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ABSTRACT

Title of Thesis: The Effect of Feedback on Penile Tumescence in Sexually Functional Men

Major Nathan W. Galbreath, Master of Science, 2002

Thesis directed by: Tracy Sbrocco, Ph.D.
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Male erectile disorder (ED) impacts the sexual functioning of ten to twenty million men in the United States. Erectile disorder, as withother sexual dysfunctions, may be caused by, or associated with a number of diseases that impact the cardiovascular and nervous systems. However, men who have few physical problems may also experience the disorder due to psychological factors. Men who suffer from ED due to psychogenic factors are believed to differ from functional men in five key cognitive and behavioral domains. Barlow and Sbrocco (1996) used these differences to formulate a model of male sexual dysfunction that explicitly addresses the cognitive mechanisms involved in ED. The model proposes that a key point in the development of ED is whether or not a man feels challenged or threatened when experiencing a discrepancy between expected and actual performance. Men who are challenged by the experience typically have the skills necessary to identify and alleviate the discrepancy in performance. They are believed to use positive outcome expectancy and confidence to overcome suboptimal sexual performance and maintain function. In contrast, men who are threatened by discrepancies between expected and actual performance may expect a negative outcome and have little faith in their ability to sexually perform. Negative expectancy and decreased confidence distract from erotic stimuli and are

therefore incompatible with sexual arousal. These men subsequently disengage from the sexual task and experience erectile dysfunction.

In the present study, a false feedback paradigm was used to manipulate the experience of thirty men to artificially produce a discrepancy between actual and expected sexual performance in a laboratory setting. Participants were provided with inflated feedback concerning the size of their erections while they viewed an erotic videotape. By examining changes in outcome expectancy, confidence and tumescence over time, the impact of distracting feedback on sexual function was experimentally evaluated. The thirty men were randomly assigned to one of two groups: positive feedback or no feedback. Penile tumescence was monitored using a mercury-in-rubber strain gauge attached to a polygraph while the men viewed a five-minute and a ten-minute erotic vignette. All participants viewed the first film without feedback. Prior to the second film, men receiving the positive feedback were asked to predict a maximum "erection score" based on a fictitious average for men watching a similar video. The men were also asked to predict the size of their erection and confidence they had in their predictions. While viewing the second film, the men receiving positive feedback were shown a real-time score that exceeded their prediction by four points. After the second film, the men were again asked to predict the scores they expected to receive on a subsequent (non-existent) film and rate their confidence. Men in the no feedback condition were simply asked to estimate the size of erection they expected to get and to rate their confidence prior to each film.

Contrary to the study's hypotheses, positive feedback did not produce a significant difference in tumescence between groups. Outcome expectancy and confidence ratings by the positive feedback group tended to be significantly lower than the no feedback group prior to the experimental manipulation in film 2. This trend

disappeared prior to film 3. The between groups trend in lower scores was believed to be related to a performance demand on the experimental subjects. However, the positive feedback group tended to increase their estimated erection score for (bogus) film 3, suggesting that they believed the false feedback they received during film 2. According to the Sbrocco and Barlow (1996) model, decreased expectancy and confidence should result in dysfunctional performance. Men in both groups unexpectedly and significantly decreased their expectancy and confidence on these measures when taken after baseline. However, both groups functioned sexually and showed increases in tumescence during each film. This finding is inconsistent with the model of sexual functioning, which would predict sexual dysfunction.

A final hypothesis involved both groups' sexual performance over time. Prior studies in this area used erotic films of equal length to study sexual function. However, this experiment used a ten-minute film for the second vignette. It was expected that men receiving positive feedback would at first be distracted by the positive feedback, but then regain their erections as they habituated to the stimulus of the erection score. After controlling for differences between the first and second half, both groups of men obtained significantly larger erections during the second half of film 2. However, further analysis did not show a characteristic pattern of erection loss and recovery by the men receiving feedback. Post hoc power analysis suggested that the present study lacked sufficient power to detect such an effect.

The findings of this study suggest that the Sbrocco and Barlow (1996) model of male sexual dysfunction be amended to explain how men who downwardly regulate their positive outcome expectancy and confidence can continue to sexually function. Two complimentary processes are proposed that are consistent within the tenets of the model. Theories of social facilitation suggest that sexually functional men are likely to

obtain erections when tested because doing so is an over learned task. However, sexually dysfunctional men are believed to lack the experience and skill set to adequately deal with the situation. Under these circumstances, social facilitation theory predicts that dysfunctional men are unlikely to obtain erections. In addition, the physiologic response of the body under conditions of challenge and threat has been shown to be different experimentally. This physiologic difference may impact the overall ability of a man to obtain and maintain an erection. Further research to expand the model into these new areas may greatly enhance our ability to diagnose and treat men suffering from erectile dysfunction due to psychological factors, including those men who do not respond to oral medications such asViagra.

The Effect of Feedback on Penile Tumescence in Sexually Functional Men

by

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Part I: Introduction

With the introduction of sildenafil citrate (Viagra®) and other drugs in recent years, discussion of the psychological aspects and treatment of erectile dysfunction (ED) may seem passé to some, even in the psychological communities. Current managed care paradigms of treatment essentially mandate the use of quick, inexpensive remedies that minimize patient contact time and maximize revenue. However, the managed care model of treatment fails to appropriately consider the faulty cognitions, unrealistic social expectations, and psychological disorders that are known to initiate, maintain, and co-occur with erectile dysfunction (Feldman, Goldstein, Hatzichristou, Kran, and McKinlay, 1994). Identifying how these factors combine to cause a patient trouble may not always be quite so straightforward. Getting and maintaining an erection is a complex process involving a number of cognitive, affective, behavioral and physiological factors (Sbrocco and Barlow, 1996). Physiological and psychological factors may separately or jointly contribute to the etiology and maintenance of erectile dysfunction. Once the physiologic causes of erectile dysfunction have been considered, clinicians must evaluate how the wide array of interactive psychological factors impact their patients' sexual arousal. Typically, ED patients have a demonstrated problem with arousal regulation (Sbrocco and Barlow, 1996). Additional understanding of the functional and dysfunctional arousal process would further validate a useful psychological model of ED and help develop clinical applications for treatment of this disorder. The following research seeks to better understand the differences in arousal regulation between sexually functional and dysfunctional men. Specifically, this research project addresses the role that distraction plays in sexually functional men. The following sections address the definition of erectile dysfunction, its diagnosis and prevalence, and current theoretical models of male erectile functioning.

Definition and Diagnosis of Erectile Dysfunction

The term "erectile dysfunction" has recently replaced impotence because of the latter's negative connotations and imprecise meaning. Erectile dysfunction is defined by the National Institutes of Health (1992) as the inability of the male to achieve or maintain an erection sufficient for satisfactory sexual performance.

Historically, normal sexual performance has been described in several ways. At the turn of the previous century, male sexual functioning was thought to involve two separate stages: tumescence (the engorgement of the penis with blood resulting in erection), and detumescence (the outflow of blood from the penis following orgasm) (Ellis, 1906). Masters and Johnson further developed this model during the 1950s and 1960s. Based on more than 10,000 observations of sexual functioning with human volunteers, they expanded Ellis's two-stage model into four stages (Figure 1):

A. Excitement. For males, this involves erection of the penis, which usually occurs within a few seconds after sexual stimulation begins. In addition, skin ridges of the scrotum smooth out and the testes are drawn towards the body.
B. Plateau. In males, the diameter of the head of the penis increases slightly and deepens in color because of increased blood flow. Vasocongestion also causes the testes to swell, becoming 50 to 100 percent larger than in the unstimulated state. In addition, small amounts of clear fluid may sometimes be secreted from the Cowper's gland and appear from the male urethra.
C. Orgasm. Males ejaculate semen during this stage, which actually has two parts: First, males experience a sensation of ejaculatory

inevitability, which occurs just before ejaculation begins. Second, contractions of the urethra, penis and prostate glad serve to expel semen from the head of the penis.

D. Resolution. Immediately after ejaculation, males enter a refractory period, during which further orgasm or ejaculation is not possible. This time varies greatly between males and increases with age. A partial loss of erection occurs during the refractory period. Eventually, blood flow to the genitals returns to pre-excitement levels. (Masters and Johnson, 1966).

For thirty years this model has served as the foundation for the study of human sexual response and sexual dysfunction.

In the 1970s, Kaplan (1974) and later Lief (1977) identified a subset of individuals whose sexual dysfunction did not lie within the four stages described by Masters and Johnson (1966). Instead, these people did not experience an interest in sexual activity. This fifth stage, theoretically occurring prior to those described by Masters and Johnson, was labeled sexual desire (Figure 1). Kaplan (1974) and Lief (1977) observed that patients with desire problems complained of an inability to become aroused, lacked interest in sexual activity, and even avoided sexual functioning.

With the latest revision of the diagnostic categories in the American Psychiatric Association's (APA) Diagnostic and Statistical Manual (DSM-IV, 1994), current theory regarding sexual psychopathology was reduced to three domains: desire, arousal and orgasm. While stage theory better reflects the continuum of human sexual response, the APA categorical approach creates a useful scheme to describe sexual dysfunction (Wincze & Carey, 1991).

Diagnostic Criteria for Male Erectile Disorder

The DSM-IV lists Male Erectile Disorder as one of the nine primary diagnostic categories for sexual dysfunction. Criteria for diagnosis are as follows:

A. Persistent or recurrent inability to attain, or to maintain until completion of the sexual activity, an adequate erection.
B. The disturbance causes marked distress or interpersonal difficulty.
C. The erectile dysfunction is not better accounted for by another Axis I disorder and is not due exclusively to the direct physiological effects of a substance or general medical condition.

Specifiers are included with the criteria to differentiate etiological considerations of the disorder: 'lifelong' (since the outset of sexual functioning) versus 'acquired' (recent onset); 'generalized' (across the continuum of sexual behaviors) versus 'situational' (appears only in certain activities); and 'due to psychological factors' or 'due to combined (physiological, pharmacological, and/or psychological) factors'.

While some males have problems attaining an erection, others may have difficulty maintaining it. To further complicate situations, erectile problems may change over time. Consequently, what starts out as a problem maintaining sufficient erection for penetration may later transition into an overall inability to obtain an erection. Some men may also lose erections during masturbation, but this is not normally the case (APA, 1994). Prior to making any diagnosis of erectile dysfunction, the clinician should carefully evaluate physiological and pharmacological factors that contribute to this disorder. For instance, diabetics have been known to acquire erectile dysfunction as one of the many complications of their disease (Klein, Klein, Lee, Moss and Cruickshanks, 1996). In addition, persons taking selective serotonin re-uptake inhibitors and other

anti-depressants have also noticed erectile dysfunction as a probable side effect of the drugs (Goldstein & Krane, 1983).

Prevalence

Recent estimates suggest that the number of men in the United States with erectile dysfunction (ED) nears 10 to 20 million (NIH, 1992). If individuals with minimal dysfunction are included, the estimate increases to approximately 30 million (Benet & Melman, 1995). A majority of these men are over 65 years old, as the prevalence of ED increases with age. However, sexual arousal problems are not relegated just to the aging. Masters, Johnson and Kolodny (1994) estimated that nearly fifty percent of all men would experience some form of erectile problems at some point during their lifetime. In addition, ED may be more prevalent than the statistics suggest. The embarrassment that many men experience with this problem and the failure of providers and patients to speak candidly about arousal difficulties contribute to the underdiagnosis of erectile dysfunction (NIH, 1992).

Generally, three sources provide information regarding the prevalence of erectile dysfunction: sex clinics, primary care physicians and urologists, and epidemiological studies. In a twenty-year literature review, Spector and Carey (1990) found that erectile dysfunction is the most common complaint for males who seek treatment at sex therapy clinics, and is involved in 15 to 53 percent of cases (Wincze and Carey, 2001). In the primary care setting, ED accounted for 400,000 outpatient visits to physicians and 30,000 hospital admissions, resulting in total direct costs of $146 million. (Feldman, et.al, 1994). Other reports showed that 34% of male patients in primary care clinics reported some degree of erectile dysfunction (Schein, Zyzanski, and Levine, 1988).

An extensive epidemiological survey, the Massachusetts Male Aging Study, confirmed the high prevalence of this disorder. Feldman, et. al., (1994) based results on a sample of 1290 males 40 to 70 years of age. The overall prevalence of some form of erectile dysfunction was 52%, with an incidence of 40% at age 40 and 67% at age 75. Incidence of complete erectile dysfunction was 5% at age 40 and 25% at age 75 (Anderson and Mulhall, 2001). Prior to the advent of highly publicized pharmacological treatments for ED, less than 5% of men sought treatment for it (Slag, Morley, and Elson, 1983). Today, more men may be seeking treatment for ED, but do so largely in a primary care setting (Sadovsky, 2000).

While ED is most closely associated with increasing age, several other risk factors have been identified, including:

1. Marital Status – Non-married men have higher reported rates of ED
2. Education – Men who fail to complete high school are twice as likely to have sexual problems as college graduates.
3. Physical Heath – Men in poor health are at higher risk for ED.
4. Socioeconomic Status – Men who are unemployed or experiencing a financial crisis have a slightly increased risk for ED.
5. Childhood Sexual Abuse – Male victims of adult abusers are three times as likely to experience ED than non-victims.
6. Sex Assault Perpetration – Men who sexually assaulted women are three times as likely to report ED (Laumann, Paik & Rosen, 1999).

Part II: Etiological Theories of Erectile Dysfunction

As suggested above, the causes of erectile dysfunction are multifactorial. Historically, most characterized the etiology of ED as either organic or psychogenic.

Organic explanations tend to focus on physiological or neurological problems such as hypertension, spinal injury, diabetes mellitus, and vascular disease. Common psychogenic causes include depression, anxiety, and alcohol dependence. However, this categorical approach has given way to the understanding that erectile dysfunction grows from a combination of problems in both areas. Currently, the etiology of erectile dysfunction has been explained through the use of four distinct but overlapping approaches: biological, psychological, sociocultural, and biopsychosocial (an integration of the preceding three approaches). First, the physiology of the erection process will be reviewed. Afterwards, the most important theories in each of the three remaining domains will be discussed.

Male Erectile Function

An erection requires the successful flow of blood into the penis (Figure 2). The penis is composed of 3 cylinders, the corpus spongiosum (containing the urethra) and the paired erectile bodies (corpora cavernosa) (Figure 3). The erectile bodies are made up of sponge-like tissue surrounded by a tough, fibrous membrane. There is a central artery within the sponge-like tissue and veins that exit through the membrane and drain the erectile bodies. The smooth muscles lining the corpora cavernosa and the central artery are tonically contracted during the flaccid state. Thus, the resistance in the vasculature of this tissue is normally quite high. In the absence of ED, appropriate stimulation leads to penile erection. The first event is smooth muscle relaxation, mediated by the autonomic nervous system. Erections can be initiated by psychogenic factors (response to erotic stimuli) or by reflexogenic factors (nocturnal erections during sleep or early morning erections). The nerve pathways initiating the process trigger the vascular endothelium to release nitric oxide (NO) into the corpora cavernosum of the

penis. NO then activates the enzyme guanylate cyclase, which stimulates a second biochemical messenger, cyclic guanosine monophosphate (cGMP). cGMP stimulates smooth muscle relaxation and mediates the effects of the NO within the smooth muscle. Vascular resistance is reduced when the smooth muscle surrounding penile arterioles relax, causing the corpora cavernosa to fill with blood. As the erectile bodies become engorged the tough membranes that surround them compress drainage veins, trapping blood in the penis. The flaccid state of the penis normally returns with the cessation of erotic stimuli, or the release of catecholamines during orgasm and ejaculation. Nitric oxide is quickly broken down by the body, as it has an extremely short half-life measured in nanoseconds. Cyclic GMP, however, is very stable. Consequently, vascular smooth muscle cells must metabolize cyclic GMP with an enzyme specific for the penile tissues, phosphodiesterase type 5 (PDE5) (Kloner & Jarow, 1999).

Biological Theory of ED Etiology

Normal sexual functioning requires good health. Feldman, et. al. (1994) found that problems in the endocrine, vascular and/or neurological systems can result in erectile dysfunction. Once adjusted for age, men treated for heart disease (39%), diabetes (28%), and hypertension (15%) had significantly higher probabilities for ED than the whole sample (10%). Untreated ulcers (18%), arthritis (15%), and allergies (12%) were also significant risk factors for ED. Erectile dysfunction has also been associated with abnormal HDL cholesterol levels, but not total serum cholesterol (Feldman, et. al., 1994). Pharmacological agents may also impact sexual functioning, and will be discussed in greater detail below.

Neurologic Injuries and Diseases. Neurologic disorders cause approximately ten percent of erectile dysfunction cases (Murray, Geisser and Murphy, 1995). Damage to

the autonomic pathways that begin in the central nervous system and innervate the penis may impede psychogenic erections. Injuries to the somatic nervous pathways may also halt reflexogenic erections and can interrupt the tactile sensations needed to maintain a psychogenic erection. Spinal cord lesions can also cause varying degrees of erectile dysfunction depending on the location and severity of the injury (Carrier, Brock, Kour and Lue, 1993).

The majority of neurologically based erection problems are due to spinal cord injury (Murray, Geisser and Murphy, 1995). The nature, location, and extent of the lesion will determine the degree of impairment (NIH, 1993). Lower spinal cord injuries tend to be involved in preventing reflexogenic erections. In general, patients with less extensive spinal damage achieve better erectile function than those with serious injury.

Multiple sclerosis is associated with a high incidence of erectile dysfunction. Partial or total erectile dysfunction has been observed in between 50% to 70% of men with an established diagnosis of multiple sclerosis (Goldstein, Siroky, and Sax, 1982). Other conditions include cerebrovascular disease, stroke, Parkinson's disease, and Alzheimer's disease. These conditions usually involve centers of the brain associated with sexual function. Diabetes mellitus Type I and II are also closely associated with erectile dysfunction due to the neuropathy that stems from poor glycemic maintenance (Meisler, Carey, Lantinga & Krauss, 1989). Unfortunately, there is no specific treatment for neurologically based erectile dysfunction (O'Keefe & Hunt, 1995).

Endocrine Abnormalities. The majority of endocrine disorders produce either a deficiency of serum testosterone or elevation of serum prolactin levels (Murray, Geiser, & Murphy, 1995). Testosterone levels lower than 250 ng/dl may decrease sex drive and cause problems with obtaining and maintaining erections. Lowered serum testosterone levels may also found in patients with hypothyroidism and primary adrenal

insufficiency. Serum prolactin levels greater than 20 ng/ml in males may influence erection capabilities independent of testosterone level. A high prolactin level is particularly concerning for males as it may indicate the presence of a pituitary tumor.

While most agree that androgens are necessary for normal sex drive, they do not appear to be an essential component for normal sexual functioning. Consequently, their role in erectile function is not clear. As demonstrated in the previous section, the biochemical erection process does not involve testosterone as a primary actor. Testosterone is needed for maintenance of fertility, libido, secondary sexual characteristics, and preservation of muscle and bone mass. Lack of testosterone can produce poor sexual performance, lower sex drive, and minimize sexual thoughts (Bancroft & Wu, 1983). However, patients with low levels of testosterone may achieve erections triggered by visual or sexual stimulation comparable to patients with normal testosterone levels (Davidson, Camargo, Smith & Kwan, 1983). Consequently, there is some agreement that hormonal factors are usually not the primary or only cause of erectile dysfunction (Jones, 1985; Schover & Jensen, 1988).

Hormone levels should be checked during any assessment for erectile dysfunction. At a minimum, serum testosterone and serum prolactin should be evaluated. Normal range for testosterone in men is typically from 280 to 1100 ng/dl. Because testosterone levels vary on a diurnal cycle, serum levels need to be checked in the morning when it is highest. While prolactin is usually associated with mammary function in females, it is also believed to be essential for sexual arousal in men. A normal level in men is between 0 and 20 ng/ml.

Treatment of ED with testosterone was recently found to be effective in the majority of cases involving low hormonal levels. Jain, Rademaker and McVary (2000) conducted a meta-analysis of sixteen studies published between 1969 and 1998. Overall,

they found that 57% of cases responded favorably to testosterone replacement therapy. However, transdermal therapy (81%) was significantly more effective than intramuscular injection and oral treatments (51% and 53%, respectively). In addition, patients with primary testicular failure also responded better than those whose testicular failure was secondary to some other disease (64% versus 44%). Use of testosterone has two side effects. First, testosterone can initiate the growth of prostate cancer. Second, testosterone increases sex drive and sexual thought. Patients who haven't completed a full treatment regimen may experience increased libido, but not improved sexual functioning.

Some systemic diseases may also lead to hypogonadism and low testosterone levels. Successful treatment of the underlying conditions can restore libido and erectile function in patients without other underlying organic causes. Examples of such conditions are myocardial infarction, sepsis, acquired immunodeficiency syndrome, chronic liver disease, chronic renal failure, sickle-cell disease, and Cushing's syndrome (Carrier, et al, 1993; Murray, et al, 1995).

Vascular Problems. Atherosclerosis of the penile arteries and venous leaks are the two vascular diseases most closely associated with erectile dysfunction. They can and often do occur together in the same individual. Overall, 10 to 20 percent of cases of erectile dysfunction can be accounted for by vascular disease. When men aged 50 years and older are considered alone, vascular disease accounts for more than 50% of cases (Murray, et al, 1995; Mulligan & Katz, 1989). Poor arterial blood flow may be caused by injury, congenital anomalies, or any other disease that limits the amount of blood reaching the penis. However, most cases of vascular disease-related ED result from atherosclerosis (Carrier, et al, 1993). One study found that in autopsies of 30 men aged 19 to 85, all men over the age of 38 were found with at least some sign of atherosclerosis

in the penile arteries (Ruzbarsky & Michal, 1977). Jevitch (1980) found that the adequacy of arterial flow can be assessed with Doppler studies. Surgery can sometimes correct these problems if a particular obstruction is found within the penis. Patients with atherosclerosis of the penile arteries also have an increased chance of developing atherosclerosis in other organs. Morely and colleagues (1988) found that 23% of males who were diagnosed with erectile dysfunction due to vascular problems later had a heart attack or stroke within two years post diagnosis, as compared to only 4.5% of patients with normal sexual functioning.

Hypertension and diabetes are known risk factors for developing cardiovascular disease. Not only do these conditions contribute to the process of atherosclerosis, medications used to treat these diseases can also increase the severity of erectile dysfunction. However, diseases such as hypertension may induce erectile dysfunction independent of the medications used to treat the condition (Bansal, 1988). Drugs known to cause ED will be discussed later in greater detail. Recently, Sullivan (1999) and colleagues found evidence for a link between ischemic heart disease and erectile dysfunction: both diseases share similar risk factors that negatively impact nitrous oxide levels in the body. Consequently, it is not surprising that these diseases are found comorbidly.

Erectile dysfunction can also be caused by irregularities with the venous system. Some patients have shunting of blood from the corporal bodies directly to medium-sized veins, so the penile tissues never become completely engorged. This is called venous leakage. Venous closure problems have been shown to be either the main or concomitant cause of erectile dysfunction in 90% of patients who do not achieve an adequate erection with intracavernous vasoactive agents (Wespes, 1993). Surgery can sometimes correct this problem, however venous leakage accounts for the fewest cases

of ED and remain some of the most difficult cases for surgical repair (Lewis, 1991). In fact, success rates in surgery for penile vascular problems in general do not inspire confidence. Success rates vary in the literature from 54% to 80% in uncontrolled studies of selected patients (Carmignani, et al., 1987; Fitch, 1990; Goldstein, 1986; Goldstein et al., 1990; Konnak & Ohl, 1989; McDougal & Jeffrey, 1983; Pearl & McGhee, 1987; Sarramon et al., 1990; Shaw & Zorgniotti, 1984; and Virag et al., 1981).

Vascular problems can be detected by comparing the penile blood pressure to the brachial systolic blood pressure. Wincze & Carey (1991) describe using the penile-brachial index, which is the ratio of penile blood pressure to brachial blood pressure. Normally, the pressures should be equal and thus have a ratio of 1.0. Vascular problems are indicated if the ratio falls below 0.7. Usually, blood pressure is obtained for both the right and left arteries of the penis. While an excellent indicator of penile vascular health, a poor penile-brachial index is not diagnostic of ED and should be used with other measures for accurate diagnosis.

Drug Induced Erectile Dysfunction. The Massachusetts Male Aging Study found that men who were taking vasodilators (36%), cardiac drugs (28%), hypoglycemic drugs (26%), and antihypertensives (14%) were at significantly greater risk for ED than the study sample as a whole (9.6%) (Feldman, et. al., 1994). Antihypertensives (beta-blockers, calcium-channel blockers, diuretics, etc.) may produce ED via their autonomic nervous system effects, or by dropping the blood pressure below that required to maintain pressure in the corpora cavernosa (Anderson and Mulhall, 2001). Antiandrogen medications are also known to impede normal sexual functioning. Depo Provera and Depo Lupron are two such drugs typically used in prostate cancer and sex offender treatments. Patients using Provera and Lupron report ED because of the drugs' ability to block the body's usage of serum testosterone or significantly reduce

testosterone bioavailability (Bradford, 1990; Galbreath and Berlin, 2002). As stated before, testosterone does not play a part in penile erection, per se. However, testosterone does have a central nervous system effect that powers libido and sexual cognition. Tricyclic and tetracyclic antidepressants, lithium, monoamine oxidase inhibitors (MAOI), and selective serotonin reuptake inhibitors may also impede central nervous system mechanisms of normal erectile response (Goldstein & Krane, 1983). Many psychotropic drugs have been associated with erectile dysfunction and other forms of sexual dysfunction. Erectile dysfunction usually occurs shortly after the initiation of pharmacotherapy, not uncommonly within 24 hours. Thioridazine and chlorpromazine appear to be the worst offenders, with an incidence as high as 40 to 60% (Brock & Lue, 1993).

Smoking, cocaine, marijuana, and ethanol can contribute to erectile dysfunction. Smoking, especially cigarettes, carries several risks. The long-term effect is to produce arterial blockage in peripheral circulation. There may also be a direct effect on penile tissue. Long-term alcohol overuse can cause damage to nerve conduction mechanisms, especially in the presence of other diseases (NIH, 1993; Schover & Jensen, 1988).

Non-Specific Medical Treatments

Several non-specific medical treatments exist for erectile dysfunction, despite the cause. Essentially, any of these treatments can be used for an individual, once he and his physician have weighed the cost, risk, benefits and side effects (O'Keefe & Hunt, 1995).

Vacuum Constriction Devices. Many patients with erectile dysfunction may be eligible candidates for vacuum therapy, as this treatment is highly effective, regardless of the etiology of erectile dysfunction. A vacuum constriction device employs an

airtight plastic tube that is placed over the penis (Figure 4). A lubricant can be used to achieve a good seal between the body and the cylinder. Most devices employ a small hose and hand pump or electric pump to remove air from the tube. The vacuum created inside the device helps the corpora cavernosa engorge with blood, subsequently creating an erection. Blood is kept in the penis by the placement of a flexible rubber constriction ring at the base of the shaft. The ring maintains the erection during intercourse. Most manufacturers recommend removal of the rubber ring after 30 minutes. The ring must be tight enough to maintain penile rigidity, but not so tight as to injure the penis. The penis may pivot at the point of constriction, which may require the patient to stabilize the penis during sexual intercourse. Partner involvement in training with these devices may be important for successful outcome, especially in establishing a mutually satisfying level of sexual activity. Vacuum devices cost approximately $400 and can be purchased from a manufacturer with a prescription.

The initial overall satisfaction rate with these devices varies throughout the literature from 66% to 93%. However, longer-term studies show satisfaction rates approaching other interventions, and are closer to 50% to 70%. One recent study of 129 men found an attrition rate with these devices of approximately 65%. However, most men who were classified with "moderate" dysfunction continued use of the device. Men who were diagnosed with mild or severe erectile dysfunction were more likely to stop treatment early and discontinue use (Dutta and Eid, 1999). A meta-analysis of the literature involving vacuum devices as treatment for erectile dysfunction found that 1470 out of 1943 patients (or nearly 76%) were able to successfully return to intercourse, 655 of 859 patients (or 76%) were satisfied with the use of the device, and 162 of 218 of the patients' partners (or 74%) were satisfied with the devices. The meta-analysis also

found a treatment drop out rate of approximately 25% (Montague, Barada, Belker, Levine, Nadig, Roehrborn, Sharlip, & Bennett, 1996).

Reported side effects of such devices include occasional numbness, pain, penile bruising, or petechiae (Montague, et al, 1996). While the literature does not indicate an exact reason for patient dropout, a major drawback of these devices is the necessity for precoital application . Consequently, partner involvement in the training and use of these devices is highly recommended. Patients who may have a tendency to develop priapism may not be good candidates for use of these devices. Likewise, patients with bleeding disorders, with sickle cell disease, or on anticoagulants should not use these devices. Some patients with Peyronie's disease (a severe penile curvature during erection) cannot use a vacuum device because of lack of freedom of movement of the penis within the cylinder (Ganem, Lucey, Janosko, and Carson, 1998).

Direct Delivery of Vasoactive Agents. Vasoactive agents can be introduced into the penis by injection or transurethral delivery. These drugs act by dilating the arterioles of the penis and increasing blood flow. An erection usually begins within a few minutes after introduction of the drug and can last between 30 and 60 minutes. The drugs commonly used in this method of treatment are papaverine hydrochloride, phentolamine, and alprostadil. These treatments are effective for most cases of erectile dysfunction, regardless of etiology. However, individuals who suffer from vascular ED are not good candidates for this method of pharmacotherapy (Montorsi, Guazzoni, Rigatti, & Pozza, 1995).

