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EMG MEASURES OF FRONTALIS MUSCLE TENSION FOR SEXUALLY
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by

Dennis Anthony Thoennes

A Dissertation Submitted to the Faculty of the
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For the Degree of

DOCTOR OF PHILOSOPHY

In the Graduate College
THE UNIVERSITY OF ARIZONA

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THE UNIVERSITY OF ARIZONA

GRADUATE COLLEGE

I hereby recommend that this dissertation prepared under my
direction by Dennis Anthony Thoennes
entitled EMG MEASURES OF FRONTALIS MUSCLE TENSION FOR SEXUALLY
SATISFIED AND SEXUALLY DISSATISFIED FEMALES
be accepted as fulfilling the dissertation requirement for the
degree of Doctor of Philosophy

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As members of the Final Examination Committee, we certify
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ABSTRACT

In recent years biofeedback has proven to be of value in many respects. The electromyograph (EMG) has been used in diagnostics as well as in muscle training for people with nerve damage involving various muscle groups. EMG has also been found an effective and expeditious therapy for muscle tension headaches. This particular use of EMG requires placing electrodes on a person's forehead. In the course of treatment he becomes more aware of the level of tension in the forehead muscle (frontalis) and learns how to regulate its level of tension.

Frontalis EMG training has been shown to be more effective than various forms of relaxation training in increasing one's awareness of muscle tension and ability to regulate it. The similarity of the principal components of frontalis EMG training and the technique of sensate focus (used in sex therapy, where a person's awareness and comfortable use of their sense of touch is facilitated) leads to the question: Can frontalis EMG training be a valuable part of sex therapy? Before such a question can be answered it is necessary to explore some preliminary questions. A principal question, and that investigated in this study, is: Do sexually satisfied and sexually dissatisfied females have different levels of frontalis EMG? If so, EMG training could be a particularly valuable dimension of sex therapy.

Using the Sexual Interaction Inventory (SII) and a woman's self-rating of level of sexual satisfaction, twelve sexually satisfied and

twelve sexually dissatisfied subjects were selected for participation in this study. Subjects participated in five one-half hour sessions. During the first session, each completed the Subject's Consent Form, the SII and the Demographic Questionnaire, and was introduced to EMG. Sessions two through five consisted of a subject being in a room alone with a female attendant. Electrodes were placed on the subject's forehead. Subsequently she viewed a film of neutral or highly erotic content, during which time her frontalis EMG level was monitored. After the film was completed and the electrodes removed the subject completed an Adjective Check List, indicating her subjective response to the film. Two films were used in the course of the study.

A 2 x 4 factorial analysis of variance with repeated measures was applied to the data. Level of statistical significance was set at .20. No statistically significant difference was found in subjects' EMG levels between film sessions or between sexually satisfied and dissatisfied subjects. A difference between sexually satisfied and dissatisfied subjects' EMG levels during the initial viewing of the erotic film, and between this film session of the sexually dissatisfied subjects and the sexually satisfied subjects' second viewing of the neutral film contributed to a finding of significant interaction effect ($p < 0.12$). The EMG levels of the sexually satisfied and dissatisfied subjects during the initial viewing of the erotic film were 2.99 uV and 2.25 uV respectively. This indicates only moderate levels of tension.

It was concluded that sexually satisfied and dissatisfied females do not differ with respect to level of tension in the frontalis muscle. Therefore, the value of frontalis EMG biofeedback training in sex therapy is yet to be determined.

CHAPTER 1

THE PROBLEM

Introduction

Human sexual behavior elicits a high degree of interest from a great many people but it has received relatively little scientific attention. The work of Kinsey, Pomeroy and Martin (1948) is widely considered to be the first study of scientific merit in this area. More recently, Masters and Johnson (1966, 1970) have made considerable contributions toward better understanding of human sexual behavior. Yet, the benefits of this research are often unavailable for persons with sexual problems (Schiller, 1976). Sex counseling with Masters and Johnson is beyond the reach of many people's time and financial resources. Likewise, sex therapy that is available in some communities is too expensive and time consuming for a great many people. A more readily available, more expeditious means of therapy is needed.

Biofeedback may prove to be an integral part of this therapy. As a technological means of learning about oneself and gaining control of one's physiological processes, biofeedback is proving to be of value to a large number of people. Self regulation has long been the province of religions and therapies and attainable only through extensive periods of self discipline. However, with biofeedback techniques Basmajian (1963) has shown that control of individual motor units can be achieved by a person in a matter of hours. Budzynski et al. (1974) have

demonstrated that sufferers of chronic muscle tension headaches can experience relief through a series of 16 half-hour electromyograph (EMG) biofeedback training sessions, learning relaxation of the frontalis muscle. Sargent, Walters and Green (1973) have successfully trained persons with migraine headaches to alter blood flow in the fingers and thus alter the intensity and frequency of migraine headaches.

While such research is in very early stages, biofeedback training provides some promise that it may enable persons to know more about themselves than any previously available therapeutic process, know this sooner than ever before, and use this information in an efficient manner to change their experience of themselves and their environment. The importance of an expeditious self awareness, self regulatory process becomes more readily apparent when we recognize the toll exacted by maladjustment to stress (Selye, 1975; Green and Green, 1975; Holmes and Masuda, 1973).

Masters and Johnson (1970), Kaplan (1974), Maddock and Chilgren (1976) identify anxiety as a prime factor in sexual dysfunction and dissatisfaction. Maddock and Chilgren (1976) state "anxiety interferes with the natural receipt of effective stimulation, the buildup of sexual tension, and the focusing of this tension into pathways toward orgasmic release" (p. 372).

Bass (1974) demonstrated the incompatibility of sexual arousal and anxiety by successfully using sexually arousing stimuli to treat anxiety. Green, Green and Walters (1973), Townsend, House and Addario (1975) have done research supporting the efficacy of biofeedback in the treatment of anxiety.

Prior to using biofeedback to help persons increase sexual satisfaction, it would be appropriate to determine the differences in levels of EMG for sexually satisfied and dissatisfied women. If no meaningful differences are found, this may prove to be an inappropriate therapeutic modality for this concern.

Statement of the Problem

This study was designed to examine the basic assumption pertaining to the use of EMG biofeedback training for the enhancement of female sexual satisfaction. Specifically, the problem was this: Do sexually satisfied and dissatisfied women have different levels of frontalis EMG?

Hypothesis

The following general hypothesis were tested in this study: Subjects with Sexual Interaction Inventory (SII) scores indicating sexual satisfaction will have the same frontalis EMG levels as subjects whose SII scores indicate sexual dissatisfaction. For research purposes, more precise hypotheses will be found in the third chapter.

Rationale for This Study

A review of the literature revealed that there has been little investigation regarding the use of biofeedback in the area of sex therapy. Heiman (1975) reports the use of the photoplethysmograph, which measures blood volume and pressure pulse, in the vagina to study female sexual arousal. Bardwick and Behrman (1967) investigated uterine contraction variations in response to sexual arousal, anxiety and phase of menstrual cycle. No studies were found that specifically used

biofeedback or related methods to establish physiological indices of difference between sexually satisfied and dissatisfied women. The use of EMG biofeedback training in therapy for sexually dissatisfied women would assume that the level of EMG for this population differs from that of sexually satisfied women. An initial study regarding such an assumption was necessary. Without such a study the use of biofeedback in this type of sex therapy would be premature.

If frontalis EMG levels differ for sexually satisfied and dissatisfied women, perhaps training subjects with low frontalis EMG levels to regulate frontalis EMG levels will increase sexual satisfaction. If not, then EMG biofeedback training of this muscle would be expected to have only chance relation to change in level of sexual satisfaction.

It is entirely presumptuous, at this stage, to consider EMG biofeedback training as a sex therapy in and of itself. Investigation of its utility as an adjunct to sex therapy is needed. This study is a first step in formulating a response to such a need.

Definition of Terms

The following terms, used in this study, are defined for the purpose of this project.

Sexual Satisfaction: This term refers to the relief, gratification or pleasure one experiences concurrent with or subsequent to sexual activity. This activity may involve fantasy and/or physical stimuli to areas of the body which are considered erotic for the person receiving the stimulation.

Orgasmic Dysfunction: This refers to the impairment of the orgasmic component of the female sexual response. A woman with orgasmic dysfunction may experience erotic feelings, sexual arousal, vaginal lubrication but lacks orgasm. There are varying degrees of orgasmic dysfunction.

Sexual Anesthesia: A woman with this dysfunction may experience the sense of touch upon stimulation of erotic body areas but does not experience sexual arousal or subsequent dimensions of sexual response (Kaplan, 1974).

Sexual Response Cycle: The female response cycle is a physiological process which has been described by Masters and Johnson (1966) as having four phases: (1) the excitement phase; (2) the plateau phase; (3) the orgasmic phase; and (4) the resolution phase.

Biofeedback: This term refers to the technological processes of monitoring any one or more of the bodies' functions and presenting this information to the subject in such a manner that he or she can use this data to increase awareness of said body functions, and alter such functions if so desired.

Electromyography: This will refer to the recording of electrical responses from the muscles (Goldstein, 1972).

Motor Unit: Within each muscle there are a number of muscle fibers innervated by a single nerve fiber. A nerve fiber consists of dendrites, the nerve cell body, its axon and the axon fibrils. The axon divides, like fingers from a hand, and these divisions or extensions are termed axon fibrils. Each axon fibril attaches to a muscle fiber. The

complete motor unit consists of dendrites, the nerve cell body, its axon, the axon fibrils and all the muscle fibers innervated by these fibrils (Goldstein, 1972).

Muscle Action Potential (MAP): Each muscle consists of many separate muscle fibers bound together by connective tissue. When the motor neurons that innervate a muscle fiber are sufficiently stimulated a change occurs in the electrical state of the muscle. The muscle fibers in most muscles do not contract individually but in concert. The sum of these signals of muscle fibers contracting can be recorded at the skin. The MAP is the brief imbalance (depolarization) of the muscle cell which occurs prior to the contraction of the muscle.

Muscle Tension: This refers to the state of contraction of the muscles. Where there is complete relaxation, there is no muscular contraction and consequently no tension. Stimulation of the muscle leads to its contraction and to simultaneous electrical, chemical, structural and thermal changes that result in the MAP. The record of electrical events on the MAP or a series of MAPs makes up the EMG.

Assumptions Underlying the Study

The following assumptions were noted in the execution of the study:

1. The honesty of the subject's responses on the SII will be randomly distributed across subjects.

Limitations of the Study

This study has limitations which restrict the generality of results:

1. The environment where the research will be conducted may introduce an artificial dimension to the subject's responses (Zuckerman, 1971).
2. EMG and MAP do not have a perfectly linear relationship.

CHAPTER 2

REVIEW OF THE LITERATURE

This chapter presents a review of the literature pertinent to this study. This review is presented in three parts. The first focuses on female sexual dysfunction and dissatisfaction. This is subdivided into treatment of terminology, extensiveness of the problem, sex research, and major approaches to sex therapy. The second section attends to biofeedback, electromyography and electromyography research. The third part is composed of a summary and implications of the literature.

Female Sexual Dysfunction and Dissatisfaction

Terminology

Masters and Johnson (1966, 1970), Fisher and Osofsky (1967), Kaplan (1974), and Barbach (1975) mention that the buildup of vasocongestion and myotonia without orgasmic release can be uncomfortable, frustrating and painful for women if this happens repeatedly. Additionally, the experience of the complete sexual response cycle does not necessarily constitute sexual satisfaction. Kinsey et al. (1953) recognized that orgasm should not be used as the only criteria for sexual satisfaction since "considerable pleasure may be found in sexual arousal . . . and in the social aspects of a sexual relationship" (p. 371). Yet, most of Kinsey's data is reported in terms of orgasm, its presence or absence, its placidity or intensity, its frequency or manner of attainment. He

does not stand alone in this respect. Masters and Johnson (1966, 1970), Fisher (1973), and Kaplan (1974) while acknowledging orgasm may not mean one is sexually satisfied, relate most of their findings and considerations to orgasm.

Wallin (1960) presents similarly inconsistent conclusions. He found that for many women intercourse can be a satisfying and enjoyable experience without orgasm, yet, frequency or orgasm in wives is clearly associated with completeness of relief in intercourse and that intercourse without orgasm is associated with frustration and unsatisfied sexual desires.

