function of sex, identified etiologic source, or time spent trying to conceive prior to medical consultation. Specifically, findings indicated that the investigation process did not cause disruptions in the sexual relationship.

The measure of sexual satisfaction used by Daniluk (1988) however, was more a measure of couple's general satisfaction with their current sexual relationship than a focused assessment of their sexual functioning. Thus the measure may not have been sensitive to subtle changes in sexual functioning.

In a similar prospective study Takefman et al. (in press) examined the impact of the medical investigation on 39 primary infertile couples beginning an infertility investigation. The couples were interviewed prior to the infertility work-up and after having received a diagnosis. Couples completed a battery of tests during these two time periods and also received monthly telephone calls monitoring their progress throughout the investigation. The results indicated that couples' marital adjustment scores and intercourse frequency rates decreased over the course of the investigation. Furthermore, 29% of couples reported developing sexual difficulties during the investigation which were not present prior to it and which they believed were directly related to their infertility. Predictive analyses demonstrated that those who did not develop sexual

difficulties actually began the investigation with unusually stable marital and sexual relationships. It was suggested that it was only the exceptionally good relationship that was immune from developing sex problems because of the investigation.

The findings from Daniluk (1988) and Takefman et al. (in press), are contradictory, and this may be because of the differences in the measures used to assess sexual functioning. As stated, Daniluk administered a measure of relationship satisfaction whereas Takefman noted changes in sexual frequency and asked specific questions concerning sexual difficulties. The results of these two studies may also have been contradictory because of differences in testing periods. Takefman administered questionnaires to couples prior to and after they had received a diagnosis. Research has shown that certain diagnoses may adversely affect couples sexual relationship (Berger, 1980). Therefore the high incidence of sexual difficulties in this study may have been the result of diagnosis received rather than the result of the investigation per se.

### III. The Effects of the Postcoital Test on Sexual Functioning:

Since the investigation consists of different diagnostic tests with varying requirements (ie., X-rays, surgery, monitoring, etc.), some researchers have chosen to study the

. . .

effects of specific tests rather than the investigation as a whole. These studies have focused on the effects of the postcoital test because it has been particularly implicated by anecdotal evidence (DeBrovner, 1976, Walker 1978) and case studies (Bullock, 1974).

The postcoital test may be a stressful procedure for couples first, because it is a scheduled test where couples must engage in sexual intercourse regardless of their desire for it. And secondly, because couples must perform sexually with the knowledge that their sexual activity will be evaluated by their physician. These circumstances combined with the frustrations and anxiety already experienced by the infertile couple, provide an ideal backdrop for the development of sexual difficulties. Masters and Johnson (1970) have theorized that sexual problems often arise as a result of the anxiety that accompanies a focus on achieving intercourse to the exclusion of enjoying the pleasures of sexual caressing and touching. The pressure to perform and the anxiety that occurs as a result of it can be sufficient for the development of a sexual difficulties.

There are several ways by which impaired sexual functioning could affect the results of the postcoital examination. The most obvious way is through behavioral effects. In the male, an inability to achieve an erection sufficient for intravaginal penetration or an inability to ejaculate intravaginally (ie., ejaculatory incompetence),

would result in a poor PCT. In the female, vaginismus (intense spasms of the vaginal musculature), may make penetration impossible. For these behavioral problems, the PCT examination would reveal a complete absence of sperm in the cervical mucus and would alert the physician to the possibilities of improper coital technique (Marcus & Marcus, 1968). Survey research has shown that the incidence of poor PCTs due to improper coital technique is approximately 17% (Harrison, 1981).

A second, less obvious way in which sexual functioning could affect the results of the PCT is through physiohormonal mechanisms. For instance, sexual arousal has been found to affect vaginal pH, an important factor in adequate cervical mucus. Ansari et al. (1980) studied the importance of pH for the receptivity of cervical mucus to sperm. They examined 93 consecutive couples undergoing an infertility investigation who had persistently negative PCTs. They found that douching with sodium bicarbonate prior to sexual intercourse significantly improved the results of the PCT examination with the greatest effect observed among males who had received a good semen analysis prior to the test. Moreover, consistent douching prior to intercourse increased the pregnancy rate among these couples. The effect of bicarbonate douching was to reduce the acidity of the cervical mucus.

Sexual arousal has also been found to reduce the acidity of the vaginal environment, and therefore possibly facilitate

the migration of sperm into the cervix. Masters (1959) was the first to demonstrate that sexual arousal reduced the acidity of vaginal fluids. Wagner and Levine (1984) using a larger sample of normally cycling premenopausal women replicated these findings. The pH glass electrodes were placed in the anterior and posterior regions of the vagina, and recordings were taken prior to and after self-induced orgasms. The results revealed that a significant decrease in the acidity of vaginal fluids occurred after orgasm or prolonged sexual arousal.

Together these studies suggest that one way in which sexual functioning could affect the results of the PCT is through an impact on the pH level of vaginal or cervical mucus. Vaginal secretions are usually acidic and exocervical mucus tends to have lower pH as it comes into contact with the acidic vaginal fluids (Zavos & Cohen, 1980). A discrepancy in pH of a sufficiently high magnitude between vaginal and cervical fluids can impede, immobilize or potentially destroy the ejaculated spermatozoa (Zavos & Cohen, 1981).

A third way by which impaired sexual functioning could affect the results of the PCT is through an effect on hormones that regulate cervical receptivity. For instance, cervical tissue has been found to be a site of prolactin action and prolactin has been hypothesized to be the hormone responsible for the appropriate hydration of mid-cycle mucus

(Sheth, et al., 1976). Prolactin levels have also been found to increase during human coital activity in woman experiencing orgasm (Stearns, Winter, & Faiman, 1972). One may speculate therefore, that sexual arousal may contribute to adequate cervical receptivity by affecting prolactin influence on cervical mucus.

In summary, anecdotal evidence suggests that the circumstances of postcoital testing may have adverse effects on couples sexual functioning. Sexual disturbances in turn may adversely affect the physiological measures that are assessed during the PCT. There are two empirical studies which have attempted to provide empirical support for these speculations.

Drake and Grunert (1979) were the first to examine the effects on sexual functioning of performing for the PCT. They examined the incidence and pattern of sexual dysfunctions in 51 males undergoing a postcoital test. The males had received a good semen analysis prior to the PCT and their spouses had received good cervical scores at the time of PCT testing, thus favorable PCTs were expected. Half of the sample engaged in coitus the night prior to the PCT whereas the other half had intercourse the morning of the examination. Subjects were assigned to these two methods of testing to clarify whether the time interval between intercourse and the PCT affects PCT results. No differences in the incidence of poor PCT results were found between these two methods of testing. Overall, 20%



of males received negative postcoital test scores, with 10% receiving negative scores on a second PCT. An examination of these men's sexual functioning indicated that 83% had been unable to perform for the PCT, although their sexual performance in the interval between the first and second postcoital test had been normal. These results indicate that for some men, approximately 10%, the pressure to perform for the PCT can cause an acute episode of erectile or ejaculatory dysfunction.

In a similar study, De Vries et al. (1984) examined the impact of performing for the postcoital test on women's sexual functioning. The sample included 30 women who had intercourse the night prior to the PCT and 20 women who had intercourse the same morning as the PCT. It was hypothesized that the over-night method of testing might be less stressful for couples since it more closely approximates the usual circumstances in which couples have intercourse. Women completed a questionnaire concerning their sexual encounter after having received the results of their postcoital exam. For the majority of women, spouses had received a good semen analysis prior to the PCT and for all women good cervical receptivity had been observed at the time of testing.

The findings of this study indicated that in comparison to regular sexual encounters, performing for the PCT had a negative impact on women's sexual functioning, and that this effect was greater among women who had coitus the same-

morning rather than the night preceding the PCT. Moreover, more women from the same-morning group reported that they did not engage in foreplay and that they did not reach orgasm. Both groups however reported similar levels of tension during the PCT sexual encounter. It was also found that 73% of women in the over-night group received favorable PCT results whereas only 40% of women in the same-morning group received such scores. It was suggested that over-night PCTs reduce the stress of performing for the PCT and enable women to experience a more favorable sexual encounter. Consequently, it was suggested that doctors recommend over-night coitus to their patients because favorable sexual encounters were associated with favorable PCT results.

Methodological flaws in this study however, limit the usefulness of the findings. First, the study did not sufficiently control for the possibility that medical factors were responsible for poor PCT results. The sample included a minority of women whose husbands semen analysis had been evaluated as abnormal. Subjects were heterogeneous with respect to their previous experience with PCTs. The average number of PCTs for the sample was 11, with an upper limit of 120 PCTs suggesting the presence of some medical problem. Finally, women were in the same-morning group because they had received poor results on an over-night PCT. Thus poor PCT results could have been attributed to poor semen parameters, and/or physiological abnormalities in the female spouse

rather than psychosexual factors. These limitations restrict what can be concluded about the effect of psychosexual factors on postcoital testing.

The design of the De Vries et al. (1984) study also limits what can be said of the specific effects of female arousal on postcoital testing. For instance, although all women who felt emotionally distant from their partners received a poor PCT, the complete absence of sperm in cervical mucus may have been due to erectile or ejaculatory disturbances. Erectile problems may have also contributed to the decrease in emotional closeness these women experienced with their spouses. Thus it is unclear whether the poor PCTs among these women were due to behavioral disturbances in the male or psychosexual factors affecting the female.

Finally, flaws in the general design of this study limit the certainty of the conclusions reached. First, women were questioned about their sexual encounter after having received the results of their PCT test. Such information may have affected the way these women responded to the questionnaire items. Second, the use of descriptive rather than inferential statistics further limits interpretation of these results and their generalizability.

Thus although research findings suggest that there are pathways by which psychosexual factors might affect the results of postcoital testing, the only study that addresses female arousal has considerable methodological flaws.

•

#### IV. The Present Study

The purpose of this study is to replicate and extend the findings of De Vries et al (1984) and to address some of the issues mentioned. That is, to determine whether psychosexual factors are associated with poor PCT results in women for whom cervical and semen abnormalities as well as erectile difficulties are not suspected. This study was also designed to determine whether postcoital testing has a negative impact on women's sexual functioning and to determine whether recommending sexual encounters the night preceding the PCT reduces these negative effects.