Papaverine hydrochloride is a nonspecific smooth muscle relaxant obtained synthetically from opium. It acts on smooth muscle to cause inhibition of phosphodiesterase, which the body uses to metabolize cyclic GMP. By itself, papaverine is not very effective, with only a 35% success rate cited in the literature. However, when

used in combination with phentolamine, approximately 65% of patients respond (Junemann & Alken, 1989). Phentolamine is an alpha andrenergic receptor blocker that prevents sympathetic activity on smooth muscle. This works to dilate the tonically-closed arterial vessels in the penis. Used by itself, phentolamine is also not very effective. Alprostadil is the third most commonly used injectable drug for ED, and is the only medication of the three formally approved for such treatment. Alprostadil also has alpha blocking properties that cause relaxation of smooth muscle in the arterioles and blockage of venous outflow. By itself, alprostadil is an effective pharmacotherapy, with 87% of patients and their partners being satisfied with its effects (Linet & Ogrinc, 1996).

Alprostadil can also be administered transurethrally, which for many patients is more desirable than injection. This product is called Medicated Urethral System for Erection, or MUSE. A suppository form of the drug is inserted with an applicator in the urethra (Figure 5). The erection process typically occurs within 10 minutes and can last from 30 to 60 minutes. Approximately 78% of patients respond to MUSE. Eleven to eighteen percent of patients encounter penile pain with MUSE, depending on the amount of drug administered. (Padma-Nathan, Auerbach, and Barada, 1996). The most serious side effects associated with all of these three drugs are priaprism and prolonged erection.

*Oral Medications: Phosphodiesterase 5 Inhibitors***.** Recent advancements in pharmacotherapy for erectile dysfunction dominate the news and popular culture. Upon its premiere, headlines portrayed sildenafil citrate (Viagra), as the ultimate answer to male arousal problems. Despite press reports of a few Viagra-related deaths, most patients tolerate the drug relatively well. However, the drug is contraindicated for patients with ischemic heart disease or patients who use long-acting nitrates (Kloner, 2000). Clinical trials have demonstrated the drug's efficacy over placebo (Goldstein,

Lue, Padma-Nathan, Rosen, Steers, and Wicker, 1998). Sildenafil's mechanism of action is to block phosphodiesterase (PDE 5) from inactivating cGMP in the smooth muscle of the arterioles that supply the corpora cavernosa, permitting smooth muscle relaxation. Once the smooth muscles around the penile arterioles relax, blood flows into the cavernosal spaces, increasing intracavernosal pressure and penile erection. Onset of erection occurs within ten to 40 minutes after taking the drug. Viagra remains active in the bloodstream for up to four hours (Boolell, Gepi-Attee, Gingell and Allen, 1996).

In clinical trials on patients with organic, psychogenic and mixed erectile dysfunction, Goldstein and colleagues found that between 56% and 84% of patients responded to the sildenafil. Response increased with the amount of drug administered. The product information for sildenafil mentions that 21 randomized, double-blind, placebo controlled studies of up to 6 months duration have been completed (Goldstein, et al, 1998). Common side effects are flushing, indigestion and headache.

Oral Medications: Vardenafil and Tadalafil. The second generation of PDE5 inhibiting drugs is poised to come on the US market in the near future. Vardenafil and tadalafil are similar to sildenafil in their pharmacology, but carry the benefit of additional research and refinement of their chemical properties. Vardenafil (to be known commercially as Nuviva) is similar to sildenafil in absorption (40 to 55 minutes) and elimination (approximately four hours) (Padma-Nathan & Giuliano, 2001). Vardenafil has entered Phase 3 clinical trials and has been shown to be more effective than placebo in patients with a variety of ED etiologies (Pryor, 2002). Tadalafil, known by the trade name of Cialis, is also undergoing multi-center clinical investigation. A major strength of this drug is that it has 10 to 10,000 times more selectivity for PDE5 than sildenafil (Porst, 2001). There are at least ten forms of PDE that metabolize cGMP in the body. However, PDE5 is the primary form found in the smooth muscles that

surround the arterioles of the penis. Sildenafil is not as specific for PDE5 as tadalafil, and also inhibits PDE6. As PDE6 is an actor in the blood vessels of the retina, some users of sildenafil reported visual changes (a blue hue). This side-effect is not currently being reported in tadalafil clinical trials (Padma-Nathan and Giuliano, 2001). Tadalafil has a much longer half-life than sildenafil (greater than 17 hours), and -- in some reports -- has allowed men to obtain an erection up to 28 hours after ingestion of the drug (Padma-Nathan and Giuliano, 2001). Cialis was originally scheduled to be released in the US in 2002, but the FDA requested additional follow-up studies due to the drug's longer half-life. Tadalafil and vardenafil have both been shown to be significantly more effective than placebo in treating ED in a sample of men with varying severities of ED and Type 1 or 2 diabetes (Jack, 2001; Pryor, 2002).

PDE5 inhibitors have several drawbacks, despite their efficacy over placebo: First, they do not help everyone. A minority of clinical subjects (ranging from 10 to 25 percent depending on the trial) do not experience improved erections or successful intercourse. In addition, Goldstein et al. (1998) found that patients diagnosed with mixed erectile dysfunction (organic plus psychogenic) did not have a higher frequency of penetration when taking sildenafil. Second, drugs have a potential economic drawback that lasts the life of the patient: Viagra costs from ten to fifteen dollars per pill (the newer drugs have not yet been priced). Third, PDE5 inhibitors are contraindicated for men taking organic nitrates, including nitroglycerin, longer acting nitrates, and amyl nitrate. Use of PDE5 inhibitors in combination with nitrates causes potentially dangerous hypotension. Fourth, drugs make the patient substance-dependent for sexual intercourse. Finally, drugs do not address the psychosocial problems that often accompany erectile dysfunction. The marital stress and depression that initiated or

contributed to the ED cannot be adequately addressed by simply restoring sexual functioning.

Oral Medications: Apomorphine. Another new drug under evaluation for the treatment of erectile dysfunction is apomorphine, known commercially as Uprima. The advantage that apomorphine offers over sildenafil is that it works on the central nervous system to cause erections, instead of the end organ. Essentially, apomorphine is a dopamine agonist that stimulates the medial preoptic area of the hypothalamus, which has been shown to play a central role in integrating sexual input from central and peripheral stimuli (Meisel and Sachs, 1994). Originally, apomorphine's pro-sexual side effects were discovered through its use with Parkinson's patients. Prior to the most recent formulation, apomorphine was not considered useful due to the nausea it quickly induced. However, a sublingual form of the drug has been developed which allows for therapeutic doses to accumulate in the body with minimal side effects (Dula, Keating, Siami, Edmonds, O'Neil, and Buttler, 2000). Recently completed clinical trials of the drug found that a significantly higher percentage of patients (48% to 56%) achieved and maintained an erection sufficient enough for intercourse than those taking placebo (35%). While nausea was still experienced by patients at higher dosage levels, it tended to disappear after four weeks of use. Another side effect encountered was fainting. However, all patients had spontaneous, rapid recovery (Dula, et al, 2000). This drug may someday prove to be a useful alternative for those cardiac patients on nitrate-based drugs who cannot take sildenafil.

Oral Medications: Yohimbine. Yohimbine is derived from the bark of the yohimbine tree. The US Food and Drug Administration grandfathered it into the market for use without testing in 1976. Yohimbine is a centrally acting drug that increases sympathetic drives by blocking alpha-2 adrenoceptors in the brain. This has

the net effect of decreasing arteriole tone and increasing blood flow into the penis. While very inexpensive, yohimbine is noted for a variety of stimulant-like side effects, including elevated blood pressure, heart rate, angina, anxiety, dizziness and nausea. Effectiveness of yohimbine has been in debate. Success rates (measured as return of complete or partial erections) in other studies have ranged from 33 to 62% (Montorsi, 1995; Susset, Tessier, and Wincze, 1989; Reid, Surridge & Morales, 1987). However, a recent meta-analysis of seven yohimbine trials showed that yohimbine was significantly more effective than placebo and that serious side effects were infrequent (Ernst, E., and Pittler, M.H., 1998). Yohimbine can be purchased over the counter and by prescription. Over the counter remedies are not subject to the same federal scrutiny as prescriptions and may not be of consistent quality. The American Urologica Association does not recommend yohimbine for ED (Sadovsky & Custis, 2001).

Oral Medications: Phentolamine. Phentolamine mesylate, an alpha-1 and alpha-2 selective adrenergic receptor agonist, has historically been used for intercavernosal injection treatment of erectile dysfunction. However, an oral formulation, known commercially as Vasomax, was recently subjected to a well-controlled clinical trial. Fifty five to fifty nine percent of patients were able to achieve sufficient erection for vaginal penetration using the drug. Variation in effect was dependent upon the dose administered (40 or 80 mg). Approximately eight percent of patients reported rhinitis as a side effect, which was the most prevalent problem noted (Goldstein, 2000). The Goldstein study replicated the findings of a prior clinical trial which also found that phentolamine was a safe, effective treatment for ED (Becker, Stief, Machtens, Schultheiss, Hartmann, and Truss, 1998).

Topical Agents. Minoxidil. Minoxidil is a vasodilator that works on arterial smooth muscle. While primarily used as a topical treatment for male pattern baldness, it has

been tested for use as a topical agent applied directly to the penis for treatment of erectile dysfunction. Minoxidil is thought to dilate the arteries of the penis and enhance blood flow into the corpora cavernosa. Studies have shown mixed results. One study showed that when applied to the head of the penis, minoxidil was more effective than other nitroglycerin-based topical treatments (Cavallini, 1991). However, in an additional clinical test, minoxidil did not show any appreciable benefit (Radomski, Herscorn, and Rangaswamy, 1994).

*Penile Prostheses***.** Penile prostheses can be surgically implanted in the corporal cavernosa of the penis. There are three types: the semirigid, malleable, and inflatable prostheses (Figure 6). The semirigid rod remains the same size but may be bent either up or down, as needed. The malleable implants are rods that can be bent or straightened. Inflatable prostheses remain flaccid until a pump located in the scrotum moves fluid from a retropubic reservoir into the prosthetic penile cylinders. Despite the pain of surgery, these devices have a high rate of patient satisfaction. Most prostheses can be expected to last from seven to ten years. Most failures can be fixed to give five to 10 more years of function. (Greiner and Weigel, 1996). The effectiveness, complications, and acceptability vary among the three types of prostheses, with the main problems being mechanical failure, infection, and erosions. (NIH, 1993). There is a risk for re-operation with all prostheses. The inflatable prostheses may provide a more physiologically natural appearance, but they have a higher rate of failure requiring surgery. Petrou and Barrett (1990) found surgical success rates between 82% to 98% with differing types of protheses. However, patients should be warned that the erections experienced with protheses are much different than those experienced naturally. Many turn to the protheses only after more conservative therapies have failed. A recent long-term study of 372 AMX 700CX inflatable prostheses users found

that 92% of the devices remained reliable after a year and 86% were still reliable after 5 years. Two hundred two of the original patients were interviewed at a later date. The authors found that 86% of these men still had prostheses, 79% used the device at least twice a month, and 88% would recommend it as an effective treatment for ED (Carson, Mulcahy, and Govier, 2000).

Summary of Biological Factors. Current medical research has taken several different approaches in the treatment of erectile dysfunction. Of late, the treatment receiving the most publicity involves the PDE5 inhibitors. This is likely due to the great attention that sildenafil citrate (Viagra) has received in popular culture. This trend is likely to progress as the different chemical pathways to successful erection are discovered and analyzed. Tadalafil, vardenafil and their successors are likely to receive similar attention. Tadalafil's twenty-eight hour effectiveness has already garnered a great deal of media attention.

Erectile dysfunction is associated with several physiological conditions and diseases. Age is the risk factor most closely associated with ED. Other noted risk factors include hypertension, vascular disease, high cholesterol, prescription drug use, and alcohol abuse. Smoking appears to accelerate or increase the negative effects of other disease processes, which ultimately impact erectile functioning.

As with most problems presumed to be of a medical nature, primary care is the most used treatment source for erectile dysfunction. However, study has shown that those suffering from erectile dysfunction actually have a combination of physiologic and psychologic risk factors that could produce the disorder (Buvat, Buvat-Herbaut, Lemaire, Marcolin and Quittelier, 1990; Melman and Gingell, 1999). While many simple cases of ED might be successfully treated in primary care, more complex cases need assessment and treatment input from multiple disciplines.

Psychophysiological Assessment for Erectile Dysfunction

Patients who present for ED should undergo a thorough physical examination. Wincze and Carey (1991) suggest that a complete medical history should be incorporated into an ED screening interview. Self-report forms should also be used that ask patients for detailed medical information. In addition to this history, appropriate medical tests and a psychophysiological evaluation should be completed.

Psychophysiology studies allow the clinician to draw conclusions and make decisions about erectile functioning based on data that typically is not available in the primary care setting. The two methods most commonly used for ED are nocturnal penile tumescence (NPT) and daytime arousal studies. At night, primarily during REM sleep, males have spontaneous erections. Sleep erections are a hormone-dependent phenomenon that are believed to be indicative of the potential for the penis to become rigid without psychological stressor influence (Althof & Seftel, 1995). Patients can be monitored for NPT in either in a sleep laboratory or with portable equipment at the patient's home. While nocturnal penile tumescence testing is not routinely used, it may be helpful for patients who report a complete absence of erections or when a primary psychogenic origin is suspected. While various methods and devices are available for the evaluation, their current clinical usefulness is hampered by the absence of a robust data set for baseline comparisons and problems with prior studies. (NIH, 1993). The RigiScan® device (Dacomed Corp, Minneapolis, MN) is commonly used in clinical studies and specialty clinics (Figure 7). The RigiScan has been proven a useful measuring device for detecting the changes in tumescence associated with NPT (Kaneko, Mizunaga, Yachiku, Yamaguchi, and Omata, 1996; Benet, Rehman , Holcomb, and Melman, 1996). The device consists of two loops, one placed around the base of the penis, the other around the tip of the penis proximal to the coronal sulcus. The loops are

attached to a logging unit the patient wears on the thigh. Changes in tumescence are monitored throughout the night. The data can be downloaded and printed in graphical and numerical form (Levine and Elterman, 2001).

While not scientifically tested, one commonly used test for NPT is to have the patient wrap four postage stamps around the shaft of the penis, with a minimum of half a stamp over lap. If the patient finds that the stamps have separated in the morning, an indication of his NPT can be inferred. Studies have not found this test accurate enough for clinical use (O'Keefe & Hunt, 1995), and it may be invalid or painful with self-adhering stamps.

Daytime arousal studies employ objective measuring methods to analyze the patient's response to erotic stimuli (Libman, Fichten, Creti, Weinstein, Amsel & Brender, 1989). Wincze and colleagues (1988) found that by exposing dysfunctional men to erotic stimuli an erectile response could be obtained, despite the fact that the men had previously reported an inability to get an erection. Most clinics are not currently equipped for such a procedure. Wincze and Carey (1991) used a mercury in rubber strain gauge to monitor the response of men to short, erotic video tapes. Stimuli are selected according to the patient's sexual orientation and exclude material the patient may find offensive. The post test interview is typically used to help understand the patient's cognitive process during arousal. Answers to questions regarding the patient's focus, emotions and concentration help give a clearer understanding of problematic cognitions. In addition, information about the patient's change in penile circumference, pattern of arousal, and physical response to types of erotica can be obtained.

Psychological Factors

Our understanding of the psychological components of erectile dysfunction has logically changed with our understanding of psychology in general. Each psychological orientation that has developed during this century and the last has produced its own description of ED etiology, assessment and treatment. While the majority of recent research deals largely with the cognitive behavioral aspects of this disorder, it is helpful to briefly review the history of psychological thought surrounding ED.

Historical Overview of the Psychology of Erectile Dysfunction. In the first half of the century, psychoanalytic concepts governed the treatment of erectile dysfunction. Problematic sexual functioning was explained by discrete, unresolved unconscious conflicts that occurred during specific developmental periods (LoPiccolo, 1992). Precursors for sexual dysfunction were hypothesized to occur during early childhood. Treatment for sexual dysfunction took many years and employed the classic Freudian techniques of free association, dream analysis, and interpretation of unconscious motives. Couples therapy was not usually employed, as most sexual problems were viewed as conflicts within the individual. While many lengthy and detailed case histories were published, little empirical research was conducted (Segraves and Althof, 1998).

With the advent of behaviorism in the 1950s, the Freudian view of sexual dysfunction was replaced with the idea that poor sexual performance stemmed from learned anxiety (Wolpe, 1958). As such, treatment efforts employed classical conditioning theory to extinguish the anxiety or performance demands that interrupted normal sexual functioning (LoPiccolo & LoPiccolo, 1978). Systematic desensitization was used to gradually eliminate the anxiety provoking features of sexual behavior (Wolpe, 1958). Similar topsychoanalysis, behavior therapy focused mainly on the

individual and rarely employed a relationship-based approach (Segraves and Althof, 1998).

Masters and Johnson substantially changed sex therapy in 1970 with the publication of *Human Sexual Inadequacy.* They believed that poor sexual functioning stemmed from performance anxiety, fear, mental detachment from sexual activity, and poor sexual education. Kaplan (1977) extended this line of thinking by including partner-demand characteristics as another source of sexual anxiety. Treatment for sexual dysfunction now involved techniques to reduce anxiety during sex. Masters and Johnson (1970) used a ban on intercourse and employment of sensate focus to re-engage the individual with the pleasurable aspects of sexual behavior. These techniques were demonstrated to relieve the patient of the sexual "duties" that inspired the fear of future sexual failure and the resultant dysfunctional sex. While Masters and Johnson's work was criticized for methodological problems and non-replicable outcomes, their approach greatly revolutionized how clinicians approached sex therapy.

Segraves and Althof (1998) describe the fourth era of sex psychology as "neo-Masters and Johnson." Essentially, Kaplan's (1974) work to integrate the best of the prior three orientations defines this period. Kaplan treated both partners in the relationship, analyzing how each individual's past and present problems and personal conflicts contributed to dissatisfying sex. Recent problems were treated directly with behavioral and Masters-and-Johnson-inspired techniques, while past problems – or "remote etiology"—was treated psychodynamically. Unfortunately, Kaplan did not document outcome or follow up data for her techniques (Seagraves and Althof, 1998).

The current era started in the mid-1980s and integrates psychology and biology as important co-contributors to sexual dysfunction. In addition, with the development of cognitive-behavioral approaches, there has been an increased focus on cognitions as

causative and maintenance factors in sexual dysfunction (LoPiccolo, 1992; Pryde, 1989). However, with the advent of so many medical treatments and the diminishing number of outcome studies for psychologically-based treatments, Schover and Leiblum (1994) suggest that psychological sex therapy has stagnated during this period. In a critical review of psychotherapy for male sexual dysfunction, O'Donohue and colleagues (1999) found little empirical support for psychotherapy as an effective intervention. O'Donohue, et al, found numerous methodological problems, clinically insignificant effect sizes, lack of compelling follow-up data, and a paucity of treatment manuals for replication.

That being said, psychologically-based interventions for erectile dysfunction are not without hope. Psychological treatments may, in the long run, turn out to be more cost effective, less intrusive, and have fewer health risks than medically based treatments. In addition, the lack of empirically sound data may actually be the result of poor research design and not the fault of inadequate treatment. What's more, psychological factors have been clearly demonstrated to be important in the development of sexual dysfunction (NIH, 1993; Catalan, Hawton & Day, 1990). Medical interventions do not typically address these factors, which may still require treatment (Schover & Leiblum, 1994; Tiefer, 1994). Finally, too few studies have been conducted to prove that medical interventions are more advantageous than psychological interventions. Concluding that one holds more promise than the other is still premature (O'Donohue, Swingen, Dopke & Regev, 1999). Some sex therapists use a synergistic approach and combine medical and psychological interventions. McCarthy (1998) advocates the use of Viagra in cognitive behavioral therapy for ED. Berman and Berman (2000) suggest that therapists should work together with physicians to make comprehensive diagnoses and establish guidelines for intervention.

Current Psychological Theory of Erectile Dysfunction. Psychological theory of erectile dysfunction has its roots in Masters and Johnson's (1970) model of sexual response. Barlow (1986, 1988) further developed this model to include cognitive and behavioral aspects, demonstrating that anxiety not only inhibits arousal but also facilitates it. In 1996, Sbrocco and Barlow revisited the model and theorized how anxiety works to initiate and maintain erectile dysfunction. The current model of erectile dysfunction and support for its tenets will be discussed below.

Masters and Johnson: Sexual Response Cycle and Therapy. As described previously, Masters and Johnson (1966) posited a four-phase descriptive model of sexual response. The physical characteristics of excitement, plateau, orgasm, and resolution served to provide cues for psychophysiological measures that led them to develop indices of sexual arousal. It should be noted that Masters and Johnson's model has not been empirically proven and has been the target of criticism for methodological and replication problems.

For the purposes of this paper, the most important idea to grow from Masters and Johnson's work is the concept of performance anxiety and its impact on sexual functioning. While Masters and Johnson (1970) acknowledged the contribution that historical factors played in the etiology of primary (lifelong) and secondary (acquired) erectile dysfunction, their interventions focused on the more immediate problems facing the male. Prominent among these troubles were fear of performance, mental detachment from sex, and problems in the relationship. Once a dysfunction developed, Masters and Johnson proposed that it was maintained by the male's preoccupation with obtaining an erection and fear of failing to do so. This concern makes the male become a "spectator" to his sexual relations, rather than an active participant. This distractibility interferes with the physical and psychological stimulation needed for heightened sexual

arousal and spontaneous erection. Negative reactions by the partner typically exacerbate this interference. Should the partner fail to provide adequate stimulation or reaction to the male's sexual advances, further anxiety can develop. The sum of these behaviors and cognitions is to cause detumescence in the male. This cycle further increases distress and continued flaccidity.

Masters and Johnson's (1970) treatment prescribed educational presentations, therapy discussions, and home exercises for the couple. These interventions were designed to alleviate sexual performance concerns, dispel misconceptions about sex, and introduce or enhance adaptive verbal and nonverbal communication. Once the male successfully redirected his attention from fears of sexual performance to the experience of sexual sensations, erectile functioning was theorized to return. Kolodny (1981) published outcome data from approximately 20 years of research at the Masters and Johnson Institute. Sixty-seven percent of men (n = 51) with lifelong erectile dysfunction responded successfully to treatment, while 78% of men (n = 501) with acquired ED responded successfully. These results included 2 or 5-year follow-up data. Treatment outcome studies by others report success rates between 35 and 90 percent (Avasthi, Basu, Kulhara & Banerjee, 1994; Hawton, Catalan, and Fagg, 1992; Takefman & Brender, 1984; Kolodny, 1981; Ansari, 1976). Other research documents suggests that a sizeable percentage of men (between 14 and 30 percent) will recover from erectile dysfunction without any form of intervention (Virag, et al., 1994; Segraves, et al., 1982, 1985).

Masters and Johnson's work laid the foundation for anxiety's role as a sexual inhibitor. However, this widely accepted belief was incorporated into treatment strategies without a thorough understanding of the interaction between anxiety and sex. Over the last twenty years, other researchers have found evidence that this

relationship is much more complex than initially hypothesized. It appears that anxiety itself is not the primary factor is initiating or maintaining sexual dysfunction. Rather, it is the distraction that anxiety produces in perceptual and attentional processes that interfere with normal sexual functioning (Cranston-Cuebas & Barlow, 1990).

Barlow's Models of Male Sexual Arousal and Response. Current cognitive behavioral theory of erectile dysfunction grew out of Barlow's (1986) analysis of how anxiety interacts with cognitions during the arousal process. Advancements in research led Sbrocco and Barlow (1996) to revisit this model of sexual functioning. Essentially, this model integrates a number of research findings that have found response differences between sexually functional and dysfunctional males. A summary of the research supporting this model follows.

1. Experimental induction of anxiety often facilitates sexual responding in sexually functional individuals. Anxiety facilitating sexual arousal has been observed outside the laboratory in paraphilia. Exhibitionism and sexual masochism by definition rely on anxiety about being caught or humiliation and pain, respectively (Beck & Barlow, 1984; Baumeister, 1997). A number of experiments have demonstrated that the physiological component of anxiety, operationalized in a number of different ways, facilitated or had no effect on sexual arousal in functional males. In dysfunctional males, however, the physiological effects of anxiety were found to be associated with a decrease in sexual responding. (Wolchick, et al., 1980; Lange, Wincze, Qwiek, Feldman, and Hughes, 1981; Barlow, Sakheim and Beck, 1983; Beck, Barlow, Sakheim and Abrahamson, 1987).

2. Performance demand facilitates responding among functional men and inhibits responding in dysfunctional men. This hypothesis is based largely on research that

found functional men capable of voluntarily controlling their erections, attending to or ignoring erotic stimuli as directed (Bancroft & Matthews, 1971; Laws & Rubin, 1969; Henson & Rubin, 1971; Mavissakalian, Blanchard, Abel & Barlow, 1975; Mahoney & Strassberg, 1991). Dysfunctionals can also suppress their erections in the presence of erotic stimuli (Beck, Barlow & Sakheim, 1982). However, a difference between the two groups was identified: Functionals were able to report cognitive strategies they used to control their erections. Dysfunctional males, however, evidenced little awareness that they had been successful, nor could they report the strategies they had used.

Performance demands are the cognitive aspects of anxiety under conditions in which individuals believe they are challenged to achieve some standard. As might be expected, functional males were found to respond favorably or become even more aroused when placed in experimental high-demand conditions (Farkas, Sine, & Evans, 1979; Lang, et al., 1981). Dysfunctional men evidenced lower levels of tumescence during high-demand relative to the low demand condition (Heiman & Rowland, 1983). When attentional focus is manipulated along with performance demand, functionals and dysfuntionals once again demonstrate different patterns of responding. Essentially, functional men are aroused by pressure to respond sexually when attending to high partner arousal. Dysfunctional men found this kind of situation to be non-arousing (Beck, Barlow, Sakheim, 1983; Abrahamson, Barlow, Beck, Sakheim, and Kelly, 1985). While these studies did not address thought content, a more recent study found that dysfunctional men experience more negative internal thoughts and deprecatory self-statements in response to erotica (Bach, Sbrocco, Weisberg, Weiner, & Barlow, 1993). This finding is a plausible

explanation for the failure of dysfunctional men to become aroused when presented with high partner sexual arousal conditions.

3. Distraction from erotic cues decreases arousal in functionals and has no significant effect on arousal among dysfunctionals. Clearly, there seems to be a lot "going on" inside a dysfunctional male's head when they are immersed in a sexual situation. These goings on appear to be of sufficient nature to distract and diminish the sexual experience. Indeed, studies on distraction and sexual arousal have found that as subjects increased their attention to a distracting task, their remaining attention on the erotic stimuli diminished. As a result, distraction brought about decrements in sexual arousal (Geer & Fuhr, 1976; Farkas, et al., 1979; J.G. Beck, et al.,1987). Further research found that dysfunctionals showed no significant change in responding when distracted—they still failed to obtain erections (Abrahamson, Barlow, Sakheim, et al., 1985). This finding suggests that exchanging one distraction (negative self focus) for another (an experimental operationalization of distraction) makes little difference for dysfunctionals. However, Wesiberg and colleagues (1994) found that when equally distracted by non-sexual stimuli , functionals and dysfunctionals perform similarly: tumescence suffers.

4. Dysfunctionals evidence greater negative affect pre- and post-exposure to erotica. Why don't dysfunctionals focus on sexually arousing stimuli? Several studies have looked to affect as a possible factor. Mitchell et al. (1992) manipulated affect with music. Subjects in the "positive affect" condition demonstrated greater tumescence than those subjects in the "negative affect" condition. Meisler and Carey (1991) attempted a similar experiment. However, they did not find a difference in tumescence between elated and depressed

groups. However, they did find a trend toward decreased responding initially and longer time until maximum arousal following a depressive mood induction. When researchers use self report measures to assess affect, dysfunctionals evidence higher levels of dysphoria both pre- and post-exposure to erotica (Abrahamson, Barlow, Sakheim, et al., 1985; Abrahamson, et al., 1989; Beck & Barlow, 1986a, 1986b; Heiman & Rowland, 1983).

Sbrocco and Barlow (1996) have integrated these findings into a self-regulatory model of sexual responding. This model presupposes that a complex system of feedback control regulates sexual arousal. That is, anxiety is a three-response system with cognitive, affective and physiological components that can all be assessed and manipulated (Barlow, 1988). As such, cognitive interference, enhanced by anxious physiological arousal, elicits sexual dysfunction.

In this model, people use reference points to adjust forthcoming behavior. Most of these reference points consist of personal goals, beliefs, and intentions that are both near and long term. As people engage in tasks, they monitor their progress by referencing their internal standards. On occasion, people adjust their behavior as needed to reach desired goals and meet self-expectations. Usually, this feedback control runs smoothly. However, in the case of erectile dysfunction, problems may arise when men miss their reference points. An uninterested partner or fatigue can cause conflict between what a man expects should happen with his body and what actually occurs. Anxiety may arise as a result of this discrepancy, warning the man to adjust his behavior. As a result, the man may shift position, use more erotic imagery, or take whatever steps he feels necessary to close the gap between experienced arousal and desired arousal. Barlow and Sbrocco (1996) contend that functional men have no problem bridging this arousal gap. In dysfunctional men, most erectile problems arise

when four cognitive factors combine to inhibit the man's ability to adjust. These factors primarily consist of counterproductive schematic content and skill deficits. Secondary factors include negative outcome expectancies and task disengagement or avoidance.

In the context of sexual functioning, schematic content essentially pertains to the man's view of sexuality and implications for the self that influence thoughts, affect, and behavior (Barlow and Sbrocco, 1996). Sexual self-schemas are often unrealistic and inaccurate. For example, some men believe that they should be capable of rapid and sequential orgasms. Others believe that sexually successful men can maintain an erection indefinitely. Both normal and dysfunctional men may ascribe to distorted self-schemas. However, for dysfunctional men, the schemas are intensely personalized and relevant. What's more, dysfunctional men tend to define their sexual problems as inherent features of their identity.