LoPiccolo and Steger (1974) cite a number of studies done to assess sexual behavior and sexual satisfaction. While many researchers have focused on particular portions of sexual behavior and sexual satisfaction, no method had been developed to assess an individual or couple's sexual relationship in terms of sexual functioning and sexual satisfaction. Their measure, the Sexual Interaction Inventory (SII), appears to have accomplished this end. Sexual behaviors are rather easy to identify and measure, but restricting oneself to such a perspective will not yield information regarding sexual satisfaction. Sexual satisfaction seems to be a term that relates to a wide range of experiences that not only vary across subjects, but for each subject, across time. The behaviors themselves are important in their role as stimuli, but gain meaning primarily by the release, gratification or pleasure that is consequent to them.

Many of the authors reviewed in this study (Masters and Johnson, 1966, 1970; Fisher, 1973; Lobitz and LoPiccolo, 1972; Kaplan, 1974; and

Barbach, 1975) focus on sexual behaviors and dysfunctions and in discussion of their observations incorporate consideration of sexual satisfaction. Sometimes the distinction between sexual behavior and sexual satisfaction is severely clouded.

Extensiveness of the Problem

Terman (1938) in his study of 792 married couples found nearly 33 percent of the women in his study reported that they only "sometimes" or "never" experienced orgasm. He considered this "one of the most puzzling mysteries in the psychology and physiology of sex" (p. 132).

Kinsey et al (1953) introduce their study by stating:

Our data suggest that there may be as many as two-thirds of the marriages which, at least on occasion in the course of years, run into serious disagreement over sexual relationships. In a considerable number, there is constant disagreement over sexual relationships. In perhaps three-quarters of the divorces recorded in our case histories sexual factors were among those which led to divorce (p. 12).

More recently Weiner (1969) stated that as many as 75 percent of the persons seeking professional services of psychiatrists, social workers, psychologists and other specialists in the area of human behavior have sexual problems that require help. A study conducted by Hunt (1973) found that many sex attitudes and practices have changed since the time of Kinsey's work, yet his research demonstrates that 15 percent of the females surveyed reported they "sometimes" or "never" experienced orgasm. This rate is similar to that noted by Kinsey.

Sex Research

Zuckerman (1971) comments that sex research to date has been retrospective (e.g., Kinsey et al., 1948, 1953; Hunt, 1973), physiological and anatomical (e.g., Masters and Johnson, 1966, 1970), but not very quantitative. There have recently been some advances in large part due to improvements in methodology and technology.

Kinsey et al. (1953) reported some women state that during the course of sexual intercourse they experience multiple orgasms. Masters and Johnson's (1966) physiological research substantiates this and underscores the significance of the fact that the most frequently reported female sexual dysfunction is orgasmic dysfunction (Kinsey et al., 1953; Masters and Johnson, 1966; Kaplan, 1974).

Various researchers have explored the etiology of orgasmic dysfunction. Fisher (1973) states that the female who considers herself highly sexually responsive is most likely to report that she is consistently orgasmic. He concluded that the females who fear the loss of their partner (love object) experience sexual dysfunction and lack of orgasm. He found no significant relationship between orgasm consistency and partner's sexual interaction techniques, galvanic skin response, source of sex education, her parent's attitudes toward sex, her religiosity, femininity, general mental health, traumatic sexual experiences (or lack of them), sensitivity to stimulation, premarital or marital sexual history.

Masters and Johnson (1970) could find biological basis for only approximately 20 percent of their patient's sexual problems. Such

factors included vaginal lesions and infections, clitoral adhesions and insufficient vaginal lubrication. These situations precurse dysfunctions for only about 20 percent of dysfunctional women. What distinguishes the orgasmic from the non-orgasmic female (other than the experience of orgasm)? Perhaps a more appropriate statement of the question is: What is it that facilitates orgasmic experience for some women that is missing in the experience of the non-orgasmic woman?

The work of Masters and Johnson (1966, 1970) and Kaplan (1974) presents a different perspective than that of Fisher (1973). Kaplan (1974) observes that satisfactory sexual functioning consists of three primary components:

First, a woman cannot respond unless she is properly stimulated. Second, she must be sufficiently relaxed during lovemaking to be able to respond to this stimulation and to abandon herself to the experience. Finally, even if these first two conditions are met, the woman's sexual functioning will still be impaired if she suffers from a specific learned inhibition of her orgasmic response (p. 347).

Masters and Johnson (1970) view the harmonious interaction of a woman's biophysical and psychosexual systems as the prerequisite for satisfactory sexual experience. If a woman's value system is not compatible with sex behavior or a specific sexual situation, it will have a high probability of being a non-orgasmic, non-satisfying experience. Likewise, if a woman's attention is devoted to consideration of future chores or obligations or is anticipating fireworks to light the sky and bells to ring when orgasm occurs, her psychosexual system is not congruent with the immediate realities of sexual intercourse and so she may have a very reduced response to the current experience.

A huge array of experiences a woman has as she grows up and lives may contribute to the development of dissonance between her biophysical and psychosexual systems. The resulting tensions and anxieties are grist for sexual orgasmic dysfunction, dissatisfaction and frustration.

Selye (1956, 1961, 1975) has done some research pertinent to this area of concern. He states that it may not be stress so much as the person's maladaptive reactions to stress which precurse dysfunction and dissatisfaction in a vast series of human enterprize. Stress is the wear and tear incurred by our body during normal usage. Distress is damaging or unpleasant stress. Maladjustment to stress can result in high blood pressure, cardiac disease, various types of arthritis, duodenal ulcers and sexual dysfunction.

When the various values, ideas, interests and experiences of a person are not at least minimally consistent adaptive reactions, such as Selye talks of, are likely to occur. Masters and Johnson (1970) support this concept with their research. The cacophony of sexually related mandates, permissions and restrictions may reach such a pitch it is not surprising that a large number of women experience sexual dysfunction and lack of satisfaction.

Zuckerman (1971) reviews a plethora of studies of physiological measures of sexual arousal in the human. He points out that sex research is largely still in the early exploratory stages and that this is due mainly to the sexual taboos present in our society. Few of the studies cited by Zuckerman attempt to identify levels of sexual satisfaction of females and physiological measures of sexual arousal in females.

Bardwick and Behrman (1967) found sexually anxious subjects had stronger uterine contractions than non-anxious subjects when presented with sexually relevant stimuli.

Using erotic, romantic and neutral printed material, Heiman (1975) found females are as arousable as males. The vaginal photoplethysmograph used in this study and the intricate measuring of uterine contractions by Bardwick and Behrman (1967) may offer some valuable information but present considerable technological, legal and ethical difficulties to the professional person offering sex counseling and therapy.

Zuckerman (1971) points out:

Until recent times sexual response has been considered a semi-private matter beyond the realm of scientific study. Confronted with prying experimenters attaching electrodes, penile plethysmographs, vaginal devices, and showing pornographic stimuli, many subjects might be inclined to inhibit voluntary response (p. 321).

Such confounding dimensions of sex research may not be able to be eliminated but should be taken into account when designing and reviewing such studies. Perhaps this pertains to the confusion discussed above regarding terminology. Orgasm is a physiological, overt event but assumes a semblance of meaning for humans when considered in terms of not so easily measured constructs as satisfaction and pleasure. For this it appears necessary to rely on subjective impressions of the subject's self report (e.g., Sexual Interaction Inventory).

Major Approaches to Sex Therapy

The following is a review of some of the primary therapies for alleviating orgasmic dysfunction or lack of sexual satisfaction. These

are labeled by the principle author(s) in the following order: (1) Masters and Johnson; (2) Kaplan; (3) Albert Ellis; (4) Wolpe and Lazarus; (5) Lobitz and LoPiccolo; and (6) Barbach.

Masters and Johnson. A therapy model that has been widely used and adapted is that of Masters and Johnson (1970). They involve the couple in therapy for 14 consecutive days. This consists of gathering an extensive history of both the male and female, sensate focus exercises, education about male and female anatomy and physiology, and extensive discussions pertinent to the concerns of the couple. During the history taking the partner's prevailing sexual attitudes and values, receptivity and levels of responsivity are described. This information is increased during the daily discussions. Masters and Johnson (1970) note:

. . . defining the etiology of the presenting sexual inadequacy does not necessarily provide the basis for treatment. A reasonably reliable history is indispensable, but it is used primarily to provide interpretive direction and to amplify definition to that which is of individual significance (p. 296).

During the first two days, the history taking and medical examinations are completed. The ensuing days are made up of discussions including the male and female therapists and the couple. During these discussions anatomical and physiological information is presented as needed. The daily discussions help therapists and clients see to what extent the needs and desires of the couple are being responded to and how they might be changing. The authors repeatedly stress that:

It seems more accurate to consider female orgasmic response as an acceptance of naturally occurring stimuli that have been given erotic significance by an individual sexual value system than to depict it as a learned response (1970, p. 297).

Therapy focuses on removing or putting aside tension provoking behavior and focusing on things the female finds to be sexually stimulating. Ways and means of doing this are suggested by the therapists. Verbal and nonverbal communication are used to bridge the sexual feelings and sexual thinking. A means of communication that is important is sensate focusing. This method affords non-threatening, non-goal directed couple communication as well as facilitating self awareness and integration of stimuli and emotions. This begins in a nongenital manner with the male touching, stroking non erotic areas of the female's body in ways that she finds pleasurable. Each such session in their private quarters is subsequently discussed with the therapists before they are given permission to proceed to contact that is increasing erotically stimulating. The purpose of this process is not bombardment but psycho-sexual pleasuring and sensitization. The experience of orgasm is nurtured in this warm and supportive environment.

Kaplan. The therapeutic process employed by Kaplan (1974) for orgasmic dysfunction or dissatisfaction is very similar to that of Masters and Johnson described above.

Treatment of both male and female versions of orgasmic retardation is based on the same principle, namely, gradual in vivo extinction of the unwelcome inhibition. In both disorders the therapeutic strategy is (1) to enhance the stimulating aspects of the sexual situation to maximum, and thereby increase ejaculatory and orgasmic urgency; (2) to concomitantly effect a progressive diminution of the anxiety associated with orgasmic release; and (3) to distract the inhibited person from his [or her] involuntary tendency to exert conscious control over the orgasmic reflex (p. 251).

Kaplan points out that stress, depression, fear and anxiety can have a very inhibiting influence on sexual response and satisfaction. Notably,

some women may physiologically experience sexual response but be "cut off" from their erotic sensations by a psychological defense mechanism.

Furthermore, Kaplan notes,

. . . approximately 80 percent of sexually dissatisfied persons can be relieved of their symptoms by sex therapy which limits intervention to modifying the immediate obstacles to satisfactory sex functioning, without concomitant changes in basic personality structure or of the marital relationship (p. 190).

Kaplan states that freedom from sexual dysfunction, inhibition and dissatisfaction is not a sufficient goal for sex therapy. Therapy should go beyond and "attempt to teach the partners to create a loving and tranquil ambience and to maximize the sensuous and psychic stimulations which potentially can enhance and amplify the pleasurable aspects of sexuality" (p. 43).

Albert Ellis. Ellis has written extensively on sexual issues (1954, 1958, 1960; Ellis and Harper, 1971) and Ard (1974) discusses the use of some of his ideas on Rational Emotive Therapy in the treatment of sexual dissatisfaction and orgasmic dysfunction. Essential to this model is the idea that objects or events do not make us feel or act in a particular way, rather it is our own ideas, values and attitudes that interlace our perception of objects and events and consequently we experience certain feelings and emotional responses. If a person wanted to alter her level of sexual satisfaction, in therapy and with various types of homework, she would be assisted by her therapist to explore and challenge irrational and illogical ideas and beliefs. Subsequent to these changes, alteration in level of satisfaction would be anticipated to occur.

Wolpe and Lazarus. Wolpe (1958) and Lazarus (1963) effectively used a model based on learning theory in treatment of sexual dysfunction.

Therapy involves the client's learning to relax and then proceeding through a hierarchy of sex related anxiety producing events or items which have been arranged in a least to most anxiety order by the client. The client works through the hierarchy with the therapist, learning to maintain relaxation while confronted with events which were previously associated with increasingly intense levels of anxiety. Lazarus reports success with this approach in nine of sixteen women whose primary problem was "persistent, recalcitrant frigidity."

Lobitz and LoPiccolo. Based largely on the models of Wolpe (1958) and Masters and Johnson (1966, 1970), Lobitz and LoPiccolo (1972) have developed a behavior modification model for couples which has proven effective.