The study was also designed to eliminate some of the methodological flaws found in the De Vries et al. (1984) study. First, women were asked to complete their questionnaire prior to receiving the results of the PCT so as to eliminate the influence of test results on questionnaire responses. Second, only the data from women whose spouses had received a good semen analysis prior to the postcoital examination were analyzed. In this way, the possibility that some women would receive unfavorable PCT scores because of poor semen characteristics was eliminated. Third, none of the women included in the sample had received results of a poor PCT in the month that preceded their PCT examination.

Finally, both the questionnaire concerning sexual functioning and the medical data obtained were more comprehensive than those used in the De Vries study. All data

concerning the physical examination were collected and used in the analyses. This allowed for a more extensive examination of the factors that might influence the outcome of the PCT.

The study included two groups of women, those who engaged in coitus the night preceding the PCT and those who had intercourse the same morning. The hypotheses of the study were as follows: 1) Performing for the postcoital examination would negatively affect the sexual functioning of both groups of women in comparison to their regular sexual functioning. 2) Women in the same-morning group would experience a less enjoyable sexual encounter than women in the over-night group. 3) Impaired sexual functioning would be associated with poor PCT outcomes.

## Method

### Subjects

Seventy-one women with a mean age of 30 years ( $\underline{SD}$ =3.9) and an average infertile period of 2.5 years ( $\underline{SD}$ =1.13) participated in this study. Subjects were recruited from the practice of an infertility specialist at the Sir Mortimer B. Davis Jewish General Hospital in Montreal, Quebec.

Subjects were included in the study if they had been infertile for at least one year, if they had sufficient knowledge of English to complete the questionnaire and if

their spouses' semen analysis, evaluated prior to the PCT, had been rated as normal. Of the 103 women recruited to participate, 20% (21) refused without explanation, 2% (3) did not have sufficient knowledge of English, and 8% (8) were excluded because of their partners' poor semen analyses. Table 1 presents selected demographic and medical characteristics of the remaining subjects.

In the final sample, 56 women had sexual intercourse the same morning as the PCT (SM-PCT), and 15 women engaged in coitus the night preceding the PCT (over-night, ON-PCT). The time interval between sexual intercourse and the PCT for the SM-PCT and ON-PCT group was, respectively, 2.6 hours ( $SD=.76$ ) and 9.90 hours ( $SD=1.1$ ).

### Measures

The test battery consisted of the following four paper and pencil questionnaires (see Appendix A):

#### Background Information Form:

This 13 item form was designed to assess various demographic and medical variables (ie., age, education, number of previous post-coital tests, etc.) of the subjects.

#### Marital Adjustment Scale (MAS) (Kimmel & Van der Veen, 1974)

This questionnaire was used to assess marital compatibility and satisfaction. The 23 item test is the new

Table 1

Means and Standard Deviations for Selected Demographic  
Variables and Percentages for Medical Variables of the Total  
Sample

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Variables

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<u>Demographic:</u>	<u>Mean</u>	<u>SD</u>		
Education	14.0	2.4		
Years Married	5.5	3.0		
 <u>Medical:</u>			<u>n</u>	<u>%</u>
Infertility Status	primary		58	81.7
	secondary		13	18.3
Ovulation	natural		58	81.7
	induced		13	18.3

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Note. N=71.

version of the Locke-Wallace Marital Adjustment Scale (Locke & Wallace, 1959), and has been shown to have high reliability and discriminant validity (Schiavi, Derogatis, Kuriansky, O'Connor & Sharpe, 1979). The normative score for maritally-satisfied women is 108 (SD=16) (Nowinski & LoPiccolo, 1979).

Sexual History Form (Nowinski & LoPiccolo, 1979).

This 19 item questionnaire asks specific questions concerning the quality of couples' sexual functioning. It has been shown to be sensitive to changes in sexual functioning, and normative data have been collected on a sample of nondysfunctional couples (LoPiccolo, Heiman, Hogan, & Roberts, 1985). For purposes of this study, 13 items of a fixed-alternative format were retained. These concerned duration of foreplay and intercourse, orgasmic frequency from various types of stimulation, erectile functioning and degree of sexual desire, arousal and satisfaction. This measure was scored on an item by item basis and thus yielded 13 variables.

PCT Sexual Functioning Questionnaire:

This questionnaire was developed for this study to address various aspects of the PCT sexual encounter. The nine items were selected on the basis of clinical reports and to be consistent with items used by De Vries et al. (1984). They evaluated areas of sexual functioning expected to be affected



by post-coital testing. The items inquired into the intensity of sexual feelings, arousal level, duration of the sexual encounter, degree of erectile difficulty and the number of sexual activities engaged in during the encounter. The items pertaining to the evaluative aspects of the encounter concerned women's feelings of comfort, nervousness and emotional closeness with their husbands during the encounter as well as their sexual satisfaction. The format of the questions includes both fixed-alternative format and 7-point Likert scales. This measure was also scored on an item by item basis and yielded nine variables.

The physician also completed a medical evaluation form designed to obtain information about the patient's infertility status (ie., type of ovulation, menstrual cycle length, results of previous semen analyses, etc.) and the PCT physiological data (ie., spinnbarkeit, ferning, pH, etc.).

#### Procedure

A month prior to the PCT, subjects were instructed by their doctor to engage in sexual intercourse either the night before their scheduled postcoital test or on the same morning. At this time the doctor also explained that the purpose of the PCT was to evaluate the receptivity of the cervical mucus and the ability of sperm to survive in the cervical mucus. Women were instructed not to use lubricants during intercourse and not to bathe or use vaginal douches after intercourse. The doctor performed the PCTs during each

woman's mid-cycle as determined by basal body temperature monitoring. The reason for the discrepancy in sample size between groups is due to the fact that the infertility specialist who collaborated on this project customarily recommends same-morning PCTs for his patients. However, for purposes of the research he agreed to schedule 15 over-night PCTs. Decisions as to whether a given patient should undergo a same-morning or over-night PCT was made on a random basis.

While waiting to be examined for the PCT at the doctor's office the researcher or an assistant asked potential subjects if they would complete a 15 minute questionnaire concerned with the PCT coital encounter. Subjects were informed that the questionnaire inquired into their sexual activities, because sexual functioning is an important factor to consider when evaluating a PCT. If subjects agreed to participate, they were also given a written form which provided more detail about the questionnaire and the steps taken to insure anonymity (see Appendix B). Subjects completed the questionnaire alone in a separate office, returned it to the doctor, and underwent the PCT.

The PCT was performed and evaluated by the physician who did not have access to the subject's responses to the questionnaire items. The PCT was graded by obtaining samples of cervical mucus from the lower and upper endocervical canal using a nasal polyp forceps or syringe inserted into the vagina. The PCT Score consisted of determining the number of

sperm in the cervical mucus. The number was first graded using a modified four-point rating scale devised by Marcus and Marcus (1968). Absence of spermatozoa or no motile sperm was assigned a score of "0"; one to six motile sperm per high powered field (HPF) received a score of "1"; seven to 15 motile sperm per HPF a score of "2"; and more than 16 motile sperm per HPF a score of "3". Scores of zero were classified as 'poor', whereas all other scores were considered an indication of a 'good' PCT.

Assessment of cervical mucus receptivity consisted of evaluating the presence of four favorable mucus characteristics graded on the basis of four-point rating scales established by Insler, Melmed, Eichenbrenner, Serr, & Lunenfeld (1972). Table 2 presents the rating scales and defining characteristics of each of the four parameters. The four cervical mucus characteristics evaluated were mucus quantity, the degree of opening of the cervical os, spinnbarkeit and ferning. Spinnbarkeit refers to the elasticity of the cervical mucus whereas ferning refers to the branching pattern. The inter-rater reliability coefficients for this grading system range from .93 for the evaluation of mucus quantity to .82 for the determination of degree of opening of the cervical os (Insler et al., 1972). In addition to these characteristics, mucus pH was assessed using litmus paper and graded on a 14-point scale ranging

Table 2  
Scoring system used by physician for the evaluation of cervical mucus receptivity

Parameter	Rating			
	0	1	2	3
Amount of mucus	None	Scant; a small amount of mucus can be drawn from cervical canal	Dribble; a glistening drop of mucus seen in the external os; mucus easily drawn	Cascade; abundant mucus pouring out of external os
Spinnbarkeit	None	Slight; uninterrupted mucus thread may be drawn approx. 1/4 distance between the external os and vulva	Moderate; uninterrupted mucus thread may be drawn approx. 1/2 of the distance between the external os and vulva	Pronounced; uninterrupted mucus thread may be drawn for the whole distance between the external os and vulva
Ferning	None; amorphous	Linear; fine linear ferning seen in a few spots; no side branching	Partial; good ferning with side branches in parts of the slide, linear or amorphous mucus in other parts	Complete; full ferning of whole preparation
Cervix	Closed; mucosa pale pink, the external os hardly admits thin applicator	Partially open; mucosa pink, cervical canal external os patulous easily penetrable by an applicator	Gaping; mucosa hyperemic,	

Note. From Insler et al., (1972).

from "1" (acidic) to "14" (alkaline). The global Cervical Receptivity Score (CRS) was 'poor' if either mucus quantity, spinnbarkeit, or ferning was rated as "0" or "1" or if pH level was less than 7. The CRS was rated as 'good' in all other cases.

## Results

### Overview:

Three main analyses were computed to test the three main hypotheses of this study. The first hypothesis concerned the effects of performing for the PCT on sexual relationship variables. To test this hypothesis women's perceptions of their regular sexual encounters were compared to their sexual responses during the PCT sexual encounter. The analysis used was a repeated measures analysis of variance (ANOVA) with method of testing as the grouping factor and type of encounter (ie., regular or PCT) as the within factor.