A recent study demonstrates the cognitive distinctions posited by Barlow and Sbrocco (1996). Nobre and Gouveia (2000) developed a self-report survey they administered in Spain to a community sample of 102 sexually functional men and a group of 29 men who sought treatment for ED at a university hospital. The survey assessed how self-reports of sexual behavior were impacted by an individual's sexual attitudes, automatic thoughts, and affective response during sexual intercourse. Subjects were asked to rate a series of 23 sexual attitudes on a 5-point Likert scale. Subjects were then asked to endorse the automatic thoughts they experienced because of a particular sexual attitude, describe subsequent affect when those automatic thoughts were activated, and report the effects of those thoughts and feelings on their own physiology and sexual functioning. Consistent with the Sbrocco and Barlow model, Nobre and Gouveia found significant differences in schematic content between functional and dysfunctional men. In the sexual attitudes domain, dysfunctional men

were more likely to agree with attitudes of a distinctly macho theme (real men should be immediately erect, frequently intimate, able to satisfy under all circumstances, and remain emotionally distant), attitudes about satisfying women (women will leave/stop loving/cheat on dysfunctional men), and attitudes about the consequences of sexual failure (catastrophization, public derision, and unhappiness). Dysfunctional men also endorsed significantly more automatic thoughts relating to performance demand and failure anticipation than functionals. Not surprisingly, dysfunctional men reported feeling significantly more negative feelings during sexual activity than controls. While no statistical differences were noted in how both groups evaluated their subsequent physiological responses, dysfunctional men's responses were more closely associated with performance demands and failure anticipation. Functional men's physiological response was more closely associated with erotic thoughts. In sum, this study offers empirical support to the concept that one's sexual function is closely tied to one's attitudes, thoughts and feelings during sexual behavior.

Differences in schematic content are believed to develop from one's learning and prior experiences with sex. Erotophobia -- the fear of sexual intimacy -- has been associated with later sexual difficulties (Byrne and Schulte, 1990). Erotophobia tends to be more prevalent in individuals who have been brought up with religious or cultural taboos about sex that influenced their cognitive development. In addition, dysfunctional men tend to believe more myths about sex than functionals (Baker and deSilva, 1989). Schemas are resistant to change: few men readily assimilate new or accurate information into their sexual schemas once developed (Sbrocco and Barlow, 1996).

Skill deficits, another primary factor in sexual cognitive regulation, may prevent a dysfunctional male from effective attitude or behavior adjustment during sexual

intimacy. A man's limited repertoire or beliefs about "proper" sexual practice may proscribe adaptive sexual responses. Consequently, these men may find themselves limited to sexual behaviors that prevent them from reaching full arousal. Some skill differences between functionals and dysfunctionals have been noted in the lab (J.G. Beck, et al, 1982). Sbrocco and Barlow (1996) noted that specific research in this area is lacking. However, they found indirect support for a skill deficit contention: the focus of sex therapy involves helping clients modify their beliefs about sex and teaching behaviors that facilitate sexual excitement. In fact, almost every psychotherapeutic intervention for erectile dysfunction from Masters and Johnson up through the latest cognitive behavioral treatment has at least one component meant to augment a man's collection of sexual skills.

A secondary factor in maladaptive sexual cognition is negative outcome expectancy. Essentially, men who are unable to adjust their behavior for successful sexual intercourse begin to predict failure. Once a performance demand is placed on a dysfunctional male, his ability to become aroused is negatively influenced by his expectation that "nothing" will happen. In addition, this problem is compounded by the dysfunctional man's tendency to focus his attention on his inability to achieve an erection. Recollections of past sexual failures are typically activated as the opportunity for sexual behavior approaches. As mentioned previously, this focus on negative outcome expectancy was empirically demonstrated by Nobre & Gouveia (2000). Dysfunctional men in that study were significantly more likely than functional men to be focused on failure anticipation. Improper focus on a dysfunctional performance history keeps the man from appreciating the erotic cues before him. Therefore, a dysfunctional man is incapable of making the corrective behavior adjustments that functionals typically do.

Three studies have found that the manipulation of expectancies can greatly affect sexual response. These three recent studies used a false-feedback paradigm to provide the strongest evidence to date that manipulating expectancies can greatly affect sexual response (i.e., Cranston-Cuebas, Barlow, Mitchell, & Athanasiou, 1993; Bach, Brown, & Barlow, 1999; Stone, Sbrocco & Lewis, 1999). In a within-subjects design employed by Cranston-Cuebas and colleagues (1993), ten functional and ten dysfunctional male subjects viewed erotic films following the ingestion of each of three placebo pills. Subjects were given an inert substance and told it would enhance, detract, or not affect their erection. Surprisingly, functional individuals exhibited a reverse placebo response, responding with increased tumescence to the detraction manipulation. Tumescence in the detraction condition was greater than responding in the enhancement or control conditions for which there were no differences. Dysfunctional individuals, however, responded with a direct placebo effect exhibiting decreased tumescence to the detraction condition. Tumescence did not differ in the enhancement and control conditions. Arousal during the detraction condition was lower than tumescence in the enhancement and control condition. Despite differences in tumescence, there were no differences in subjective arousal across the three conditions for both functionals and dysfunctionals. In addition, a majority of the subjects (7 of the functionals, 6 of the dysfunctionals) believed the "active" pills had no effect on their erectile response. Functionals believed the enhancement and detraction pills had 8% and 13.5% control, respectively, over their tumescence. Dysfunctional subjects reported 9% control for enhancement and 24% control for detraction.

In the second study, Bach, Brown, and Barlow (1999) provided false negative tumescence feedback or no-feedback to sexually functional college males. False negative feedback subjects were told over an intercom immediately following an erotic

film, “Are you finding it difficult to become aroused? … The information that we are getting on our computer is not what we would typically see for someone who is feeling very aroused. Let me see if I can print out the results from that last film and I will explain them to you.” Upon entering the room, the investigator showed the participant a bogus printout of his response as well as a scoring sheet that indicated the response was below that of the average participant. The investigator then said, “This is not a problem. It happens from time to time. However, we do know, from having done many of these assessments, that if someone does not become aroused during either the first or the second film, it is very unlikely that he will become aroused during the third film. Why don't we go ahead and finish the assessment anyway. I will answer any questions that you have afterwards."

Results indicated that while there were no significant changes in the no-feedback group, the false negative feedback manipulation lowered the level of efficacy expectancies and led to a significant decline in penile tumescence. The false negative feedback in this study was designed to significantly decrease expectancies and was evidently effective in doing so. The authors describe the negative feedback as “harsh” (Bach,1997, as cited in Stone, Sbrocco and Lewis, 1999). A more subtle feedback manipulation would not be expected to negatively impact the sexual response of a normally functioning male. The feedback was presented to the subjects between the second and third films they viewed and was evidently effective in lowering their confidence and outcome expectancies. Despite its effects on physiological arousal, false feedback did not lead to a significant decline in subjective arousal or an increase in negative affect.

Also applying a misattribution paradigm, Stone, Sbrocco, and Lewis (1999) used false feedback on penile tumescence to produce a discrepancy between expected and

actual performance among sexually functional and dysfunctional men. The primary hypothesis was that discrepancies induced experimentally between subjects' confidence and expectations of sexual performance and their "actual" performance could influence subjects' subsequent tumescence and cognitive set. Subject's "actual" performance was experimentally manipulated through the use of a bogus "erection score" shown during the viewing of an erotic video clip. Men's erections were monitored through the use of a penile plethysmograph. Subjects were given a range of possible erection scores and asked to predict their score, confidence and erection size prior to viewing erotica. Scores were inflated, deflated, or matched with subjects' predictions according to their experimental condition.

Given the tenets of the Sbrocco and Barlow model (1996), we would expect that men's sexual performance and expectancies are directly tied to their sexual schemas. Positive outcome expectancy and confidence should predict satisfactory sexual functioning. Negative outcome expectancy and low confidence should predict poor sexual performance. Functional men who are given greater than expected feedback should show little change in tumescence or cognitive set. These men expect to perform well, and positive feedback will only serve as confirmation of their expectations. Functional men who are given negative feedback should interpret this discrepancy as a challenge and attempt to increase their erections, as they would when presented with such a challenge in normal sexual relations. We would also predict that dysfunctional men act similarly. positive feedback should increase confidence and enhance outcome expectancies, producing a condition different from their typical sexual experience. As such, dysfunctional men should show improved sexual functioning when given positive feedback. However, negative feedback should not influence a dysfunctional man's cognitions or behavior. For dysfunctional men, negative feedback should serve as

confirmation of their negative outcome expectancy and low confidence. If performing consistently with the model, these men should disengage from the task at hand and show little response to erotic stimuli.

Surprisingly, the results of the Stone, Sbrocco and Lewis study (1999) were contradictory to the Sbrocco and Barlow (1996) model-based hypotheses described above. Functional men did not see the positive feedback as confirmation of their expected functional performance. Rather, functional men were surprised by the discrepancy between their performance and the greater than expected erection score. Consequently, these men became distracted by this discrepancy and experienced a decrease in tumescence. This occurred despite the men's positive expectations and increased confidence. Functional men who received negative feedback did not perceive it as a challenge to overcome. Rather, these subjects were also distracted by the discrepancy between their expected and "actual" performance and experienced a decrease in tumescence as well. These subjects also reported a decrease in outcome expectancy, confidence and arousal. Overall, the findings of this study suggest that confidence and outcome expectancy, regardless of functioning history and sexual schema, is quite friable in functional men. This might explain how dysfunction begins in normal, healthy males.

For dysfunctional men, the results were equally as surprising. Positive feedback did improve dysfunctional subjects' outcome expectancy and confidence, but did not produce an enhancement in erectile functioning. According to the model, these men's tumescence should have followed the improvements in their cognitive set. While negative feedback lowered dysfunctional men's outcome expectancy, these men did not experience the predicted change in tumescence. This may be explained partially by the

fact that these men did not report a change in confidence during the experimental manipulation.

The findings of this study suggest that the model posited by Sbrocco and Barlow (1996) be slightly amended. Sbrocco and Barlow contend that positive outcome expectancy and confidence predict functional performance. However, Stone, Sbrocco and Lewis (1999), as described above, found that this was not necessarily the case. Functional and dysfunctional men who become distracted by discrepancies in performance reduce attention to erotic cues and experience decreased tumescence. Discrepancies can cause tumescence to suffer despite the overall positive or negative connotations of that discrepancy.

The results of these studies illustrate two important steps in behavioral regulation: discrepancy monitoring and outcome expectancies. Applying a self-regulatory model to these results, it appears that functionals would only seek to reduce discrepancy in the condition where they feel challenged. That is, they have essentially been provided with feedback that they will not be aroused enough or are currently not aroused enough and they then use their skills to reduce this anticipated or current discrepancy. It is here they notice or have their attention focused on the potential for a discrepancy. In response to this "threat" or challenge, they should regulate their behavior, that is, they should increase tumescence. One possible medium by which increased tumescence might occur is by changing attentional focus. Functionals have the skills, positive outcome expectancies, and confidence to effect this change. However, the functional men in the Stone, Sbrocco and Lewis (1999) study did not meet the challenge with increased tumescence. Instead, functional men became distracted by the discrepancy between their perceived performance and their experimentally manipulated performance. This surprising feedback decreased penile tumescence in

both positive and negative feedback conditions. Because the feedback persisted throughout the experiment, functional men had no opportunity to refocus their attention on erotic cues or even "ignore" their bogus erection score. The score was shown in close proximity to the erotic action on the video. They may not have been given adequate opportunity to ignore the distraction and respond to the challenge. In a natural setting, functional men would be able to alter their focus away from the challenge or non-erotic cue. If that non-erotic cue were a decrease in tumescence, functional men are able to look away from their penis and concentrate on other erotic stimuli. In the Stone, Sbrocco and Lewis (1999) experiment, men were continually reminded with their erection score that their functioning was not what they expected. The ability of the functional individual to change erotic focus, or flexibly apply their attention, appears to be one key to overcoming challenges presented in the environment. Given the opportunity to concentrate longer on erotic cues and desensitize to the bogus erection score, these functional men might have been able to recover their erections.

Dysfunctional men may likewise lack an ability to "ignore" distracting environmental cues. However, dysfunctional men also bring their negative outcome expectancy and poor confidence to sexual situations as well. In this way, dysfunctional men may have a double burden to overcome when trying to perform sexually. Cognitive and environmental distractions combine to make sexual functioning what seems a near impossibility. As Stone, Sbrocco and Lewis (1999) demonstrated, the environmental distraction may even be "good news", e.g. evidence that they are performing better than expected. This may explain why the technique of sensate focus is so helpful with psychogenically based ED: sensate focus helps shift the attentional focus of the man to only those erotic cues present in the environment (Masters, Johnson

and Kolodny, 1986). Once a man is able to narrow his concentration in this way, cognitive and environmental distractions melt away, producing a spontaneous erection. This ability to shift attentional focus – attentional flexibility -- appears to be a critical factor in male sexual functioning.

Knowing about attentional flexibility helps clarify our understanding of subject performance in the Cranston-Cuebas , et al, (1993) study. For dysfunctional men, the detraction pill likely magnified their typical response process, characterized by an increased salience in negative outcome expectancies and decreased confidence in their ability to perform. Dysfunctional men's lack of attentional flexibility in this condition factored only in their focus on their negative sexual schemas. The authors presented no persistent environmental distractions. The detraction pill did not challenge dysfunctionals as it did the functionals. Rather, this condition represented confirmation of the status quo, that is, their negative expectancies about their poor sexual performance. Therefore they have little reason to even try to respond. In fact, they may not be task engaged at all. An enhancement manipulation will only increase tumescence if dysfunctional individuals change their outcome expectancies such that they believe a change could occur given their negative past, and have the skills to shift their attentional focus to erotic cues. Functional men may have overcome the challenge of the detraction pill in part because there were no persistently distracting environmental cues. Attention could be closely focused on the erotic imagery presented them, allowing them to overcome the challenge to their functioning. The saliency and the nuisance of the non-erotic cue presented by the detraction pill were not sufficient to distract functional men from becoming aroused.

We now know that simply changing outcome expectancies is insufficient to break the negative feedback cycle experienced by dysfunctional men. Many men with

ED experience improvement in functioning when skills and core cognitions are initially modified. However, this phenomenon likely represents the temporary "cure" sometimes experienced by individuals at the start of treatment. This "new hope" offered by treatment may be sufficient to at least temporarily limit the distracting influences of poor prior functioning, maladaptive schemas and negative environmental cues. Lasting treatment gains will not be possible if modifications to expectancies and the ability to focus are not incorporated into the individual's sexual behavior.

The Bach, Brown, and Barlow (1999) study furthered our understanding of these processes by providing functional subjects particularly salient ("harsh") false feedback about their erections between films, which undoubtedly had a greater impact on confidence, expectations and attention than merely providing an erection-detracting pill. It is likely that the negative feedback was salient enough to last through the film and act as a distractor as well. Consequently, functional men experienced a decrease in functioning and expectancies.

Closely associated with negative outcome expectancies is the idea that men will disengage completely from negative sexual experiences. Carver and Scheier (1988) found that task disengagement is a natural response for individuals who doubt their ability to perform and expect failure. As a result, dysfunctionals avoid in engaging in a behavior for which they have "no chance" and negative expectancies.

Overt withdrawal and avoidance have received little attention in the literature. Operationalizing overt withdrawal as ceasing task engagement, Sbrocco and Barlow (1996) examined subjects' retrospective reports of ceasing to try to obtain an erection, that is, "quitting," when they lost their erection during partner-related sexual behavior. Ninety percent of men seeking help for erectile dysfunction reported they quit. Interestingly, men were fairly equally distributed in their reported response to quitting.

Approximately half ceased sexual behavior altogether while the others reported focusing on pleasuring their partner to climax. However, no data are available on functionals' response to difficulty. Interestingly, when Weisberg, Sbrocco, & Barlow, (1994) asked functional and dysfunctional men to either fantasize about a successful or unsuccessful sexual situation , all of the dysfunctional males refused to participate in the unsuccessful fantasy, while none of the functionals objected. In fact, functionals reportedly became equally aroused to fantasies incorporating erectile difficulty. The implication being, dysfunctionals avoid engaging in a behavior they perceive is futile. In fact, a primary treatment component for erectile dysfunction is to teach men to lose their erection and regain it (e.g., Zilbergeld, 1992). Data from Barlow's lab suggest dysfunctional individuals attempt intercourse less frequently, controlling for partner availability (Sbrocco & Barlow, 1996). In addition, retrospective report suggests frequency of sexual activity by dysfunctionals before the development of the dysfunction is similar to functionals' frequency of sexual activity.

Summary of Psychological Factors. On the psychological side, a major shift has taken place toward more complex or multidimensional formulations of sexual dysfunction. Cognitive factors, in particular, and the role of perceptual and attentional processes have been highlighted in recent formulations of sexual dysfunction (Cranston-Cuebas & Barlow, 1990; Fichten, Libman, Takefman & Brender, 1988; Rosen, Leiblum & Spector, 1994; Sbrocco & Barlow, 1996). As described by Ackerman and Carey (1995), the effects of anxiety on sexual dysfunction in male patients appear to be mediated primarily by cognitive and attentional processes (Barlow, Sakheim & Beck, 1983; Beck et al., 1987; Cranston-Cuebas & Barlow, 1990). Similar findings have been reported in recent studies of female sexual dysfunction (Palace & Gorzalka, 1990, 1992). Interestingly, in these studies, women were found to be less susceptible than men to the

distracting effects of anxiety or sexual performance demands. More recently, Sbrocco and Barlow (1996), Palace (1995b), and Stone, Sbrocco, & Lewis (1999) have shown that confidence in one's ability to perform and expectations of future performance are important cognitive mediating factors in sexual performance. Results from a number of studies (e.g., Cranston-Cuebas, Barlow, Mitchell, & Athanasiou, 1993; Bach, Brown, & Barlow, 1999; Palace, 1995a) suggest that manipulating subjects' confidence, expectations, and attention profoundly affects their sexual performance.

Taken together, the results of these studies suggest that the historical role of anxiety in sexual dysfunction needs to be reconceptualized. It appears that it is not anxiety in and of itself that is responsible for initiating or maintaining sexual difficulties in most cases; rather it is the alterations in perceptual and attentional processes that occur in sexually dysfunctional males. LoPiccolo (1992) has also commented on the role of "meta-performance anxiety," or the cognitive distraction that typically occurs when sexually dysfunctional individuals fail to become aroused in a sexual situation. Similarly, Apfelbaum (1988, 1989) has noted that anxiety about lack of arousal, or "response anxiety", is a frequent concomitant of sexual dysfunction in both genders. The major focus of treatment, according to Apfelbaum, should be on the elimination of performance demands or the "need to be sexual", that frequently underlies sexual desire or arousal difficulties. Once these distractors have been minimized, the individual is free to rediscover their sexuality.

Sociocultural Factors in Etiology of ED

Culture typically sets the parameters and expectations for what is considered to be normal sexual performance. Typically, these norms are passed along informally via depictions in the media, by authoritative influence (parents, religion, etc.), and by peer

influence. Gagnon (1990) proposed that each of us function in society by following a personal script. Our "scriptwriters" are those social and cultural influences that have guided and molded our lives. For example, children taught that sex is a good and natural part of life typically have less vulnerability to developing sexual dysfunction later on in life. Unfortunately, there seem to be few realistic models for sexual behavior in our culture. Rather, we appear to be influenced most by the two extreme views most prevalent in society. On one side, the hedonistic attitudes pervasive in the media and popular culture suggest that anything sexual is acceptable, people are purely sexual beings, and there few consequences for sexual behavior (and even those consequences are "curable"). On the other side, religious and more conservative influences implicate that all things sexual are illegal, immoral or dangerous. Few influences occupy the middle ground.

Zilbergeld (1999) has summarized a number of sexual myths for male sexual functioning prevalent in Western culture. These myths include ideas that men must "perform" during sex, all touching should lead to sex, men are always ready for sex, sex is centered around a hard penis and how its used, and that there is a pill to fix whatever sexual problems you may have. Baker and DeSilva (1988) used an earlier version of Zilbergeld's myths to develop a questionnaire for sexually functional and dysfunctional men. Dysfunctional men showed significantly greater belief in the myths than did sexually functional men.

Men who have developed negative attitudes or had negative experiences with sex tend to develop sexual responses consistent with their beliefs. This cognitive set, largely influenced in childhood by family members and other authority figures, has been referred to as erotophobia (Byrne & Schulte, 1990). Erotophobia has been demonstrated to be a predictor of sexual dysfunction later in life. For others, sexual cues

may take on a negative aspect after a perceived traumatic event such as rape, sexual abuse, or some sexual disappointment. This negative affect toward sex may put the individual into a dysfunctional sexual pattern (Barlow & Durand).

Part III: Specific Aims

Purpose of This Study

The purpose of the present study is to replicate and extend the paradigm employed by Stone et al. (1999) in order to examine whether extending stimulus time will allow functionals to "recover"; that is, to increase tumescence by attending to erotic cues after experiencing a discrepancy. As before, the paradigm is intended to manipulate the experience of sexually functional males within a laboratory context to produce a discrepancy between expected and "actual" sexual performance. This involves providing subjects with false feedback concerning the size of their erections while they view an erotic videotape. By examining men's outcome expectancy, confidence, and penile tumescence, the path toward functional or dysfunctional performance can be experimentally followed.

This line of research has significant treatment implications. For example, it would be very useful for psychotherapists to know the specific cognitions and processes that need to be targeted for cognitive restructuring in order to improve sexual response. Any such enhancement to psychotherapy of ED could potentially reduce the dependence of this subset of patients upon pharmacotherapy. Men for whom pharmacotherapy is contraindicated would most benefit from a scientifically-based, drug free approach. Recent research in male erectile dysfunction has focused on the efficacy of sildenafil citrate (Viagra) and its chemical cousins. However, no studies have been conducted to assess whether or not PDE5 inhibitors are more effective in treating

psychologically based erectile dysfunction (ED) in this patient population than cognitive behavioral therapy. While pharmacotherapy may seem easy and advantageous in the short term, long-term improvement to psychological health has not been demonstrated. Psychogenic ED often has its roots in relationship problems that pharmacotherapy and the other medical therapies alone cannot address (Zilbergeld, 1999). If ED due to psychogenic factors is effectively treated with a scientifically-proven form of psychotherapy, use of PDE5 inhibitors or other medical interventions may be reduced or become superfluous for this population of patients.

Research Questions

The following questions were posited:

(1) For sexually functional males, does false positive feedback differentially modify their cognitive set and subsequent penile tumescence? Stone, et al, (1999) found that functional men experienced a decrease in sexual performance when exposed to information that they were performing better than expected. This distraction from erotic cues caused by unexpected performance or "surprise" prevented men from focusing their full attention on arousal. The rationale for these expected findings are provided in greater detail below.

1A. Cognitive Set

For sexually functional males, it is expected that false positive feedback will distract the subjects from the erotic stimuli. The score presented to them will be greater than their predicted score by four points. At first, the men will be surprised by the discrepancy. As their performance continues to surpass their expectations, the men will question why this might be. While they think about the situation, their attention to the erotica will

wane. A decrease in tumescence (described below) will occur. Despite the decrease in sexual performance, the men will come to accept the erection score and modify their expectations and confidence for future performance. The amount of change in expectancy and confidence may be indicative of how well the subjects buy into the experimental deception. Similar cognitive changes were noted in functional men by Stone, et al, (1999).

1B. Tumescence

For sexually functional males, penile tumescence in the positive feedback condition will on average be less than the no-feedback condition. Due to the distraction caused by the inflated erection score, experimental subjects will focus more on the discrepancy between performance and expectation and less on the erotic stimuli. While the men receiving feedback may at first make gains in tumescence that match controls, the differences between the two groups should become more pronounced as exposure to the bogus score continues. This difference should become evident in lower average and maximal tumescence measurements for the feedback group when compared to controls.

(2) For sexually functional men, is additional exposure time to the erotic film associated with "recovery"? Sexually functional men are able to recover from distraction and detumescence during sex by adjusting their focus of attention and staying on task (Dysfunctional men respond to such distraction by disengaging from the sexual stimuli and focusing on negative expectancies). However, in order for this recovery process to occur, men need to have enough time to redirect their attention. In Stone, et al., (1999), functional men receiving

false feedback were limited to a five minute video clip. These men experienced a decrease in erectile functioning due to the distraction caused by the feedback score. Five minutes may not have allowed sufficient time for the men to refocus their attention on the erotic stimuli and regain tumescence. In the present study, sexually functional men will be presented with a ten minute erotic video clip -- twice the length of that presented in the previous study (Stone, Sbrocco, and Lewis, 1999). Men in the no feedback condition are not expected to show a significant difference in penile tumescence throughout the film. However, men receiving positive feedback will be quite different in their response. At first, men receiving feedback will become distracted by the erection score and show a decrease in tumescence. Once the men cease being surprised by the score, their attention should shift back to the erotic video and tumescence should increase.

Part IV: Research Design and Methodology

Subjects

Thirty sexually functional men between the ages of 23 and 60 were recruited via local newspaper advertisements. Each was paid $40 for their participation in this study. A copy of the advertisement is in Appendix B. The subjects' reported sexual orientation was heterosexual. They men were free of major psychological disturbances and sexual dysfunctions, as determined by semi-structured interview. All subjects were required to give signed consent to view explicit sexual materials and allow their erections to be monitored by plethysmograph. Forty-three percent were married. The subjects had a mean age of 42.07 years (SD = 9.21, range = 23 to 60 years). Sixty percent of the subjects were Caucasian, 33% were African-American, and 3% were Hispanic or Asian. Ten

percent had a high school degree or less and 33% had at least a bachelor's degree. Thirty seven percent of the men had a graduate or professional degree.

All subjects were randomly assigned to 1 of 2 experimental groups (positive feedback or no feedback) following a phone screen. Fifteen men were assigned to each group.

MEASURES

Clinician Rated

1. **Phone Screen.** Potential subjects were interviewed over the phone using a Phone Screen Form (Appendix C). This semi-structured interview was designed to gather general information regarding demographics and medical, sexual, and psychiatric history. Volunteers not meeting inclusion criteria were excluded from this study.

2. **Sexual Dysfunction Interview.** To assess sexual functioning, subjects were administered the Sexual Dysfunction Interview-revised (SDI; Sbrocco, Weisberg, and Barlow, 1995; Appendix E). The interview usually lasts approximately one hour and consists of a thorough assessment of the subject's sexual history, experiences, attitudes, and difficulties. The instrument assists the interviewer in making a DSM-IV diagnosis of a sexual dysfunction.

3. **Structured Clinical Interview for Axis I DSM-IV Disorders**. Subjects were screened for major mood disorders, anxiety disorders, and psychiatric disorders using the screening section of the Structured Clinical Interview for Axis I DSM-IV Disorders – Patient Edition (SCID; First, Spitzer, Gibbon, & Williams, 1994; Appendix F). Follow-up questions were asked of subjects who responded positively (indicating potential

psychopathology) during the screening questions. Subjects were excluded from this study if they were diagnosed with a current Axis I disorder.

Physiological

1. **Penile Circumference.** Each subject was asked to privately measure the circumference of his flaccid penis. This was accomplished by wrapping a strip of paper around the mid-shaft of the penis and marking with a pencil the point at which the ends met. The interviewer then obtained a measurement of the distance marked on the paper strip in millimeters.

2. **Penile Plethysmograph.** Changes in penile tumescence (circumference) during the two films were measured using a D.M. Davis, Inc., Stretchistor mercury-in-rubber strain gauge, designed to be worn on the shaft of the penis. A photograph of the mercury-in-rubber strain gauge is shown in Figure 10. The device consists of a hollow rubber tube filled with mercury. The tube is sealed at the ends with platinum electrodes that are themselves submerged in the mercury. The electrodes attach to a bridge circuit that allows for connection to a polygraph. Changes in penile circumference cause the rubber gauge to stretch or contract, altering the cross-sectional area of the column of mercury within the tube. The electrical resistance of the mercury inside the tube varies directly with its cross-sectional area. These changes in resistance are reflective of the changes in the circumference of the penis. Once calibrated correctly, changes in the electrical resistance in the mercury can be output on a polygraph in physical units of measurement (in this case millimeters).

In order to avoid errors in measurement and capture the full range of the subjects' erectile responding, strain gauges were selected for each patient that were at least 5-10mm smaller than the circumference of the subject's flaccid penis. Changes in

penile tumescence were recorded by way of a Grass Instruments Dual Mercury Gauge Adapter (Model F-70DMGAC; pre-amplifier). The pre-amplifier output was channeled into a Grass Instruments 78G polysomnograph equipped with a 7P122H amplifier and a 7DAK driver amplifier. Tumescence responses were recorded on polygraph chart-paper, which moved at a speed of 50mm/sec. The polygraph was calibrated prior to each evaluation in order to yield a linear equivalent for changes in penile circumference. A plexiglass calibration cone with standard circumferences corresponding to the various sizes of strain gauges was used to estimate the linearity of output. This calibration prior to the testing of each subject ensured that changes in erection, quantified as millimeters of penile circumference, corresponded to equivalent pen deflections on the polygraph chart-paper. The strain gauge was calibrated for a range of 40mm, with the flaccid measurement as the minimum circumference. The use of the mercury-in-rubber strain gauge to measure changes in penile tumescence has been shown to be a reliable and valid measure (Laws, 1977; Farkas, Evans, Sine, Eifert, Wittlieb, & Vogelmann-Sine, 1979; Earls, Quinsey, & Castonguay, 1987)

Self-Report

1. **Medical Information Form**. Subjects completed a medical history questionnaire (Appendix G). This instrument was created specifically for this study. The form was mailed to the subjects prior to the intake interview and the completed form was reviewed with them during the interview.