When physical pathology has been ruled out these authors consider sexual dysfunction to be a learned phenomenon, maintained by such factors as performance anxiety and/or a non-reinforcing environment. Often lack of sexual skill, insufficient knowledge, or poor communication contributes to the dysfunction and dissatisfaction.

This therapy model incorporates an array of behavior techniques in training couples to alter sexual behavior and satisfaction. For example, performance anxiety is treated by in vivo, graded exposure tasks similar to that Wolpe (1958) described above. Interpersonal sexual skills are taught by therapist modeling and client role playing. Clients actively participate in planning the final three or four sessions of the 15 session sequence. This, in combination with a written behavioral maintenance program has been found effective in supporting and extending treatment gains.

Barbach. Barbach (1974, 1975) utilizing the work of Masters and Johnson, and Lobitz and LoPiccolo, has been working with women in a group treatment program. While most of the components are similar to the other models of therapy reviewed above, Barbach's treatment program differs in that it is used with a group of women with partners not directly involved in the therapy process.

Summary

The primary therapies for female orgasmic dysfunction and sexual dissatisfaction differ somewhat in theory and methods but merge in their placement of importance on the woman's full involvement in the present moment, in her allowing herself to bring her attention and energy into the experience of right now, and freely reveling in it.

Biofeedback

Biofeedback, as defined for the purposes of this study, is a recent phenomenon which has grown out of a tradition of self-regulation. Research regarding the utility of biofeedback has focused on highly specific needs and further research is called for in order to establish the value of biofeedback in a wider area of application.

Following the state of arousal due to some form of physical exertion or simply the experience of some stimulus in his environment, man has long sought to relax and recoup. Stoyva and Budzynski (1975) mention that "individuals forced frequently to mobilize themselves to meet stresses are likely to lose their ability to execute the opposite response, i.e., to shift into the parasympathetic mode in which bodily

recuperation normally occurs" (p. 265). In order to gain the desired state, many people have used some form of drug. Benson, Beary and Carol (1975) note that the process of relaxation has historically been associated with a large array of religions (e.g., Christianity, Judaism, Zen, Yoga, Shintoism and Taoism). The "way" to this experience was long and arduous. In 1910 Johannes Schultz (Luthe, 1969) developed a system of self-regulation which brought together concepts and practices from medical research, particularly hypnosis, and Yoga. This system, called Autogenic Training, was handicapped by the many months, or years, it required for the patient to learn it. Jacobson (1938) shortened the process and made some changes when he introduced Progressive Relaxation (PR). PR advanced the process of self-regulation somewhat but remained inefficient and impractical for most purposes.

Technological developments following World War II have shortened the processes necessary to gain the benefits of earlier methods leading to self-regulation. The human potential to modify and control behavior and particularly one's internal processes is no longer restricted in its realization to the few stalwart disciples of some religion or therapeutic method (Brown, 1975; Kanfer and Karoly, 1974; Miller, 1975; Blanchard and Young, 1975).

Electromyography

Electromyography (EMG) can be used as a method of biofeedback. EMG refers to the monitoring of electrical signals from the muscles. In order to do this one can use needle or surface electrodes. Needle electrodes penetrate the epidermis and monitor select portions of neural

activity in a particular area of a muscle. A method that more readily lends itself to clinical application is the use of surface electrodes. The electrode is a metal disc (e.g., silver, silver-chloride) about one-half inch in diameter. Two electrodes are placed on a selected muscle (e.g., frontalis or masseter) and they monitor the MAPs in that vicinity. One must take care to remove body oils, cosmetics, and the outer layer of the epidermis which impair accurate monitoring. Precautions must be taken to place electrodes properly (Venables and Martin, 1967) so desired muscles are monitored and their signal not made indistinguishable by signals from proximate muscles, heart or brain signals. Geer (1975) and Heiman (1975) note these concerns specifically in regard to difficulty of monitoring a person during sexual behavior. Budzynski (1974) describes the essential components to an adequate EMG system. It amplifies the monitored signal which can then be made available to the subject visually and/or audibly. The EMG system can be equipped with filters which act to delete artifacts of the signal originating from sources in the room or other body functions such as heart action and brain rhythms.

Electromyograph Research

Budzynski, Stoyva and Adler (1971) and Budzynski et al. (1974) demonstrated the value of EMG for persons suffering from tension headaches. Using the frontalis (forehead) muscle, subjects in these studies were able to reduce EMG level considerably and almost completely eliminate headache activity. A three month follow-up found success had been

maintained. The work of Green (1969), Green, Green and Walters (1970, 1971, 1973), Green and Green (1975), and that of Wickramasekera (1974) supports the findings of Budzynski et al. (1974)

Raskin, Johnson and Rondesvedt (1974) and Townsend et al. (1975) have found EMG frontalis muscle relaxation training to be helpful in the treatment programs of psychiatric patients suffering from chronic anxiety. Haynes, Moseley and McGowan (1975) found frontalis EMG relaxation training significantly more effective in lowering frontalis EMG levels than "abbreviated relaxation training" or Jacobson (1938) relaxation instructions. Coursey (1975) showed that "EMG feedback is more effective in lowering a specific muscle [frontalis] throughout training than either simple verbal instructions or the reduction achieved by the subject's own unaided efforts" (p. 831).

Research studying the impact of reduction of frontalis EMG levels on a person's life generally, has been essentially anecdotal. Stoyva and Budzynski (1975) report subjects with low levels of frontalis EMG were similar to those Green et al. (1970) mentions in that decreased heart and respiration rates were exhibited along with increased warmth, sensations of heaviness and tingling of the limbs, increased salivation, drowsiness and hypnagogic (sleep onset) imagery. In his follow-up for tension headache subjects, Budzynski (1974) found both treatment group subjects and control subjects who received "pseudo-feedback" reported decreasing severity or frequency on items such as depression, tension, anxiety, irritability and sexual disinterest. Budzynski's design and intentions were focused on tension headaches and the response regarding sexuality were to only two items, so further investigation is warranted.

Biofeedback has advanced man's opportunity to know and regulate his behavior and internal processes far beyond previously available methods. Caution must be exercised in claiming the extent of its benefits (Blanchard and Young, 1975; Miller, 1975; Schwartz, 1974). There are many complex dimensions to man and their interaction is intricate. Green et al. (1971) postulates a "psychophysical principle" which states:

Every change in the physiological state is accompanied by an appropriate change in the mental-emotional state, conscious or unconscious, and conversely, every change in the mental-emotional state, conscious or unconscious, is accompanied by an appropriate change in the physiological state (p. 4).

Further research of the complexities of human functioning is necessary to extend the self-regulatory capacities of man. In this respect EMG may lead to tremendous benefits.

Implications of the Literature

Sex research, of a scientific nature, has been severely impaired by cultural taboos. It has been found that amongst females, orgasmic dysfunction is the most prevalent sexual dysfunction. This is infrequently due to biological impairment. A woman can become unaware and "out-of-touch" with various body areas. This may be due to the fact that learning of sensuality of body areas was prohibited or not fostered. Likewise, a woman may have experienced strong, conflicting, value laden directions regarding erotic areas of her body and certain sexually related behaviors. A means of resolving this dissonance, for some women, is to become unaware or insensitive to the stimuli. Sexual satisfaction is related to manner and location of stimulation but highly determined by the individual's attitudes and values pertinent to their own sexuality.

To experience sexual satisfaction a woman needs sufficient and appropriate erotic stimulation. Additionally, she needs the personal freedom to be aware of and revel in this experience.

EMG biofeedback training has proven valuable in assisting people to become aware of particular body processes and regulate them, thereby enhancing pleasure or reducing pain. In many respects this is a passive volitional process (Green et al., 1971), that is, the person does not make a muscle relax but becomes aware of it and helps it or allows it to relax.

It appears the process of sex therapy and biofeedback are very similar in their focus on the role of increased awareness of body functions and stimuli, relaxation and/or removal of inhibitions to functioning, allowing "normal," healthy functions to occur without restrictions imposed by the individual.

The congruence of these major dimensions of biofeedback training and sex therapy indicate a very possible benefit for sexually dissatisfied persons if biofeedback training can be included as part of their sex therapy.

Before such a study is initiated, it is necessary to identify what form of biofeedback would be most appropriate and with what particular body process. The frontalis muscle is readily available. It is easy to attach EMG surface electrodes there. Relaxation training of this muscle has shown that it is amenable to EMG biofeedback training. Relaxation of this muscle correlates highly with decreased level of self-reported anxiety and increase in self-regulation, self-awareness

processes. Using this mode of biofeedback (EMG) and this muscle (frontalis), a necessary preliminary step is to see if EMG levels differ between sexually satisfied and sexually dissatisfied women.

CHAPTER 3

RESEARCH METHODOLOGY

The purposes of this chapter are: (1) to describe the population, the setting, the apparatus, measures and investigatory procedures; (2) to describe the research design; (3) to delineate the statistical treatment of the data.

Population

The population in this study consisted of women who initially learned of the research project from their physicians, associates or from notices placed at a variety of locations on the university campus (e.g., Student Health Service, Women's Drop-In Center). Subjects were initially screened according to the following criteria: (1) heterosexual orientation; (2) between the age of 18 and 45; (3) not using any prescription medications other than birth control pills; (4) considered healthy by herself and verified as such by a recent medical exam (i.e., at a minimum this means the subject is not suffering from any known disability or pathology); (5) sexually active; (6) not pregnant. Prospective subjects who met these criteria were further informed about the study by being given the "Letter of Introduction" (Appendix A), if they had not read it prior to this time. If a subject met the six criteria and was interested in being a subject after reading the "Letter of Introduction" the first of five appointments was scheduled. During

this session subjects read and signed the "Subject's Consent Form" (Appendix B) and completed the "Demographic Questionnaire" (Appendix C). Also during this session each subject was introduced to EMG.

Subjects for the study were selected from those women who completed the first session. Women considered sexually satisfied, for the purposes of this study, were those who rated themselves a 5 or 6 on the self-rating scale and their SII scores on the Female Pleasure Mean (Scale #9) were 5.5 or above. Those women considered sexually dissatisfied rated themselves 1 to 4 on the self-rating scale and had scores on the SII ranging from 3.8 to 5.0. Women with SII scores 5.1 to 5.4 were not selected to participate in the study. This was done in order to maximize the variance between the sexually satisfied and dissatisfied groups (Kerlinger, 1973).

Satisfied and Dissatisfied subjects differed little on descriptive items (Demographic Questionnaire). They attended religious services "once-in-awhile" or "rarely" and ranged in age from 19 to 39. Sexually satisfied subjects had lived at their current residence for 2.5 years, the dissatisfied subjects for an average of 1.5 years. No subject had used heroin. About eighty-five percent of the subjects report they had used marijuana (equally in both sexually satisfied/dissatisfied groups). Additional descriptive data fails to portray remarkable differences between the two groups (Table 1).

Table 1. Descriptive Data

Characteristic	Groups		Standard Deviation
	Satisfied (mean values)	Dissatisfied	
Age (years)	26.41	26.66	4.91
Education (years)	16.25	14.66	2.16
Contraception (1=yes,2=no)	1.00	1.16	.28
SII (scale #9)	5.88	4.58	.03(S)/.16(D)
Self-Rating	5.16	2.50	.15(S)/.64(D)
(absolute frequency)			
Marital Status	4	married	4
	6	single	8
	2	single, living with mate	0
Kind of Contraception	0	nothing	3
	7	Birth Control Pill	1
	3	IUD	2
	1	Diaphragm	3
	1	Condom	1
	0	Sterilization	2
Income Level	2	5,000 and less	7
	4	6,000 to 8,000	3
	3	10,000 to 12,000	0
	2	13,000 to 15,000	1
	1	16,000 to 20,000	0
	0	21,000 to 25,000	0
	0	26,000 and above	1
Occupation	1	unemployed/student	3
	7	professional/technical managerial	5
	4	clerical/sales	1
	0	service	2
	0	miscellaneous	1

Setting

The procedures described in this study were carried out at the Student Counseling Center's Annex office located in the student family living complex in Tucson, Arizona. Subjects sat in a large chair placed 12 feet from the film screen. EMG equipment, movie projector and female attendant were in the same room as the subject but remained out of the subject's visual field during the showing of the film.