The second goal of this study was to determine whether women's sexual and emotional reactions during the PCT sexual encounter varied as a function of method of testing (ie., same-morning versus over-night). To this end, the PCT sexual functioning of the SM-PCT group was compared to that of the ON-PCT group using two multivariate analyses of variance (MANOVA), with method of testing as the grouping factor.

The final hypothesis of this study was concerned with the relationship between sexual functioning and physiological

function as evaluated by the PCT Score. This hypothesis was tested by examining the accuracy of classification of favorable and unfavorable PCT Scores achieved by a discriminant analysis using PCT sexual encounter variables as predictors.

### I. Comparison of Regular versus PCT Sexual Functioning:

#### A. Group Equivalence:

The SM-PCT and ON-PCT groups were compared on baseline demographic, medical, marital adjustment and sexual functioning variables. These comparisons were undertaken to insure that the two groups were equivalent prior to comparisons on PCT sexual encounter variables and physiological measures.

##### i. Demographic and medical variables:

The two groups were compared using the t-statistic on the following demographic variables; age, education, number of years married and number of years infertile. There were no significant differences between the two groups on these variables (see Appendix C.1 for summary statistics and means and standard deviations).

The two groups were also compared using the t-statistic on number of previous postcoital tests and day of cycle at the time of PCT. The chi-square statistic was computed on the following dichotomous variables; type of ovulation, (ie.,

natural or medically induced), and infertility status (ie., primary or secondary). There were no significant differences between the SM-PCT and ON-PCT group on these variables (see Appendix C.2 for summary statistics).

ii. Marital adjustment and general sexual functioning:

There was no significant difference between the SM-PCT and ON-PCT group on marital adjustment. The mean for the sample was 117.2 (SD=12.8) which is within the normative range established by Nowinski and LoPiccolo (1979).

There were 13 questionnaire items that assessed general sexual functioning. Because some of the correlations among these variables were quite high ( $r \geq .50$ ) a multivariate analysis of variance (MANOVA) was considered to assess group differences. However, the assumptions of multivariate normality and homogeneity of the variance-covariance matrix underlying this statistic were not met and a MANOVA could not be computed (see Appendix D). Group differences on the general sexual functioning items were thus evaluated by univariate t-tests.

There were no significant differences between the two groups on any of these variables (see Appendix C.3 for t-test summary tables).

In summary, there were no significant differences between the SM-PCT and ON-PCT groups on baseline demographic and medical variables, or on measures of marital adjustment and general sexual functioning. Consequently, the two groups

were combined when describing couples' regular sexual functioning.

#### B. General Sexual Functioning: Descriptive Statistics

This sample of women appeared to be well-adjusted in terms of their general sexual functioning. Thirty-eight percent (27) of women reported engaging in sexual intercourse twice weekly, whereas 34% (24) reported a coital frequency of 3-4 times per week. These frequencies are similar to the normative data provided by Friedman (1979) for coital activity among infertile couples. The majority of women were orgasmic, with 79% (56) reporting a capacity to achieve orgasm through intercourse in more than 50% of sexual encounters.

Both the average duration of foreplay and the average duration of sexual intercourse during these sexual encounters was 7 to 10 minutes. Fifty-two percent (37) of women rated their general sexual encounters as extremely satisfying, whereas 42% (30) reported a moderate level of sexual satisfaction. Seventy-five percent (53) of women stated that their spouses never experienced erectile difficulties, whereas 21% (15) of women reported that erectile difficulties occurred in less than 10% of sexual encounters. Finally, 86% (61) of women, stated that they never experienced negative feelings during their sexual encounters.



### C. General versus PCT Sexual Functioning:

Of the 75% (53) of women who reported that their spouses never experienced sexual difficulties during regular sexual encounters, 11.3% (6) reported that their mates had experienced sexual difficulties during the PCT encounter. The increase in the frequency of erectile difficulties is significant using McNemar's test for the significance of change,  $\chi^2(1)=4.17$ ,  $p \leq .05$ .

Because the scales used to assess regular and PCT sexual variables differed quantitatively (ie., fixed-alternative versus Likert-scale response formats), direct comparisons between these two sexual occasions could be computed on the only comparable variable; level of sexual satisfaction. This comparison was computed using a two-way repeated measures ANOVA with method of testing as the grouping factor and type of sexual encounter (ie., regular or PCT) as the repeated measure.

The interaction between type of sexual encounter and method of testing approached significance,  $F(1,69)=2.84$ ,  $p \leq .08$ , indicating a trend for women in the SM-PCT group to report a greater discrepancy in sexual satisfaction between regular and PCT sexual encounters than women in the ON-PCT group. The main effect of type of encounter was significant,  $F(1,69)=33.20$ ,  $p \leq .001$ . The means and standard deviations for the two groups are presented in Table 3, and show that overall, women experienced less sexual satisfaction

Table 3

Means and Standard Deviations for SM-PCT and ON-PCT groups on Sexual Satisfaction during both types of Sexual Encounters

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Type of Sexual Encounter	<u>Method of Testing</u>	
	SM-PCT	ON-PCT
	(n=56)	(n=15)
Regular	5.46 (0.8)	5.20 (1.1)
PCT	4.03 (1.4)	4.40 (1.5)

---

during the PCT sexual encounter than during regular sexual contact (see Appendix E for ANOVA summary table).

In summary, women in this sample were well-adjusted in terms of their general sexual functioning. Performing for the PCT however, significantly increased the percentage of women who experienced sexual difficulties both in terms of behaviour and satisfaction levels.

## II. Comparison of the SM-PCT and ON-PCT groups on PCT Sexual Functioning:

These analyses were carried out to determine whether the experience of performing for the postcoital test differed between the SM-PCT and ON-PCT groups. The MANOVA statistic was used given the pattern of intercorrelations among the PCT sexual relationship variables.

Prior to computation of this statistic however, analyses were computed to determine whether the assumptions underlying MANOVA had been met. In order to evaluate the assumption of multivariate normality, the skewness coefficients for all nine PCT sexual variables were examined within each group. The only variable to demonstrate a significant departure from normality was 'degree of erectile difficulty' within the SM-PCT group. The shape of the distribution indicated that the majority of respondents, 64.2% (36), reported very little erectile difficulty. A t-test computed between the two groups was not significant. Therefore, on the basis of the severity

of the skewness and the lack of concordance with the ON-PCT group, this variable was dropped from subsequent analyses. The univariate F-test for homogeneity of variance was significant for 'degree of nervousness' with the smaller group having the larger variance. Under such conditions, cases tend to produce univariate F-ratios that are too liberal (Howell, 1986), thus, this variable was also dropped from subsequent analyses.

Table 4 presents the correlation matrix between all PCT sexual encounter variables considered for inclusion in the MANOVA. The correlation between subjects' overall arousal level correlated highly with overall sexual satisfaction, intensity of sexual feelings, and number of sexual activities engaged in. The latter two variables were considered to be more objective than an overall estimate of arousal therefore arousal level was dropped from subsequent analyses. All other variables were retained.

Two separate oneway MANOVA analyses with PCT group as the independent factor were computed. The first included variables considered to be related to the emotional context of the PCT sexual encounter, and the other, variables considered to be related to the sexual aspects of the encounter. The variables included in the emotional context MANOVA were: level of satisfaction, degree of closeness experienced, and level of comfort in approaching the PCT sexual encounter. The sexual MANOVA consisted of the

Table 4

Correlations among PCT Sexual Encounter Variables considered for inclusion in MANOVAs

	1	2	3	4	5	6	7
1. Intensity of Sexual Feelings	1.00						
2. Closeness	.469***	1.00					
3. Duration	.358**	.300	1.00				
4. Arousal	.734***	.502***	.491***	1.00			
5. Satisfaction	.548***	.432***	.488***	.693***	1.00		
6. Sexual activities	.511***	.364**	.506***	.652***	.308**	1.00	
7. Comfort	.427***	.435***	.029	.523***	.439***	-.147	1.00

Note. N=71.

\*  $p \leq .05$

\*\*  $p \leq .01$

\*\*\*  $p \leq .001$

following variables: the duration of the PCT sexual encounter, the intensity of sexual feelings, and the number of sexual activities engaged in during the sexual encounter. The Mahalanobis distance measure failed to reveal multivariate outliers in either MANOVA. Box's M statistic indicated homogeneity of the variance-covariance matrix for both MANOVAs (see Appendix F.1 for statistics pertaining to tests of assumptions underlying the MANOVA statistic).

A. Emotional MANOVA :

The Hotelling  $T^2$  criterion for the emotional context MANOVA was non-significant. There were also no significant differences between the SM-PCT and ON-PCT groups at the univariate level (see Appendix F.2 for MANOVA summary table). The means and standard deviations for both groups of subjects are presented in Table 5.

B. Sexual MANOVA :

The Hotelling  $T^2$  criterion showed a trend toward significance for the main effect of group with  $F(3,66)=2.26$ ,  $p \leq .10$ . Examination of univariate F-tests indicated that of the three variables included in this MANOVA, the number of sexual activities engaged in contributed significantly to the multivariate F statistic, whereas duration of sexual encounter had only a marginal contribution. As shown in Table 6, the ON-PCT group engaged in significantly more

Table 5

Means and Standard Deviations for Variables included in the  
Emotional MANOVA

Variables	<u>Method of Testing</u>		<u>F</u>
	SM-PCT ( <u>n</u> =56)	ON-PCT ( <u>n</u> =15)	
Closeness	5.34 (1.5)	5.67 (1.4)	0.4
Satisfaction	4.04 (1.4)	4.40 (1.5)	0.4
Comfort Level	3.88 (1.6)	4.60 (1.9)	0.1

Table 6

Means and Standard Deviations for Variables included in the Sexual MANOVA

Variables	<u>Method of Testing</u>		<u>F</u>
	SM-PCT ( <u>n</u> =56)	ON-PCT ( <u>n</u> =15)	
Duration of Encounter	5.73 (1.8)	6.67 (1.3)	3.97 <sup>t</sup>
Number of Sexual Activities	5.94 (2.5)	7.67 (1.7)	6.34**
Intensity of Sexual Feelings	40.78 (17.0)	47.07 (19.4)	1.46

<sup>t</sup>  $p \leq .10$

\*\*  $p \leq .01$



sexual activities and had a tendency to have a longer sexual encounter than the SM-PCT group (see Appendix F.3 for MANOVA summary table).