2. **Beck Depression Inventory**. Depression was screened using the Beck Depression Inventory (BDI; Beck, 1978; Appendix K). The BDI is a 21 item, self report measure that has been found to detect depression as effectively as longer and more costly structured interviews. The inventory is self-administered and takes from 5 to 10 minutes to

complete. Respondents rate the intensity of each of the 21 symptoms on a scale from 0 to 3. The total possible range of scores extends from a low of 0 to a high of 63. However, the more typical clinically depressed individual usually will score in the 10 to 30 range. Average internal consistency as established by meta-analysis has been determined to be .86. Test-retest reliability has ranged between .48 to .86, depending on the group being tested and testing interval. Since the BDI is probably testing aspects of both state and trait variables in depression, this wide range of variability is understandable. (Groth-Marnat, 1997) Depression is highly correlated with erectile dysfunction. Consequently, subjects were also screened for depression with the appropriate diagnostic questions from the SCID.

3. **Beck Anxiety Inventory**. Anxiety was screened using the Beck Anxiety Inventory (BAI; Beck, 1990, 1987; Appendix L). The BAI consists of 21 anxiety symptoms, with respondents being asked to indicate the extent to which they were bothered by each item "during the past week, including today." Responses are scored on a 0-3 scale ranging from "not at all" to "severely", giving a score range of 0 to 63. Beck and Steer (1990) recommend that scores of 0 to 9 points be interpreted as normal anxiety, 10 to 18 as mild-moderate, 19 to 29 as moderate-severe, and 30 to 63 as severe anxiety. The BAI is more a measure of state, rather than trait anxiety. Excellent internal consistency (Cronback's alpha = .92) and good test-retest correlation (r = .75) at one week have been demonstrated in the literature (Groth-Marnat, 1997).

4. Confidence and Expectancy Ratings

a. **Erection Prediction Questionnaire**. All subjects were asked to make 2 visual analog scale ratings prior to viewing each film. They rated the maximum size erection they thought they could achieve during the upcoming film, and they rated how confident they were in their prediction **(**Appendix N). All subjects were administered

this questionnaire immediately prior to viewing film 1. Subjects in the no feedback conditions also took this questionnaire prior to film 2 and (imaginary) film 3. Possible scores on this and the other visual analog scales discussed below ranged from 0 to 150, and were based on the overall measurement of the line to be marked (millimeters).

b. **Erection Score Prediction Questionnaire**. Prior to the second and (imaginary) third film, subjects in the positive feedback group also predicted their maximum erection score (from 0 to 24), and made visual analog scale ratings of confidence in achieving that score and expected erection size. The erection score they were asked to predict had to be a whole number. Subjects were told the average score for most people viewing similar erotic films was 12 (possible range from 0 to 24). In reality, there were no actual erection scores and the average score was a fictitious number. Subjects rated their confidence in achieving their predicted scores and expected erection sizes on visual analog scales anchored by "no confidence" and "no erection", and "maximum confidence" and "full erection", respectively (see Appendix O).

5. Subjective Response Measures

a. **Sexual Arousal Questionnaire**. After each film, subjects' subjective responses to the film and their experiences were assessed using 10 visual analog scales (see Appendix P). Subjects rated their level of sexual arousal, anxiety, confidence in maintaining their erection, size of erection, level of attention to the film, attention to their body, control over their erection, number of negative thoughts, cognitive interference, and how similar the lab experience was to actual sexual situations. In addition, the subjects also completed a thought listing, reporting thoughts they had during the film. This questionnaire was given to all subjects immediately after viewing

the first videotape segment. The questionnaire was also given to the no-feedback subjects immediately after viewing the second videotape segment.

b. **Sexual Arousal and Feedback Questionnaire**. The positive feedback subjects were also asked to complete a Sexual Arousal and Feedback Questionnaire following the second film segment **(**see Appendix Q). Twelve visual analog scale ratings were added to the Sexual Arousal Questionnaire to assess reaction to the erection score. Subjects were asked to record various aspects of viewing the score, including distraction, arousal, anxiety, confidence, size of erection, attention to their body, attention to the film, and control over their erection. In addition, this questionnaire assessed perceived accuracy of the erection score, how surprised the subject was by the erection score, and how much he tried to change the erection score.

6. Timeline of Measures. Table 2 indicates the order of instruments and other information collected during the study. Table 3 lists the order of instruments collected during the physiological assessment.

PROCEDURE

Screening Procedure

1. Phone Screen

The interviews and physiological assessments were conducted by a clinical psychology graduate student in the Department of Medical and Clinical Psychology at USUHS under the supervision of Tracy Sbrocco, Ph.D. (a clinical psychologist and associate professor in the Department of Medical and Clinical Psychology), and Evelyn Lewis, M.D., Department of Family Medicine. Subjects screened over the telephone were excluded if they reported current emotional problems, substance abuse, history of heart disease (myocardial infarction, angina, atherosclerosis), hypertension (currently treated by medication or untreated BP greater than 150mm systolic or 90 diastolic),

history of renal disease, or diabetes. Subjects who reported they were not heterosexual were also excluded from the study.

Prior to asking the screening questions, the study was described in detail to potential participants. Subjects who indicated interest in participation were screened as described above. Subjects meeting the inclusion criteria were scheduled for an intake interview and physiological measurement session.

Dysfunctional subjects who did not meet the inclusion criteria for this study, or who did not wish to participate in this study, were still offered a complete assessment, including an interview and a physiological evaluation (measurement of their erections while viewing erotic videotape segments). An assessment report was sent to referring physicians. If appropriate, treatment was also offered free of charge.

2. Intake Interview

All subjects were escorted to a sound attenuated chamber upon arrival at the USU campus. Subjects were allowed to take care of any personal needs prior to starting. At the start of the intake interview, informed consent was obtained for participation in the study (Appendix D). After signing consent, subjects were screened for DSM-IV diagnoses with a number of investigator-administered and self-report instruments. To assess sexual functioning, the subject was administered the Sexual Dysfunction Interview-revised (SDI; Sbrocco, Weisberg, and Barlow, 1995). SDI interviews usually lasted one hour and consisted of a thorough assessment of the subject's sexual history, experiences, attitudes, and difficulties if any.

Current symptoms of depression and anxiety were assessed using the Beck Depression Inventory and Beck Anxiety Inventory, respectively. Subjects were further screened for major mood disorders, anxiety disorders, and psychiatric disorders using the screening section of the Structured Clinical Interview for Axis I DSM-IV Disorders –

Patient Edition (SCID; First, Spitzer, Gibbon, & Williams, 1994). Subjects meeting criteria for a current major affective disorder were excluded from the study. However, as appropriate, a standard physiological evaluation was still conducted.

Procedure for Physiological Assessment

After the intake interview, subjects were allowed to take a short break to take care of personal needs. After subjects returned to the sound attenuated chamber, physiological assessment procedures began.

1. Positive Feedback Group. The investigator began the physiological assessment process by re-explaining the experimental procedure to the subject. The subjects in the feedback group were told they would view a series of short erotic videotape segments while their erections were measured. After subjects completed activities for film1, they were told about the erection score and asked to predict their score prior to viewing film 2. See Appendix M for the exact wording provided to the subjects.

2. No-feedback Group. Subjects assigned to the control (no-feedback) group were told they would view a series of short erotic videotape segments while their erections were measured. Subjects were asked to predict their erection size and rate their confidence prior to each film, but were not shown an erection score. See Appendix M for the exact wording provided to the subjects.

The subject was then instructed how to measure the circumference of the mid-shaft of his penis with a strip of paper. The investigator left the room while the subject pushed down his pants and took this measurement. The subject was instructed to notify the investigator via intercom when he was dressed and ready. The investigator returned to the chamber and asked the subject to wait while the investigator calibrated

the experimental equipment. The investigator then took the strip of paper used to measure the subject's flaccid penis back to the control room. After taking a measurement from the paper in millimeters, he selected a mercury-in-rubber strain gauge that was at least 5-10mm smaller than the flaccid circumference measurement. The investigator then calibrated the polygraph to the strain gauge using a calibration cone. Having completed calibration, he returned to the sound chamber and provided the subject with the strain gauge. The subject was instructed how to attach the strain gauge around the mid-shaft of his penis. The investigator left the room while the subject disrobed from the waist down, attached the strain gauge, and sat on a paper-covered reclining chair. The investigator returned to visually check that the device was properly attached around the mid-shaft of the subject's penis, without any twists in the mercury-filled rubber tube. The subject was then asked to place a sheet of paper across his lap to prevent the subject from seeing or touching his penis. If the strain gauge was not properly in place, the investigator asked the subject to adjust it correctly. Once the gauge was in place, the subject completed the first Erection Prediction Questionnaire on a clipboard. The subject was then told that an erotic videotape would begin on the monitor. The subject was instructed to imagine himself involved in the activity that he saw, and was asked not to move the paper covering his lap or touch his genitals. After asking if the subject had any questions, the investigator dimmed the lights and left the room. The investigator operated the polygraph and VCR from the adjacent control room, and monitored the subject via intercom. Changes in penile circumference were measured on polygraph chart paper during the five-minute erotic videotape.

Following the first film, the investigator returned to the assessment room and turned on the lights. Subjects were asked to complete the first Sexual Arousal

Questionnaire. After completing the instrument, subjects were provided instructions according to their randomly-assigned experimental group:

1. Positive Feedback Group. Subjects were provided an Erection Score Prediction Questionnaire and told, "In a few minutes you will view another sexually explicit videotape while we measure your sexual responding. Only this time we will show you in the corner of the video screen your "real time" erection score. Remember, your erection score is based on a number of factors including size, rigidity, temperature, and blood flow. An average erection score for a man watching a similar erotic videotape is 12. Possible scores range from 0 to 24. Write down on the Erection Score Prediction Questionnaire the maximum score you think you can achieve during the next videotape, the level of confidence you have in that prediction, and the maximum size erection you think you will achieve."

2. No Feedback Group. Control subjects were told "In a few minutes you will view another sexually explicit videotape while we collect the same measurements." Subjects completed another Erection Prediction Questionnaire prior to viewing the second film, documenting on the visual analog scale the maximum size erection they thought they could achieve during the upcoming film, and how confident they were in that prediction.

The investigator then answered any questions posed by the subject, dimmed the lights and returned to the control room.

After ensuring that the subject's penile circumference returned to baseline flaccidity, the investigator started the second erotic videotape on the VCR. If the readout from the polygraph indicated that the subject's penile circumference had not returned to baseline levels, a return-to-baseline procedure was employed. This strategy

consisted of asking the subject to count backward by 7s from 100. However, this procedure was rarely used as the subject typically spent 5-10 minutes completing questionnaires between films.

While the second videotape was played, an erection score was displayed for the positive feedback subjects. Each of these subjects started out with an erection score of 0. The investigator closely followed changes in the subject's penile circumference via the polygraph and assigned erection scores as circumference varied throughout the film. When the subjects in the inflated feedback group reached their maximum tumescence (as assessed by Film 1), the score shown to them on the TV monitor was 4 points higher than they predicted on the Erection Score Prediction Questionnaire. The erection scores shown were only even numbers, given the limited range of stored memory on the video display apparatus. Subjects who did not reach maximum erection during the second film were shown their predicted erection score plus 4 points one minute after the point they reached maximum erection during the previous film. Men in the no feedback group were not provided an erection score and allowed to watch film 2 as they had film 1. Both groups were shown the same ten-minute erotic videotape clip.

Following the second film, the investigator returned to the sound chamber, turned on the lights, and handed the no feedback subjects a second Sexual Arousal Questionnaire. The positive feedback group received the Sexual Arousal and Feedback Questionnaire. This questionnaire was similar to the Sexual Arousal Questionnaire, but added twelve questions about the experience of the erection score.

The investigator then handed subjects assigned to the positive feedback group an Erection Score Prediction Questionnaire, and told them, "In a few minutes you will view another sexually explicit videotape while we measure your sexual responding. Again we will show you in the corner of the video screen your "real time" erection

score. Remember, your erection score is based on a number of factors including size, rigidity, temperature, and blood flow. An average erection score for a man watching an erotic videotape is 12 and possible scores range from 0 to 24. Write down on the Erection Score Prediction Questionnaire the maximum score you think you can achieve when you watch the next videotape and mark the level of confidence you have in that prediction and the maximum size erection you think you will achieve." No feedback group subjects completed a third Erection Prediction Questionnaire asking them to rate on visual analog scales the maximum size erection they though they could achieve during the next film and how confident they were in that prediction. After all subjects accomplished their respective prediction questionnaires, they were told there were no more films or measurements. Subjects were instructed to remove the strain gauge and get dressed while the investigator was out of the room.

Debriefing Session

Subjects were then debriefed by the investigator. Subjects were told the purpose of the study, how the results of the study were to be used, and – if in the positive feedback group -- that they were given false feedback and why.

Subjects were debriefed based on the following possible scenarios:

1. Increase in tumescence from baseline: Subjects were told that receiving false feedback resulted in an increase in tumescence because they had the skills and confidence to make adaptations to overcome discrepancies. This is what the study predicted. Discrepancies were not expected to impact the confidence and expectancies of sexually functional men in their ability to achieve and maintain erections.

2. No change in tumescence from baseline: Subjects were told that receiving false feedback had no impact on their tumescence because they had the skills and confidence to make adaptations to overcome discrepancies. This is what the study

predicted. Discrepancies were not expected to impact the confidence and expectancies of sexually functional men in their ability to achieve and maintain erections.

3. Decrease in tumescence from baseline: Subjects were told that receiving false feedback resulted in a decrease in tumescence because when they were shown that they were less aroused than they thought they were, they downwardly adjusted their confidence and outcome expectancy. They probably identified a reason for the discrepancy, such as being tired, uncomfortable in the lab, distracted, or not interested in the films. Subjects were asked to give examples of similar occurrences in the past. The subjects were told that no permanent or lasting effects were expected. It was pointed out that they overcame past discrepancies between expected and actual arousal. It was further emphasized that the situation was not an actual sexual situation because they only viewed a film. Many normally functioning men were unable to get fully aroused while viewing the movies. For most men, the conditions have to be right for full sexual arousal. Finally, it was explained to the subjects that they responded exactly in the manner we tried to make them respond. Their response to receiving discrepant information about arousal was to disengage from the process – a perfectly normal response.

Subjects were then invited to comment on their experience and ask any questions about the experiment they might have had. Subjects were also reminded that they could call the investigator at the number listed on the take-home copy of their consent form if they wanted more information.

Following debriefing, the investigator paid the subjects. The re-useable mercury-in-rubber strain gauges were sterilized after each use in accordance with manufacturer recommendations (D.M. Davis, 2000). Paper items were disposed of appropriately.

Apparatus

The physiological assessment was conducted in a 7′ x 10′ sound attenuated chamber at USUHS (in room B1004). The only objects in the room were a vinyl upholstered recliner chair, a 27″ television on a stand placed 5′ in front of the recliner, a chair and table for the interviewer, and a table next to the recliner. On the table on sat a wireless intercom (turned on in "hands free" mode; the other intercom was in the adjacent control room) and a white noise generator (which was turned on during the assessment to reduce outside noises). The walls and ceiling were painted white and the carpet was brown. The walls were left bare in order to minimize distractions. In the wall behind the recliner was a 2′ x 3′ two-way mirror, through which the interviewer could observe the back of the subject and the television monitor from the adjacent control room.

The mercury-in-rubber strain gauge was attached to a wire lead that was inserted through a hole in the wall beneath the two-way mirror and into the polygraph in the control room. The television in the sound chamber was attached to a VCR in the control room. The cable connecting the VCR passed through the hole in the wall as well. Erection scores were displayed as a 5″ white number in the lower right corner of the television screen. The scores were generated by a Sima Screenwriter Video Movie Character Generator in the control room and composited into the erotic video clip being sent from the VCR to the television. The investigator in the control room displayed the erection score by selecting numbers stored in the video display device (12 numbers were stored, even numbers 0 through 22).

Stimulus Materials

One five-minute erotic videotape segment and one ten-minute erotic videotape segment containing similar sexual activity (foreplay and intercourse) were shown. The films were matched in similarity to those used in other studies of male sexual arousal (e.g., Abrahamson, et al., 1985; Barlow, Sakheim & Beck, 1983; Beck, et al., 1987; Cranston-Cuebas, et al., 1993; and Jones, Bruce & Barlow, 1986). They depicted adults engaging in consensual heterosexual sex and did not contain any violence. The films were carefully matched in age of the actors, type of sexual activity depicted, order of sexual activity depicted, and production quality.

Data Sampling and Analysis

Groups were initially compared on demographic variables to ensure that there were no differences between the positive feedback and no feedback groups. T-tests and chi-squares were used for these comparisons. Three major sets of analyses were conducted corresponding to the three major study hypotheses. The general analytic model is described below. Analyses of variance/covariance were followed up with planned comparisons.

Analysis One: ***Effect of feedback on tumescence.*** Each participant's raw data expressed in changes in millimeters of penile tumescence was reduced to mean millimeters of change by subtracting the first second of penile response from subsequent seconds for each film. For example, if subject A started a film at 2mm over his baseline, each following time segment's value (x) was computed as (x-2). (The vast majority of subjects started each film at their baseline measurement.) Penile responses for each participant were then divided into 50 time segments/epochs of 6 seconds for film 1. A similar procedure was followed for film 2, except responses were divided into

100 epochs due to the second film's ten-minute length. The time segments/epochs were then collapsed into one overall mean for each participant per film. A repeated measures ANOVA was conducted with average change and maximum change in penile tumescence from Film 1 to Film 2 as the within subjects factors, and feedback condition as the between subjects factors. It was expected that the men in the no feedback condition would not be distracted by environmental cues and demonstrate significantly larger erections than men in the positive feedback condition.

Analysis Two: ***Effect of feedback on predicted erection scores and erection size.***

To examine the effect of feedback on predicted erection size, a 3 x 2 repeated measures ANOVA was conducted. The within subjects factor was average predicted erection size before each of the three films. Feedback condition was used as the between subjects factor. It was expected that positive feedback would result in increased predicted erection size from subjects receiving inflated feedback. It was also expected that men in the no feedback group would show no change in predicted erection size. Men in the positive feedback condition were also expected to predict larger erections prior to Film 3 than men in the no feedback condition, due to their manipulated expectancies.

A repeated measures t-test was conducted to examine the effect of positive feedback on predicted erection score from Film 2 to Film 3. It is expected that men in this condition will increase their score as a result of receiving inflated feedback.

Analysis Three: ***Effect of feedback on confidence in predictions.*** To further examine the effect of positive feedback on confidence, a 3 x 2 repeated measures ANOVA was conducted with confidence in predictions made prior to each film as the within groups variable, and feedback group as the between subjects variable. It was expected that positive feedback would result in increased confidence in subjects

receiving an inflated erection score. It was also predicted that men in the no feedback group would show no change in confidence across films. Men in the positive feedback condition were also expected to report more confidence in predictions made prior to Film 3 than men in the no feedback condition, due to their manipulated expectancies.

Analysis Four: ***Effect of feedback on subjective responses during film.*** Two questionnaires (Sexual Arousal Questionnaire and Sexual Arousal and Feedback Questionnaire) were designed to measure a number of subjective variables pertaining to the viewing of each film segment. Immediately following Film 1, all subjects recorded their responses on the 10 visual analog scales in the Sexual Arousal Questionnaire. After viewing Film 2, the no feedback subjects again completed the Sexual Arousal Questionnaire (SAQ). However, the positive feedback subjects completed the Sexual Arousal and Feedback Questionnaire, which consisted of the same 10 visual analog scales in the SAQ, plus 11 scales pertaining to receiving the erection score (Sexual Arousal and Feedback Questionnaire). To examine the effect of feedback condition on subjective responses, paired-sample, within groups t-tests were conducted to examine changes in responses from Film 1 to Film 2. It was expected that men in the positive feedback condition would report an increase in arousal, perceived size of erection, and confidence from Film 2 to Film 3. No other differences were expected in the cognitive variables for either the positive feedback group or the no feedback group.

Analysis Five: ***Effect of additional exposure time on tumescence.*** Based on the Sbrocco and Barlow model (1996) and the findings of Stone, Sbrocco and Lewis (1999), it was expected that functional men would demonstrate increased tumescence when allowed additional exposure time to the erotic stimulus. Accordingly, functional men should be able to effectively shift their attention away from non-erotic cues, such as the erection score, anxiety, environmental distractions, and enhance their sexual

responding, e.g. penile tumescence. Average tumescence for the first five minutes (epochs 1 through 50) and the last five minutes (epochs 51 through 100) of Film 2 was computed for all subjects. However, comparison of the averages for the two halves of the film would not be an accurate assessment of the effects of exposure time. Subjects start at baseline (0 mm of erectile change) during the first half of Film 2; they do not start at baseline for the second half of the film. This has the net effect of skewing the first half average of Film 2 downward. Consequently, a repeated measures ANCOVA was conducted to analyze the effect of exposure time on average tumescence, using Film 1 average tumescence as the covariate. After controlling for differences in baseline measurements of the two film segments, it was expected that average tumescence would increase for all subjects during the second half of Film 2.

According to the model, the erection score should initially distract men receiving positive feedback. As such, men receiving feedback should show decreased penile tumescence as compared to men in the no feedback condition during the initial portion of Film 2. Theoretically, the difference between the two groups should dissipate as continued exposure to erotic stimuli increases. By the end of Film 2, average tumescence should not be significantly different between the positive feedback group and the no feedback group. The distracting effect of feedback should ameliorate over time. In order to compare changes in tumescence at regular intervals during Film 2, the 100 epochs were collapsed into ten intervals, representing the ten-minute duration of the film. An average tumescence score was calculated for each minute of film for each group. A repeated measures ANOVA was conducted with average tumescence per minute as the within subjects variables, and feedback group as between subjects variables.

Sample Size and Power Considerations

Based on the literature comparing functional and dysfunctional tumescence, a large effect size was selected. A determination of sample size was conducted for a 2 X 2 ANOVA based on the following parameters: alpha = .05, a large effect size of 0.40, and a minimum power of 0.7. A total sample size of at least 40 (20 functionals and 20 dysfunctionals) was determined to be sufficient (See Table 4). The current research is part of an ongoing project to compare the tumescence of functional and dysfunctional men in varying feedback conditions. Sample size problems and research limitations of this project will be described in detail in the Discussion section.

Part V: Results

Demographics. Independent samples t-tests were conducted for age, years of education, length of time at current job, and flaccid penile circumference. There were no statistically significant differences between the groups in these variables. However, a Levene test for equality of variances indicated that the two groups had significantly different variance in flaccid penile circumference. While the means for the two groups were almost the same (Positive Feedback $\underline{M}$ = 103.27mm, $\underline{SD}$ = 7.15; No Feedback $\underline{M}$ = 103.20, $\underline{SD}$ = 11.77), the standard deviation for the groups was quite different. Data from both groups was examined for outliers. It was discovered that the no feedback group had several men with very large and very small penile circumference measurements, while the positive feedback group had men with measurements that were more centrally clustered around the group mean. Chi-square analyses revealed no differences between the groups in ethnicity, relationship status, employment status, or occupation.

Data Reduction. Each participant's raw data expressed in changes in millimeters of penile tumescence was reduced to mean millimeters of change by subtracting the first second of penile response from subsequent seconds for each film. Penile responses for each participant were then divided into 50 time segments/epochs of 6 seconds for film 1. A similar procedure was followed for film 2, except responses were divided into 100 epochs due to the second film's ten-minute length. The time segments/epochs were then collapsed into one overall mean for each participant per film. Because the groups had unequal variance on measurements of flaccid penile circumference, t-tests were conducted to check for baseline differences in average and maximal tumescence (measurements taken during Film 1). The tests disclosed that men in the no feedback group had on average larger changes in tumescence at baseline than men in the positive feedback group (t (28) = -2.057, p = .049), and tended towards a significant difference in maximal tumescence (t(28) = -1.964, p = .060). A search for outliers in the no feedback group disclosed that one man in that group had significantly larger measurements than all other subjects in average tumescence and maximal tumescence across both films. In addition, the man was the third largest overall in flaccid penile circumference. With this participant eliminated from the no feedback group, the two groups no longer had significant differences in the baseline measurements of average change in tumescence, t(27) = -1.735, p = .094, and maximal tumescence t(27) = -1.673, p = .106. For continuity, the participant was also eliminated from all following analyses. Follow up chi-square and t-tests on demographic variables disclosed that elimination of the subject did not produce significant differences in those variables between the two groups.

Analysis One: ***Effect of feedback on tumescence.*** A repeated measures ANOVA was conducted with average change and maximum change in penile tumescence from Film 1 to Film 2 as within subjects factors, and feedback condition as the between

subjects factor. Contrary to expectations, the analysis disclosed no statistically significant differences between feedback groups, no difference in average change or maximal tumescence between films, nor was there a significant interaction between average or maximal tumescence and feedback group (see Table 5).

Positive Feedback Group. A paired samples t-test was conducted to examine changes in tumescence from Film 1 to Film 2. While no significant change in average tumescence was detected, a significant increase in maximal tumescence occurred between Film 1 ($\underline{M}$ = 14.07 mm, $\underline{SD}$ = 12.19) and Film 2 ($\underline{M}$ = 18.07 mm, $\underline{SD}$ = 12.31), $\underline{t}$ (14) = -2.428, $\underline{p}$ = .029). Maximal tumescence is defined as the largest change in penile circumference recorded at one point during each film. This difference suggests that men in the positive feedback condition were getting larger erections at some point during Film 2 than during Film 1, as expected.

Positive feedback should theoretically allow men to upwardly adjust their expectations and confidence. Consistent with the Sbrocco and Barlow model (1996), this adjustment should produce larger erections. It was hoped that this difference in erection size would be sufficiently large that the present statistical analysis would detect it. This was not the case. However, there may be a confound for time in the positive feedback data from Film 2. Men may not have shown an overall increase or decrease in average tumescence because the data points chosen do not completely summarize the process of performance of the men receiving feedback during Film 2. Men receiving feedback are initially expected to decrease in tumescence as a result of the distracting score. However, increased exposure to the erotic stimulus should allow them to recover their erections. This expected negative, and then positive swing is likely not to be detected using average and maximal tumescence data for the entire Film 2 segment.

Consequently, the issue of erectile performance over the entire course of Film 2 will be addressed in more detail in Analysis 5.

No Feedback Group. As expected, a paired samples t-test revealed no differences in average tumescence or maximal tumescence from Film 1 to Film 2. Using a paired samples t-test, Film 1 average tumescence (M = 11.5 mm, SD = 6.79) was compared with average tumescence from Film 2 (M = 10.8 mm, SD = 9.20). Consistent with predictions, men in this condition showed no significant difference in penile tumescence across films.

Analysis Two: ***Effect of feedback on predicted erection scores and erection size.***

Using an independent samples t-test, the groups were compared for baseline differences in the prediction of erection size. No significant differences were detected between the groups on predicted erection size prior to seeing Film 1, t (27) = 1.61, ns. Erection prediction and confidence ratings are presented by condition in Table 6.

To examine the effect of feedback on predicted erection size, a 3 x 2 repeated measures ANOVA was conducted. The within subjects factor was average predicted erection size before each of the three films. Feedback condition was used as the between subjects factor. The test revealed a significant main effect for time, F (2, 54) = 18.11, p < .001. Collapsing across groups, the largest erection size prediction scores occurred during film one (M = 110.3, SD = 33.3), but size predictions decreased prior to film two (M = 84.0, SD = 33.6), and decreased again prior to film three (M = 77.1, SD = 42.1). Post hoc comparisons of predicted erection size averages showed that the difference between the Film 1 (baseline) average and the Film 2 average was statistically significant, t (28) = 6.02, p < .001, but the difference between the Film 2 and imaginary Film 3 averages was not. The 3 x 2 ANOVA also revealed a trend towards significance for feedback condition, F (1, 27) = 3.76, p = .063. Contrary to expectations, men in the positive

feedback group made smaller predictions about erection size (M = 79.9, SE = 7.8) than men in the no feedback group (M = 101.9, SE = 8.2). While the positive feedback group made smaller erection size predictions prior to each film, post hoc analysis disclosed that the difference between the two groups only approached statistical significance at the pre-Film 2 measurement point, t (28) = -2.02, p = .053 (Feedback: M = 72.5, SD = 27.2; No Feedback: M = 96.4, SD = 36.2). It had been expected that men in the positive feedback condition would make significantly larger predictions prior to Film 3 than men in the no feedback condition as a result of manipulated expectancy. The only experimental difference between the two groups of sexually functional men was the addition of the erection score in the positive feedback condition during Film 2. It appears that the erection score placed a performance demand on men in the experimental condition that motivated them to doubt their predictions. However, performance demand was not exclusive to the experimental condition. Men in the no feedback condition showed evidence of performance demand in that their erection predictions continued to decrease over time as well.

Positive Feedback. There was an unexpected significant difference between erection size predictions made by this group prior to Film 1 (M = 101.0, SD = 34.8) and prior to Film 2 (M = 72.5, SD = 27.2), t (14) = 4.24, p = .001. Contrary to expectations, there was no effect for positive feedback on predicted erection sizes from Film 2 to imaginary Film 3. It had been hypothesized that men would increase their expectancy in this variable, based on the bogus feedback. While not statistically different, average predicted erection size decreased from Film 2 (M = 72.5, SD = 27.24) to Film 3 (M = 66.2, SD = 39.91). However, observed power was extremely low (.09) and error cannot be ruled out as a factor in explaining the downward change in this variable. Effect size, as determined post hoc through the use of G•Power (Buchard, Faul, & Erdfelder, 1997),

was small (ϕ = .17). Given this effect size, a sample of 274 subjects would be needed to detect an effect in this variable at a power level of .8 and α = .05. Stone, Sbrocco and Lewis (1999) also failed to detect such a change in outcome expectancy by men receiving positive feedback. That study had a total of 80 subjects. Given these calculations, it appears that neither study had sufficient power to detect a change in outcome expectancy as operationalized by erection size predictions.