Treatment

Subjects participated in five one-half hour sessions. The first session involved the subjects reading and signing the "Subject's Consent Form" (Appendix B), completing the "Demographic Questionnaire" (Appendix C) and the SII, and being introduced to the EMG (using the forearm for electrode placement). The following four sessions were scheduled to occur every other day, at times compatible with the subject's time demands. Each session began by cleaning the skin on the subject's forehead with isopropyl alcohol and cotton. Electrodes were affixed following standard procedures (Venables and Martin, 1967). Each subject was instructed to sit back and relax, keep her eyes open and keep general body movement to a minimum during the film presentation. Electrode impedance was monitored before and after each film. All such readings were below 15,000 ohms. During the course of "treatment" (i.e., watching the film) each subject was shown two films, each film was seen twice per subject (one film per session). One film was of erotically neutral content (e.g., general landscape, color, no sound) and one film was of highly erotic content (i.e., "Heterosexual Intercourse," n.d., color, no

sound; Heiman and LoPiccolo, 1976). Each film was shown for approximately the same amount of time (15 minutes). Following post film electrode impedance monitoring, electrodes were removed. At this time the subject completed a brief adjective rating scale (Adjective Check List, Appendix D) to indicate how she felt following the film (Table 2).

Subjects were given ten dollars upon completion of the fifth and final session. Any subject who completed the first session but was not selected to complete the study was given two dollars for their time and participation.

Apparatus

The Projector

A Bauer 8/super 8 mm projector was located 15 feet from the screen. This projected an image measuring approximately three feet by four feet.

The EMG

The Autogen 1700, manufactured by Autogenic Systems Incorporated, was used to monitor frontalis muscle action potentials. The electrode assembly consisted of three silver/silver chloride electrodes, each embedded in a plastic insulator disc and attached to a shielded cable. The bandpass of 100 to 200 Hz. was used. This instrument performs integral averaged EMG amplitude quantification. Peak to peak readings can be obtained by multiplying microvolt levels reported in this study by 3.14.

Table 2. Flow Chart for Subjects

Events*	1	2	3	4	5	6	7	8	9
						Session 2	Session 3	Session 4	Session 5
	S	LI	Phone	1st Session	E ₁	E ₂	N ₁	N ₂	Follow-up
	S	LI	Phone	1st Session	N ₁	E ₁	N ₂	E ₂	Follow-up
Time, in days	1	2	3	7	10	12	14	16	1 to 4 mo.

*Events

1. The subject first learns of the study
2. She reads the "Letter of Introduction"
3. She calls to find out more about the study and/or to schedule the first session
4. During the first session questionnaires, consent form filled out and EMG is introduced
- 5-8. Subjects are shown the erotically neutral film (N₁, N₂) or the highly erotic film (E₁, E₂)
9. Individual subject's own data and general results of the study are shared with interested subjects

The output mode of Instantaneous Absolute EMG was connected to Input Connector S2 of the Autogen 5100 Digital Integrator. This provided the computation of the time integral function, which is the cumulative average value of the EMG signal. The period of time selected was one minute. The attendant recorded this data each minute when it appeared on the digital display.

Each of these instruments is powered by two 9-volt batteries. Each instrument was inspected by the Bio-Medical Engineering Office, University of Arizona Health Sciences Center to verify that neither posed the possibility of harm to a subject.

Measures

Sexual Interaction Inventory

The SII was developed by Joseph LoPiccolo and Jeffrey Steger (1974). This is a self-report instrument designed to assess level of sexual functioning and satisfaction for couples. Responses from each partner are summed across 17 items. The totals are then used to get an 11 scale profile for the couple. For the purpose of this study only scale nine, the Female Pleasure Mean was used. This scale gives the best indication of general sexual satisfaction of the 11 scales and can be interpreted without needing a male partner's SII.

In discussing basic concepts of validity, Anastasi (1976) states that "construct validity is a comprehensive concept which includes the other types [of validity]" (p. 159). In this presentation Anastasi states that there are four primary measures of construct validity.

They are: (1) effect of experimental variables (e.g., treatment) on test; (2) criterion validity; (3) internal consistency; and (4) convergent validity.

LoPiccolo and Steger (1974) present data pertinent to the first three measures of construct validity:

1. Effect of experimental variables on test scores. The authors of the SII report pre-post treatment means for 16 client couples and found all 11 scales differed at a level of 0.05 or better (e.g., 0.01). This indicates that all scales of the SII are reactive to treatment and thus support the construct validity of this instrument.

2. Concurrent criterion related validity is relevant to tests employed for diagnosis of existing status. Two studies pertinent to this concern are reported by LoPiccolo and Steger. The first found relationships between nine of the scales and couples' self-rating (on a scale of 1 to 6) of sexual satisfaction, that were significant at the 0.05 level or better. (The two scales not significant at this level were Perceptual Accuracy Male of Female, and Mate Acceptance Female of Male.)

In the second study, the SII scores of 28 couples seeking treatment for sexual dysfunction were compared with the SII scores of 78 nondysfunctional couples. To strengthen the identity of this latter group as nondysfunctional the same sexual self-rating scale as reported above was used and thus reduced the number of nondysfunctional couples to 63. Nine of the SII's 11 scales were found to discriminate between the two samples at the 0.05 level or better. (The two scales not significantly different at this level were Pleasure Mean Male and Mate Acceptance

Female of Male.) This data supports the validity of this instrument in respect to construct validity.

3. Internal consistency. Cronbach's alpha coefficient for measuring internal consistency was computed for the SII scores obtained from the nondysfunctional sample (n=63) described above. Coefficients range from .795 to .933. This indicates good internal consistency for the SII and further supports its construct validity.

Replication of the studies reported by LoPiccolo and Steger (1974) are currently in progress but data in this respect is currently not available.

Demographic Questionnaire

This measure was constructed by the researcher to obtain descriptive data. In addition to many items which are of general use in research with human subjects (e.g., marital status, occupation, level of education) information was gathered on tobacco, alcohol and drug use. Kaplan (1974) discusses the impact of a variety of chemical agents on sexual behavior. These items were included to discern differences between sexually satisfied and dissatisfied subjects.

Adjective Check List

This instrument provided a means of supplementing the EMG with each subject's subjective descriptive of how she felt following each film session. First, adjectives were arranged in pairs and the subject was instructed to circle that adjective of the pair that most closely described how she felt at the time. Secondly, the subject was instructed

to select, from all the adjectives, the one that most accurately and the one that least accurately described how she felt following the film session.

Research Design

The research design used in this study was similar to the counter-balanced design described by Campbell and Stanley (1963, p. 50) and mixed design discussed by Kirk (1969, p. 246). The independent variables were the film of erotically neutral content (first viewing, N_1 ; second viewing, N_2), and the film of highly erotic content (first viewing, E_1 ; second viewing, E_2). The dependent variable was the EMG recording (O). This design is presented in Table 3.

Table 3. Research Design

Session 2	Session 3	Session 4	Session 5
N_1O	N_2O	E_1O	E_2O
E_1O	E_2O	N_1O	N_2O
N_1O	E_1O	N_2O	E_2O
E_1O	N_1O	E_2O	N_2O
N_1O	E_1O	E_2O	N_2O
E_1O	N_1O	N_2O	E_2O

Subjects were divided into two groups based on their SII scores and self-rating of level of sexual satisfaction/dissatisfaction. Equal numbers of sexually satisfied (S) and sexually dissatisfied (D) were

selected for participation in the study. Two S and two D subjects were randomly assigned to each row (horizontal) of the design. The total number of subjects was 24. Campbell and Stanley (1963) identify eight sources of internal invalidity for research designs. The design employed in this study, as reported by Campbell and Stanley, essentially eliminates seven of these threats to internal invalidity (history, maturation, testing, instrumentation, regression, selection and mortality). The last source of invalidity, interaction, is included in the analysis of results.

Statistical Hypotheses

The following null hypotheses were tested:

$$Ho_1: \mu E_1 = \mu E_2 = \mu N_1 = \mu N_2$$

that is, EMG levels for those in the first viewing of the erotic film will be equal to those in the second viewing of the erotic film which will be equal to those in the first viewing of the neutral film which will be equal to those in the second viewing of the neutral film.

$$Ho_2: \mu S = \mu D$$

that is, EMG levels of the satisfied and dissatisfied will be equal.

Ho₃: there will be no interaction effect.

Statistical Procedures

A 2 x 4 factorial analysis of variance (ANOVA) with repeated measures was used to test the hypotheses stated above (Glass and Stanley,

1970). This mixed design with one between factor and one within factor is graphically represented below:

	E_1	E_2	N_1	N_2
S	EMG	EMG	EMG	EMG
D	EMG	EMG	EMG	EMG

Level of Significance

Levels of significance of 0.05 and 0.01 have become conventional in much behavioral sciences research. Kirk (1969) states that this "convention is based primarily on the notion that a Type I error is very bad and to be avoided" (p. 31). Winer (1971) sees little scientific or logical basis for such a convention and feels that other levels of significance should be considered in appropriate circumstances.

Type I error consists of rejecting the null hypothesis when it is true. Determining to reject the null hypothesis, or retaining it is established by the specific level of significance. Type II error is made when one fails to reject the null hypothesis when it is false, i.e., failing to discern a true difference.

The nature of this study was exploratory. Previous studies of relationships between EMG levels and level of sexual satisfaction are lacking. At this point in time the risk of finding a difference between sexually satisfied and sexually dissatisfied females that is not terribly strong appears to present less of a loss than failing to recognize a difference between the two group's EMG levels when such a difference does exist. A Type II error could prematurely terminate further efforts in

this field and deprive women of a possibly effective means of increasing their level of sexual satisfaction. The level of significance of .20 was used to increase the probability of detecting significant differences.

CHAPTER 4

RESULTS OF THE STUDY

This chapter reports the results of the study. First, the general results are presented. Next, the hypotheses are re-stated and the findings pertaining to each are analyzed. Following this, data from the Demographic Questionnaire and the Adjective Check List are reported. Finally, the results are summarized.

General Results

As a result of the analysis of variance, F values beyond the .20 level of significance were not found for the main effects of the study. A probability level of .12 was found for the interaction. Multiple comparisons between cell means were carried out using the Tukey HSD procedure. Statistically significant differences were found between the satisfied and dissatisfied subject's EMG levels during the initial viewing of the erotic film. A statistically significant difference was also found between EMG levels during the second viewing of the neutral film by the sexually satisfied subjects and the initial viewing of the erotic film by the sexually dissatisfied subjects.

Testing the Hypotheses

The principal statistical procedure applied to the data was analysis of variance with repeated measures. The results of this analysis (Table 4) were used in testing the hypotheses.

Table 4. Summary Table: 2 x 4 ANOVA with Repeated Measures

Source	df	Mean Square	F-Ratio	P
Between	23			
Groups	1	.1691	.678	.58
Error between	22	.2496		
Within	72			
Films	3	.0352	.963	.58
Groups x Films Interaction	3	.0737	2.018	.12
Error within	66			
Total	95			

Hypothesis 1

The first hypothesis, stated in null form, asserts that the EMG levels of the sexually satisfied and sexually dissatisfied will be equal. The analysis of variance resulted in a probability level of .58. The null hypothesis cannot be rejected based on this data.

Hypothesis 2

The second hypothesis, stated in null form, asserts that the EMG levels of subjects in E_1 , E_2 , N_1 and N_2 will be equal. The analysis of variance resulted in a probability level of .58. The null hypothesis cannot be rejected based on this data.

Hypothesis 3

The third hypothesis, stated in null form, asserts that there is no interaction. The .12 probability level indicates significant interaction effect.

The Tukey HSD method of analyzing the variance between cell means was used to determine the source of the interaction. It was found that the EMG level of the sexually satisfied subjects in the initial viewing of the erotic film was significantly different than the EMG level of the sexually dissatisfied subjects in their first viewing of the same film. Also, this EMG level of the sexually dissatisfied subjects was significantly different than the sexually satisfied subject's EMG level in the second viewing of the neutral film. The interaction effects are graphically presented in Figures 1 and 2.

Demographic Questionnaire

Descriptive data obtained from the subject's Demographic Questionnaires was reported in Chapter 3 (in the identification of the population). Items other than the self-rating of level of sexual satisfaction (number 33) do not appear to discriminate between the sexually satisfied and sexually dissatisfied subjects.