In summary, the effect of method of testing on sexual functioning appears to be limited to the sexual rather than the emotional aspects of the PCT encounter.

### III. Comparison of the SM-PCT and ON-PCT groups on Physiological Measures:

#### A. Cervical Receptivity Scores:

As shown in Table 7, some of the correlations among spinnbarkeit, ferning, mucus quantity and pH level were fairly high ( $r \geq .90$ ) and suggested the presence of multicollinearity among the variables (Tabachnik & Fidel, 1983). Consequently, comparisons were based on the t-statistic. There were no significant differences between the SM-PCT and ON-PCT groups on measures of ferning, spinnbarkeit, mucus quantity or pH level (see Appendix G.1 for t-test summary statistics).

A chi-square statistic was also computed to identify differences between the two groups on CRS. This statistic was non-significant (see Appendix G.2 for chi-square summary statistics).

Table 8 presents the correlations between the characteristics which constitute the CRS: spinnbarkeit, ferning, mucus quantity, pH level, and the PCT sexual

Table 7

Correlations among Cervical Receptivity Characteristics

	1	2	3	4
1. Spinnbarkeit	1.00			
2. Ferning	.838 (.001)	1.00		
3. Mucus Quantity	.909 (.001)	.851 (.001)	1.00	
4. pH Level	.543 (.001)	.549 (.001)	.547 (.001)	1.00

Note. N=71. Significance levels are indicated in parenthesis.

Table 8

Correlations between Spinnbarkeit (Spin), Ferning (Fern),  
Mucus Quantity (Mucus), pH and PCT Sexual Encounter Variables

	<u>Cervical Receptivity Characteristics</u>			
	Spin	Fern	Mucus	pH
<u>PCT variables</u>				
Intensity of				
Sexual Feelings	.094	.086	.126	.080
Nervousness	-.064	-.034	-.072	.104
Emotional Closeness	.077	.104	.141	-.120
Duration	.151	.129	.131	.104
Sexual Satisfaction	.120	.066	.092	-.124
Arousal Level	.067	-.012	.091	-.061
Erectile				
Difficulties	.080	.145	.082	.195
Comfort Level	.133	.103	.149	-.143
Number of				
Sexual Activities	.038	.004	.019	.040

Note. N=71.

encounter variables. There were no significant correlations among these variables.

#### B. PCT Score:

Table 9 shows that favorable PCT Scores were associated with more intense sexual feelings, higher arousal levels, more sexual activities and greater feelings of emotional closeness with husband.

A chi-square statistic computed between the SM-PCT and ON-PCT groups on PCT Score was not significant (see Appendix G.3 for chi-square summary statistics). A t-test comparing the two groups on all four categories of postcoital outcome was also nonsignificant ( $t(69)=.04, p \leq .97$ ).

In summary, there were no significant differences between the SM-PCT and ON-PCT groups on variables assessing the quality of sexual functioning or on physiological measures. As there were no differences between the two groups on sexual functioning the relationship between sexual functioning and PCT results was examined by classifying subjects into sexually satisfied and dissatisfied groups.

#### i. Subject selection:

Subjects were classified on the basis of their scores on three measures of the quality of sexual functioning during the PCT sexual encounter. These were sexual satisfaction, arousal and orgasm. To be included in the PCT sexually

Correlations between PCT Score and PCT Sexual EncounterVariables


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	<u>PCT Score</u>
<u>PCT Variables</u>	
Intensity of Sexual Feelings	.265*
Nervousness	.089
Emotional Closeness	.285*
Duration of Encounter	.148
Sexual Satisfaction	.096
Arousal Level	.275*
Erectile Difficulties	.029
Comfort Level	.157
Number of Sexual Activities	.309**

---

Note. N=71.

\*  $p \leq .05$

\*\*  $p \leq .01$

satisfied group, subjects had to obtain the best possible scores on at least two of the measures ( $\geq 5$ ) and a score of no less than the median ( $> 4$ ) on the third variable. Conversely, to be included in the PCT sexually dissatisfied group, subjects had to obtain the worst possible score on two of the measures ( $\leq 3$ ) and a score no higher than the median ( $< 4$ ) on the third variable. In addition, subjects were dropped from the analysis if they reported that their spouses had experienced erectile difficulties during the PCT encounter or if their spouses had received a poor semen analysis prior to PCT testing. In this way, it was possible to eliminate couples who received unfavorable PCT scores because of erectile, ejaculatory or semen anomalies. The final sample consisted of 16 women in the sexually satisfied group and 14 women in the dissatisfied group.

To confirm that this selection procedure was valid, t-tests were computed between the two groups on all of the other PCT sexual variables. Table 10 shows the means and standard deviations for both groups of subjects on these variables. The PCT sexually satisfied group experienced significantly more intense physical changes, and engaged in significantly more sexual activities than the poorly adjusted group. In addition, this group of subjects reported feeling less nervous and more comfortable about the PCT sexual encounter and reported experiencing more emotional closeness with their husbands than the poorly adjusted group.

Table 10

Means and Standard Deviations for Sexually Satisfied and Sexually Dissatisfied Groups on PCT Sexual encounter variables

Variables	<u>Satisfaction Groups</u>		t
	Satisfied ( <u>n</u> =16)	Dissatisfied ( <u>n</u> =14)	
Intensity of			
Sexual Feeling	59.31 (12.9)	23.28 (10.1)	8.8***
Nervousness	2.31 (1.5)	4.14 (1.7)	3.1**
Emotional			
Closeness	6.25 (1.2)	4.42 (1.9)	3.2**
Duration	6.62 (1.7)	4.28 (1.4)	4.0***
Erectile			
Difficulties	1.06 (.3)	1.2 (.4)	1.21
Comfort Level	5.06 (1.2)	2.93 (1.9)	3.64***
Number of Sexual			
Activities	7.25 (1.6)	4.07 (1.9)	5.08***

\*\*  $p \leq .01$

\*\*\*  $p \leq .001$

The results of these t-tests indicate that the selection procedure was valid. The two groups did not differ significantly on any demographic or medical variables (see Appendix G.4, for summary statistics).

A chi-square statistic (using Fisher's exact probability test for small expected frequencies) was computed to evaluate whether the incidence of poor PCT Scores was higher among sexually dissatisfied women. This analysis was significant with  $\chi^2(1)=5.01$ ,  $p \leq .03$ , indicating that the percentage of poor PCTs was higher among women who experienced an unsatisfactory sexual encounter prior to the PCT than among woman who reported a satisfactory sexual encounter. Specifically, 13% (2) of women in the sexually satisfied group received a poor PCT Score whereas 50% (7) of the women in the dissatisfied group received a poor PCT.

In summary, the results indicate that women who experience an unsatisfactory PCT sexual encounter, regardless of method of testing, obtain significantly more poor PCTs than women who experience a satisfactory sexual encounter. Moreover, this finding cannot be explained on the basis of known semen abnormalities or on the basis of erectile/ejaculatory difficulties.

#### IV. Predicting PCT outcome:

To extend the finding that psychosexual factors are associated with PCT Score to a sample of women for whom



medical factors are not a cause of the poor PCT, a stepwise discriminant analysis was computed. The goal of this analysis was to determine whether good and poor PCT Scores could be predicted on the basis of information related to subject's sexual functioning during the PCT sexual encounter.

Discriminant analysis is generally used in two ways; first, as a means of describing group differences and secondly, as used in this study, as a means of classifying subjects into their respective groups on the basis of collected data. The classification scheme is based on a linear combination of the best discriminating variables, that is, the variables which maximally differentiate the two groups.

#### A. Subject Selection:

In order to rule out extraneous influences on PCT scores, selection criteria were used to create a homogeneous subgroup of subjects whose poor PCT Score could not be explained by known medical factors (ie., poor semen or cervical scores). Therefore, subjects who had a poor CRS at the time of PCT testing and subjects whose spouses had received a poor semen evaluation were not included in this analysis. In addition subjects' whose ovulation had been medically induced for the PCT were also dropped from the analysis. In order to control for the possible effect of PCT experience, only women who had not undergone a poor PCT in the preceding month were included in the analysis. Finally,

women from both the SM-PCT and ON-PCT groups were included in this analysis as there were no differences between the two groups on PCT Score or on the sexual functioning variables included in this analysis. The final sample for this analysis consisted of 50 women. Of these, 13 received unfavorable PCT Scores, while the remainder received favorable scores.

#### B. Selection of Predictor Variables:

The selection of variables to be included in the analysis was based on consideration of the assumptions underlying discriminant analysis and on the intercorrelations among variables. The assumptions underlying this statistical analysis are multivariate normality, homogeneity of the variance-covariance matrix and linearity between all variables. Multivariate normality was tested by inspecting univariate skewness coefficients within each group. These revealed that all variables were approximately normally distributed, except degree of erectile difficulty. Examination of this variable's distribution indicated that the majority of respondents in the good PCT group, 64.9% (24), reported that their spouses did not experience erectile difficulties. A t-test comparison with the poor PCT group was non-significant. Given this information, this variable would normally be excluded from the analysis, however the importance of this variable in relation to PCT Score precluded this option. Given that all other variables were

normally distributed and that the other assumptions of discriminant analysis were met it was expected that inclusion of this variable would not affect the results obtained. The F-tests for univariate homogeneity of variance on all variables were non-significant as was the Box M multivariate test of the variance-covariance matrix. Scatterplots between all pairwise combinations of variables indicated linear relationships throughout. The Mahalanobis distance measure computed for all variables failed to reveal any multivariate outliers in either the poor or good PCT group.