To examine the effect of Positive feedback on predicted erection score, a paired-sample t-test was conducted to examine changes in predicted erection score prior to Film 2 and imaginary Film 3 (men in the no feedback (control) condition were not asked to predict a score). While no statistically significant difference was detected between the scores, there was a trend in the data. As hypothesized, scores predicted prior to Imaginary Film 3 ($\underline{M}$ = 10.60, $\underline{SD}$ = 3.79) tended to be higher than scores predicted before Film 2 ($\underline{M}$ = 9.2, $\underline{SD}$ = 3.91), $\underline{t}$ (14) = -1.887, $\underline{p}$ = .080). This suggests that the men in this condition tended to "buy" the bogus score. Due to the small numbers of men in this group (n = 15), sufficient power to detect a statistical difference was lacking. However, post hoc analysis of the data using G•Power (Buchner, Faul & Erdflder, 1997) shows a relatively large effect size (ϕ = .505) at work. Given this effect size, observed power for 15 subjects is low (.42, □ = .05). A priori power analysis suggests that thirty-three subjects are needed to raise power to a more acceptable level (.8, □ = .05).

No Feedback. Once again, there was an unexpected significant difference between erection size predictions made in this group prior to Film 1 ($\underline{M}$ = 120.4, $\underline{SD}$ = 29.7) and prior to Film 2 ($\underline{M}$ = 96.4, $\underline{SD}$ = 36.2), $\underline{t}$ (13) = 4.21, $\underline{p}$ = .001. Consistent with expectations, a paired samples t-test disclosed no difference in predicted erection sizes

between Film 2 and imaginary Film 3. These men were not asked to predict an erection score, as they were not in a feedback condition.

Analysis Three: ***Effect of feedback on confidence in predictions.*** Using an independent samples t-test, the groups were compared for baseline differences in confidence about their predictions. No significant differences were detected between the groups on confidence prior to seeing Film 1, $\underline{t}$ (27) = -0.51, ns. Erection prediction and confidence ratings are presented by condition in Table 6.

To examine the effect of feedback on confidence, a 3 x 2 repeated measures ANOVA was conducted. The within subjects factor was average confidence in predictions made before each of the three films. Feedback condition was used as the between subjects factor. The test revealed a significant main effect for time, $\underline{F}$ (2, 54) = 9.58, $\underline{p} < .001$. Collapsing across group, the largest confidence scores occurred prior to film one at baseline ($\underline{M}$ = 102.8, $\underline{SD}$ = 26.7). Confidence ratings decreased prior to Film 2 ($\underline{M}$ = 73.0, $\underline{SD}$ = 32.0), but then increased prior to film three ($\underline{M}$ = 80.4, $\underline{SD}$ = 33.0). Post hoc comparisons of confidence averages showed that the difference between the Film 1 (baseline) average and the Film 2 average was statistically significant, $\underline{t}$ (28) = 5.54, $\underline{p} < .001$, but the difference between the Film 2 and imaginary Film 3 averages was not. The 3 x 2 ANOVA also revealed a trend towards statistical significance for feedback condition, $\underline{F}$ (1, 27) = 3.39, $\underline{p}$ = .077. Contrary to expectations, men in the positive feedback group tended to less confident about their predictions overall ($\underline{M}$ = 78.5, $\underline{SE}$ = 5.4) than men in the no feedback group ($\underline{M}$ = 92.8, $\underline{SE}$ = 5.6). While the positive feedback group rated their confidence lower prior to each film, post hoc analysis disclosed that the difference between the two groups only approached statistical significance at the pre-Film 2 measurement point, $\underline{t}$ (28) = -2.03, $\underline{p}$ = .053 (Feedback: $\underline{M}$ = 61.9, $\underline{SD}$ = 29.3; No Feedback: $\underline{M}$ = 84.8, $\underline{SD}$ = 31.3). It had been hypothesized that positive feedback subjects

would actually be more confident due to their manipulated expectancies. This was not the case. Once again, this near significant trend in difference between groups in confidence ratings made prior to Film 2 suggests a performance demand in the experimental condition.

Positive Feedback. There was an unexpected significant difference between confidence ratings made by this group prior to Film 1 ($\underline{M}$ = 100.3, $\underline{SD}$ = 26.6) and prior to Film 2 ($\underline{M}$ = 61.9, $\underline{SD}$ = 29.3), $\underline{t}$ (14) = 5.28, $\underline{p}$ = .001. Contrary to expectations, there was no effect for positive feedback on predicted erection sizes from Film 2 to imaginary Film 3. It had been hypothesized that men would increase their expectancy in this variable, based on the bogus feedback. While not statistically different, average confidence increased from Film 2 ($\underline{M}$ = 61.9, $\underline{SD}$ = 29.3) to Film 3 ($\underline{M}$ = 73.3, $\underline{SD}$ = 32.1). However, observed power was extremely low (.15) and error cannot be ruled out as a factor in explaining the upward change in this variable. Effect size, as determined post hoc through the use of G•Power (Buchard, Faul, & Erdfelder, 1997), was only moderate (ϕ = .26). Given this effect size, a sample of 121 subjects would be needed to detect an effect in this variable at a power level of .8 and α = .05. However, Stone, Sbrocco and Lewis (1999) did detect such a change in confidence by functional and dysfunctional men receiving positive feedback. Additional subjects will likely improve the chances of detecting a significant change in confidence.

No Feedback. Once again, there was an unexpected significant difference between confidence ratings taken in this group prior to Film 1 ($\underline{M}$ = 105.4, $\underline{SD}$ = 27.6) and prior to Film 2 ($\underline{M}$ = 84.8, $\underline{SD}$ = 31.3), $\underline{t}$ (13) = 2.76, $\underline{p}$ = .016. Consistent with expectations, a paired samples t-test disclosed no difference in predicted erection sizes between Film 2

and imaginary Film 3. These men were not asked to predict an erection score, as they were not in a feedback condition.

Analysis Four: ***Effect of feedback on subjective responses during film.*** Two questionnaires (Sexual Arousal Questionnaire and Sexual Arousal and Feedback Questionnaire) were designed to measure a number of subjective variables pertaining to the viewing of each film segment. Immediately following Film 1, all subjects recorded their responses on the 10 visual analog scales in the Sexual Arousal Questionnaire. After viewing Film 2, the no feedback subjects again completed the Sexual Arousal Questionnaire (SAQ). However, the Positive feedback subjects completed the Sexual Arousal and Feedback Questionnaire, which consisted of the same 10 visual analog scales in the SAQ, plus 11 scales pertaining to receiving the erection score (Sexual Arousal and Feedback Questionnaire).

To examine the effect of feedback on subjective responses, a 2 x 2 ANOVA was conducted on each of the ten subjective ratings made following Film 2. The subjective ratings taken after each film were used as the within groups variable, and feedback group was used as the between groups variable. Tables 7 and 8 present the subjective ratings by condition for Film 1 and 2, respectively. Contrary to predictions, no significant differences in subjective ratings were noted between the two groups. No significant within groups relationships were noted, except for the following:

Collapsing across group, there was a significant increase in reported erection size between Film 1 ($\underline{M}$ = 55, $\underline{SD}$ = 45) and Film 2 ($\underline{M}$ = 71, $\underline{SD}$ = 46), $\underline{F}$ (1,27) = 4.2, p = .05. As stated before, there was no main effect for feedback between groups. There was also a trend towards significance in reported sexual arousal across groups between Film 1 ($\underline{M}$ = 62, $\underline{SD}$ = 35) and Film 2 ($\underline{M}$ = 75, $\underline{SD}$ = 41), $\underline{F}$ (1, 27) = 3.8, $\underline{p}$ = .061. Again, no main effect for feedback between groups was detected.

Positive Feedback. To examine the effect of feedback condition on subjective responses, paired-sample t-tests were conducted to examine changes in responses from Film 1 to Film 2 for each group (See Tables 7 and 8 for the responses). Consistent with predictions, men in the Positive feedback group perceived a significant increase in erection size from Film 1 ($\underline{M}$ = 42.27, $\underline{SD}$ = 38.58) to Film 2 ($\underline{M}$ = 69.73, $\underline{SD}$ = 46.77), $\underline{t}$ (14) = -2.590, $\underline{p}$ = .021. Relatively large but not statistically significant changes were also observed in reported arousal (Film 1: $\underline{M}$ = 53, $\underline{SD}$ = 32.86; Film 2: $\underline{M}$ = 69, $\underline{SD}$ = 46.53), and reported confidence (Film 1: $\underline{M}$ = 55, $\underline{SD}$ = 37.68; Film 2 : $\underline{M}$ = 70, $\underline{SD}$ = 40.09). It had been expected that men receiving positive feedback would demonstrate a significant change in reported arousal and confidence based on the inflated feedback shown to them. However, this experiment was limited in power to detect an effect due to the small sample size in the manipulation group.

No Feedback Group. Consistent with predictions, subjects reported no significant changes in any of the subjective variables measured by the SAQ.

Analysis Five: ***Effect of additional exposure time on tumescence.*** Based on the Sbrocco and Barlow model (1996) and the findings of Stone, Sbrocco and Lewis (1999), it was expected that functional men would demonstrate increased tumescence when allowed additional exposure time to the erotic stimulus. According to the research, functional men should be able to effectively shift their attention away from non-erotic cues, such as the erection score, anxiety, environmental distractions, and enhance their sexual responding, e.g. penile tumescence. Average tumescence for the first five minutes (epochs 1 through 50) and the last five minutes (epochs 51 through 100) of Film 2 were computed for all subjects. However, comparison of the averages for the two halves of the film would not be an accurate assessment of the effects of exposure time. Subjects start at baseline (0 mm of erectile change) during the first half of Film 2; they

do not start at baseline for the second half of the film. This has the net effect of skewing the first half average of Film 2 downward. Consequently, a repeated measures ANCOVA was conducted to analyze the effect of exposure time on average tumescence, using Film 1 average tumescence as the covariate. After controlling for differences in baseline measurements of the two film segments, a main effect for time was detected. Consistent with predictions, the entire sample showed greater average tumescence change during the second half of Film 2 ($\underline{M}$ = 10.88 mm, SE = 1.24) than in the first half of Film 2 ($\underline{M}$ = 9.04 mm, $\underline{SE}$ = 1.24), $\underline{F}$ (1,26) = 4.449, $\underline{p}$ = .045).

According to the model, the erection score should initially distract men receiving Positive feedback. As such, men receiving feedback should show decreased penile tumescence as compared to men in the no feedback condition during the initial portion of Film 2. Theoretically, the difference between the two groups should dissipate as continued exposure to erotic stimuli increases. By the end of Film 2, average tumescence should not be significantly different between the Positive feedback group and the no feedback group. The distracting effect of feedback should ameliorate over time. In order to compare changes in tumescence at regular intervals during Film 2, the 100 epochs were collapsed into ten intervals, representing the ten-minute duration of the film. An average tumescence score was calculated for each minute of film for each group. A repeated measures ANOVA was conducted with average tumescence per minute as the within subjects variables, and feedback group as between subjects variables. A main effect for time was found in that both groups averaged a significant change in tumescence from the beginning to the end of the film, $\underline{F}$ = 9.987, $\underline{p}$ < .001. However, no significant difference between the feedback groups was noted. Independent samples t-tests were used to compare minute-by-minute average tumescence. No significant differences in average change in tumescence were noted between the groups in any of

the ten time periods. See Figure 15 for plots of the minute-by-minute group averages. See Table 10 for average change in tumescence by minute for each group. This study, once again, is too small to detect a between groups effect in this analysis, given that there is one. Post hoc analysis shows that observed power is very low (.17), with a medium effect size (ϕ□□□□□□□. A priori power analysis with the given effect size indicates that sample of 205 men would be required to detect an effect at a power level of .8.

Part VI: Discussion

This study examined the effects of false feedback on penile tumescence in sexually functional men. Despite limitations (to be discussed below), trends in the data collected during this study generally support the findings of Stone, Sbrocco & Lewis (1999): Positively inflated feedback decreases penile tumescence in sexually functional men. According to the model proposed by Sbrocco and Barlow (1996), functional men are not expected to decrease responding when they enter a sexual encounter with positive outcome expectancy and confidence. However, an emerging theme in this and prior research is that the expectancy and confidence of normally functioning men is fragile and subject to manipulation. Distraction from arousing stimuli is a significant moderating influence on sexual functioning, apparently independent of schema. The major finding of the current study is that continued exposure to and focus on erotic cues may be helpful in overcoming such assaults to expectancy and confidence in sexually functional men.

This study found further support for the contention that functional men are likely to believe false feedback about their erections. Men in the positive feedback condition tended to predict larger erection scores prior to Film 3 than they did in Film 2.

This was after the men had watched an erotic video and received inflated feedback (the score they predicted plus four points) about the level of their arousal. Unfortunately, the difference observed failed to reach statistical significance, $\underline{t}$ (14) = -1.887, $\underline{p}$ = .08). Due to the small number of subjects tested in the positive feedback condition (n = 15), the experiment lacked sufficient power to detect the experimental effect, given that there was one. This study is actually the first part of a much larger research project involving a total of 80 men -- 40 sexually functional and 40 sexually dysfunctional males. A total of 40 men (20 functionals, 20 dysfunctionals) will be randomly assigned to the positive feedback condition. A sample size of 40 will raise the power of the experiment to .88 (α = .05).

It is ironic to see such a large effect size from an experimental manipulation that the subject can dispute by noting his own physiologic response. While men were not allowed to visually observe their penises during the experiment, they certainly were able to feel whether or not they were becoming aroused. However, after watching Film 2 and receiving the inflated feedback, the men subjectively reported obtaining significantly larger erections than they had during Film 1. Consequently, they must have believed the deception, despite their actual tumescence. In actuality, no such increase in average erection size was detected between Film 1 and Film 2. The subjects must not have noticed the status of their actual erection while viewing the video. These results are consistent with prior research that found men are likely to overestimate their sexual response, even in conditions when tumescence tended to decrease (Stone, Sbrocco, & Lewis, 1999; Abrahamson et al., 1985b; Cranston-Cuebas et al., 1989; Farkas et al., 1979; Viglietta, 1982).

Despite the inflated feedback and their own reports about their erections, subjects in positive feedback condition failed to increase their expectancy, as

operationalized by predicted erection size. According to the Sbrocco and Barlow (1996) model, men receiving inflated feedback should upwardly adjust their expectancy of future performance. However, the subjects receiving positive feedback in Stone, et al. (1999) also did not significantly increase their predicted erection sizes. The authors suggest that functional men may not be used to receiving inflated feedback about their sexual performance. When men do receive it, they may not know how to incorporate it into their functioning. Stone, et al. (1999) came to this conclusion after examining not just positive feedback, but negative and neutral feedback as well. In that study, negative feedback resulted in decreased outcome expectancy (lower predicted scores and erection sizes), decreased tumescence, and lower subjective ratings on erection size.

While men may not know how to handle unexpected inflated feedback, there may be another explanation for why subjects in this study do not predict increased erection sizes. The instructions given to subjects about the erection score indicate that the "score" is based on a variety of factors, including measurements through the plethysmograph of "penile circumference, length, volume, pulse, temperature, hardness, and blood flow." Subjects receiving positive feedback might indeed know they are not as erect as they could be, but they may believe that the additional factors being "measured" by the machine account for the additional points in the score over what they predicted. Consequently, the men may not be upwardly adjusting their expectancy as operationalized by an erection size. In other words, our subjects may have bought the deception too well. Changes in confidence ratings taken prior to each film suggest that changes in this variable are easier to detect. Effect size for the change in confidence was much larger for confidence ratings ($\phi = .26$) than predictions of erection size ($\phi = .17$). This difference in effect size may speak to the ecological validity

of the experiment. On a day-to-day basis, men are rarely asked to predict the size of their erections prior to a sexual encounter. Consequently, their unfamiliarity with this request and the laboratory setting may make them reticent to predict changes in their erection size regardless of feedback. Detecting changes in confidence may be easier because this is a concept with which men are much more familiar, both in and out of sexual contexts. Cognitively, functional men may not regularly assess their confidence with regard to erection size when presented with a sexually stimulating situation. For example, the thought, "That woman is turn on; I predict that I will get an above average erection" is not a common response for most men. They do, however, assess whether a particular partner or situation is of a nature and quality to arouse them. Functional men are more likely to think, "That woman is a turn on; I want to have sex with her," the implication being that the man is confident he can follow through on his desire. In this way, confidence about future sexual functioning may be a construct with which men are much more familiar. As such, ratings of confidence may be a more ecologically sound operationalization of expectancy.

Another unexpected finding appeared in this study. Men in the no feedback group tended to predict larger erections in Films 2 and 3 than men in the positive feedback condition. The difference approached significance ($\underline{p} = .065$) and did not appear at baseline. In contrast, controls did not consistently predict larger erections prior to Films 2 and 3 in the previous study conducted by Stone, et al. (1999). The Stone, et al., subject sample and the current sample are very similar in terms of age, ethnicity, and years of education. The current study has 15 and 14 men in the positive and no feedback conditions, respectively. Stone, et al. (1999) had similar sample sizes for functional men in their study: 16 in positive feedback and 14 in no feedback. Using G•Power (Buchard, et al., 1997) for post hoc analysis of the present study, effect size for

the between groups difference in erection predictions for the present study is estimated to relatively large ($\phi = .37$). A sample of 29 subjects yields a power estimate of .49 ($\alpha = .05$). Post hoc power analysis of the same condition in Stone, et al. (Positive vs. No Feedback subjects, Erection Score Predictions on Film 2 and 3) shows a much weaker effect size ($\phi = .09$). As a result, power to detect this effect in Stone's sample of n = 30 was calculated post hoc to be very low (.08). A similar trend was found in confidence ratings taken prior to Films 2 and 3: Men in the positive feedback condition tended to rate their confidence in future performance at lower levels than men in the no feedback condition, $\underline{F}$ (1, 27) = 3.39, $\underline{p}$ = .077. If this trend in the data holds when additional subjects are added to the second half of the current study, it would have a number of implications for the model of sexual functioning, especially in how the model addresses the concept of performance demand.

Evidence of the experiment's performance demand can be found in both groups' predictions. While the hypotheses of this experiment were not particularly concerned with the observation of performance demand, it is interesting to note that both groups' predictions of tumescence and confidence prior to Film 2 were much lower than predictions taken prior to Film 1. All subjects reported a significant reduction in confidence about their predictions prior to each film, $\underline{F}(1, 27) = 50.348$, $\underline{p} < .001$. Erection size predictions taken prior to each film were not statistically different between groups, but did tend toward significance, $\underline{F}$ (1, 27) = 3.714, $\underline{p}$ = .065. Clearly, the men adjusted their predictions and confidence once they developed an understanding of what the study involved, how they were expected to interact with the stimuli presented them, and how they could perform in the experimental context. Predictions made prior to

imaginary Film 3 were similarly low for both groups compared to those predictions made prior to Film 1.

This trend in differences between groups in expectancy and confidence can also be understood in terms of the model of male sexual functioning (Sbrocco & Barlow, 1996). As stated before, the model posits that sexual functioning is based on a series of expectations about sexual performance, and how those expectations compare to appraisals of performance by the individual engaging in sexual activity. The first appraisal made by all participants involves their perception about the experiment in general. The Sbrocco & Barlow (1996) model addresses this primary appraisal in Stage 1 (Figure 8). Presumably, the participants formulated favorable impressions about the situation and about their ability to perform sexually in the laboratory context prior to volunteering. The men subsequently agreed to participate and watch erotic videotapes while being instrumentally monitored. Participants were only admitted to the study if free from psychopathology and sexual dysfunction. We therefore are quite confident that these men come to the experiment sexually functional with erotophilic schemas. The favorable appraisal of the men's performance is also reflected in their initial predictions of erection size and confidence. While watching the first erotic film and being instrumentally monitored, the participants adjusted their expectations about future performance based on observations they made about their sexual response and the experiment itself during the film. Both groups found the situation to be more challenging than originally predicted, which is reflected in the significant downward change in erection size predictions and confidence made prior to Film 2. Men in the positive feedback condition, who were told they would not only have their erections monitored but scored as well, experienced an additional challenge to sexual function. As stated before, this appraisal of challenge is reflected in the more conservative

erection size predictions and confidence ratings made by the experimental group prior to Film 2. While erectile functioning suffered in this during film 2 due to the surprising and distracting nature of the erection score, their cognitive appraisals improved. While significant changes in expectancy and confidence didn't occur between Film 2 and 3, the experimental group did become "more normal" as the trend in between group differences disappeared. The experimental group met the challenge and did "better" than they expected. Evidence that the bogus score influenced the experimental group's appraisal of performance is reflected by the near significant increase in predicted erection score prior to Film 3 and significantly larger ratings of perceived erection size during Film 2 (Tables 7 and 8). Stage 3 of the sexual functioning model addresses this successful adjustment and predicts functional performance and sustained engagement in the erotic task. The ability to obtain erections despite significantly decreased confidence and substantially decreased expectancy suggests that functional men are somewhat resilient in their sexual functioning. Perhaps this resilience to environmental challenge is one of the factors that keeps these men "functional."

Indeed, two complimentary processes may contribute to the resilience of sexually functional men: social facilitation and the body's physiologic response to challenge. First, social facilitation refers to the performance enhancement and impairment effects engendered by the presence of others as observers or an audience. Zajonc (1965) and many other researchers over the past 35 years have suggested that the presence of others increases generalized drive or arousal. Arousal subsequently tends to increase dominant responses, resulting in enhancement of simple or well-learned tasks but impairment of unlearned or complex tasks. The current research presents just such a condition for the sexually functional men involved in the study. Participants are evaluated by the experimenter on their ability to achieve and maintain an erection. For

sexually functional men, obtaining an erection when exposed to sexual stimuli is a well-learned task. Despite less than erotic conditions and experimental challenges to arousal, functional men are likely to obtain erections because of their history of functional sexual performance. The present experiment in this way gains ecological validity, as it simulates with a plethysmograph how a sexual partner would "monitor" erectile functioning in a more natural setting. In contrast, sexually dysfunctional men are likely to experience similar effects of social facilitation. However, in their case sexual functioning is not fully learned. Consistent with the model of sexual functioning, these men lack the skills and cognitive set for functional performance. When they are put to "the test," a dysfunctional man's most likely response is a flaccid penis.

A second factor that may contribute to sexually functional performance under challenge is the body's physiologic response. Blascovich, Mendes, Hunter & Salomon (1999) developed a biopsychosocial model of social facilitation in which they suggest that the differences in socially facilitated performance are mediated by the body's responses to challenge and threat, respectively. The authors define challenge as a condition wherein the individual experiences sufficient resources to meet situational demands. Threat occurs when the individual experiences insufficient resources to meet demands. The authors constructed their model using experimentation and measurement of cognitive and physiologic changes in the body due to non-metabolically demanding performance situations. Interestingly, the authors found that the body's physiologic response to threat is different than its response to challenge. During challenge, sympathetic neural stimulation of the myocardium enhances cardiac performance, particularly in contractility. At the same time, adrenal medullary release of epinephrine causes vasodilatation, resulting in declines in systemic vascular resistance. This pattern typically produces little or no changes in blood pressure. During

threat, sympathetic stimulation similarly enhances cardiac performance. However, pituitary-adrenal cortical activity inhibits the adrenal medullary generated release of epinephrine. Consequently, increased cardiac performance occurs but without decreases in systemic vascular resistance. Consequently, threat conditions cause an increase in blood pressure.

To propose an extension of the Blascovich, et. al., (1999) model into sexual function, functional men may be able to obtain erections under challenge because the physiology of the body in such a condition supports the production of an erection. In contrast, sexually dysfunctional men who are threatened by sexual activity may find it more difficult to obtain an erection because the physiology of threat is inconsistent with sexual responding. However, it may be simplistic to assume that the physiology of sexual functioning responds in exactly the same way to challenge and threat as the cardiovascular system. Since both sympathetic and parasympathetic neural channels influence male erectile functioning, sexual functioning may or may not be sensitive to the physiologic changes experienced under challenge and threat. However, given that vasodilation of tonically closed arteries are a key factor in the erection process, it stands to reason that a condition in the body that prevents systemic dilation might inhibit erection. Should their exist some biological mechanism to prevent the vasodilation of penile arteries during times of threat, this model would be of great use in furthering a biopsychosocial model of sexual dysfunction. In regards to a challenge response, it is well known that epinephrine from the adrenal medulla is the vasodilator involved in cardiovascular reactivity (Blascovich, et. al., 1999). Erections, on the other hand, are neurogencially regulated by andrenergic mechanisms (norepinephrine), cholinergic mechanisms (acetylcholine), and a nonadrenergic, nonchlorinergic system (nitrous oxide and vasoactive intenstinal polypeptide) (Rehman & Melman, 2001). It remains to

be established exactly how respective differences in physiologic response under challenge and threat may facilitate or inhibit sexual functioning.

To return to the more cognitive aspects of the current study, lower confidence and erection size predictions in the positive feedback group may also be reflective of distraction (e.g. having to watch a score while trying to become aroused). It is possible that one five-minute segment, and two ten-minute segments (one real, one imaginary) of exposure to erotic stimuli under experimental conditions could somehow negatively impact one's expectation of becoming and remaining erect. However, the men were not told how long the second and third films would last. Consequently, evidence of a performance demand related to time should hypothetically not occur until the third film. However, the no feedback group tended towards larger size predictions and confidence in both Film 2 and Film 3. It is more likely that the men in the experimental condition became concerned about this challenge prior to Film 2 when they were told they would be "scored" on the quality of their erections. The feedback group subsequently felt less confident about their ability to meet the challenge of the experiment and downgraded their size predictions and confidence. The trend in statistical difference between the groups disappears prior to the third film. This may in part be accounted for by the positive feedback given the men in the experimental condition. Their "performance" -- as reflected by the inflated score from Film 2 – was better than they expected and influenced their predictions about Film 3. When asked to predict a score, erection size and confidence for Film 3, the positive feedback appears to make the experimental group's answers look similar to the control group. By Film 3, the significant differences between the groups disappear (Table 6).

With regard to the recovery of erectile functioning associated with time, this study, in a very general way, demonstrated that longer exposure to erotic stimuli

produces larger erections. Controlling for differences in baseline erectile functioning between the first half and the second half of the film, men in both groups produced significantly larger erections during the second half of Film 2, F (1, 26) = 4.449, p = .045. However, the larger average tumescence observed may not only be due to time, but the content of the erotic film as well. Great care was taken by the investigator to match the two erotic films on the types of sexual acts performed, the sequence of sexual acts within the film segment, the attractiveness/appearance of the actors, and the quality of the production. The film segments can both be broken down into two halves. The first half of each segment shows the couple engaged in consensual oral sex. The second half of each segment shows the couple engaged in sexual intercourse. The first film lasts a total of five minutes, while the second film lasts a total of ten minutes. By coincidence, the greater tumescence identified during the second half of film 2 starts at about minute 5 when the couple changes from oral sex to intercourse. Consequently, there may be a confound in this finding for time and change in film content. However, the impact of the confound is probably minimal, as the men had a longer time to watch the sexual activity and hence become more aroused. Essentially, this is what was predicted.

With regards to the recovery hypothesis, it was also expected that the positive feedback group would show a characteristic pattern of erection loss and recovery in correspondence to initial distraction and then habituation to the erection score. This did not appear to happen. As indicated above, the effect size for this portion of the analysis is only moderate (ϕ□□□□□□□, and a much larger sample would be needed to detect a between groups effect. When measurements provided by dysfunctional men are added to this study, the distraction effect may become more pronounced. Our current model of sexual functioning suggests that dysfunctional men are more sensitive to evaluation than functional men, due to their erotophobic sexual schemas and limited skill sets.

Unfortunately, data from the Stone, et. al., (1999) does little to shed light on this possibility . In that study, sexually functional men lost an average of nineteen percent of their tumescence when exposed to inflated feedback; dysfunctional men lost an average of 36 percent. However, the difference between groups was not statistically significant. Given the small effect size between groups in current study, a more sensitive method of data analysis may also be necessary to better understand how feedback influences erection loss and recovery.

As mentioned earlier, this study is the first half of a much larger study involving a total of 80 men, 40 with erectile dysfunction and 40 with normal sexual functioning. Some of the trends in the data may become more evident (or disappear) when additional subjects are added and power to detect an effect -- given that there is one -- is subsequently increased. It will be interesting to see if the trends in the no feedback group persist: will these men continue to score higher on measures of expectancy and confidence than men receiving inflated feedback?

Recent advances in the biopsychosocial model of social facilitation suggest that there may be a new line of erectile dysfunction research – one that better relates changes in cognition to physiologic and chemical changes within the body. Blascovich (personal communication, December 9, 2002) suggests that sexually functional and dysfunctional men might be differentiated by measurements of cardiovascular reactivity while giving a speech about a sexual fantasy. One would hypothesize that functional men would find such a task challenging, while dysfunctional men might find it threatening. The measurements taken during the experiment could then be matched to known physiologic profiles of challenge and threat from other experiments. Essentially, this kind of experiment might ultimately yield a physiologically based method to measure erotophobia and erotophilia. Currently, only self-report measures are available to better

understand an individual's sexual schema. Of course, the benefits of such a testing procedure do not stop there. Additional psychophysiological measurements could be taken to better understand the body's response profile to challenge and threat in sexual situations. Ultimately, antecedent cognitions could be linked to erectile dysfunction, via a biochemically and physiologically detailed model. This, in turn, may further our understanding of why PDE-5 inhibitors still have a ten to fifteen percent failure rate in men with erectile dysfunction due to psychological factors.

The Sbrocco and Barlow (1996) model of sexual functioning continues to explain a great deal of functional and dysfunctional behavior. However, the present study and Stone, et. al., (1999) provide evidence that the model needs to be updated to reflect the impact of unexpected feedback on sexual functioning (Figure 9). In addition, the current research quantifies performance demand in terms of impact on outcome expectancy and confidence. While both groups showed a significant decrease from baseline on both cognitive measures, both groups of men were still able to sexually function during a second film. The current model would not necessarily predict this. It suggests that the individual makes a qualitative estimation of the threat presented by the instant sexual situation (Figure 8). If the situation presents no threat, then functional performance would result. If the situation is a threat or challenge, then outcome expectancy and confidence are assessed. Depending upon the nature of the assessment, focus on either a positive or negative outcome predicts functional or dysfunctional performance, respectively. However, the present research indicates that functional men are able to make significant downward shifts in expectations and confidence, but still function sexually. This resilience in the face of adversity is not fully addressed by the model. The socially facilitative effects of the experimental setting and the physiologic profile of the body's challenge response have been proffered as possible complimentary

factors that contribute to resilience. Evidence of resilience in turn suggests some measurable threshold of expectancy and confidence under which even normal men cannot function. Identification of that threshold may ultimately yield a pathway by which normal men develop sexual dysfunction. Once the pathway to dysfunction is better understood, better interventions and prevention measures can be developed and incorporated into sexual therapies.