Adjective Check List

Seven adjectives provide the essential elements of this instrument (Appendix D) designed to gain information on how a subject felt very shortly after she saw a film. Very similar distributions of subjects can be seen on the rating scales for both groups of subjects (Figures 3 and 4). The most notable difference between the satisfied and dissatisfied subject's EMG levels was in the first viewing of the erotic film. The check list ratings for the two groups are essentially not different. "Most descriptive" designates the adjective that

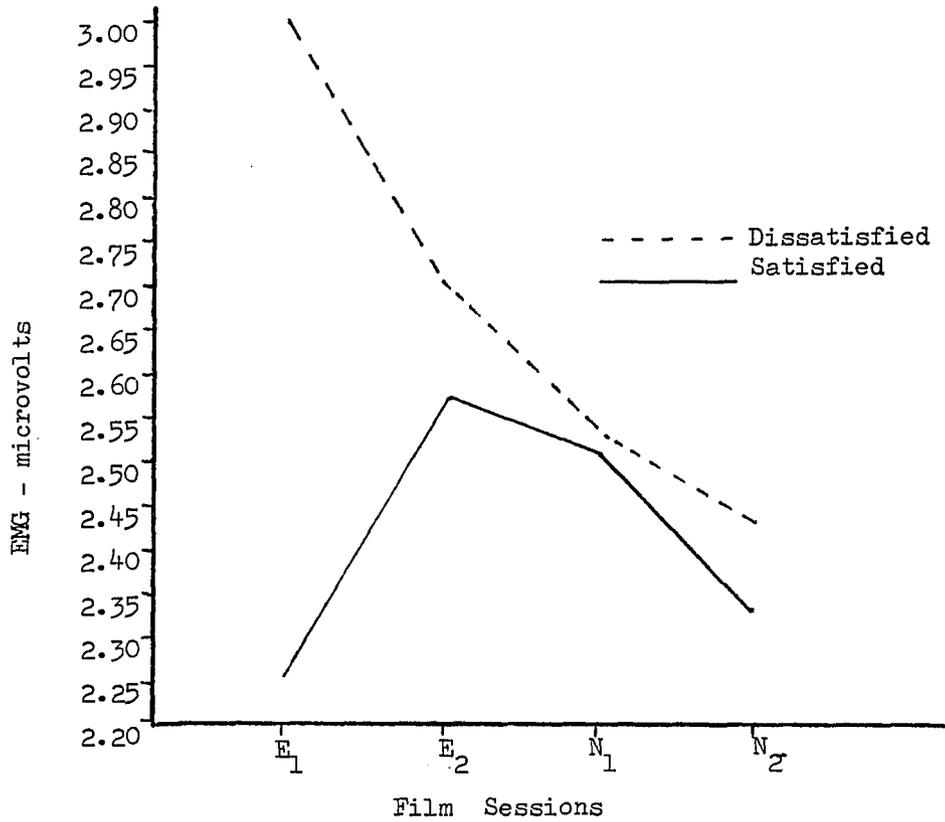


Figure 1. Interaction: EMG Level (μ V) by Film Session

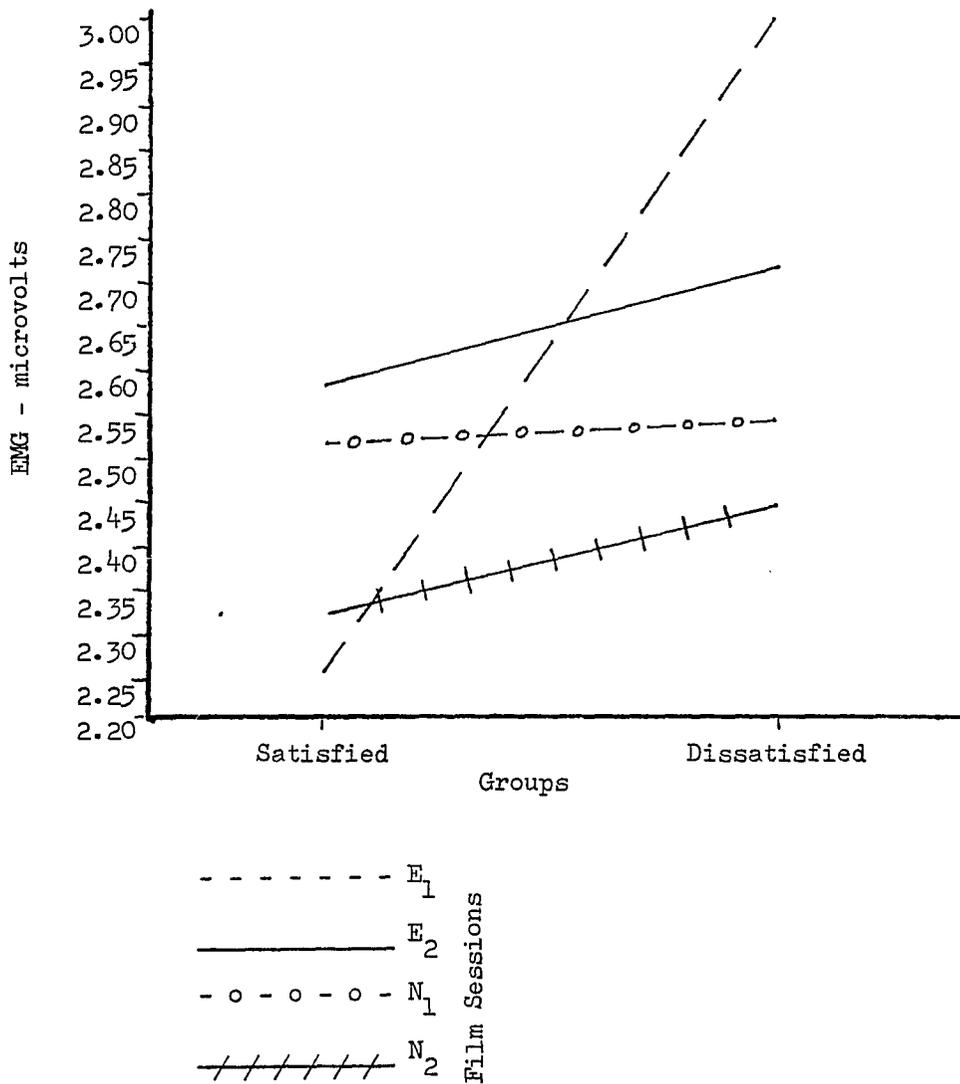


Figure 2. Interaction: EMG Level (μV) by Groups

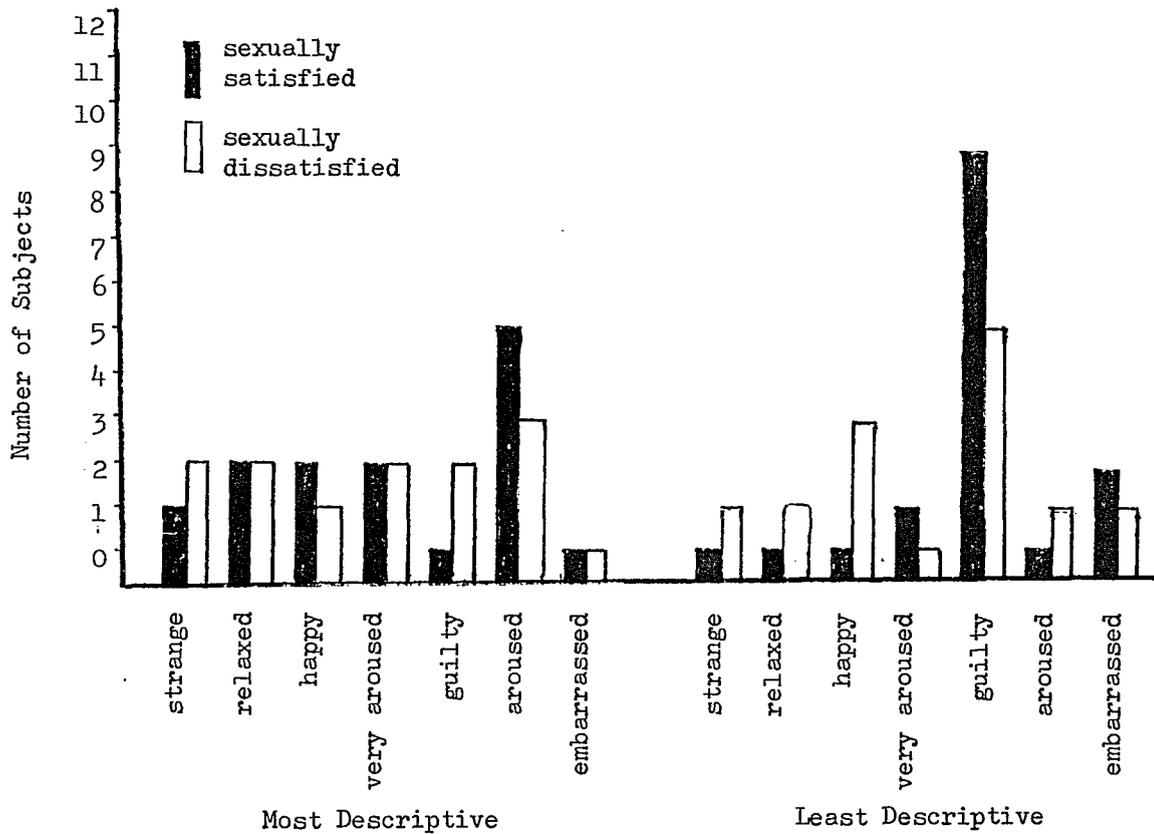


Figure 3. Frequency Graph: Subject's Self-report of Feelings Following First Erotic Film Session

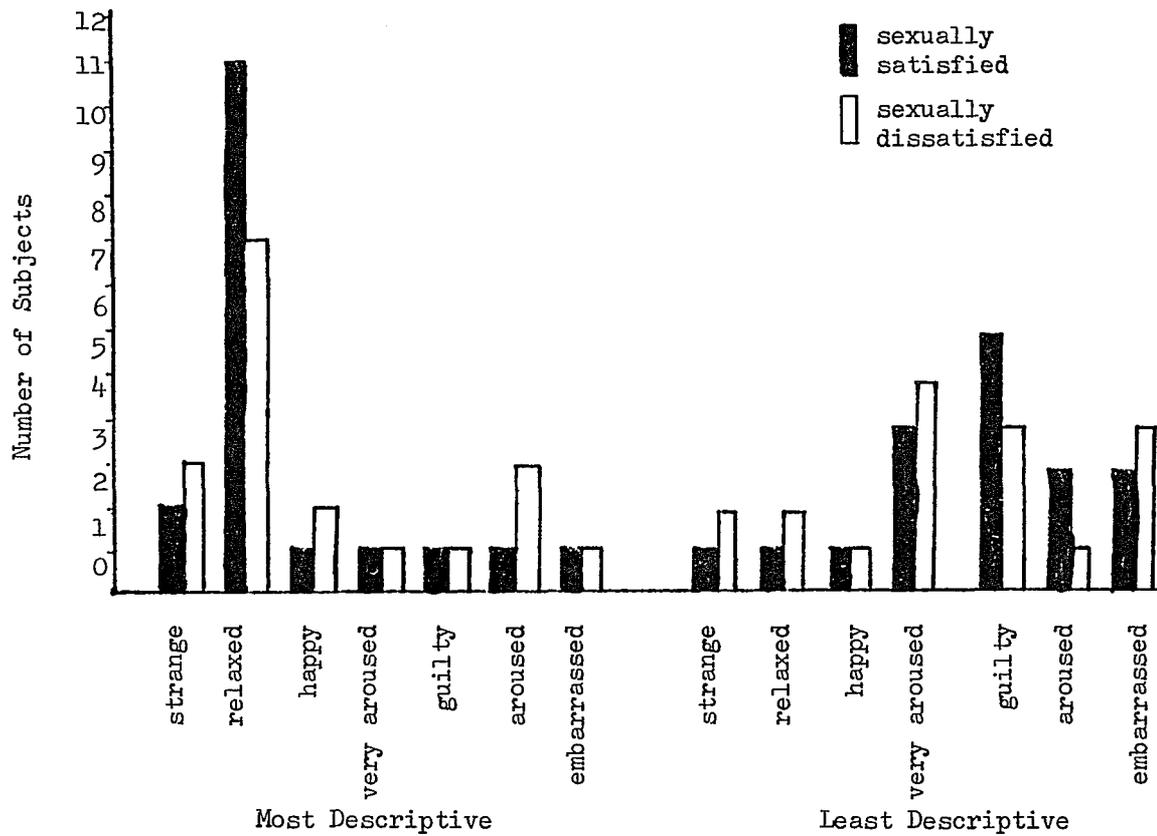


Figure 4. Frequency Graph: Subject's Self-report of Feelings Following First Neutral Film Session

subjects selected as most accurately reflective of how they felt following the film. "Least descriptive" designates the adjective they chose as least representative of how they felt at the time. To provide a reference point, the same information is provided for the subject's first viewing of the neutral film (N_1). This is the film session during which subject's EMG levels were most similar across groups.