Number of sexual activities engaged in and duration of sexual encounter were excluded from this analysis because significant differences between the SM-PCT and ON-PCT groups were obtained on these variables. All other PCT sexual variables were retained for the analysis. Infertility status variables were also included in this analysis to account for the possibility that these variables in combination could account for poor PCT results. Correlations among infertility status variables were generally low and did not lead to rejection of any variables. Thus the following set of 12 variables were included in the analysis: age, years infertile, number of previous PCTs, day of cycle at PCT testing, interval of time between the sexual encounter and PCT testing, intensity of sexual feelings, level of sexual satisfaction and arousal, level of erectile difficulties and degree of nervousness, closeness and comfort during the PCT

encounter. (see Appendix H for statistics pertaining to the selection of variables for this analysis).

Due to the relatively small sample size, several strategies were employed to maximize confidence in the results produced by this discriminant analysis. Stevens (1986) suggests that confidence is increased if the ratio of total sample size to number of variables is at least 20:1. Thus the discriminant analysis was computed to select the two best predictors among the 12 variables allowing for a maximum subject to variable ratio of 25:1. Moreover, the two variables chosen were selected if they showed an F-ratio between groups of at least two. This reduced the possibility of predictors being selected because of intercorrelations rather than differentiation of groups. Finally, Tabachnik and Fidel (1983) suggest that the jackknife classification procedure reduces the statistical bias inherent in the discriminant method of classification. Using this procedure each subject is classified based on a classification scheme computed on all other subjects. Thus the subject to be classified is not included in the data used to compute the classification coefficients. Therefore, this classification scheme was used for the analysis.

### C. Results of the discriminant analysis predicting PCT Score:

The overall discriminant function calculated was significant,  $\chi^2(2)=6.80$ ,  $p \leq .03$ . Table 11 presents the

summary statistics for the analysis. Sexual satisfaction and arousal level were selected as the two variables achieving maximum discrimination between groups. The canonical correlation coefficient indicated that in total, 13% of the between group variance was accounted for by this linear combination of variables. The correlations between these variables and the discriminant function indicated that although arousal contributed significantly to this function, satisfaction level had a negligible contribution.

The results of the jackknife classification of subjects is shown in Table 12. Seventy-three percent (27) of subjects in the good PCT group were correctly classified whereas 61.5% (8) of subjects in the poor PCT group were correctly classified on the basis of both of these variables.

Examination of mean scores on these variables, presented in Table 13, showed that women in the favorable PCT group had significantly higher arousal scores than women in the unfavorable PCT group. Sexual satisfaction scores, however, were similar in both groups.

#### Discussion

The main findings of this study are that sexual activity engaged in for the purposes of the PCT is less satisfying than sexual activity at other times and that impaired sexual functioning in turn, is associated with poor PCT results.

The finding that the PCT sexual encounter was less

Table 11

Results of Discriminant Analysis

Predictor Variables	Correlations of predictors with Function	Univariate F (1,48)	Pooled Within Group Correlations	
			Among Predictors	Sexual Satisfaction
Arousal Level	.77	4.43*	1.00	.66
Sexual Staisfaction	.03	.12		1.00
Canonical R	.37			
Eigenvalue	.16			

Note. N=71.

\*  $p < .05$ .

Table 12

Jackknife Classification Results for Discriminant Analysis

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Actual Groups	n	<u>Predicted Group</u>	
		Good	Poor
Good	37	27 (73.0 %)	10 (17.0 %)
Poor	13	5 (38.5%)	8 (61.5%)

---

Note. Overall percent of cases correctly classified = 70.0%.

Table 13

Group Means and Standard Deviations for Variables predicting PCT Outcome

Variable	<u>Groups</u>	
	Good	Poor
Sexual Arousal	4.57 (1.5)	3.53 (1.5)*
Sexual Satisfaction	4.19 (1.3)	4.15 (1.6)

Note. Means are indicated first; SD's are in parentheses.

\*  $p \leq .05$



satisfying than regular sexual encounters is consistent with De Vries et al. (1984) who found decreased levels of sexual enjoyment in women undergoing the PCT. Moreover, in the present study, 11% of women who reported an absence of erectile difficulties during regular sexual encounters reported that such difficulties had arisen during the PCT sexual encounter. Drake & Grunert (1979) reported a similar 10% incidence of mid-cycle sexual dysfunction among males undergoing PCTs. These findings suggest that scheduled intercourse has a negative impact on both female and male sexual functioning.

It was hypothesized that allowing women to engage in sexual activities the night prior to the PCT rather than the morning of this test, would reduce the negative impact of performing for the PCT. This hypothesis was not supported. No differences were obtained between the SM-PCT and ON-PCT groups on variables assessing emotional comfort or the quality of sexual functioning during the PCT encounter. However, women in the ON-PCT group did engage in more sexual activities and had a longer sexual encounter than women in the SM-PCT group. This finding is similar to De Vries et al. (1984) who found that women in the over-night group engaged in more sexual foreplay activity than women in the same-morning group. This finding is likely explained by the fact that the over-night method of testing allows more time between the sexual encounter and the PCT, thereby enabling

couples to broaden the range of activities they can engage in. Couples in the same-morning group may experience time pressure and limit their sexual activities to coitus.

The general consensus in the literature on sexual functioning (Leiblum & Rosen, 1989) suggests that higher scores on these two behavioral measures (duration of sexual encounter and number of sexual activities) are an indication of more favorable sexual encounters. In this study however, longer and more varied sexual encounters did not manifest in higher arousal or satisfaction levels. This suggests that conclusions based on data obtained from general populations may not be useful for the understanding of sexual functioning among couples performing for the PCT.

As a task requested by the physician and required to identify a couples's infertility problem, couples may approach the PCT with one goal in mind - getting it done - regardless of the conditions under which intercourse occurs. Thus the impact of scheduled intercourse and pressure to perform on sexual arousal and satisfaction would be the same regardless of whether couples had more time to accomplish this task, as was the case for women in the ON-PCT group. However, if the pressure to perform affects erectile capacity, as was reported by 11% of women in this study, the over-night method of testing might allow more opportunity for couples to overcome these difficulties.

Since there were no differences between the SM-PCT and

ON-PCT groups on sexual functioning variables, no differences between the groups were expected or found on PCT results. This finding is consistent with Drake and Grunert (1979) but inconsistent with the findings of De Vries et al. (1984) who found that there was a greater percentage of poor PCTs in the same-morning group. As stated previously however, De Vries et al. (1984) assigned subjects to the same-morning group if they had previously received a poor test result following an over-night PCT. Given that 68% of poor PCTs will be poor on a repeat occasion (Harrison, 1981) their findings are not surprising.

As there were no differences between the SM-PCT and ON-PCT groups on sexual functioning or PCT Score the groups were collapsed and the relationship between sexual functioning and PCT outcome was examined by classifying subjects into sexually satisfied and dissatisfied groups according to three measures of female sexual functioning (arousal, satisfaction and orgasm). Based on these two independent groups the incidence of poor PCTs was found to be significantly higher in sexually dissatisfied women than in the sexually satisfied. It is important to note that neither the sexual dissatisfaction nor the poor PCTs could be attributed to poor performance on the males' part as women whose spouses experienced erectile difficulties were excluded from this analysis. This finding supports the hypothesis that impaired sexual functioning is associated with poor PCT results. More

specifically, however, it indicates that it is not only male sexual functioning that is associated with PCT results, as other studies have suggested, but female psychosexual factors as well.

One can argue however, as for the De Vries et al. (1984) study, that the poor PCTs could have been explained by medical factors such as semen abnormalities, medically induced ovulation, or previously poor PCTs. In order to deal with this potential confound, medical factors were controlled in the discriminant analysis and the finding that impaired sexual functioning was associated with poor PCT results remained. That is, sexual arousal was a significant predictor of poor PCTs in couples in whom ovulation had been natural, who did not have cervical and/or semen abnormalities and who had not received a poor PCT in the month that preceded the current PCT. This is an important finding because it suggests that factors in the couple's sexual interaction could be a cause of poor PCTs. This finding could prove to be important in elucidating why some couples repeatedly obtain poor PCTs despite obtaining satisfactory medical data that would predict good PCT results. The incidence of couples who obtain unexplained poor PCTs on two separate occasions has been reported to be 30.3% in a sample of 423 PCTs (Harrison, 1981). It is this proportion of couples whose PCTs might be influenced by sexual factors. The finding that 24.5% of the couples in this survey subsequently achieved a pregnancy

supports this contention. Assessing couples sexual functioning during the PCT sexual encounter could help to clarify why couples obtain poor PCTs despite good concurrent medical data. This in turn, could reduce the incidence of unexplained poor PCTs.

#### Theoretical Implications:

The findings of this study suggest that parameters of sexual functioning may interact with physiohormonal mechanisms to influence the fertilization process. The exact mechanisms involved cannot be inferred from this study but several directions for future inquiry seem warranted. The results of the discriminant analysis suggest that the effects of sexual functioning may not be through hormonal influences on cervical receptivity. Twenty-six percent of women with good cervical scores obtained poor PCTs and these women reported significantly reduced sexual arousal in comparison to women who received good PCTs. Moreover, none of the variables used to determine cervical receptivity (ie., spinnbarkeit) correlated with psychosexual data. Presumably, women's sexual functioning did not negatively affect their cervical receptivity scores at the time of the PCT. It may be however, that there was not sufficient time between intercourse and the PCT to register changes in CRS. Cervical receptivity changes progressively and gradually throughout the menstrual cycle, with the changes corresponding to the

levels of estrogen and progesterone available. Changes in hormones may precede changes in cervical receptivity by as much as 48 hours (McCoshen, 1987). This suggests that if sexual functioning does affect cervical receptivity via hormonal mechanisms that the effects may only be seen at a much later time.

It may also be that more than one sexual encounter is required to influence hormonal levels or cervical receptivity. Some researchers have found that the consistency in the occurrence of sexual intercourse influences endocrine-related measures such as menstrual cycle lengths, basal body temperature profiles and estrogen levels (Cutler, Garcia, Huggins & Preti, 1986). Thus it may be that one episode of sexual intercourse as in the case of the PCT will not affect hormonal patterns, but that the pattern of intercourse over a period of time may. Thus, although there may be effects of sexual functioning on hormonal patterns it does not seem that the sex-related effects on PCT results are due to these changes.