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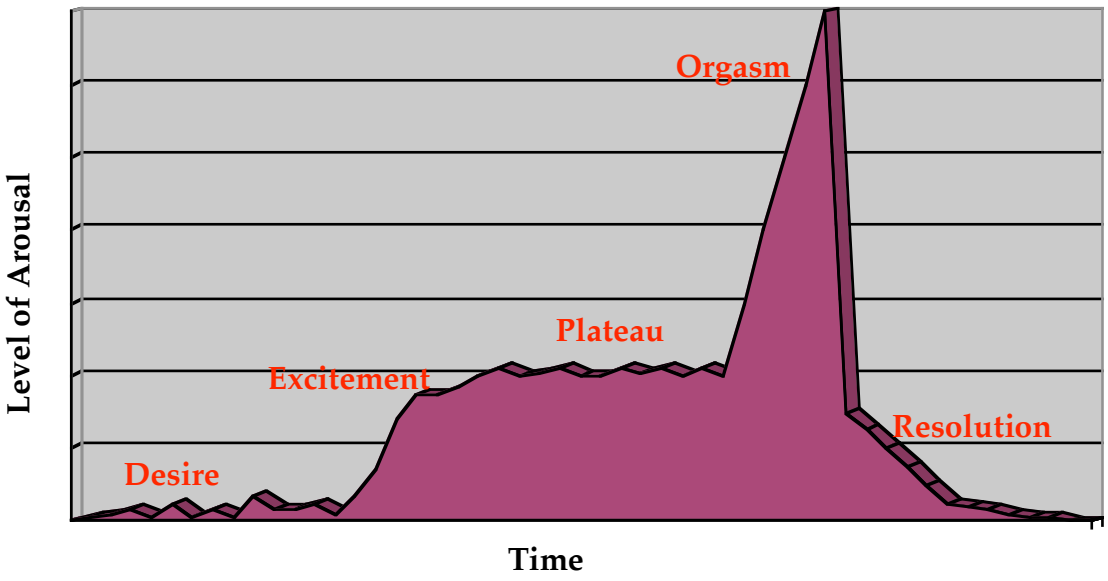


Figure 1. Graphic representation of the stages of sexual arousal

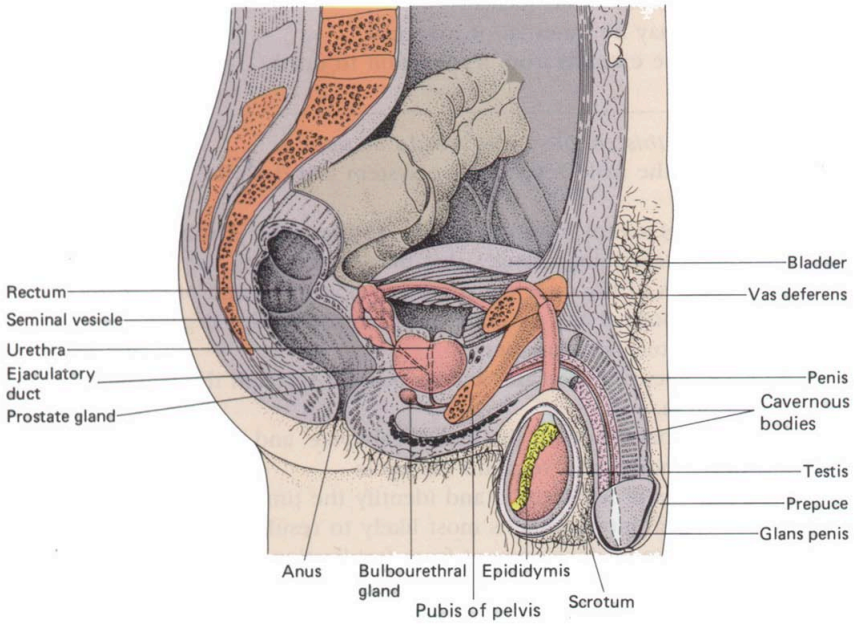


Figure 2. Midsagittal view of male pelvic region. From "Reproduction," by Eldra Pearl Solomon, 1992, Introduction to Human Anatomy and Physiology (p. 248), Philadelphia, PA: W. B. Saunders Company.

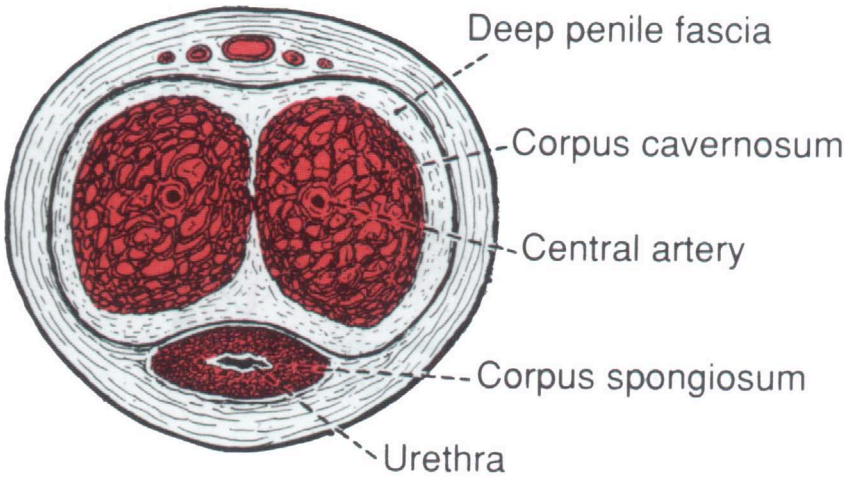


Figure 3. Cross section of penis. From "Reproductive and Hormonal Functions of the Male (and the Pineal Gland)," by Arthur Guyton and John Hall, 1996, Textbook of Medical Physiology (p. 1009), Philadelphia, PA: W. B. Saunders Company.

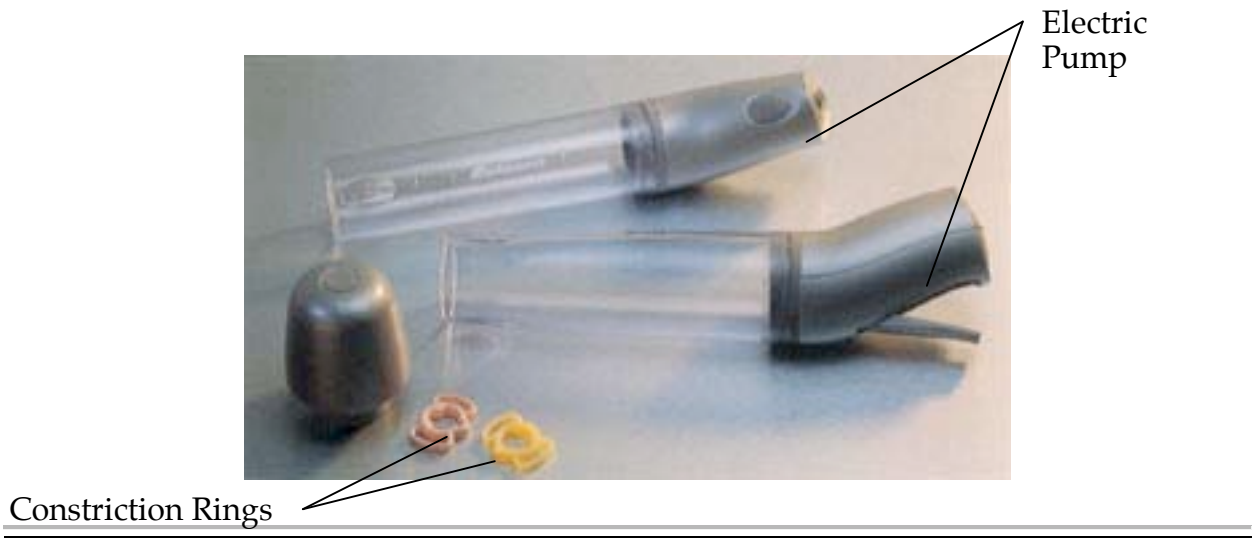


Figure 4. Vacuum constriction device. From "Erecaid Esteem" by Timm Medical (2002) [On-line]. Available: http://www.timmmedical.com/erecaid/index.htm.

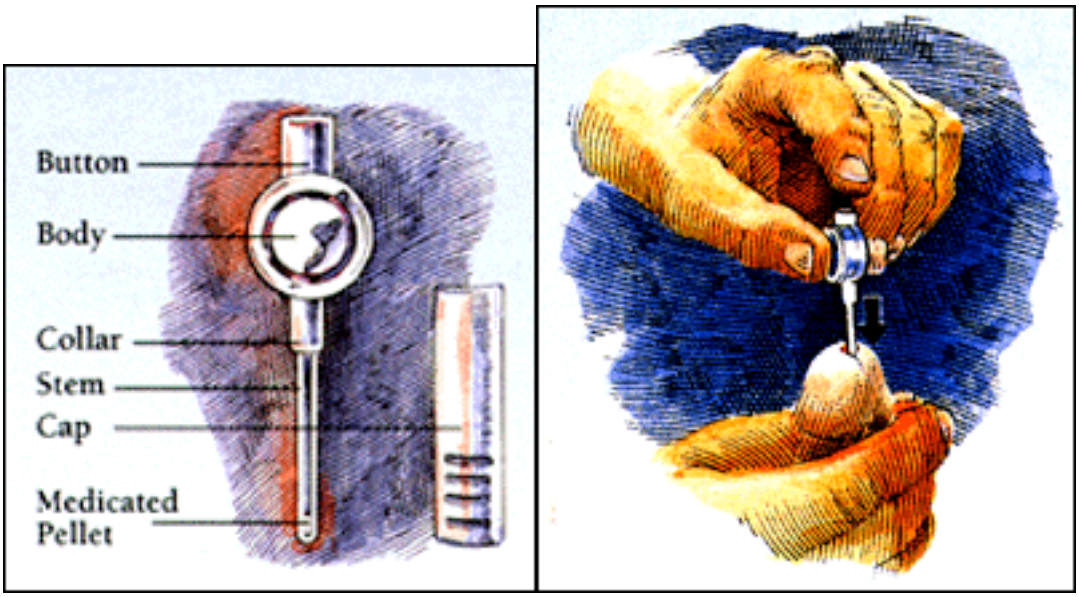


Figure 5. Intraurethral applicator for MUSE (alprostadil) drug administration. From "Treating impotence with MUSE" by VIVUS Corporation (2002) [On-line], Available: http://www.vivus. com/frames/products/restore.shtm

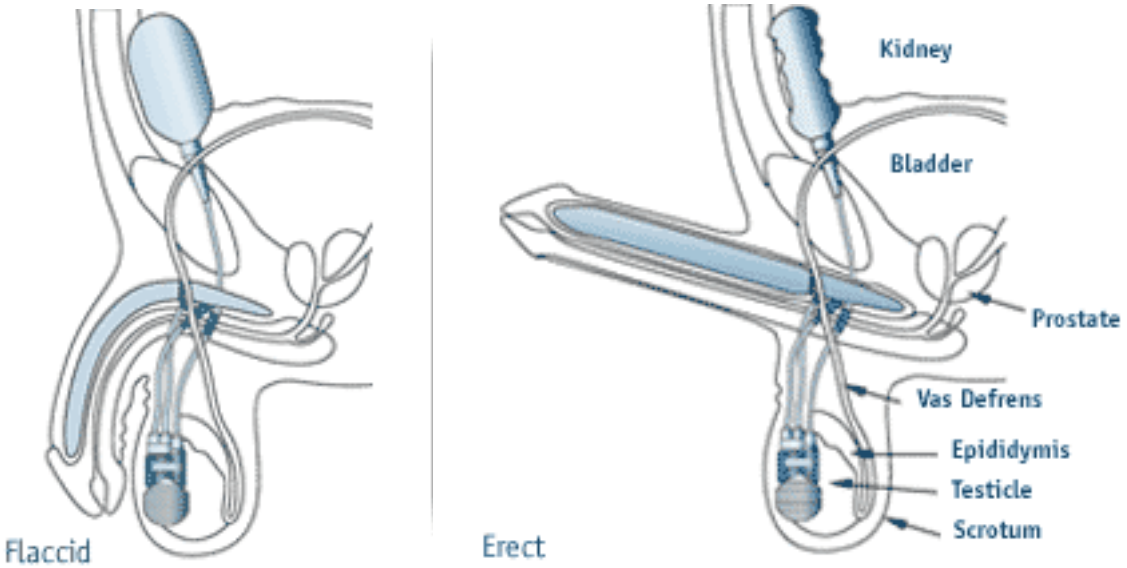


Figure 6. Inflatable penile implant. From "Patient Guide for Alpha I Inflatable Penile Implant" by Mentor Corporation (2002) [On-line]. Available: http://www.mentorcorp.com/ed/ed_pg_intro.htm

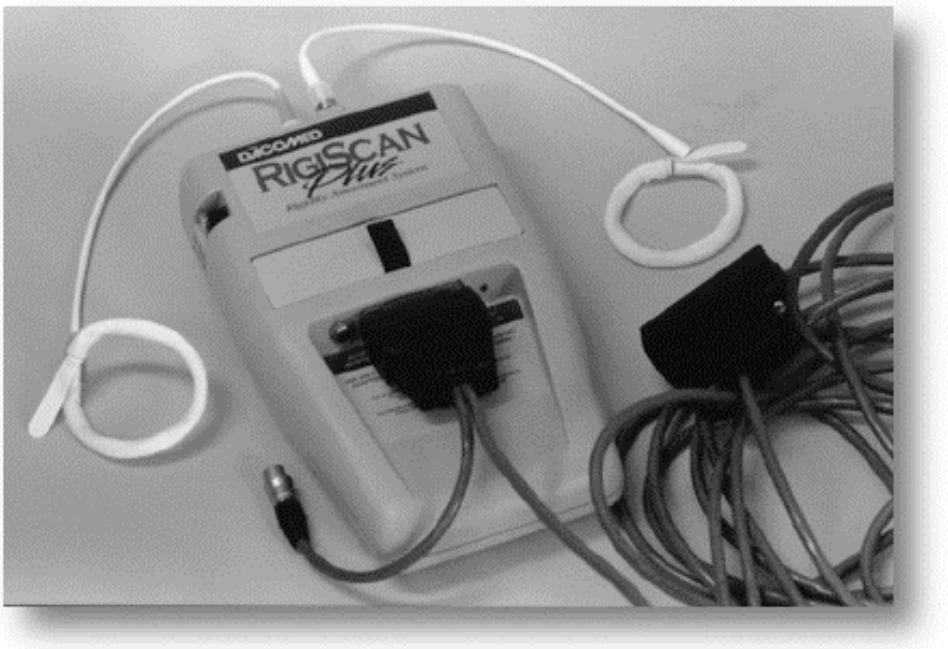


Figure 7. Rigiscan device. From "The Kinsey Institute Today,"1997, Research and Creative Activity, 20, [On-line], Available: http: www.indiana.edu/~rcapub/v20n2/

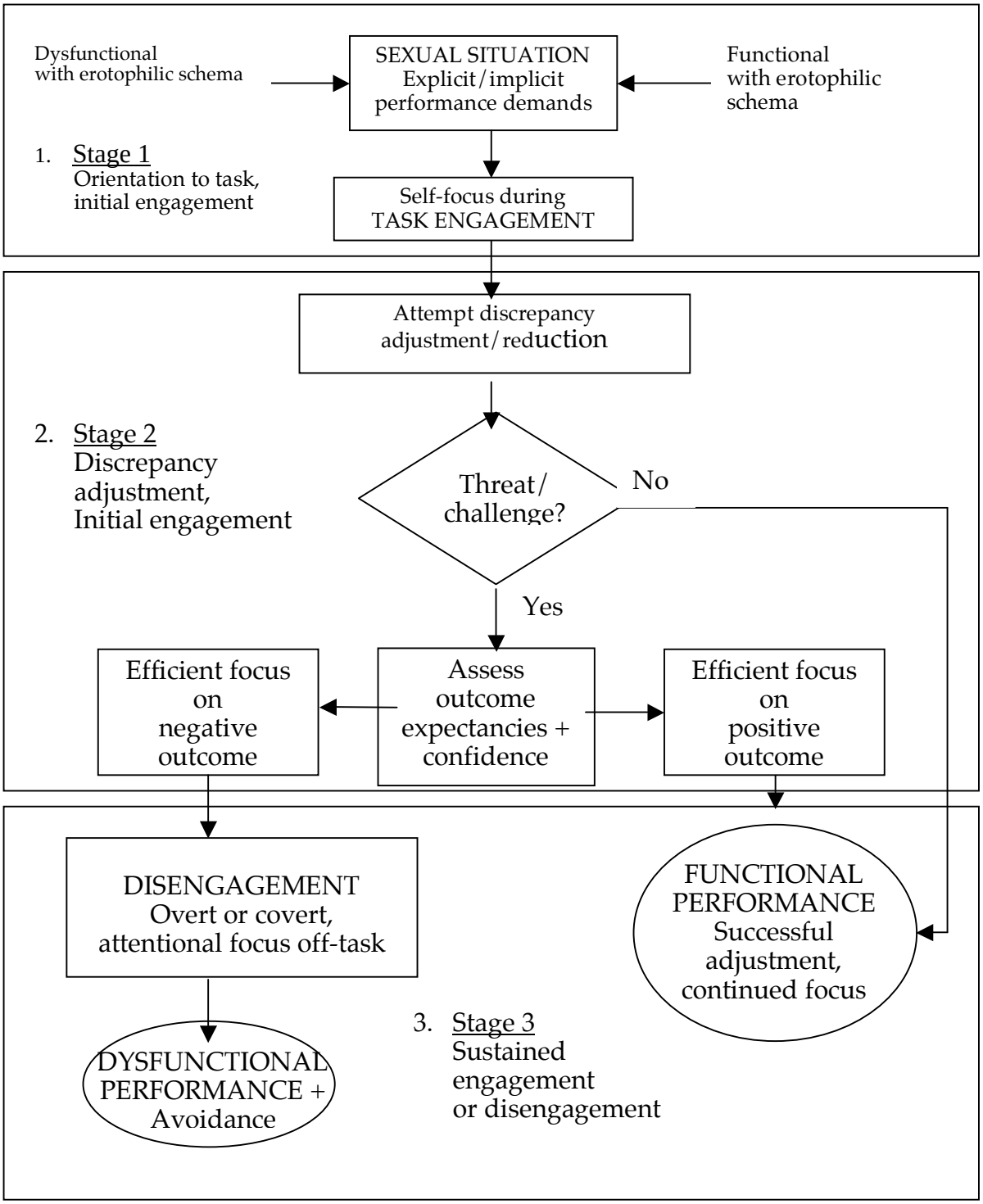


Figure 8. A model of sexual dysfunction: implications for examining attentional processes. From "Conceptualizing the Cognitive Component of Sexual Arousal: Implications for Sexuality Research and Treatment," by T. Sbrocco, and D. H. Barlow, 1996, in P. Sulkouskis (Ed.), Frontiers of Cognitive Therapy, p. 440, Guilford.

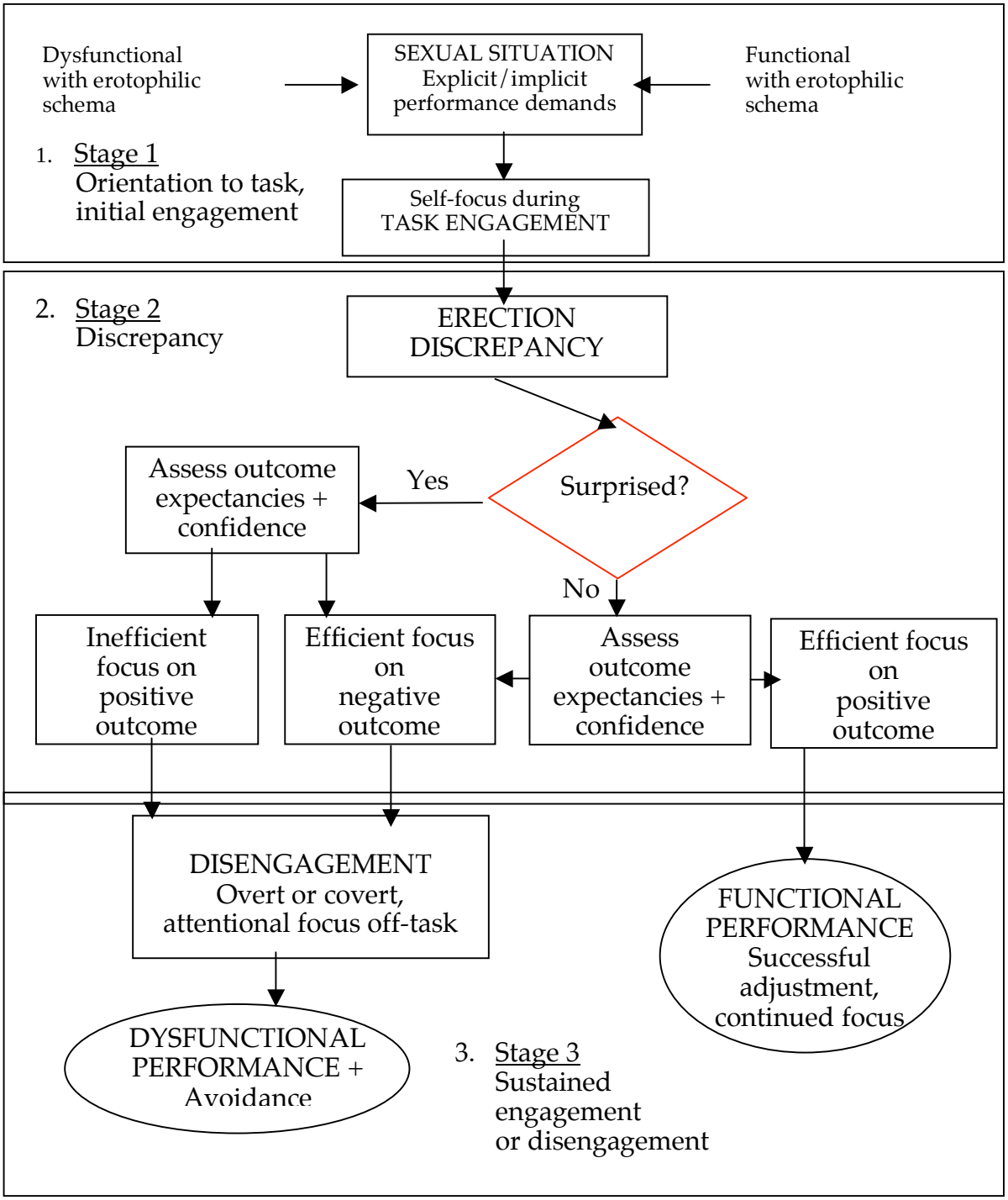


Figure 9. A revised model of sexual dysfunction: implications for examining attentional processes. From "The Effects of false physiological feedback on sexual arousal in sexually dysfunctional and functional males,"by J. M. Stone, 1999, Unpublished doctoral dissertation, Uniformed Services University.

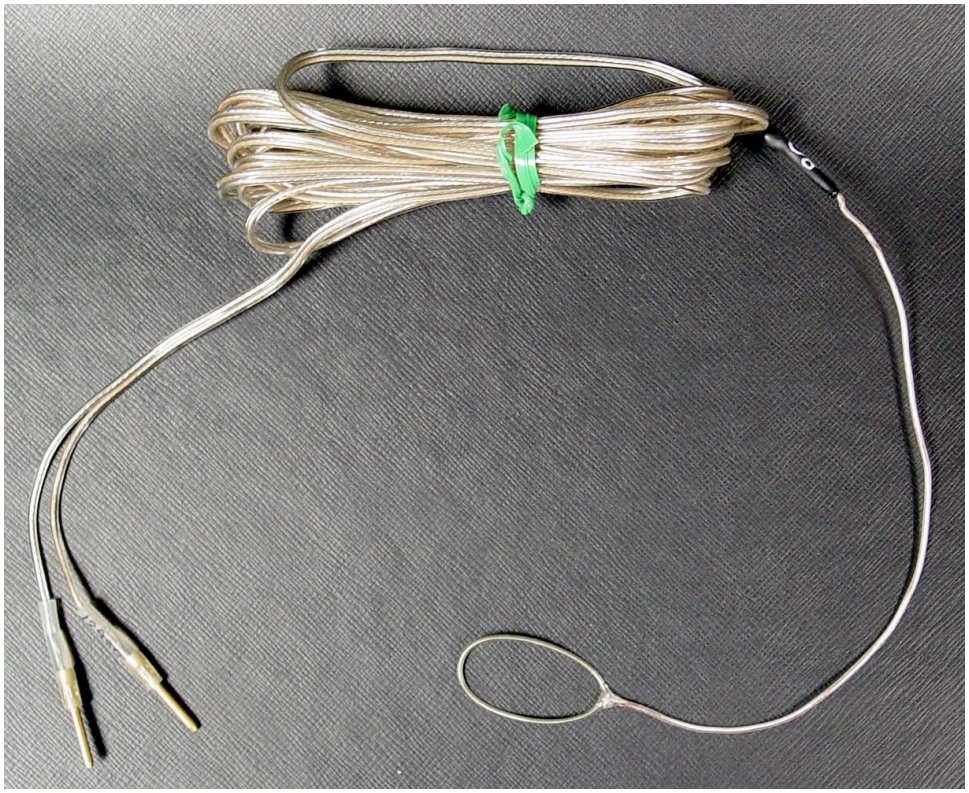


Figure 10. Photo of mercury-in-rubber strain gauge.