Summary

As a result of the statistical analysis of the EMG data the two null hypotheses regarding the study's main effects cannot be rejected. This means the level of tension in the frontalis muscle of the sexually satisfied subjects was not found to be significantly different than that of the sexually dissatisfied subjects. Additionally, the mean EMG levels of subjects in the four film sessions are not significantly different from one another. When looking at mean values of individual cells in relation to each other there is a difference between these values for the two groups for the initial viewing of the film of highly erotic content.

With reference to the Demographic Questionnaire and Adjective Check List there are no remarkable differences between sexually satisfied and sexually dissatisfied subjects. They vary little in demographic data and reported they felt similar feelings following each of the film sessions.

CHAPTER 5

SUMMARY, CONCLUSIONS, DISCUSSION AND RECOMMENDATIONS

This chapter presents a summary of the development and implementation of the study. The results are examined in light of the initial research questions. The significance and generalizability of the results are explored and discussed. Recommendations are suggested for further research.

Background

A wholistic philosophy of life considers the experience of living as an integral unit. This differs from a variety of other philosophies in that no one dimension of the human is considered really separate from another. No one "part" (e.g., ego or "parent") has dominion over the whole.

The human's experience of living has been considered from a variety of positions. Descartes presents a perspective of the human, as do Freud, B. F. Skinner, the Christians, the Taoists and many others. Some consider the physical and the immediately tangible as the principal if not the sole components of the human. Some consider the physical as that which burdens the spirit and this encumbrance is thankfully shed at the time of death. Until that time one's body should be disciplined and brought into submission. Some people, ascribing to this type of philosophy, attempt such submission or discipline by enduring years of

tortuous practices such as self flagellation, rigorous fasts, wearing clothing or sitting or standing in positions that caused bodily irritation, discomfort or trauma.

The work of Selye (1956, 1961, 1974, 1975), Green, Green, and Walters (1971), and Brown (1975) underscores the integral nature of human experience. The human does not appear to be a composite of related but relatively autonomous parts. The whole person experiences living. When a person "feels" tense it is quite likely he or she is physiologically "uptight" as well (Budzynski et al., 1971; Wickramasekera, 1974; Benson et al., 1975; Reinking and Kohl, 1975).

Masters and Johnson (1970) note that the lack of homeostasis, the lack of harmonious interaction between the bio-physical and psychosocial dimensions of a person promotes dysfunction and dissatisfaction in a vast array of human experiences, including sex. A variety of sex therapies facilitate sexual satisfaction by teaching people some basic anatomy and physiology, helping them to attend to the stimuli in the immediate physical and emotional environment of the sexual experience, help the person(s) to not block, to flow with their responses to the experience in which they are immediately participating.

Biofeedback may prove to be a very beneficial instrument in sex therapy. The literature identifies some of its principal benefits as: (1) aiding people to become more aware of particular body processes; and (2) facilitating the regulation of said processes thus reducing pain and increasing levels of proper functioning and satisfaction.

These benefits are very similar to some of the main components of the major sex therapies. To what extent then might biofeedback be of value as a dimension of sex therapy?

Summary

The Problem

The purpose of this study was to determine whether the frontalis EMG levels of Sexually Satisfied females are different than those of Sexually Dissatisfied females, when viewing an erotic and a neutral film. The three hypotheses were retained or rejected on the basis of evidence obtained through statistical analysis of the data.

The Sample

Twenty-four subjects participated in the study. Based on their own self-rating of level of sexual satisfaction and their scores on the Sexual Interaction Inventory (SII), the women were separated into two groups. Twelve were in the group designated Sexually Satisfied (S) and 12 in the group labeled Sexually Dissatisfied (D). These 24 were selected from 55 volunteers. Twenty-nine volunteers not selected for the study either had SII or self-rating scores which conflicted in indication of level of sexual satisfaction/dissatisfaction or their scores on the SII were between 5.1 and 5.4. This range of scores was deleted from the study to maximize the variance between the two groups. Two subjects dropped out of the study during the treatment period. Data were collected on 24 subjects for the analysis. The mixed design used in this study

allowed for the random assignment of two S and two D subjects to each possible sequence of the film sessions.

The Procedure

Subjects participated in five sessions, each lasting approximately one-half hour. The first session consisted of the subject's reading and signing a consent form and then completing the Demographic Questionnaire and SII. Following this each subject was introduced to the EMG, the setting and procedures to be utilized in the subsequent four sessions. Sessions two through five involved the subject's being in a room with a female attendant. The subject sat in a large, upholstered chair and was asked to sit back and keep general body movement to a minimum during the film presentation. After the subject was seated, her forehead was cleaned and electrodes were placed on her forehead. Following the film the electrodes were removed and each subject completed the Adjective Check List before leaving. A follow-up session was scheduled with each subject who asked for one. This provided the subject the opportunity to see her own data, the general results of the study, and discuss any questions or concerns she might have had about the study.

Statistical Treatment

A 2×4 analysis of variance with repeated measures was the major statistical treatment applied to the EMG data collected from the subjects. The purpose was to compare the satisfied with the dissatisfied subjects, the film sessions with each other, and determine the presence of any

interaction effect. The Tukey HSD method of post hoc analysis was applied to further examine differences between cell means.

The Results

The statistical analysis of the data resulted in the finding of significant interaction beyond the .20 level established for the study. Post hoc analysis determined the source of this interaction was the difference between the sexually dissatisfied subject's EMG level during the initial viewing of the erotic film and the EMG level of the sexually satisfied subjects for the same film session. Significant difference was also noted between the EMG level of dissatisfied subjects in the first viewing of the erotic film and the satisfied subject's EMG level for the second viewing of the neutral film.

Based on the analysis of the data, the null hypotheses regarding the design's main effects ($S \times D$, groups; $E_1 \times E_2 \times N_1 \times N_2$, film sessions) cannot be rejected.

Other data regarding the subjects (Demographic Questionnaire, Adjective Check List) yielded no information that would discriminate between the sexually satisfied and sexually dissatisfied subjects.

Conclusions

The conclusions drawn from this study are based on the results of the statistical analysis of the data. These analyses were computed primarily to test the specific hypotheses reported in Chapter 3. These hypotheses, in turn, evolve from the principal question: Do sexually satisfied and sexually dissatisfied females have different levels of frontalis EMG? Following are the conclusions of the study:

1. There are no significant differences between groups (Table 3). It may therefore be concluded that in general EMG levels of Sexually Satisfied and Sexually Dissatisfied females do not differ. That is, when using the frontalis muscle as an index, one cannot validly hold the notion that sexually satisfied women are any more or less tense (or relaxed) than those women who are sexually dissatisfied.

2. There are no significant differences in subject's EMG levels between film sessions. It may be concluded that viewing a film of highly erotic content or a film of neutral erotic value has no noticeable impact on level of frontalis tension.

3. Considering the sources contributing to a significant level of interaction it is particularly notable that EMG levels of satisfied and dissatisfied subjects significantly differed during the initial viewing of the erotic film. Although generally the two groups display no difference in level of tension to the films, one may conclude that initially sexually dissatisfied women will have a higher level of tension than sexually satisfied women when presented with stimuli of highly erotic value.

4. Based on the findings of this study the assumption that frontalis EMG biofeedback training, for the purposes of tension reduction as a part of therapy for sexually dissatisfied females, is not supported.

Discussion

This study was initiated in order to explore a basic assumption regarding the use of biofeedback as a part of sex therapy. In the course of the study while information has been discovered many questions remain.

EMG Levels

The results and conclusions of this study do not support the assumption that sexually dissatisfied females are more or less tense than sexually satisfied females, at least with regard to the frontalis muscle.

Alexander (1975) questions the role some have attributed to the frontalis as the indicator of general body tension. The concerns he voices are pertinent here. Other muscle groups were not monitored so their levels of tension are not known. The frontalis muscle was chosen because it has been used in self-awareness and relaxation therapy and is readily available for monitoring. Its use in a clinical or treatment setting poses little or no technical, ethical or legal difficulties.

A different bandpass might have been selected. Had frequencies below 100Hz. been included additional general frontalis muscle tension would have been observable. This would require determining what portions of these signals were attributable to the experimental conditions and which to ECG, EEG and sundry artifacts. The difficulties in such case appear to outweigh the benefits. Also, there is no evidence that EMG potentials below 100Hz. represent activity that is different from that above 100Hz.

The finding of significant differences between EMG levels of satisfied and dissatisfied subjects initial viewing of the erotic film is notable. Perhaps this finding indicates sexually dissatisfied women are more startled by or sensitive to the initial presentation of erotic stimuli than satisfied women. One should note though the difference between these two levels of EMG was .75 microvolts. Such a minimal

difference should moderate one's strong or enthusiastic conclusion about sexually dissatisfied women's initial sensitivity to erotic stimuli.

It is interesting to consider the change in the subject's EMG levels in the second viewing of the erotic film (Table 4, Chapter 4). A graphic increase in EMG level can be seen for sexually satisfied women while a similarly sharp but negatively inclined slope is seen for the sexually dissatisfied women. The Adjective Check List indicates an increase in feelings of relaxation and apparent comfort levels whereas a concomitant decrease of aroused or very aroused feelings are noted for the satisfied subjects, and of feelings of guilt for the dissatisfied subjects. The frequency distributions on this instrument can be considered as possibly some indication of difference between sexually satisfied and sexually dissatisfied females but the differences are minor.

Other Differences between Sexually Satisfied and Sexually Dissatisfied Subjects

This finding, of no significant differences between the two group's EMG levels, and the minor differences between them in the demographic data and the Adjective Check List, may itself be significant. Fisher (1973) commented about the mistaken notion of many people that those women who are sexually dissatisfied or dysfunctional are in some sense "sick" or abnormal. He found no particular differences between the sexually satisfied and functional women and those who experience sexual dysfunction or dissatisfaction. The two groups are essentially indistinguishable on measures of mental or physical health, social and occupational skills, avocational interests and activities. Kaplan (1974)

notes also that sex therapy generally does not need to involve long term, extensive restructuring of one's personality or marital relation. Rather, it is generally sufficient to attend to the presenting concern and its resolution.

The sexually satisfied and sexually dissatisfied appear to belong to the same very heterogeneous population. Previous studies have examined the similarities and differences between college students who volunteer for sex research and those who do not (Kaats and Davis, 1971). No information is available regarding characteristics of women from the general public who volunteer for such studies as opposed to those who do not.

The ratio of women who phoned and volunteered for the study was about 4:1, sexually satisfied to dissatisfied. Perhaps the satisfied women feel more comfortable about letting it be known that they are sexually satisfied. Some sexually dissatisfied women indicated they felt a little uncomfortable with their level of sexual satisfaction. A few mentioned that they felt "embarrassed" or "guilty" about being sexually dissatisfied.

Sexual dissatisfaction is a classification that encompasses many subgroups. Perhaps a few of those subgroups would have displayed significantly different EMG levels than the sexually satisfied. Those sexually dissatisfied women who are married or in a stable, long term relationship with a partner may differ from those who have a different type of relationship with their mate. Likewise, those who are pre-orgasmic may have different levels of EMG than those women whose

dissatisfaction is attributable to other factors. The question regarding difference in tension levels between such groups could be the focus of another study.

Generalization

This discussion of the degrees of difference between the two groups leads to another question, how generalizable are this study's conclusions? In this respect caution would be advisable. There is nothing to indicate that this sample is a unique subgroup of the general population. Yet, a much larger sample size would be desirable if one were interested in applying these results to the general population. This study presents some indications of general conclusions and provides information which can aid in the formulation of other studies.