Perhaps a more likely way in which sexual and physiological factors interact to affect fertility is through the impact of the vaginal environment on spermatozoa. The chemical properties of vaginal fluids that change during sexual arousal are also known to affect sperm motility and survival. Sexual arousal has been found to effect changes in vaginal pH level (Wagner & Levin, 1984), sodium and chloride

ions (Wagner & Levin, 1977), glycerol and stearic acids (Preti, Huggins & Silverberg, 1979). Some of these chemical properties, for instance pH and ionic changes, have been shown to influence sperm motility (Zavos & Cohen, 1980, Preti et al., 1979). Thus it may be that sexual arousal influences the fertilization process by creating an adequate environment for sperm survival and migration to the cervical mucus. In the case of this study, sexual functioning may have influenced PCT results in women for whom semen and cervical abnormalities were not suspected by reducing the receptivity of the vaginal environment and thereby the number of sperm that actually migrated to the cervical mucus from the vaginal pool. Further research might investigate more specifically the chemical changes in vaginal fluids associated with alterations in sexual arousal and relate these to the parameters that influence sperm function during early reproductive events.

#### Clinical Implications:

On the basis of the present findings it is recommended that physicians question couples on their sexual functioning in the PCT encounter when poor PCT results are obtained. It has not been uncommon for physicians to do this when poor PCT results have been found. However, this has usually been to determine whether intravaginal ejaculation occurred. The findings of this study indicate however, that sexual

functioning may influence PCT results through more subtle means than improper coital technique. Therefore physicians should also inquire into more qualitative aspects of sexual functioning such as sexual arousal and satisfaction levels.

If sex for the PCT is found to be a problem for couples than it is recommended that physicians attempt to alleviate the pressures on couples. Although in this study time of sexual activity (ie., same-morning versus over-night) did not affect sexual functioning per se, some couples might still benefit from over-night testing if they indicate a preference.

Alternatively, the pressures associated with postcoital testing may be substantially reduced if couples are not actually scheduled for this test. The PCT is performed during the fertile period of the menstrual cycle, at a time when most infertile couples will have intercourse anyway. Therefore, physicians might allow couples to informally come in to the office for the PCT when they have had intercourse during the fertile period. In this manner, couples would not be engaging in coitus with the knowledge that they have a scheduled appointment with their physician.

Finally, there is evidence to suggest that the medical information obtained through the postcoital test can be obtained through other means. For example, PCT results have been found to correlate significantly with the results of sperm penetration tests using capillary tubes or glass slides



(Moghissi & Syner, 1970). Although these methods are more subjective and therefore less accurate, they can be suggested as an alternative for couples who repeatedly test poorly on the PCT and who report that sex was a problem.

In summary the findings of this study indicate that the effects on sexual functioning associated with the pressures of performing for the PCT may in fact contribute to poor PCTs. These findings suggest that further research is required into how sexual functioning influences physiological factors which affect fertility. The findings also suggest that reducing the performance pressures associated with postcoital testing may facilitate this task for couples as well as improve the diagnostic validity of this procedure.

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Appendix A  
Questionnaire and Medical Evaluation Form



## Background Information Form

1. Date \_\_\_\_\_ 2. Time \_\_\_\_\_
3. Age \_\_\_\_\_ 4. Religion \_\_\_\_\_
5. How long have you been married (living together)? \_\_\_\_\_
6. How many children do you have? \_\_\_\_\_
7. How many years of schooling have you completed (ie., high school completion would be considered 11 years)? \_\_\_\_\_
8. What is your occupation? \_\_\_\_\_
9. How many days have passed since the first day of your last menstrual period (make a reasonable estimate)? \_\_\_\_\_
10. Are you presently taking any type of medication? YES \_\_\_ NO \_\_\_ . If yes, name the type of medication? \_\_\_\_\_
11. How long have you been trying to conceive? \_\_\_\_\_
12. (a) How many Post Coital tests have you had in all? \_\_\_\_\_
- (b) Over what period of time? \_\_\_\_\_
- (c) Are you aware of the results of any of your Post-Coital tests? If yes, please describe \_\_\_\_\_
- (d) How many Post-Coital tests have you had this menstrual cycle? \_\_\_\_\_
- (e) What time did you engage in sexual intercourse for today's Post-Coital test? \_\_\_\_\_
13. Has your husband had a semen analysis? YES \_\_\_ NO \_\_\_ .
- If yes, how many? \_\_\_\_\_ To your knowledge, what were the results? \_\_\_\_\_

### Locke-Wallace Marital Adjustment Scale

Please reply to each of the questions by circling the appropriate answer. If you cannot give an exact answer to a question, answer the best you can.

1. Have you ever wished you had not married?
  - a. Frequently
  - b. Occasionally
  - c. Rarely
2. If you had your life to live again, would you:
  - a. Marry the same person
  - b. Marry a different person
  - c. Not marry at all
3. How many outside activities do husband and wife engage in together?
  - a. All of them
  - b. Some of them
  - c. Few of them
  - d. None of them
4. In leisure time, which situation do you prefer?
  - a. Both husband/wife to stay home
  - b. Both to be on the go
  - c. One to be on the go and the other to stay home
5. Do you and your mate talk things over together?
  - a. Never
  - b. Now and then
  - c. Almost always
  - d. Always
6. How often do you kiss your mate?
  - a. Every day
  - b. Now and then
  - c. Almost never
7. Check any of the following items which you think have caused serious difficulties in your marriage.
  - Mate's attempt to control my
  - Religious differences
  - Different amusement interests
  - Lack of mutual friends
  - Constant bickering
  - Interference of in-laws
  - Lack of mutual affection
  - Unsatisfying sex relations
  - Selfishness/lack of cooperation
  - Adultery
  - Desire to have children
  - Sterility of husband or wife
  - Venereal diseases
  - Mate became familiar with other
  - Desertion
  - Nonsupport
  - Drunkenness
  - Gambling
  - Ill health
  - Mate sent to jail
  - Other reasons
8. How many things truly satisfy you about your marriage?
  - a. Nothing
  - b. One thing
  - c. Two things
  - d. Three or more
9. When disagreement arise, they result in:
  - a. Husband giving in
  - b. Wife giving in
  - c. Neither giving in
  - d. Agreement by mutual give and take
10. What is the total number of times you left mate or mate left you due to conflict
  - a. No time
  - b. One or more times
11. How frequently do you or your mate get on each other's nerves around the house?
  - a. Never
  - b. Occasionally
  - c. Frequently
  - d. Almost always
  - e. Always
12. What are your feelings on sex relations between you and your mate?
  - a. Very enjoyable
  - b. Enjoyable
  - c. Tolerable
  - d. Disgusting
13. What are your mate's feelings on sex relations with you?

Indicate approximate extent of agreement between husband and wife.

Check one column for each item below.	Almost		Occa-		Fre-		Almost	
	Always agree	Always agree	sionally disagree	quently disagree	Always disagree	Always disagree	Always disagree	Always disagree
14. Handling family finances								
15. Matters of recreation (Ex. going to dance)								
16. Demonstration of affection (Ex. kissing frequency)								
17. Friends (Ex. dislike of mate's friends)								
18. Intimate relations								
19. Ways of dealing with in-laws								
20. Amount of time that should be spent together								
21. Conventionality (Ex. right, good, or proper conduct)								
22. Aims, goals and things believed to be important								
23. Circle the dot which you feel best represents the degree of happiness in your marriage								
	•	•	•	•	•	•	•	•
	Very unhappy			happy			Very happy	

In answering Questions 1 to 20 consider your **typical, general sexual functioning** rather than any one particular sexual encounter. Circle the number for each question that corresponds with the most appropriate description of your sexual relationship with your husband.

1. How frequently do you and your mate have sexual intercourse?

- |                          |                           |
|--------------------------|---------------------------|
| 1. more than once a day  | 5. once a week            |
| 2. once a day            | 6. once every two weeks   |
| 3. 3 or 4 times per week | 7. once a month           |
| 4. twice a week          | 8. less than once a month |

2. For how long do you and your mate usually engage in sexual foreplay (ie., kissing, petting, etc.) before having intercourse?

- |                         |                         |
|-------------------------|-------------------------|
| 1. less than one minute | 5. 11 to 15 minutes     |
| 2. 1 to 3 minutes       | 6. 16 to 30 minutes     |
| 3. 4 to 6 minutes       | 7. 30 minutes to 1 hour |
| 4. 7 to 10 minutes      |                         |

3. How long does intercourse usually last, from entry of the penis until the male ejaculates?

- |                       |                         |
|-----------------------|-------------------------|
| 1. less than a minute | 6. 11 to 15 minutes     |
| 2. 1 to 2 minutes     | 7. 15 to 20 minutes     |
| 3. 2 to 4 minutes     | 8. 20 to 30 minutes     |
| 4. 4 to 7 minutes     | 9. more than 30 minutes |
| 5. 7 to 10 minutes    |                         |

4. If you try, is it possible for you to reach orgasm through having your genitals caressed by your mate?

- |  |                                  |
|--|----------------------------------|
| 1. nearly always, over 90% of the time | 4. seldom, about 25% of the time |
| 2. usually, about 75% of the time      | 5. never                         |
| 3. sometimes, about 50% of the time    | 6. have never tried to           |

5. If you try, is it possible for you to reach orgasm through sexual intercourse?

- |  |                                  |
|--|----------------------------------|
| 1. nearly always, over 90% of the time | 4. seldom, about 25% of the time |
| 2. usually, about 75% of the time      | 5. never                         |
| 3. sometimes, about 50% of the time    | 6. have never tried to           |

6. Does the male have any trouble in getting an erection, before intercourse begins?

- |                                      |                               |
|--------------------------------------|-------------------------------|
| 1. never                             | 4. sometimes, 50% of the time |
| 2. rarely, less than 10% of the time | 5. usually, 75% of the time   |

3. seldom, less than 25% of the time      6. nearly always, over 90% of the time

7. When you have sex with your mate, including foreplay and intercourse, do you notice some of these things happening: your breathing and pulse speeding up, wetness in your vagina, pleasurable sensations in your breasts and genitals?