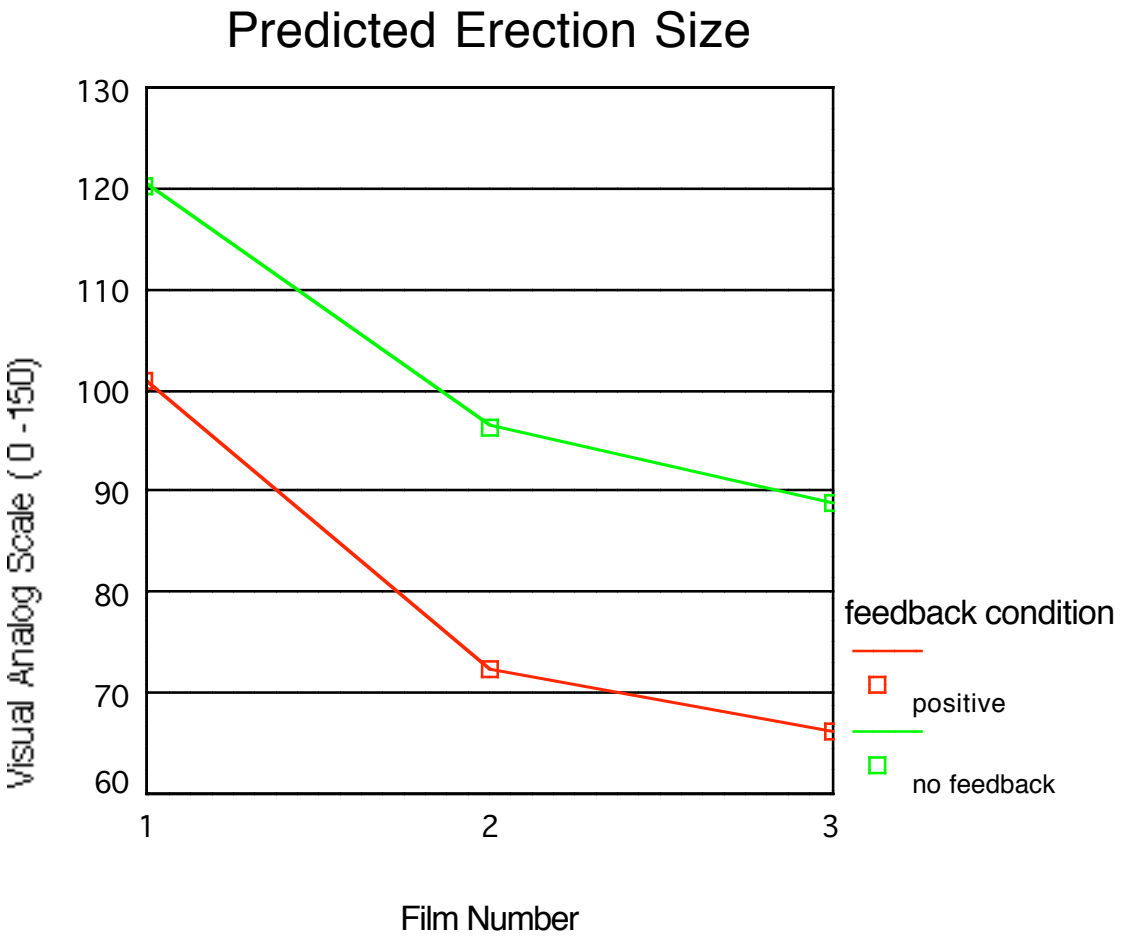


Figure 11. Mean predicted erection size for both conditions, taken prior to each film. (Note: Film 3 was imaginary)

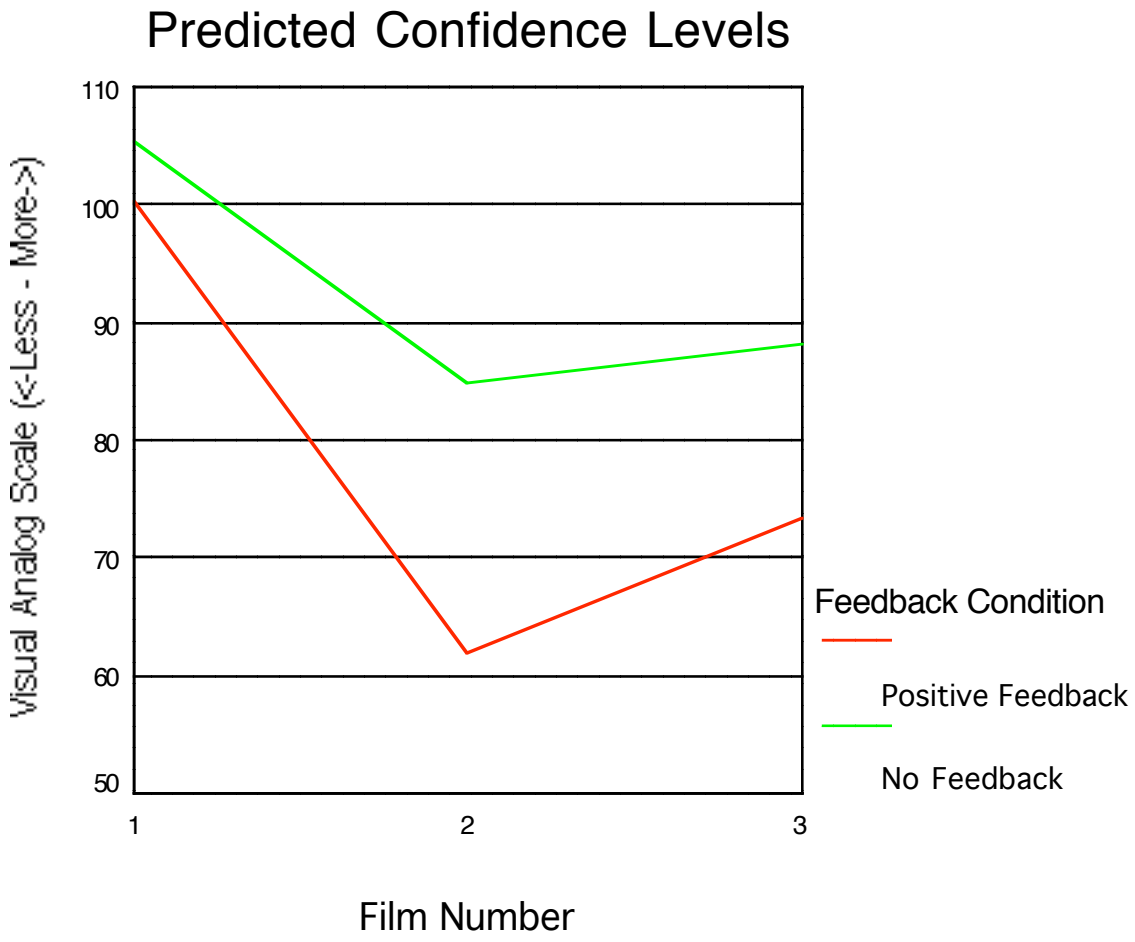


Figure 12. Mean predicted confidence levels by condition, taken prior to each film. (Note: Film 3 was imaginary)

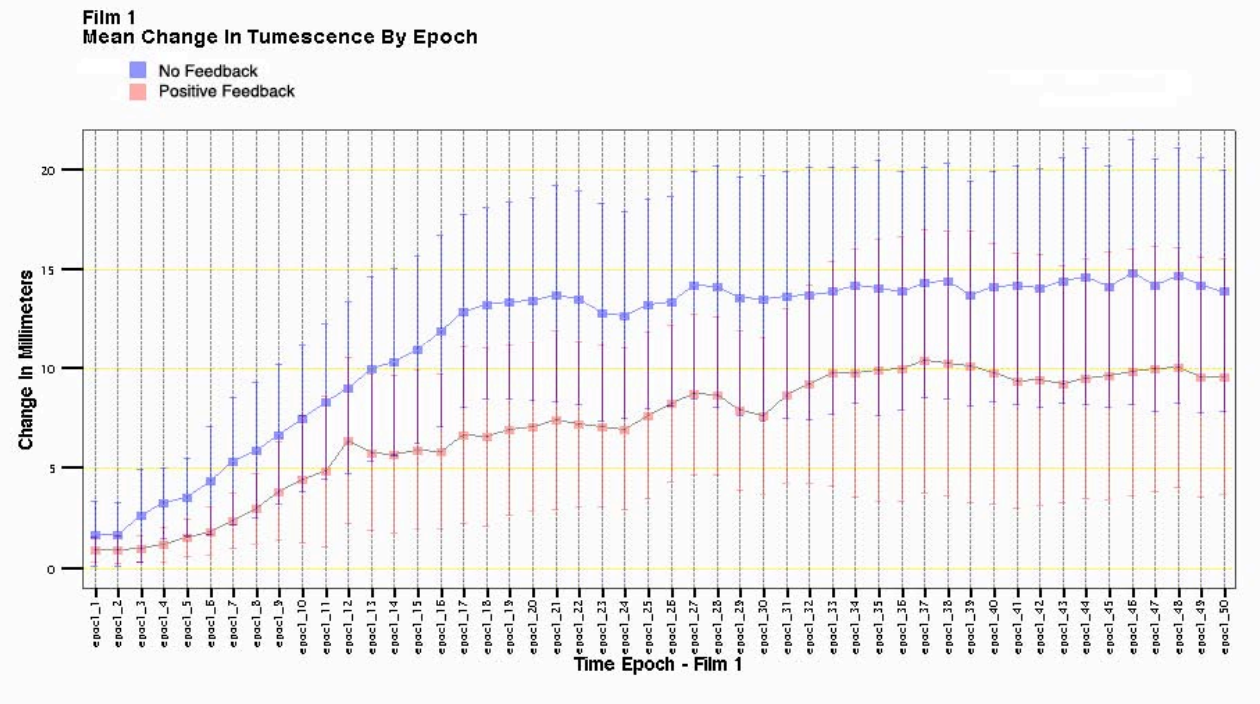


Figure 13. Mean strain gauge responses by epoch and condition during Film 1.

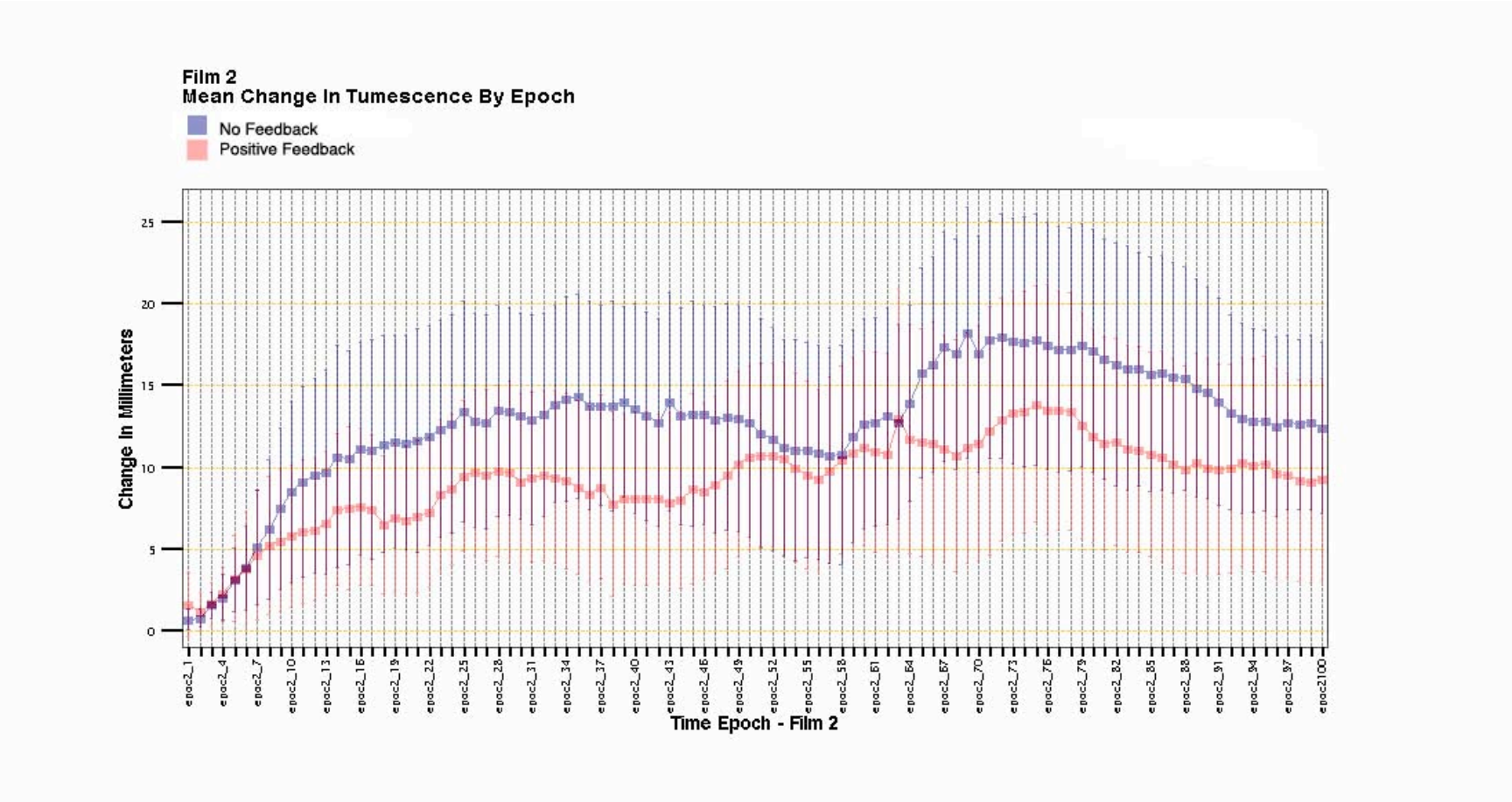


Figure 14. Mean strain gauge responses by epoch and condition during Film 2

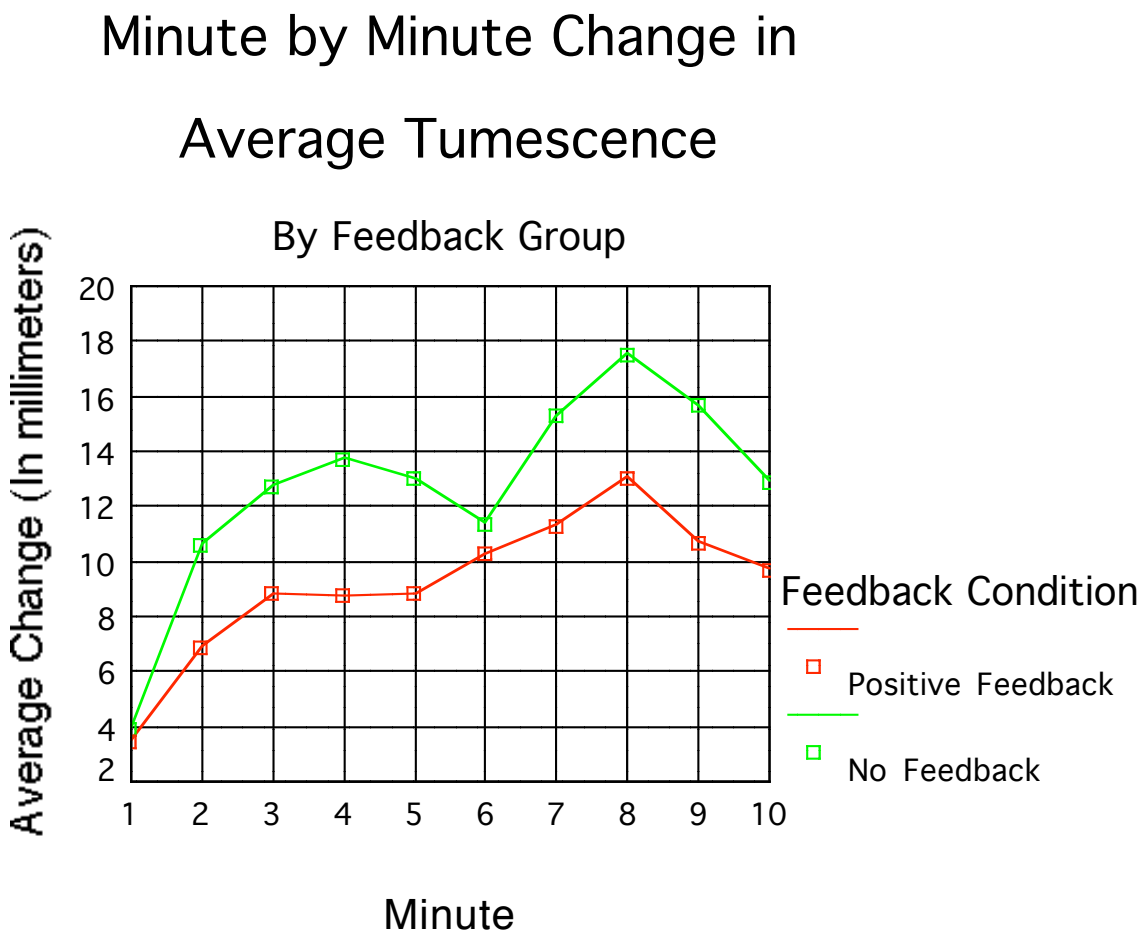


Figure 15. Graph of minute-by-minute change in average tumescence by group

Table 1

Zilbergeld's (1999) Myths of Male Sexuality

1. We're liberated folks who are very comfortable with sex.
2. A real man isn't into sissy stuff life feelings and communicating.
3. All touching is sexual or should lead to sex.
4. A man is always interested in and always ready for sex.
5. A real man performs in sex.
6. Sex is centered on a hard penis and what's done with it.
7. If your penis isn't up to snuff, we have a pill that will take care of everything.
8. Sex equals intercourse.
9. A man should be able to make the earth move for his partner, or at the very least knock her socks off.
10. Good sex is spontaneous, with no planning and no talking.

Note. From The New Male Sexuality by B. Zilbergeld, 1999, New York: Bantam.

Table 2

Timeline of Information Collected During the Study

Phone Screen	**Intake Interview**	**Physiological Assessment***	**Debriefing Session**	**Follow-up Phonecall**
Phone Screen Form	Informed Consent Form	SEE BELOW		
	SDI			
	SCID			
	Medical Information Form			
	BDI			
	BAI			
	Authorization for Exchange of Information			

Table 3

Information Collected During the Physiological Assessment

Pre-Film 1	Film 1	Post-Film 1	Pre-Film 2	Film 2	Post-Film 2	Pre-Film 3
Flaccid Penile Circumfer-ence Measurement	Penile Tumescence	Sexual Arousal Questionnaire	Erection Score Prediction Questionnaire (feedback)	Penile Tumescence	Sexual Arousal and Feedback Questionnaire (feedback)	Erection Score Prediction Questionnaire (feedback)
Erection Prediction Questionnaire			Erection Prediction Questionnaire (no-feedback)		Sexual Arousal Questionnaire (no-feedback)	Erection Prediction Questionnaire (no-feedback)

Table 4

Statistical Power Analysis (ANOVA)

Factor Name	Number of levels	Cases per level	Effect size F	Power
Feedback	2	20	0.40	0.7

Cases per cell = 20, Total N of cases = 40
Alpha (2-tailed) = 0.05
Power computations: Non-central F

Table 5

Mean change in Average Tumescence and Maximal Tumescence Between Films (in millimeters)

	FILM 1		FILM 2	
Feedback Condition	Average Tumescence (SD)	Maximal Tumescence (SD)	Average Tumescence (SD)	Maximal Tumescence (SD)
Positive	7.1 (6.8)	14.1 (12.2)*	9.2 (8.9)	18.1 (12.3)*
None	11.5 (6.8)	20.9 (9.4)	12.7 (9.5)	20.6 (11.7)
Total	**9.2 (7.0)**	**17.3 (11.3)**	**10.9 (9.2)**	**19.3 (11.9)**

* Statistically significant difference ($p < .05$) between Film 1 and Film 2.

Table 6

Expectancy and Confidence Ratings

	Pre-FILM 1 Questionnaires		Pre-FILM 2 Questionnaires			Pre-FILM 3 Questionnaires		
Feedback Condition	Erection Prediction (0 – 150) (SD)	Confidence (0 – 150) (SD)	Erection Prediction (0 – 150) (SD)	Confidence (0 – 150) (SD)	Score Prediction (0 – 12) (SD)	Erection Prediction (0 – 150) (SD)	Confidence (0 – 150) (SD)	Score Prediction (0 – 12) (SD)
Positive	101 (35)[a, f]	100 (27)[h, i]	72 (27)[a, e]	62 (29)[h,]	9.2 (3.9)[d]	66 (40)[f]	73 (32)[i]	10.6 (3.8)[d]
None	120 (28)[b, g]	105 (28)[k, l]	96 (36)[b, e]	85 (31)[k]	-	89 (43)[g]	88 (33)[l]	-
Total	**111 (32)[c, j]**	**103 (27)[m, n]**	**84 (32)[c]**	**73 (32)[m]**	**-**	**78 (42)[j]**	**80 (33)[n]**	-

_____
0 — 75 — 150
Low — Medium — High

[a, b, c, f, g, h, i, j, l, m, n] Matching superscripts indicate a statistically significant difference ($p < .01$)
[k,] Matching superscripts indicate a statistically significant difference ($p < .05$)
[d, e] Matching superscripts indicate a trend towards statistically significant difference ($p < .10$)

Table 7

Post-Film 1 Subjective Ratings Questionnaire (All Subjects)

	Arousal (0 – 150) (SD)	Anxiety (0 – 150) (SD)	Confidence (0 – 150) (SD)	Size of Erection (0 – 150) (SD)	Attention to Film (0 – 150) (SD)	Attention to Body (0 – 150) (SD)	Control of Erection (0 – 150) (SD)	Negative Thoughts (0 – 150) (SD)	Thought Interference (0 – 150) (SD)	Similar to Reality (0 – 150) (SD)
Positive	53 (33)	50 (35)	55 (38)	42 (39)	93 (27)	77 (34)	52 (27)	27 (21)	50 (38)	42 (29)
None	71 (37)	56 (42)	77 (34)	68 (49)	102 (26)	82 (38)	58 (41)	34 (22)	53 (31)	51 (40)
Total	62 (35)	53 (38)	66 (37)	55 (45)	97 (26)	79 (35)	55 (35)	31 (21)	51 (34)	46 (34)

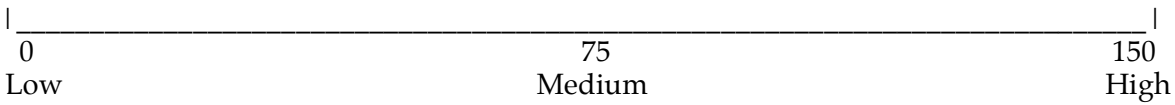
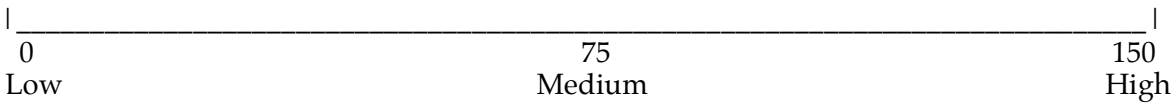


Table 8

Post-Film 2 Questionnaire (All Subjects)

	Arousal (0 – 150) (SD)	Anxiety (0 – 150) (SD)	Confidence (0 – 150) (SD)	Size of Erection (0 – 150) (SD)	Attention to Film (0 – 150) (SD)	Attention to Body (0 – 150) (SD)	Control of Erection (0 – 150) (SD)	Negative Thoughts (0 – 150) (SD)	Thought Interference (0 – 150) (SD)	Similar to Reality (0 – 150) (SD)
Positive	69 (47)	42 (31)	70 (40)	70 (47)*	96 (40)	84 (38)	61 (44)	32 (29)	42 (35)	55 (46)
None	81 (34)	57 (37)	76 (41)	72 (46)	92 (27)	88 (37)	73 (50)	33 (27)	51 (34)	40 (33)
Total	75 (41)**	49 (34)	73 (40)	71 (46)*	94 (34)	86 (37)	67 (47)	32 (27)	46 (34)	48 (40)



* Statistically significant difference ($p < .05$) between Film 1 and Film 2.
** Trend towards statistical significance ($p < .10$) between Film 1 and Film 2

Table 9

Additional Post-Film 2 Questionnaire (Feedback Subjects)

	Score Distraction (0–150) (SD)	Score Arousal (0–150) (SD)	Score Anxiety (0-150) (SD)	Score Confidence (0-150) (SD)	Score Erection Maint. (0-150) (SD)	Score Attention to Film (0-150) (SD)	Score Attention to Body (0-150) (SD)	Score Control over Erection (0-150) (SD)	Score Accuracy (0-150) (SD)	Control over Score (0-150) (SD)	Tried to Change Score (0-150) (SD)	Score Surprise (0-150) (SD)
Positive	49 (42)	79 (29)	81 (29)	71 (28)	66 (24)	63 (27)	85 (25)	69 (23)	71 (31)	42 (30)	60 (42)	64 (37)

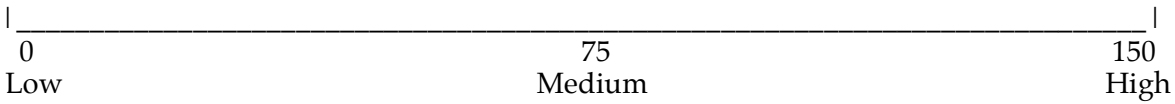


Table 10

Minute-by-Minute Change in Average Tumescence by Group
(In Millimeters)

	1 (SD)	2 (SD)	3 (SD)	4 (SD)	5 (SD)	6 (SD)	7 (SD)	8 (SD)	9 (SD)	10 (SD)
Positive	3.5 (5.1)	6.9 (8.0)	8.9 (8.5)	8.8 (9.5)	8.9 (9.7)	10.3 (10.2)	11.3 (12.3)	13.1 (13.0)	10.7 (11.5)	9.7 (11.3)
None	4.0 (4.2)	10.6 (11.0)	12.7 (11.2)	13.8 (10.6)	13.0 (11.6)	11.4 (11.4)	15.3 (10.8)	17.52 (12.9)	15.7 (12.2)	12.9 (9.5)
Total	**3.7* (4.6)**	**8.7 (9.6)**	**10.8 (9.9)**	**11.2 (10.2)**	**10.9 (10.7)**	**10.8 (10.6)**	**13.3 (11.6)**	**15.2 (12.9)**	**13.1 (11.9)**	**11.3* (10.5)**

*Within Groups Variable: Time (1 to 10 minutes)
F (1, 27) = 11.9, p = .002

Appendix A

Subject Recruitment and Selection

Subject Recruitment and Selection

Subject Recruitment

(1) Referral Sources: Sexually functional men were recruited from the local area through newspaper advertisements (See Appendix B). These subjects were paid $40 for their participation in the study (intake interview, physiological assessment, and accomplishing questionnaires). Study data indicate that normal volunteers for studies of sexual behavior obtained in this manner do not differ from the population at large in prevalence of excessive "liberality" of views of sexual behavior or in the prevalence of excessive anxiety or inhibitions concerning sex (Thorne, 1966; Udry & Morris, 1967).

(2) Initial Phone Contact: When a prospective subject initially called the lab, the principal investigator explained the study and conducted a phone screen. When the lab's procedures were explained to the functional volunteer subject, the following was included:

(a) The purpose of the study.

(b) Mention and explanation of physiological measurement (penile tumescence). Explanations were made using appropriate language.

(c) Confidentiality: It was explained to the subject that all information collected during the studies is coded and that his name will not appear on any records.

(d) It was explained to the caller that there were restrictions placed upon us regarding who we could use as subjects. Therefore, it was

necessary to do an initial screening interview, lasting approximately one hour.

(e) It was explained to the caller that the interview and assessment would be conducted by doctoral students in clinical psychology who were supervised by a clinical psychologist.

(f) All subjects would be paid $40 for participating in the study (to include intake interview, physiological measurements, and questionnaires).

(g) Any questions raised by the caller were answered.

(h) If the caller was still interested in volunteering, the phone screen form was completed (See Appendix C).

(i) If the caller met the inclusion criteria, a three hour session was scheduled.

Subject Selection

Sexually "functional" subjects were 21-60 year old males who reported a history of adequate sexual functioning (adequate sexual arousal, orgasm with intercourse, and a subjective sense of arousal), as well as not meeting the diagnostic criteria for Male Erectile Disorder (DSM-IV). Subjects also met the screening criteria (see Screening Criteria below).

Screening Criteria. All subjects were clinically and physically screened during a one-hour initial screening session. The following is a description of the methods and criteria for determination of subject eligibility:

(1) Presence of psychopathology: Current contact with a psychotherapist for treatment of emotional or behavioral disturbance, or history of past psychiatric hospitalization was normally sufficient to exclude a subject from participation in the proposed studies. A careful assessment of the subject's current life situation also was made during the clinical interview. Any subject who met DSM-IV criteria for emotional or behavioral disorder was excluded from participation in this study. The screening section of the SCID, which assists in making DSM-IV diagnoses, was an efficacious assessment tool for this purpose. The interviewer also reviewed results from the Beck Depression Inventory and the Beck Anxiety Inventory.

(2) Emotional distress at the prospect of viewing explicit sexual material: Each subject's experience with erotic literature was assessed. This included past negative reactions to viewing sexually explicit material and/or anticipation of having such an negative reaction. Any subject expressing this type of concern was excluded from participation in the proposed study.

(3) Assessment of sexual functioning: The subject was interviewed using a semi-structured interview (Sexual Dysfunction Interview-revised, Appendix E). The interview typically lasted one hour and consisted of a thorough assessment of the subject's sexual history, experiences, attitudes, and difficulties. Subjects

were excluded from the present study if they acknowledged history of any sexual dysfunction.

(4) Physical assessment: The Medical Information Form (Appendix G) asked the subject questions concerning physical health in order for the study's physician, Dr. Lewis, to make a detailed assessment of relevant medical complications (e.g., prostatitis, genital surgery, diabetes) or prescription medications (e.g., anti-hypertensives) that have been reported to be associated with erectile failure. Subjects who had medical problems or who were taking medications that impacted sexual functioning were excluded from this study.

(5) In summary, the general screening criteria were:

(a) Age: 18 - 60

(b) No major psychological or physiological disturbance

(c) Consent to view explicit sexual materials

Other Considerations in Subject Selection

The specific issues mentioned above were not the only questions related to subject selection. The usual considerations regarding research with human participants were implemented in the proposed study. These included the following:

(a) Informing participants of all factors influencing their willingness to participate in the studies.

(b) The explanation of any descriptions with the restoration of the relationship between the investigator and the subject following completion of the studies.

(c) Clarification for the subject of his constant freedom to decline participation in the studies at any time without fear of prejudice.

(d) Confidentiality of the results. Records and data from subjects in these studies were filed separately (kept in a locked filing cabinet) and were inaccessible to anyone except the personnel on this project.

(e) Detection and removal of any unwanted consequences of the study following completion.

(f) All subjects were told in advance that a thorough debriefing interview would follow the experimental session.

Appendix B

Newspaper Advertisement for Recruitment

of Sexually Functional Subjects

Newspaper Advertisement for Recruitment of Sexually Functional Subjects

Men Earn $40 in Lab Study of Factors Impacting Sexual Arousal

University study seeks healthy men, 18-60, for 3-hr laboratory assessment. The purpose of the study is to gain a better understanding of factors that affect sexual functioning. We are looking for 2 types of volunteers: men with erection problems and men without sexual problems. If you are interested, call Nate Galbreath at (301) 295-1788 for more information.

(30-word advertisement)

Men Earn $40 in Lab Study of Factors Impacting Sexual Arousal

University study seeks men with and without erection problems to assess factors affecting sexual arousal. Call Nate Galbreath, (301) 295-1788.

Appendix C

Phone Screen Form

PHONE SCREEN – CONTROLS

INTRODUCTION (READ TO CALLER)

"Based on experimental data collected over the past decade, men who have erection problems are known to differ from men who don't in several areas. One of these important areas includes how feedback about their sexual performance affects erection size. The purpose of this study is to determine how the performance of sexually functional and dysfunctional men is affected by receiving feedback about their erection size while viewing sexually explicit videotapes. Sexually functional and dysfunctional men meeting certain criteria will be asked to participate in a sexual functioning study.

The study will consist of three phases. During the first phase, we will be collecting information on your physical health, sexual functioning, and psychological health. This phase will take approximately one hour to complete. The second phase will also take approximately one hour to complete and involves the physiological assessment of your erection while viewing sexually explicit videotapes. You will be asked to wear a thin rubber tube around your penis to collect information about your erection while you view erotic movies in the privacy of a small room in one of our laboratories. During the second phase, you will also be filling out questionnaires asking you about your sexual performance and making predictions about your performance. During the third phase you will be explained the results of your participation in the study. This phase will take approximately 30 minutes. The interview and physiological assessment are conducted by doctoral students in clinical psychology who are supervised by a licensed clinical psychologist. All information collected during the study is coded and your name will not appear on any records. You will be paid $40 for your participation in the three phases of the study. Do you have any questions? If you are interested in participating in this study I now need to ask you a series of questions to determine if you are the type of person we are looking for: Are you interested?" (If yes, get the following information. If no, thank the caller and discontinue the screening.)