Biofeedback may prove to be a valuable tool in sex therapy. This may not be based on the rationale that sexually dissatisfied females are more tense or less aware of their bodies than sexually satisfied females. Perhaps biofeedback (frontalis EMG) will be of value for the sexually satisfied as well as others in that it can assist them in becoming more aware of their selves and learn to regulate processes previously believed to be beyond their ability to influence. This knowledge and skill may enhance not only level of sexual satisfaction but a wide range of their experiences.

Recommendations

The role of biofeedback in sex therapy presents a vast array of questions and possibilities. Sexual interaction interests all but a very

small minority of people. Sex is a very integral dimension within each person. Sexual relations between people are subject to stress and distress. At times sexual functioning and satisfaction is encumbered by one's maladjustment to a variety of stressful elements in their environment.

Many biofeedback modalities have been demonstrated as having value in increasing a person's awareness of their body and in regulating its response to particular stimuli. From the previously existing body of information and that generated by this study there are many questions and possibilities to investigate. Some recommendations for further research are the following:

1. There is a need to replicate this study with other populations. It would be valuable, in such studies, to identify subject's source of dissatisfaction and analyze the difference in tension level for different subgroups amongst the dissatisfied.

2. There is a need to investigate the impact of frontalis EMG training and other biofeedback therapies as a part of sex therapy. Electrodermal training, digital temperature training or EMG training may prove to expedite the process of sex therapy.

Supplemental Suggestions

The initial interest for the topic of this study grew out of a consideration of the sexual concerns of those persons who are physically disabled. EMG has been used with various subgroups of this population for the purpose of muscle training. Although this study specifically deleted the physically disabled from the population, the study was

formulated as an exploration of a therapeutic modality that may have particular value for disabled individuals. Further investigations pertaining to the sexual concerns of the physically disabled are necessary to assist in the rehabilitation process.

In the course of the development and implementation of this study a severe lack of proper resources was noted. Specifically, there are few erotic materials (films, photographs, drawings or printed material) that have physiological as well as subjective measures which verify their arousal characteristics. The materials which are developed should be of high technical quality (e.g., lighting and editing).

Sexual myths, misinformation, and ignorance foster sexual dysfunction and dissatisfaction and constitute major impediments to valid and very needed endeavors in sex research. For students in areas of human service delivery it is important to be aware of their own attitudes and values regarding sex and to have enough information, sensitivity and skill to competently respond to the sexual concerns of the clients they will be dealing with. Resources for needed information and training should be made available by the educational institution.

APPENDIX A

LETTER OF INTRODUCTION

Dear Ms.

I am Dennis Thoennes, a doctoral student in Rehabilitation Counseling at The University of Arizona. I am married and have two children. My professional background includes work with youth, alcoholism treatment, individual and marriage counseling.

I am currently beginning my dissertation, a last step toward the doctoral degree. This letter will describe the study I propose to do and asks you to participate as a research subject.

The study I wish to introduce to you has been approved and considered of professional merit by a committee of five faculty members of The University of Arizona. A second committee, The Human Subjects Committee, at The University of Arizona, has reviewed the proposed study to assure that each subject's rights are observed.

The dissertation will study the relationship of muscle tension and female sexual satisfaction. The topic of sex elicits a variety of feelings and thoughts from each of us. For all the interest that sex generates it has received relatively little scientific study. For those of us who are sexually active, sexual interaction is sometimes more or less satisfying and pleasurable than at other times. Researchers note that there are proportionally few women who find their sexual experiences usually satisfying.

There has been research in recent years indicating muscle tension plays a significant role in satisfaction, dissatisfaction, functional and dysfunctional areas of our lives. Inappropriate levels of tension can lead to certain types of ulcers, arthritis, headaches, cardio-vascular problems and sexual dysfunction. Some degree of muscle tension is necessary for all human behavior.

Such research of muscle tension raises a number of questions: what role does muscle tension play in sexual satisfaction? if a person could learn to regulate his/her body tension could this lead to changes in level of sexual satisfaction? Prior to answering such questions it is necessary to find out if levels of tension differ for sexually satisfied and dissatisfied people. This question is the focus of this study.

If you choose to participate in this study your privacy will be protected by the fact that all data will be grouped together for analysis. No information regarding you will be shared with anyone. You may withdraw from the study at any time.

Your participation in the study would consist of calling me and setting up an appointment for you to come to my office and fill out two questionnaires. One would ask general questions about you such as age, marital status, age and number of children. The second questionnaire consists of questions relating to sexual functioning and satisfaction. Questions pertain to seventeen sexual behaviors ranging from seeing your partner nude, to intercourse. This questionnaire was developed by Dr. Joseph LoPiccolo from State University of New York at Stony Brook. The first session would also include showing you an electromyograph (EMG) machine (which measures muscle tension) and placing recording metal discs (called electrodes) on your forearm. These would be removed in a short while.

Following this first session we would schedule four sessions that would occur every other day. Each of these would be one-half hour long. At the beginning of each session your forehead would be cleaned and three electrodes would be taped to your forehead. This would enable the muscle tension in your forehead to be monitored for the remainder of the session. Attaching the electrodes will feel like having a dime taped to your forehead. No wires, needles, or shock enter the skin.

During each of these four sessions you would see a film of erotically neutral content (such as general landscape scenes) or a film of highly erotic content (such as a man and woman involved in sexual contact). While you are watching the film a female attendant would be in the room collecting data from the EMG and operating the film projector. You will not be asked to do anything other than sit back in your chair, observe the film and not move about while sitting.

If you complete all five of these sessions you will be given ten dollars for your time and co-operation. If you have any questions feel welcome to call me. If you wish to participate in the study please call me at school () or at home ().

I look forward to hearing from you soon!

Sincerely,

APPENDIX B

SUBJECT'S CONSENT FORM

The following describes the research project and what you will be involved in as a research subject.

1. Title: EMG Measures of Frontalis Muscle Tension for Sexually Satisfied and Sexually Dissatisfied Females.
2. Location: 3401 North Columbus, Tucson, Arizona.
3. Procedures: You were first introduced to the study by a letter which you received from your physician. After that you called to set an appointment for this first session. During this first session you are asked to complete two questionnaires, the Sexual Interaction Inventory and the Demographic Questionnaire. During this first session you will also be introduced to electromyography, a machine that records muscle tension, and recording electrodes will be placed on your forearm. If you choose to continue your participation in the study, and if you are selected to do so by the researcher, four additional appointments will be scheduled. These will occur every other day, will be about thirty minutes long, and will consist of the following: (1) surface electrodes will be placed on your forehead after it is cleaned; (2) you will be asked to sit back in a comfortable chair, keep general body movement to a minimum, watch the film for the next twenty minutes; (3) a film of erotically neutral or highly erotic content will be shown during each of the following four sessions; (4) during each session the frontalis (forehead) tension level will be recorded; (5) when the film is finished the electrodes will be removed; (6) following each film you will be asked to complete a brief questionnaire regarding how you feel following the film; (7) following the fifth and final session you will be given ten dollars. Any questions or concerns you have about the study may be discussed.
4. Data will be collected between July 1 and November 1, 1976. Total time required for each subject will be about two and one-half hours. This is made up of five one-half hour sessions.
5. Potential Discomfort or Risks: You may have some slight irritation of the skin on the forehead due to the thorough cleaning of that area. You may be slightly uncomfortable while watching the highly erotic film.
6. Means available to meet emergent discomfort or risks: Following each session a lotion will be available to put on the forehead. If you express a desire to stop viewing the film and withdraw from the study this will be accommodated.

7. Subject's costs or remuneration: You are responsible for getting yourself to each session. There will be no "make-up" sessions. No baby sitting will be provided.' You will be given ten dollars at the end of the fifth session. You will be given two dollars if you complete the first session but are not selected to complete the study.
8. Benefits to you or society: You may enjoy watching the films and finding out about your level of tension. Your participation as a research subject is not intended to be, nor should it be considered counseling, therapy or treatment. This study may benefit society by determining a basis for the use of similar procedures as a part of sex therapy.
9. At any point in the study you may ask questions. It will be preferred that you not ask questions once the film begins until it is ended. When the study is completed results and conclusions will be shared with you, if you are interested in such information. You may see your own data and the general data of the study.
10. If, at any time during the study, you choose to do so, you may withdraw from the study. This will not be responded to by ill-will of the researcher and will not be mentioned to anyone.
11. Regarding confidentiality: Information from the two questionnaires and the tension level recordings will be grouped together. Thus individual subject's privacy will not be intruded upon. Furthermore, only the researcher and the female attendant (a female attendant will operate equipment and collect data during the four sessions in which a film is shown) will have access to information regarding the relationship of any particular subject and the data. This will be shared with only one person, the subject herself, and only at her request. If data is shared with anyone else, subject's numbers (e.g., 1 to 24) will be used and thus individual subject's privacy will be insured. The attendant in the film session will have access only to that subject's data for the film session. The attendant will not have access to questionnaire data or other subject's data, except for attendant's access to the data once it has been coded in such a way that preserves the anonymity of the research subject.

I have read the above "Subject's Consent Form." The nature, demands, risks and benefits of this project have been explained to me. I understand that I may ask questions and that I am free to withdraw from the project at any time without ill-will. At this point I freely and knowingly choose to participate as a research subject in this study.

Subject's Signature _____ Date _____

Investigator's Signature _____ Date _____

Comments:

APPENDIX C

DEMOGRAPHIC QUESTIONNAIRE

ID No. _____

Date: _____

1. Age _____
2. Race or Ethnic Group: ___Caucasian; ___Negro; ___American Indian;
___Mexican; ___Oriental; ___Other (Please
Specify _____).
3. Marital Status: ___Married; ___Single; ___Divorced; ___Separated;
___Widowed; ___Single but living with mate.
4. Current Occupation: _____
5. Total income for past year (1975), if married, for family:
___ under 5,000
___ 6,000 to 9,000
___ 10,000 to 12,000
___ 13,000 to 15,000
___ 16,000 to 20,000
___ 21,000 to 25,000
___ 26,000 or more
6. Highest Level of Formal Education Completed: _____
7. Number of Children: _____
8. Ages of children: _____, _____, _____, _____, _____, _____.
9. Do you attend religious services:
___ frequently (3 times per month)
___ often (2 times per month)
___ once-in-awhile (1 time per month)
___ rarely (2 times per year)
___ never

10. How long have you lived at your current address?
 one year or less
 one to two years
 two to three years
 three to four years
 four years or more
11. How many places have you lived, for more than one month, in the last five years? 1, 2, 3, 4, 5 or more.
12. If married, how many years have you been married to your current spouse? 1 year, 2 years, 3 years, 4 years
 5 to 10 years, 11 to 15 years, 16 or more years
13. Do you participate in sexual activity with:
 opposite sex partner only
 opposite and same sex partner
 same sex partner only
14. Do you or your partner use any form of contraception?
 yes no
15. If yes, what do you use? _____
16. Do you smoke tobacco?
 yes no
17. If yes: 10 cigarettes or less per day
 11 cigarettes to 1 pack per day
 more than one pack per day
 pipe or cigar
18. Do you drink alcoholic beverages?
 yes no
19. If yes:
 less than 1 beer, glass of wine or mixed drink per week
 2 to 5 beers, glasses of wine or mixed drinks per week
 6 to 10 beers, glasses of wine or mixed drinks per week
 11 or more beers, glasses of wine or mixed drinks per week

20. Have you ever taken or used _____ Heroin
 _____ L.S.D.
 _____ Speed
 _____ Marijuana (or Hash)
 _____ Uppers
 _____ Downers
 _____ Other "recreational" drugs
21. Have you used any of these substances in the last three months?
 _____ yes _____ no
22. Do you use any one or more of these substances (refer to #20):
 _____ frequently (3 times per month or more)
 _____ often (2 times per month)
 _____ once-in-awhile (1 time per month)
 _____ rarely (2 times per year)
 _____ never
23. Do you drink coffee or tea? _____ yes _____ no
24. If yes, _____ less than one cup per day
 _____ 1 to 3 cups per day
 _____ 4 to 6 cups per day
 _____ 7 to 10 cups per day
 _____ 11 or more cups per day
25. Do you use any non-prescription medications (such as aspirin, Excedrin, Sominex, Geritol, Milk of Magnesia) _____ yes _____ no
26. Do you use any of these or other non-prescription medications
 _____ frequently (3 times per month or more)
 _____ often (2 times per month)
 _____ once-in-awhile (1 time per month)
 _____ rarely (2 times per year)
 _____ never
27. If you use any non-prescription medication what is it? _____
28. Do you use any prescription medications? _____ yes _____ no
29. If yes, what? _____
30. If no, when was the last time you took prescription medication? _____

APPENDIX D

ADJECTIVE CHECK LIST

This question concerns your feelings following the film.
Please circle one adjective from each of the pairs below that most accurately describes or matches how you feel following the film:

guilty	---	strange
happy	---	relaxed
guilty	---	relaxed
guilty	---	happy
embarrassed	---	happy
guilty	---	very aroused
happy	---	very aroused
strange	---	very aroused
embarrassed	---	relaxed
strange	---	happy
very aroused	---	relaxed
strange	---	relaxed
embarrassed	---	guilty
embarrassed	---	aroused
strange	---	embarrassed

Now, please go back and put a plus (+) sign next to the word that most closely describes how you feel, and a minus (-) next to the word most unlike how you feel.