1. nearly always, over 90% of the time      4. seldom, about 25% of the time  
 2. usually, about 75% of the time      5. never  
 3. sometimes, about 50% of the time

8. Is the female's vagina so 'dry' or 'tight' that intercourse cannot occur?

1. never      4. sometimes, 50% of the time  
 2. rarely, less than 10% of the time      5. usually, 75% of the time  
 3. seldom, less than 25% of the time      6. nearly always, over 90% of the time

9. Overall, how satisfying to you is your sexual relationship with your mate?

1. extremely unsatisfying      4. slightly satisfying  
 2. moderately unsatisfying      5. moderately satisfying  
 3. slightly unsatisfying      6. extremely satisfying

10. How frequently do you feel sexual desire? This feeling may include wanting to have sex, fantasizing about sex, feeling frustrated due to a lack of sex, etc.

1. more than once a day      6. once every two weeks  
 2. once a day      7. once a month  
 3. 3 or 4 times per week      8. less than once a month  
 4. twice a week      9. not at all  
 5. once a week

11. When you have sex with your mate, do you feel sexually aroused (i.e., feeling 'turned on', pleasure, excitement)

1. nearly always, over 90% of the time      4. seldom, about 25% of the time  
 2. usually, about 75% of the time      5. never  
 3. sometimes, about 50% of the time

12. When you have sex with your mate, do you have negative emotional reactions, such as fear, disgust, shame or guilt?

1. never      4. sometimes, 50% of the time  
 2. rarely, less than 10% of the time      5. usually, 75% of the time  
 3. seldom, less than 25% of the time      6. nearly always, over 90% of the time

13. How often do you masturbate?

- |                          |                           |
|--------------------------|---------------------------|
| 1. more than once a day  | 6. once every two weeks   |
| 2. once a day            | 7. once a month           |
| 3. 3 or 4 times per week | 8. less than once a month |
| 4. twice a week          | 9. never                  |
| 5. once a week           |                           |

Questions 14 to 22 are to be answered specifically with regard to the Post-coital test sexual encounter that you engaged (ie., the most recent sexual encounter you had in order to undergo the Post-Coital test procedure by Dr. Tulandi).

14. Circle a number indicating to what degree (if any) you noticed the following changes when you engaged in sex for purposes of the Post-Coital test.

	Not at all			A great deal			
- Vaginal lubrication (dampness)	1	2	3	4	5	6	7
- mild, genital sensation (warmth, pulsations)	1	2	3	4	5	6	7
- Moderate genital sensation	1	2	3	4	5	6	7
- Strong genital sensation	1	2	3	4	5	6	7
- Nipple erection	1	2	3	4	5	6	7
- Breast swelling	1	2	3	4	5	6	7
- Muscular tension	1	2	3	4	5	6	7
- Sex flush (reddening skin)	1	2	3	4	5	6	7
- Hyperventilation (rapid breathing)	1	2	3	4	5	6	7
- Heart rate increases	1	2	3	4	5	6	7
- Decreasing awareness of the environment	1	2	3	4	5	6	7
- Orgasm	1	2	3	4	5	6	7

15. To what degree did you experience nervousness or tenseness during this sexual encounter?

1	2	3	4	5	6	7
Not at all		Moderate amount			A great deal	

16. To what degree did you feel close with your husband during this sexual encounter?

1	2	3	4	5	6	7
Not at all		Moderate amount			A great deal	

17. How long did this entire sexual encounter last (including foreplay and intercourse)?

- |                       |                     |
|-----------------------|---------------------|
| 1. less than a minute | 6. 11 to 15 minutes |
|-----------------------|---------------------|

- |                    |                          |
|--------------------|--------------------------|
| 2. 1 to 2 minutes  | 7. 15 to 20 minutes      |
| 3. 2 to 4 minutes  | 8. 20 to 30 minutes      |
| 4. 4 to 7 minutes  | 9. 30 to 60 minutes      |
| 5. 7 to 10 minutes | 10. 60 minutes or longer |

18. Overall, how satisfying to you was this sexual encounter with your mate?

- |                            |                          |
|----------------------------|--------------------------|
| 1. extremely unsatisfying  | 4. slightly satisfying   |
| 2. moderately unsatisfying | 5. moderately satisfying |
| 3. slightly unsatisfying   | 6. extremely satisfying  |

19. During this sexual encounter did you feel sexually aroused (ie., feeling 'turned on', excited, etc.)?

- |            |   |                 |   |   |              |   |
|------------|---|-----------------|---|---|--------------|---|
| 1          | 2 | 3               | 4 | 5 | 6            | 7 |
| Not at all |   | Moderate amount |   |   | A great deal |   |

20. During this sexual encounter, did your mate experience any erectile difficulties (ie., unable to get a full erection, unable to maintain an erection to ejaculation, etc.)?

- |            |   |                 |   |   |              |   |
|------------|---|-----------------|---|---|--------------|---|
| 1          | 2 | 3               | 4 | 5 | 6            | 7 |
| Not at all |   | Moderate amount |   |   | A great deal |   |

21. What were your feelings in approaching the task of having intercourse for the Post-Coital test?

- |                                       |   |   |   |   |                                   |   |
|---------------------------------------|---|---|---|---|-----------------------------------|---|
| 1                                     | 2 | 3 | 4 | 5 | 6                                 | 7 |
| Extremely<br>Uncomfortable/<br>Uneasy |   |   |   |   | Extremely<br>Comfortable/<br>Easy |   |

22. Please circle every number that describes what sexual activities occurred during this sexual encounter:

1. one minute continuous lip kissing
2. general foreplay activity, ie., caressing, petting, etc.
3. manual manipulation of the female breasts, by male
4. manual manipulation of female genitals, by male
5. self manipulation of female breasts and /or genitals
6. kissing nipples of female breasts
7. manual manipulation of male genitals, by female
8. mutual manual manipulation of genitals
9. manual manipulations of female genitals to massive secretions, by male
10. oral contact with female genitals
11. oral contact with male genitals
12. oral manipulation of female genitals
13. oral manipulation of male genitals
14. mutual oral-genital manipulation
15. sexual intercourse, male on top of female
16. sexual intercourse, in a position other than male on top

Medical Evaluation Form  
PCT Evaluation

Time of PCT: \_\_\_\_\_  
 Parity: \_\_\_\_\_  
 Day of Cycle: \_\_\_\_\_  
 Average length of cycle: \_\_\_\_\_ (days)  
 Last coitus: \_\_\_\_\_  
 Type of ovulation: natural \_\_\_\_\_ induced \_\_\_\_\_  
 Douche: YES \_\_\_\_\_ NO \_\_\_\_\_  
 BBT elevation: YES \_\_\_\_\_ NO \_\_\_\_\_  
 Years of infertility: \_\_\_\_\_  
 Over-night PCT \_\_\_\_\_ Same-morning PCT \_\_\_\_\_

Sperm Evaluation

Semen Analysis:

Sperm count:	good	moderate	poor
Sperm motility:	good	moderate	poor

PCT Motility Score:

Number of motile sperm/HPF: \_\_\_\_\_

Progression: \_\_\_\_\_

PCT Cervical Score

Mucus Quantity:	None 0	Scant 1	Moderate 2	Abundant 3
Spinnbarkeit:	None 0	Scant 1	Moderate 2	Abundant 3
Ferning:	None 0	Scant 1	Moderate 2	Abundant 3
Cervix:	Closed 0	Partially Opened 2	Gaping 3	

pH level: \_\_\_\_\_



Appendix B  
Information Form

Dear Madam,

The purpose of this project is to determine some of the psychological and sexual factors that may influence post-coital test results. Your participation will help us acquire information which may, at a later date, be very useful scientifically and practically. I am conducting this project in collaboration with Dr. William Brender of Concordia University.

The questionnaire focuses mostly on sexual matters since the post-coital test, by definition, involves your sexual relationship. As the information you provide is very personal, I would like to reassure you that it will be kept strictly confidential. Once you have completed the questionnaire, you will return it to me, and the information that you have provided will be passed along to members of the research team without your name or other identifying information. This guarantees that you remain anonymous. Furthermore, your decision to participate or not will in no way affect the management of your case.

The questionnaire takes about 15 minutes to complete. If you have any questions, please feel free to contact Dr. William Brender at 848-7535.

Thank you for your time,

Dr. Togas Tulandi,

Appendix C

Summary statistics: Baseline demographic and medical variables, and measures of marital adjustment and general sexual functioning

Appendix C.1 - Summary statistics for t-test and chi-square comparisons between SM-PCT and ON-PCT groups on demographic variables

<u>Variable</u>	<u>SM-PCT</u>		<u>ON-PCT</u>		<u>df</u>	<u>t</u>
Age	29.6	(3.8)	31.5	(4.3)	69	1.71
Education	13.8	(2.4)	14.7	(2.5)		1.18
Years Married	5.7	(3.1)	4.7	(2.4)		1.17
Years Infertile	2.5	(1.1)	2.2	(1.1)		1.02

Appendix C.2 - Summary statistics for t-test and chi-square comparisons between SM-PCT and ON-PCT groups on medical variables

<u>Variable</u>	<u>SM-PCT</u>		<u>ON-PCT</u>		<u>df</u>	<u>t</u>
# previous PCTs	0.7	(0.8)	0.7	(1.1)	69	.86
Day of Cycle	14.2	(1.9)	15.0	(3.0)	17.1 <sup>a</sup>	.34

<sup>a</sup> - If the degrees of freedom are not equal to 69, it indicates that adjusted degrees of freedom were used because of heterogeneity of variance among groups.