DATE _____

NAME_____

ADDRESS _____

_____

1. HOME PHONE _____
2. WORK PHONE _____
3. AGE _____
4. RACE _____
5. HEIGHT _____

6. WEIGHT _____

7. DO YOU SMOKE? YES NO

8. WHAT IS YOUR MARITAL STATUS?
_____

9. ARE YOU EMPLOYED? YES NO

10. ARE YOU IN THE MILITARY OR A MILITARY DEPENDENT? YES NO

11. HAVE YOU EVER BEEN TOLD BY A PHYSICIAN THAT YOU HAD:

A. HEART DISEASE	YES	NO
B. HIGH BLOOD PRESSURE	YES	NO
C. KIDNEY DISEASE	YES	NO
D. DIABETES	YES	NO
E. SEXUAL PROBLEMS	YES	NO
F. PROSTATE PROBLEMS	YES	NO
G. BACK INJURY	YES	NO

12. ARE YOU CURRENTLY ON ANY MEDICATION? YES NO

IF YES, WHAT ARE YOU TAKING?
_____

13. DO YOU HAVE ANY PROBLEMS WITH YOUR SEXUAL FUNCTIONING?

YES NO

SPECIFICALLY, DO YOU HAVE ANY PROBLEMS:

OBTAINING ERECTIONS? YES NO

MAINTAINING/KEEPING ERECTIONS YES NO

EJACULATING/CUMMING TOO QUICKLY? YES NO

HAVE YOU EVER HAD ANY PROBLEMS WITH YOUR SEXUAL FUNCTIONING? YES NO

HAVE YOU EVER HAD ANY PROBLEMS:

OBTAINING ERECTIONS? YES NO

MAINTAINING/KEEPING ERECTIONS YES NO

EJACULATING/CUMMING TOO QUICKLY? YES NO

14. ARE YOU HETEROSEXUAL? YES NO

15. HAVE YOU EVER RECEIVED MENTAL HEALTH COUNSELING? YES NO

IF YES, CAN YOU TELL ME ABOUT THAT?

_____

16. WOULD YOU BE ABLE TO COME IN FOR A 3 HOUR SESSION AS PART OF THIS STUDY? YES NO

17. WOULD YOU BE WILLING TO ANSWER QUESTIONS ABOUT YOUR PHYSICAL AND MENTAL HEALTH AND YOUR SEXUAL FUNCTIONING? YES NO

18. WOULD YOU BE WILLING TO WATCH EROTIC VIDEOTAPES WHILE WE MEASURE YOUR ERECTION? YES NO

19. WHEN CAN YOU COME IN FOR A 3 HOUR SESSION FOR YOUR PARTICIPATION IN THIS STUDY?

DATE _____ TIME _____

Appendix D

Informed Consent Form

Appendix E

Sexual Dysfunction Interview

SEXUAL DYSFUNCTION INTERVIEW-revised

◆◆◆

Tracy Sbrocco, Ph.D., Risa Weisberg, B.A., and David H. Barlow, Ph.D.

Albany, NY: 1995

◆◆◆

SEXUAL DYSFUNCTION INVENTORY

Client Name:

Address:

Home Ph:

Work Ph:

Referral Source:

Address:

Release of Information Obtained? **Yes** **No**

Date referral received:

I. Life Situation

Let me begin by getting some basic information:

1. DOB/Age

2. Ethnicity
   1 = Caucasian, Non-Hispanic
   2 = Black, Non-Hispanic
   3 = Hispanic
   4 = Asian
   5 = Other

3. Current Relationship Status
   1 = Never Married
   2 = Divorced
   3 = Separated
   4 = Widowed
   5 = Married
   6 = Living Together

4. Duration of Marital/Relationship Status (# of years)
   99= Missing or Not Applicable

5. Years of Education

a. Less than High School Degree
b. High School Degree
c. Partial College
d. College Degree
e. Graduate or Professional School

6. Occupation (Present or Previous)

1 = High Level Executive, Professional (M.D., Ph.D., Attorney)
2 = Business Manager, Lesser Professional (Nurse, Teacher, Social Worker)
3 = Administrator, minor professional [legal secretary, small business owner (e.g. bakery, clothing)]
4 = Clerical or sales worker, technician
5 = Skilled manual employee
6 = Machine operator, semi-skilled employee
7=Unskilled Employee (laborer, messenger)

7. Employment Status
1 = Retired
2 = Full-Time
3 = Part-Time
4 = Disabled
5 = Unemployed

8. Length of time at current job _____

II. **Presenting Problem(s)**
I **know about your sexual problem(s)** from what you said on the phone/what your M.D. said, etc.
Is that correct?

I will get back to your sexual functioning, but first I would like to ask you some questions pertaining to your overall psychological functioning. Many of the questions may not apply to you and some will.

Psychiatric Diagnostic Interview, revised (PDI-R)

Begin with **Alcoholism,** come back to Organic Brain Syndrome only if it seems necessary at the end of the interview.

Pay close attention to signs and symptoms of **Major Depression.** MDE can have a profound affect on sexual functioning. When in doubt, continue questioning.

Diagnoses: NONE

FREQUENCY OF SEXUAL BEHAVIOR

1. How often to you engage in intercourse with your/a partner?

2. What is your ideal frequency of intercourse?

3. How often do you engage in mutual cuddling/stimulation without intercourse?

4. I'd like to ask you some questions about masturbation/self-stimulation. I want to assure you that we consider it to be a normal, healthy activity. We are aware that not everybody feels this way...
How often do you engage in self-stimulation/masturbation?

SEXUAL DYSFUNCTIONS

I. SEXUAL DESIRE DISORDERS

A. Hypoactive Sexual Desire Disorder

1. How would you describe your interest in sex?

a. (If client describes problems) Has your interest changed or is your current interest pretty typical for you?

b. How long have you felt this way?

c. If change occurred, What was associated with or caused this change? i. personal stress/emotional problems ii. illness iii. marital problems iv. partner stress/emotional problems v. partner illness vi. sexual problem vii. medication

2. Do you have sexual fantasies

a. during intercourse? YES NO % time

b. during masturbation? YES NO % time

c. at other times? YES NO % time

3. Do you always feel this way or are there times or situations when you have a strong interest/desire in sex?

If client **is currently depressed (or has another Axis I) disorder OR **If the client has a medical problem(s) that may be related to his/her sexual functioning: ASK 0. 4. otherwise SKIP to 5.

4. Was **your interest/desire in sex low before your problem(s)** with _____ began?

5. Have you ever **been sexually abused,** raped, or **had a very** negative experience associated with sex?

If yes, what affect did this experience have on your sexual behavior?

a. avoid all/most sexual behavior
b. relationship difficulties; trust
c. pain
d. OTHER

SEXUAL AVERSION DISORDER

6. Do you avoid engaging in sexual behavior with your/a partner?

7. If in a relationship: Who usually intiates sexual activity in your relationship?

8. Do you experience anxiety or worry when you think about engaging in sexual behavior with your/a partner?

If yes, what types of things do you say to yourself?

-performance self statements
-failure self statements
-concern about pleasing partner
-concern/worry about sexually transmitted diseases
-more general cognitive interference

9. **Do you fear engaging in sex?**

If client is currently depressed (or has **another Axis I such as I OCD disorder)** I or **If the client has a medical problem(s) that may be related to **his/her sexual functioning: (ASK** Q.10)

10. Did you avoid/fear sex before your problems with began?

DX:

Hypoactive Sexual Desire Disorder

Sexual Aversion Disorder

Specify: psychogenic only psychogenic and biogenic (biogenic only record on Axis III)

lifelong or acquired generalized or situational

II. MALE ERECTILE DIS0RDER

1. Do you have problems attaining/getting an erection?

2. Do you have problems maintaining/keeping an erection?

3. When did these problems begin? month and year

a. Did the problem come on gradually?

b. Is there a specific event associated with the start of the difficulty?

i. personal stress/emotional problems
ii. illness iii. marital problems
iv. partner stress/emotional problems
v. partner illness
vi. drinking/alcohol
vii. medication
viii. loss of partner

Classify event - Medical or Psychological

4. What percentage of the time is this a problem?

5. Using a 1 to 100 scale, where 1 is no erection and 100 is the best erection You've ever had ...

a. What percent of an erection do you **typically** obtain? _____

b. What percent describes the best erection you can get?_____

6. Do you have a problem with erections during foreplay?

7. Do you have a problem with erections when attempting penetration?

8. Are you able to penetrate?

What percent of the time? _____

9. Do you have problems maintaining your erection, that is, do you lose your erection?

What do you do when you lose your erection? a. quit/give up b. try to get it back - successful or not?

l0. Do you have problems obtaining or maintaining an erection during masturbation?

**If individual describes problems obtaining or maintaining an erection:

11. Do you notice your ability to get an erection depends on the situation?

Partner
Masturbation vs Partner
Stress
Fatigue/Tired

12. Do you have morning erections?

13. Do you ejaculate with intercourse? with stimulation by partner? with self-stimulation?

Subjective pleasure/excitement:

14. How do you feel during sexual activity?

15. Do you experience an orgasm?

Dx:

Male Erectile Disorder

Onset

Specify: psychogenic only, psychogenic, and biogenic (biogenic only record on Axis III)

lifelong or acquired generalized or situational

III. ORGASM DISORDER

1. Do you ever have problems reaching orgasm during sexual behavior?

If yes, Does this difficulty occur with

a. masturbation
b. intercourse
c. foreplay/partner stimulation

2. Does it seem like you are aroused before experiencing this difficulty?

3. When did this difficulty begin?

Is onset associated with events such as

a. Relationship change or length of relationship

b. Change in the pattern of sexual behavior (for example, being used to multiple partners and now has one partner)

c. Stress

d. Medical problem

Dx:

Inhibited Male Orgasm Onset

Specify: psychogenic only **psychogenic and biogenic (biogenic only record on Axis III)**

lifelong or acquired generalized or situational

IV. PREMATURE EJACULATION

1. Do you ever experience problems ejaculating/coming before you are ready to?

Percent of the time:_____

2. Do you consider this a problems?

If client describes a problems ASK q.3, otherwise SKIP to DYSPAREUNIA

3. When did this begin?

4. If client indicates he does not ejaculate, inquire about prostate surgery.

5. Do you sometimes ejaculate before penetration, when you do not want to?

Does this occur after stimulation or is thinking about sex enough?

6. Do you ejaculate immediately after penetrating or in a shorter time than you wish?

Estimate the length of time _____

7. How long before you ejaculate during masturbation?

8. Do you have problems controlling your erections, that is having erections when you do not want to generally because it is embarrassing?

9. Do you notice that changes in the situation make a difference, for example:

a. partner attractiveness b. novelty of the situation c. length of time since last sexual experience or ejaculation d. oral sex e. what other factors influence latency to ejaculation (increase or decrease)?

10. Have you tried any of the following to delay ejaculation:

a. alcohol percent of time used

b. drugs

c. numbing cremes/ointments

d. thinking of un-arousing things

e. withdrawal/ceasing stimulation

DX:

Premature Ejaculation

Onset

Specify: psychogenic only psychogenic and biogenic (biogenic only record on Axis III)

lifelong or acquired generalized or situational

V. DYSPAREUNIA

1. Do you ever experience pain associated with sexual activity?

2. Does this occur before, during, after sexual activity?

Describe problem:

3. When did this problem begin?

4. Does this occur across all situations?

5. Assess whether this is due to lack of partner's **lubrication or** difficulty penetrating due to vaginismus.

DX:

Dyspareunia Onset

Specify: psychogenic only psychogenic and biogenic (biogenic only record on Axis III)

lifelong or acquired generalized or situational

COMMENTS:

Appendix F

Semi-Structured Clinical Interview for Axis I DSM-IV Disorders

Screening Questions

Appendix G

Medical Information Form

MEDICAL INFORMATION FORM

A. Identifying Data:

Name: _____ Home phone: ( ) _____

Address: _____ Marital Status: _____

_____Date of Birth: _____

Occupation: _____ Work phone: ( )_____

Married ____Yes

Single, never married ____Yes

Divorced ____Yes

Widowed ____Yes

B. 1. Do you receive regular medical care from a physician or clinic? ☐ No ☐ Yes

If yes, please provide the following information:

Name of Physician or Clinic: _____

2. Have you been evaluated by a urologist? ☐ No ☐ Yes

If yes, please provide the following information:

Name of Physician or Clinic: _____

3. Have you ever had to be hospitalized? ☐ No ☐ Yes If yes, complete the following:

Year	Doctor's Name	Name of Hospital	Reason
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

4. Have you ever had surgery, or been advised to have surgery? ☐ No ☐ Yes If yes, complete the following:

Year	Doctor's Name	Name of Hospital	Name of Operation or Procedure
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

C. Personal Medical History:

1. Have you ever been told you had any of the following medical conditions?

	NO	YES	When/Explain	If yes, are you currently being treated or followed for these problems
Heart Disease				
High Blood Pressure				
Diabetes or High Blood				
Cancer				
Thyroid Disease				
Depression				
Alcoholism				
High Cholesterol				
Low Testosterone				
Other Hormone				
Prostate problem,				
Anxiety or Stress				
Spinal cord, neck or				
Back problems				
Drug Addiction				
Gall Bladder Problems				
Digestive Disease				
Kidney Disease				
Peptic Ulcers (stomach				
Colitis				
Meningitis or				
Tuberculosis				
Stroke				
Rheumatic Fever				
Asthma				
Birth Defects				
Gout				

(a) Have you ever had any other disease? ☐ No ☐ Yes If yes, explain:

_____

_____

_____

(b) What is your current weight?_____ lbs. __estimate __actual

(c) What is the most you have ever weighed? _____ lbs. When? _____

(d) Have you recently lost or gained any weight? ☐ No ☐ Yes

(e) Can you explain any recent weight loss or gain? _____

_____

2. Have you recently had any of the following tests?

	No	Yes	When	Results
Physical Exam				
Blood Tests				
Hormone Levels				
Electrocardiogram (EKG)				
Blood Flow in penis (Doppler Study)				
Penis Injection (Papaverine)				
Nocturnal penile tumescence				
Other				

3. Are you in the habit of using any of the following?

	Amount Currently Using	Most Ever Used	When Stopped Using
Coffee (cups/day)			
Cigarettes (packs/day)			
Alcohol (amount and types of alcohol used daily)			
Vitamins			
Sleeping Pills			
Aspirin			
Laxatives			
Diet Pills			

4. Are you currently on any medication? ☐ No ☐ Yes
If yes, please give name and dosage: _____
_____

5. Have you ever used any of the following medications for your mood, nerves, sleep, pain, or energy level?

(Circle the ones used.)

	No	Yes	When/How Long	How Much/Reason
Dilantin, Tegretol, L-Dopa, Cogentin, Artane				
Medication for anxiety , stress or nerves				

(Xanax, Valium, Librium, Serax, Dalmane. Tranxene, Ativan, etc.)				
Medication for depression (Prozac, Wellbutrin, Elavil, etc.)				
Lithium				
Thorazine, Mellaril, Stelazine, Navane, Haldol, Prolixin Injection, Loxitane, Moban, Serentil				
Phenobarbital, Seconal, Tuinal, Other barbiturates				
Amphetamines, Ritalin, Other stimulants				
Codeine, Methadone, Percodan, Dilaudid, Talwin, Darvon, Demerol, other prescription pain killers				
Other				

6. What type(s) of treatment have you tried for your sexual difficulties?

	No	Yes	When	How successful/helpful? (Please rate from 0-5, 0=no change) Please describe
Testosterone Injections				
Testosterone Patch				
Other hormone Replacement (Specify):				
Vacuum Pump (ErecAid)				
Penis Injection (Papaverine)				
MUSE				
Medication(s) (Specify):				
Surgery or Penile Implant				
Self-help books/videos				
Creams/Ointments				
Psychological Treatment (Sex Therapy, Marital Therapy)				

Other (Please Specify):				

D. Personal Psychiatric History:

1. Have you ever received any previous psychiatric or psychological evaluation or treatment?

☐ No ☐ Yes If yes, complete the following:

Year	Reason	Medication Used (if any)
_____	_____	_____
_____	_____	_____
_____	_____	_____

2. Have you ever attempted suicide in the past? ☐ No ☐ Yes

If yes, complete the following:

Year	How did you attempt suicide?	What happened?
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

E. Review of Your Current Health:

1. Do you have? or **Have you ever had?**	**No**	**Yes**		**No**	**Yes**
Lumps anywhere			Unusual excessive thirst		
Double vision or poor vision			Urine problems, blood in urine		
Difficulty hearing			Indigestion, gas, heartburn		
Fainting spells, blackout spells			Stomach pain or stomach ulcer		
Hernia			Groin or Penis Injury		
Sexually Transmitted Disease/HIV			Joint pain		
Convulsion			Diarrhea		
Paralysis			Constipation		
Dizziness			Vomiting, vomiting blood		

Headaches			Blood in stool		
Thyroid problem, goiter			Change in appetite or eating habits		
Skin problem			Trouble sleeping		
Cough or wheeze			Sexual problems		
Chest pain			Weight loss or weight gain		
Spitting up blood			Depression		
Shortness of breath at night or with exercise			Problems with memory, thinking, concentration		
Palpitation or heart fluttering			Suicidal thoughts		
Swelling of hands or feet			Weakness or tiredness		
Visual hallucinations			Other		

Please describe or explain any of the positive answers above

_____

_____

_____

Appendix H

Beck Depression Inventory

Appendix I

Beck Anxiety Inventory

Appendix J

Procedure for Physiological Assessment

Procedure for Physiological Assessment

Feedback Groups

When the subject was ready for the physiological assessment, the experimenter began by re-explaining the procedure to him. The subjects randomly assigned to the experimental feedback group were given the following explanation for the assessment: "We know that current sexual performance influences men's abilities to continue responding and to make predictions about future sexual performance. Men constantly evaluate how they are performing during sex, and their level of responding as compared to their expectations affects their confidence. Men use all kinds of information to evaluate their performance, such as how big their erection appears to be and the response of their partner. In this experiment, we provide an erection score on a monitor to let you know how big your erection is to help you evaluate your performance. The erection score is based on a number of factors such as size, rigidity, temperature, and blood flow. We are interested in finding out how knowing this information affects men's sexual responding, confidence, and predictions about future performance.

"You will watch a series of short videotapes showing a man and woman having sex while we collect all the information we need for your erection score from the strain gauge around your penis. You will not be shown your erection score during the first five-minute session but you will see it during the following sessions. The erection score will be 'real time' meaning that it reflects your score at that exact time and will be displayed continuously throughout those entire five-minute sessions. In addition, you will be asked to predict what maximum score you think you can achieve prior to each session and how much confidence you have in that prediction. An average erection score for a man watching similar erotic videotapes is 12. Possible erection scores range from 0 to 24.

"Do you have any questions before we proceed?" The subject was told he may elect not to participate at any time without repercussions.

No-feedback Group

Subjects randomly assigned to the control (no-feedback) group were explained the following about the study: "We know that current sexual performance influences men's abilities to continue responding and to make predictions about future sexual performance. Men constantly evaluate how they are performing during sex, and their level of responding as compared to their expectations affects their confidence. Men use all kinds of information to evaluate their performance, such as how big their erection appears to be and the response of their partner. In this experiment, we provide an erection score on a monitor to let you know how big your erection is to help you evaluate your performance. The erection score is based on a number of factors such as size, rigidity, temperature, and blood flow. We are interested in finding out how knowing their erection score affects men's sexual responding, confidence, and predictions about future performance.

"You will watch a series of short videotapes showing a man and woman having sex while we collect all the information we need for your erection score from the strain gauge around your penis. However, you have been randomly assigned to a group that will not be shown your erection score while you watch the erotic videotapes. This way we can compare the results of men who see their erection score with men who don't.

"Do you have any questions before we proceed?" The subject was told he may elect not to participate at any time without repercussions.

All Subjects

The subject was then escorted to the sound attenuated chamber where he was instructed how to measure the circumference of the mid-shaft of his penis with a paper strip. The experimenter left the room while the subject disrobed from the waist down and took this measurement. The subject was instructed to call the experimenter, who was in the adjacent control room, via an intercom when he was ready and had his clothes back on. The experimenter returned and retrieved the paper strip with the measurement. The subject was then asked to wait while the equipment was callibrated. The experimenter returned to the control room with the strip of paper used to measure the subject's flaccid penis. He measured the distance of the penile circumference in mm with a ruler and selected a mercury-in-rubber strain gauge that was at least 5-10mm smaller than the flaccid circumference. The experimenter calibrated the polygraph to the strain gauge using a calibration cone. He returned to the sound chamber and provided the subject with the strain gauge. The subject was instructed how to attach the strain gauge around the mid-shaft of his penis. The experimenter left the room while the subject disrobed from the waist down, attached the strain gauge, and sat on the paper-covered reclining chair. The experimenter returned to visually check to make sure the device was properly attached (i.e., around the mid-shaft of the penis and without twists) and placed a sheet of paper across the subject's lap to prevent him from seeing or touching his penis. If the strain gauge was not properly in place, the experimenter re-explained how to place the device and asked the subject to adjust it correctly. Once the gauge was in place, the subject completed the Erection Prediction Questionnaire on a clipboard. The subject was then told that an erotic videotape would begin on the monitor and continue for a few minutes. He was instructed to imagine himself involved in the activity which he saw and was asked not to move the paper covering his lap or touch his genitals. After asking if he had any questions, the lights were dimmed and the experimenter left the room. The experimenter operated the equipment (polygraph and VCR) from the adjacent control room and monitored the subject via intercom. Penile circumference was measured on polygraph chart paper during the five-minute erotic videotape.

Following the first film offset, the experimenter returned to the assessment room and raised the lights. He handed the subject a pencil and clipboard containing the Sexual Arousal Questionnaire. Once the subject completed the instrument, the experimenter handed the subject assigned to an experimental group an Erection Score Prediction Questionnaire and told the subject "In a few minutes you will view another sexually explicit videotape while we measure your sexual responding. Only this time we will show you in the corner of the video screen your "real time" erection score. Remember, your erection score is based on a number of factors including size, rigidity, temperature, and blood flow. An average erection score for a man watching a similar erotic videotape is 12. Possible scores range from 0 to 24. Write down on the Erection Score Prediction Questionnaire the maximum score you think you can achieve when you watch the next videotape and mark the level of confidence you have in that prediction and the maximum size erection you think you will achieve." Control subjects were told "In a few minutes you will view another sexually explicit videotape while we collect the same measurements." All subjects were reminded to imagine being involved in the activities in the film and not to touch themselves. All subjects were asked to complete a questionnaire asking them to rate on a visual analog scale the maximum size erection they thought they could achieve during the film they were about to watch, and how confident they were in that prediction. The experimenter asked the subject if he had any questions and after answering them, dimmed the lights and returned to the control room.

After the subject's penile circumference returned to baseline flaccidity, the second erotic videotape was started on the VCR. If the readout from the genital measure did not return to baseline levels, a return-to-baseline procedure was employed to bring the subject to his basal level. This strategy consisted of asking the subject to count backward by 7s from 100. However, this procedure was rarely necessary given that the subject spent 5-10 minutes completing questionnaires between films.

While the videotape was played, an erection score was displayed for the experimental subjects. Each subject in a feedback group started out with an erection score of 0 and the number increased with incremental increases in penile circumference:

1. Positive Feedback Group. When the subjects in the inflated feedback group reached their maximum erection, their meters reflected scores 4 points higher than they predicted. The erection scores were only even numbers, given the limited range of stored memory on the video display apparatus. Subjects who did not reach maximum erection during the second film were shown their predicted erection score plus 4 points one minute after the point they reached maximum erection during the previous film.

2. No Feedback Group. No score was presented.

Following the second film offset, the experimenter returned to the sound chamber, raised the lights, and handed the control (no-feedback) subject a Sexual Arousal Questionnaire. Experimental groups received the Sexual Arousal and Feedback Questionnaire.

The experimenter then handed the subject assigned to a feedback group an Erection Score Prediction Questionnaire and told the subject "In a few minutes you will view another sexually explicit videotape while we measure your sexual responding. Again we will show you in the corner of the video screen your "real time" erection score. Remember, your erection score is based on a number of factors including size, rigidity, temperature, and blood flow. An average erection score for a man watching an erotic videotape is 12 and possible scores range from 0 to 24. Write down on the Erection Score Prediction Questionnaire the maximum score you think you can achieve when you watch the next videotape and mark the level of confidence you have in that prediction and the maximum size erection you think you will achieve." No-feedback subjects completed an Erection Prediction Questionnaire asking them to rate on visual analog scales the maximum size erection they thought they could achieve during the next film and how confident they were in that prediction. After all subjects accomplished their respective prediction questionnaires, they were told there were no more films or measurements and were instructed to remove the strain gauge and get dressed while the experimenter was out of the room.

Appendix K

Erection Prediction Questionnaire

Film Number:_____ Subject:_____

Erection Prediction Questionnaire

1. Mark on the line the maximum size erection you think you can achieve during the film you're about to watch:

   |_____|

no erection half erection full erection

2. Mark on the line how confident you are that you can achieve the size of erection you predicted:

   |_____|

no confidence medium confidence maximum confidence

Appendix L

Erection Score Prediction Questionnaire

Film Number:_____ Subject:_____

Erection Score Prediction Questionnaire

We know that current sexual performance influences men's abilities to continue responding and to make predictions about future sexual performance. Men constantly evaluate how they are performing during sex, and their level of responding as compared to their expectations affects their confidence. Men use all kinds of information to evaluate their performance, such as how big their erection appears to be and the response of their partner. In the following assessment, as information to help you evaluate your performance, an erection score will be provided for you on a monitor. The erection score is based on a number of important sexual factors such as penile circumference, length, volume, pulse, temperature, hardness, and blood flow. Most of this information is unavailable to men while they are engaged in sexual activity. We are interested in finding out how knowing this information affects men's sexual responding, confidence, and predictions about future performance. You will watch a videotape showing a man and woman having sex while we collect all the information we need for your erection score from the strain gauge around your penis. The erection score will be "real time" meaning that it reflects your score at that exact time and will be displayed continuously throughout the entire session. At this time we would like you to predict what score you think you can achieve while you view the following erotic videotape. An average erection score for a man watching similar erotic videotapes is 12. Possible scores range from 0 to 24.

1. Maximum erection score I will achieve: _____

2. Mark on the line how confident you are that you can achieve the score you just predicted:

|_____|

no confidence medium confidence maximum confidence

3. Mark on the line the maximum size erection you think you can achieve during the film you're about to watch:

|_____|

no erection half erection full erection

Appendix M

Sexual Arousal Questionnaire

Film Number:_____ Subject:_____

Sexual Arousal Questionnaire

1. Mark on the line how sexually aroused you felt during the film you just watched:

|_____|

no arousal medium arousal maximum arousal

2. Mark on the line how anxious, tense, or nervous you felt during the film you just watched:

|_____|

no anxiety medium anxiety maximum anxiety

3. Mark on the line how much confidence you had in your ability to maintain an erection during the film you just watched:

|_____|

no confidence medium confidence maximum confidence

4. Mark on the line the maximum size of your erection during the film you just watched:

|_____|

no erection half erection full erection

5. Mark on the line your level of attention to the film you just watched:

|_____|

no attention medium attention maximum attention

6. Mark on the line your level of attention to your body during the film you just watched:

|_____|

no attention medium attention maximum attention

7. Mark on the line how much control you had over your erection:

|_____|

no control medium control maximum control

Mark on the line how many negative-type thoughts you had during the film you just watched:

|_____|

no negative thoughts lots of negative thoughts

8. Mark on the line how much your thoughts interfered with your ability to maintain your erection:

|_____|

no interference medium interference maximum interference

9. Mark on the line how similar your response was (for example: erection, thoughts, arousal) during this lab experience compared to actual sexual situations:

|_____|

not at all similar very similar

10. List the thoughts you had during the film you just watched:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

Appendix N

Sexual Arousal and Feedback Questionnaire

Subject: _____

Sexual Arousal and Feedback Questionnaire
(After Second Film)

1. Mark on the line how sexually aroused you felt during the film you just watched:

|_____|

no arousal medium arousal maximum arousal

2. Mark on the line how anxious, tense, or nervous you felt during the film you just watched:

|_____|

no anxiety medium anxiety maximum anxiety

3. Mark on the line how much confidence you had in your ability to maintain an erection during the film you just watched:

|_____|

no confidence medium confidence maximum confidence

4. Mark on the line the maximum size of your erection during the film you just watched:

|_____|

no erection half erection full erection

5. Mark on the line your level of attention to the film you just watched:

|_____|

no attention medium attention maximum attention

6. Mark on the line your level of attention to your body during the film you just watched:

|_____|

no attention medium attention maximum attention

7. Mark on the line how much control you had over your erection:

|_____|

no control medium control maximum control

8. Mark on the line how many negative-type thoughts you had during the film you just watched:

|_____|

no negative thoughts lots of negative thoughts

9. Mark on the line how much your thoughts interfered with your ability to maintain your erection:

|_____|

no interference medium interference maximum interference

10. Mark on the line how similar your response was (for example: erection, thoughts, arousal) during this lab experience compared to actual sexual situations:

|_____|

not at all similar very similar

11. Mark on the line how distracting the erection score was:

|_____|

no distraction medium distraction maximum distraction

12. Mark on the line the effect that the erection score had on your level of arousal:

|_____|_____|

decreased arousal no effect increased arousal

13. Mark on the line the effect that the erection score had on your level of anxiety, tension, or nervousness:

|_____|_____|

decreased anxiety no effect increased anxiety

14. Mark on the line the effect that the erection score had on your level of confidence in achieving and maintaining an erection:

|_____|_____|

decreased confidence no effect increased confidence

15. Mark on the line the effect that the erection score had on your ability to maintain an erection:

|_____|_____|

decreased ability no effect increased ability

16. Mark on the line the effect that the erection score had on your attention to the film:

|_____|_____|

decreased attention no effect increased attention

17. Mark on the line the effect that the erection score had on your attention to <u>your body</u>:

|_____|_____|

decreased attention no effect increased attention

18. Mark on the line the effect that the erection score had on your level of control over your erection:

|_____|_____|

decreased control no effect increased control

19. Mark on the line how accurate the erection score was:

|_____|_____|

underestimated accurate overestimated

20. Mark on the line how much control you had over your erection score:

|_____|

no control medium control maximum control

21. Mark on the line how much you tried to change your erection score:

|_____|

no effort medium effort maximum effort

22. Mark on the line how surprised you were by your erection score:

|_____|

no surprise medium surprise maximum surprise

23. List the thoughts you had during the film you just watched:

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____