Chi-square statistic on medical variables

Type of ovulation - natural versus medically induced

$\chi^2(1) = .03, p = .85$

Infertility Status: primary or secondary

$\chi^2(1) = .03, p \leq .85$

Appendix C.3 - Summary statistics for marital adjustment and general sexual functioning

<u>Variable</u>	<u>SM-PCT</u>	<u>ON-PCT</u>	<u>df</u>	<u>t</u>
Marital Adjustment	119.7 (10.9)	114.7 (14.2)	69	1.48
Intercourse Frequency	3.7 (0.9)	4.4 (1.3)	17.6	2.09
Masturbation Frequency	7.9 (1.6)	7.7 (1.3)	69	0.53
Duration of Foreplay	4.1 (1.1)	3.9 (1.2)		0.64
Duration of Intercourse	4.6 (1.4)	4.9 (1.5)		0.82
Level of Sexual Satisfaction	5.5 (0.8)	5.2 (1.0)		1.13
Orgasm through Manual Stimulation	2.3 (1.5)	2.6 (1.5)		0.82
Orgasm through Intercourse	2.4 (1.2)	2.2 (1.4)		0.62
Erectile Difficulties	1.2 (0.4)	1.6 (0.9)	15.4	1.41
Physical Changes	1.5 (0.9)	1.5 (1.1)	69	0.12
Painful Intercourse	1.8 (0.8)	1.7 (0.6)		0.37
Frequency of Sexual Desire	3.9 (1.5)	5.0 (2.1)	18.2	1.91
Arousal Level	1.6 (0.8)	1.8 (1.0)	69	0.83
Negative Emotional Reactions	1.1 (0.3)	1.3 (0.6)	16.4	0.89

Appendix D

Rationale: The use of t-tests rather than MANOVA for group comparisons on PCT sexual functioning

Given the number of items and the pattern of intercorrelations among the variables used to assess general sexual functioning, a multivariate analysis of variance was considered the appropriate statistic to use. The unequal sample ratio between the SM-PCT and ON-PCT groups (4:1) made it especially important to meet the assumptions underlying this statistic; multivariate normality and homogeneity of the variance-covariance matrix. Multivariate normality is difficult to evaluate and is usually assessed by means of univariate statistics. Thus the skewness coefficient for all 13 items was evaluated within each of the two groups. The results showed that 10 of the 13 items indicated significant departures from normality. The shape of the distribution on variables affected was however, similar for the two groups. Overall, the skewness of the variables reflected the subjects tendency to report good sexual functioning.

Homogeneity of variance was first evaluated by the univariate F-test between the two groups on the assumption that univariate homogeneity of variance was a necessary (though not sufficient) condition for multivariate homogeneity of variance. Five variables indicated heterogeneous variances between the two groups. The multivariate test of homogeneity of variance, the Box M statistic, computed on these variables was also significant with  $F(15,2600)=1.68$ ,  $p < .001$ , indicating heterogeneity of the variance-covariance. Stevens (1986) indicates that Box M

may be significant because of non-normality rather than because of heterogeneity of variance when variables are badly skewed.

Although the t-statistic is also computed based on the assumption of normality and homogeneity of variance, violations are more easily dealt with at the univariate than at the multivariate level. With respect to the skewness of variables, Howell (1982) indicates that if the distributions of the two groups to be compared are skewed but roughly the same shape then violation of the normality assumption does not produce intolerable results. As this condition was satisfied no transformations were computed to correct for the skewness of these variables.

For those variables which demonstrated heterogeneous variance, the t-statistic was computed using adjusted degrees of freedom (Howell, 1982). With this modification the probability of the uncorrected t-statistic can be evaluated against Student's t distribution with no increase in the probability of a Type I error. Consequently, the two groups were compared on all the 13 general sexual functioning items using the t-statistic.

Finally, when many t-tests are computed the probability of a type I error increases because the actual alpha level used to compare groups is inflated with respect to the nominal alpha level selected. Thus the probability of rejecting a true null hypothesis is increased. Usually, the



Bonferroni correction is applied to guard against alpha inflation. In the case of baseline comparisons however, type II errors, the probability of accepting a false null hypothesis was considered to be of greater importance and so the Bonferroni correction was not applied because it increases the probability of making type II errors.

Appendix E

ANOVA Summary Table: Sexual Satisfaction

ANOVA summary table using method of testing as the between group factor and type of sexual encounter (ie., regular or PCT) as the within group factor

<u>Source</u>	<u>SS</u>	<u>MS</u>	<u>df</u>	<u>F</u>	<u>p</u>
Mean	2158.03	2158.03	1	1253.40	.000
Method of Testing	0.06	0.06	1	0.03	.853
error	118.80	1.72	69		
Type of Encounter	29.38	29.38	1	33.20	.000
Type x Testing	2.34	2.34	1	2.84	.080
error	61.06	0.89	69		

Appendix F

MANOVA Summary statistics: Sexual and emotional aspects of  
the PCT sexual encounter

### F.1 - Tests of Assumptions

The variable 'degree of erectile difficulty' was excluded from the MANOVA analyses because it was severely positively skewed in the SM-PCT group. The skewness coefficient (1.45) was significantly different from zero with  $p \leq .001$ .

The variable 'degree of nervousness' was dropped because of heterogeneous variance among groups with the smaller group having the larger variance. Levine's test indicated an approximate  $F=2.45$ ,  $p \leq .05$ .

The Box M test for the sexual MANOVA was nonsignificant,  $F(6,3863)=1.19$ ,  $p = .31$ , as was Box M test for the emotional MANOVA,  $F(6,3842)=.37$ ,  $p = .90$ .

### F.2 - Summary table for the emotional MANOVA

#### Multivariate F test

<u>Effect</u>	<u>Pillais</u>	<u>F</u>	<u>Hypothesis</u> <u>df</u>	<u>Error</u> <u>df</u>	<u>p</u>
Method of Testing	.031	.724	3	67	.54

#### Univariate F tests

<u>Source</u>	<u>SS</u>	<u>MS</u>	<u>df</u>	<u>F</u>	<u>p</u>
Closeness error	1.27 147.89	1.27 2.14	1 69	.59	.44
Satisfaction error	1.57 135.52	1.57 1.96	1 69	.80	.37
Comfort error	6.22 199.73	6.22 2.89	1 69	2.15	.15

### F.3 Summary table for the sexual MANOVA

#### Multivariate F test

<u>Effect</u>	<u>Pillais</u>	<u>F</u>	<u>Hypothesis</u> <u>df</u>	<u>Error</u> <u>df</u>	<u>p</u>
Method of Testing	.092	2.26	3	66	.09

## Univariate F tests

<u>Source</u>	<u>SS</u>	<u>MS</u>	<u>df</u>	<u>F</u>	<u>p</u>
Sexual Acts	34.92	34.92	1	6.35	.01
error	374.17	5.50	68		
Duration	10.40	10.40	1	3.40	.07
error	208.24	3.06	68		
Sexual Feelings	465.53	465.53	1	1.46	.23
error	21618.32	317.92	68		

Appendix G

Summary statistics: physiological variables

G.1 - T-test summary statistics on variables that constitute the CRS and ph level

<u>Variable</u>	<u>SM-PCT</u>	<u>ON-PCT</u>	<u>df</u>	<u>t</u>	<u>p</u>
Mucus	2.48 (0.7)	2.53 (0.7)	69	0.26	.80
Spinnbarkeit	2.36 (0.7)	2.47 (0.9)		0.49	.63
Ferning	2.39 (0.9)	2.40 (1.0)		0.03	.98
pH	7.49 (0.35)	7.52 (0.3)		0.33	.75

G.2 - Chi-square statistic comparing the two methods of testing on CRS

$$x^2(1) = .07, p \leq .80$$

G.3 - Chi-square statistic comparing the two methods of testing on PCT Score

$$x^2(1) = .03, p \leq .86$$



G.4 - Summary statistics for comparisons between sexually dissatisfied and satisfied women on demographic and medical variables

<u>Variable</u>	<u>Dissatisfied</u>	<u>Satisfied</u>	<u>df</u>	<u>t</u>	<u>p</u>
Age	31.50 (2.9)	29.62 (3.9)	28	1.47	.15
Education	13.92 (2.3)	14.06 (2.5)		0.49	.63
Years Married	5.07 (3.1)	6.06 (3.1)		0.88	.40
Marital Adjustment	115.5 (10.34)	120.3 (10.6)		1.25	.22
Intercourse Frequency	1.79 (0.4)	1.50 (0.6)		1.43	.16
Years Infertile	2.43 (1.1)	2.67 (1.3)		0.59	.56
Day of Cycle	13.64 (1.9)	14.81 (2.2)		1.53	.14
# previous PCTs	0.58 (0.9)	0.69 (1.1)		0.31	.76

---

Chi-square statistic on medical variables:

Type of ovulation: natural or medically induced

$$\chi^2(1) = .03, p \leq .87$$

Infertility Status: Primary or secondary

$$\chi^2(1) = 3.09, p \leq .08$$

Cervical Receptivity Score (CRS): poor or good

$$\chi^2(1) = 0.47, p \leq .50$$

Method of testing: same-morning or overnight

$$\chi^2(1) = 0.24, p \leq .63$$

Appendix H  
Summary statistics: Discriminant analysis

## Appendix H - Variable selection

The variable 'erectile difficulties' was severely positively skewed in the 'good' PCT group. The skewness coefficient (3.38) was significantly different from zero,  $p \leq .001$ . The t-test between the poor and good PCT group on this variable was nonsignificant,  $t(48)=.34$ ,  $p=.74$ .

The following are the results of the F-test for homogeneity of variance for all variables included in this analysis:

<u>Variable</u>	<u>F</u>	<u>p</u>
Age	1.10	.91
Years Infertile	3.02	.09
# previous PCTs	1.07	.95
Day of Cycle	1.32	.50
Time between PCT & Sex	1.45	.38
Intensity Sexual Feeling	1.12	.76
Nervousness	1.53	.43
Closeness	1.19	.67
Comfort	1.01	.99
Satisfaction	1.54	.32

Note. Poor PCT,  $n=13$ , Good PCT,  $n=37$ .

The Box M test for multivariate homogeneity was nonsignificant,  $F(3,8284)=2.68$ ,  $p \leq .48$ .

## Correlations among demographic and medical variables:

	1	2	3	4	5
1. Age	1.00				
2. Years Infertile	.093	1.00			
3. # previous PCTs	.122	.227	1.00		
4. Day Cycle	.006	-.296*	-.157	1.00	
5. Time between PCT and Sex	.241	-.122	-.075	.293*	1.00

$n=50$

\*  $p \leq .05$