REFERENCES

- Alexander, A. B. An experimental test of assumptions relating to the use of electromyographic biofeedback as a general relaxation training technique. Psychophysiology, 1975, 12 (6), 656-662.
- Anastasi, A. Psychological Testing, 4th ed. New York: Macmillan, 1976.
- Ard, B. N., Jr. Treating Psychosexual Dysfunction. New York: Jason Aronson, 1974.
- Barbach, L. G. Group treatment of preorgasmic women. Journal of Sex and Marital Therapy, 1974, 1 (2), 139-143.
- Barbach, L. G. For Yourself: The Fulfillment of Female Sexuality. New York: Doubleday and Company, Incorporated, 1975.
- Bardwick, J. M. and S. J. Behrman. Investigation into the effects of anxiety, sexual arousal, and menstrual cycle phase on uterine contractions. Psychosomatic Medicine, 1967, 29, 468-482.
- Basmajian, J. V. Control and training of individual motor units. Science, 1963, 141, 440-441.
- Bass, B. A. Sexual arousal as an anxiety inhibitor. Journal of Behavioral Therapy and Experimental Psychiatry, 1974, 5, 151-152.
- Benson, H., J. F. Beary, and M. P. Carol. The relaxation response. In L. V. DiCara, T. X. Barber, J. Kamiya, N. E. Miller, D. Shapiro, and J. Stoyva, (Eds.), Biofeedback and Self-Control: 1974. Chicago: Aldine Publishing Company, 1975, 467-476.
- Blanchard, E. G. and L. D. Young. Clinical applications of biofeedback training: A review of evidence. In L. V. DiCara, T. X. Barber, J. Kamiya, N. E. Miller, D. Shapiro, and J. Stoyva, (Eds.). Biofeedback and Self-Control: 1974. Chicago: Aldine Publishing Company, 1975, 3-39.
- Brown, B. B. New Mind, New Body. New York: Bantam Books, Incorporated, 1975.

- Budzynski, T. H. Biofeedback procedures in the clinic. In N. E. Miller, T. X. Barber, L. V. DiCara, L. Kamiya, D. Shapiro, and J. Stoyva, (Eds.), Biofeedback and Self-Control: 1973. Chicago: Aldine Publishing Company, 1974, 441-452.
- Budzynski, T. H., J. Stoyva, and C. Adler. Feedback induced muscle relaxation: Application to tension headache. In T. X. Barber, L. V. DiCara, J. Kamiya, N. E. Miller, D. Shapiro, and J. Stoyva, (Eds.), Biofeedback and Self-Control: 1970. Chicago: Aldine Atherton, Incorporated, 1971, 447-453.
- Budzynski, T. H., J. M. Stoyva, C. S. Adler, and D. J. Mullaney. EMG biofeedback and tension headache: A controlled outcome study. In N. E. Miller, T. X. Barber, L. V. DiCara, J. Kamiya, D. Shapiro, and J. Stoyva, (Eds.), Biofeedback and Self-Control: 1973. Chicago: Aldine Publishing Company, 1974, 253-264.
- Campbell, D. T. and J. C. Stanley. Experimental and Quasi Experimental Designs for Research. Chicago: Rand McNally, 1963.
- Coursey, R. D. Electromyograph feedback as a relaxation technique. Journal of Consulting and Clinical Psychology, 1975, 43 (6), 825-834.
- Ellis, A. The American Sexual Tragedy. New York: Twayne, 1954.
- Ellis, A. Sex Without Guilt. New York: Lyle Stuart, 1958.
- Ellis, A. The Art and Science of Love. New York: Lyle Stuart, 1960.
- Ellis, A. and R. A. Harper. A Guide to Rational Living. North Hollywood, California: Wilshire Book Company, 1971.
- Fisher, S. The Female Orgasm. New York: Basic Books, Incorporated, 1973.
- Fisher, S. and H. Osofsky. Sexual responsiveness in women. Archives of General Psychiatry, 1967, 17, 214-226.
- Geer, J. H. Direct measurement of genital responding. American Psychologist, 1975, 30 (3), 415-418.
- Glass, G. V. and J. C. Stanley. Statistical Methods in Education and Psychology. New Jersey: Prentice-Hall, 1970.
- Goldstein, I. B. Electromyography, a measure of skeletal response. In N. S. Greenfield and R. A. Sternbach, (Eds.), Handbook of Psychophysiology. New York: Holt, Rinehart, and Winston, Incorporated, 1972.

- Green, A. M. and E. E. Green. Biofeedback: Research and therapy. In N. O. Jacobson, (Ed), Being Well Is a Responsibility! London: Thurston Books, 1975.
- Green, E. E. Feedback technique for deep relaxation. Psychophysiology, 1969, 6 (3), 371-377.
- Green, E. E., A. M. Green, and E. D. Walters. Voluntary control of internal states: Psychological and physiological. Journal of Transpersonal Psychology, 1970, 2 (1), 1-26.
- Green, E. E., A. M. Green, and E. D. Walters. Biofeedback for mind-body, self-regulation: Healing and Creativity. Report presented at De Anza College, Cupertino, California, October 30, 1971.
- Green, E. E., A. M. Green, and E. D. Walters. Biofeedback training for anxiety tension reduction. Annals of the New York Academy of Sciences, 1973, 233, 157-161.
- Haynes, S. N., D. Moseley, and W. T. McGowan. Relaxation training and biofeedback in the reduction of frontalis muscle tension. Psychophysiology, 1975, 12 (5), 547-552.
- Heiman, J. Women's sexual arousal. Psychology Today, 1975, 8 (11), 91-94.
- Heiman, J. and J. LoPiccolo. Personal communication, State University of New York, Stony Brook, New York, May, 1976.
- Heterosexual Intercourse, EDCOA, Incorporated, New Jersey, (n.d.).
- Holmes, T. H. and M. Masuda. Life change and illness susceptibility. Separation and Depression: Clinical and Research Aspects; A Symposium Presented at the Chicago Meeting of the American Association for the Advancement of Science, 27 December 1970. Edited by J. P. Scott and E. C. Senay. Washington, D. C.: American Association for the Advancement of Science, 1973.
- Hunt, M. Sexual behavior in the 1970's. Playboy, 1973, 20 (10), 85-89, 107-114.
- Jacobson, E. Progressive Relaxation. Chicago: University of Chicago, 1938.
- Kaats, G. A. and K. E. Davis. Effects of volunteer bias in studies of sexual behavior. Journal of Sex Research, 1971, 7, 26-34.

- Kanfer, F. H. and P. Karoly. Self-regulation and its clinical application: Some additional conceptualizations. In N. E. Miller, T. X. Barber, L. V. DiCara, J. Kamiya, D. Shapiro, and J. Stoyva, (Eds.), Biofeedback and Self-Control: 1973. Chicago: Aldine Publishing Company, 1974.
- Kaplan, H. S. The New Sex Therapy: Active Treatment of Sexual Dysfunctions. New York: Bruner/Mazel, 1974.
- Kerlinger, F. N. Foundations of Behavioral Research, 2nd ed. New York: Holt, Rinehart, and Winston, Incorporated, 1973.
- Kinsey, A. C., W. B. Pomeroy, and C. E. Martin. Sexual Behavior in the Human Male. Philadelphia: W. B. Saunders, 1948.
- Kinsey, A. C., W. B. Pomeroy, C. E. Martin, and P. H. Gebhard. Sexual Behavior in the Human Female. Philadelphia: W. B. Saunders and Company, 1953.
- Kirk, R. E. Experimental Designs: Procedures for the Behavioral Sciences. Belmont, California: Brooks/Cole Publishing Company, 1969.
- Lazarus, A. A. The treatment of chronic frigidity by systematic desensitization. Journal of Nervous and Mental Disorders, 1963, 136, 272-278.
- Lobitz, W. C. and J. LoPiccolo. New methods in the behavioral treatment of sexual dysfunction. Journal of Behavioral Therapy and Experimental Psychiatry, 1972, 3, 265-271.
- LoPiccolo, J. and J. C. Steger. The sexual interaction inventory: A new instrument for assessment of sexual dysfunction. Archives of Sexual Behavior, 1974, 3 (6), 585-595.
- Luthe, Wolfgang (Ed.). Autogenic Therapy, 2nd ed. Englewood, New Jersey: Grune and Stratton, 1969.
- Maddock, J. W. and R. A. Chilgren. The emergence of sex therapy. Personnel and Guidance Journal, 1976, 54, 371-373.
- Masters, W. H. and V. E. Johnson. Human Sexual Response. Boston: Little, Brown and Company, 1966.
- Masters, W. H. and V. E. Johnson. Human Sexual Inadequacy. Boston: Little, Brown and Company, 1970.
- Miller, N. E. Biofeedback: Evaluation of a new technique. In L. V. DiCara, T. X. Barber, J. Kamiya, N. E. Miller, D. Shapiro, and J. Stoyva, (Eds.), Biofeedback and Self-Control: 1974. Chicago: Aldine Publishing Company, 1975.

- Raskin, M., G. Johnson, and J. W. Rondesvedt. Chronic anxiety treated by biofeedback induced muscle relaxation: A pilot study. In N. E. Miller, T. X. Barber, L. V. DiCara, J. Kamiya, D. Shapiro, and J. Stoyva, (Eds.), Biofeedback and Self-Control: 1973. Chicago: Aldine Publishing Company, 1974, 274-285.
- Reinking, R. H. and M. L. Kohl. Effects of various forms of relaxation training on psychological and self-report measures of relaxation. Journal of Consulting and Clinical Psychology, 1975, 43 (5), 595-600.
- Sargent, J. D., E. D. Walters, and E. E. Green. Psychosomatic self-regulation of migraine headaches. Seminars in Psychiatry, 1973, 5 (4), 415-428.
- Schiller, P. The sex counselor and therapist. Personnel and Guidance Journal, 1976, 54 (7), 369-371.
- Schwartz, G. E. Biofeedback as therapy. In N. E. Miller, T. X. Barber, L. V. DiCara, L. Kamiya, D. Shapiro, and J. Stoyva, (Eds.), Biofeedback and Self-Control: 1973. Chicago: Aldine Publishing Company, 1974, 441-452.
- Selye, H. The Stress of Life. New York: McGraw-Hill, 1956.
- Selye, H. Stress and sex. In A. Ellis and A. Abarbanel, The Encyclopedia of Sexual Behavior, (Vol. 2). New York: Hawthorne Books, Incorporated, 1961, 1010-1011.
- Selye, H. Stress Without Distress. New York: The New American Library, Incorporated, 1974.
- Selye, H. Soma, mind, and spirit--in the light of the stress concept. Presented at the First National Congress on Integrative Health, Tucson, Arizona, October 8, 1975.
- Stoyva, J. and T. H. Budzynski. Cultivated low arousal--an antistress response? In L. V. DiCara, T. X. Barber, J. Kamiya, N. E. Miller, D. Shapiro, and J. Stoyva, (Eds.), Biofeedback and Self-Control: 1974. Chicago: Aldine Publishing Company, 1975, 265-290.
- Terman, L. M. Psychological Factors in Marital Happiness. New York: McGraw-Hill, 1938.
- Townsend, R. E., J. F. House, and D. Addario. A comparison of biofeedback mediated relaxation and group therapy in the treatment of chronic anxiety. American Journal of Psychiatry, 1975, 132 (6), 598-601.

- Venables, P. H. and I. Martin (Eds.). A Manual of Psychophysiological Methods. New York: Wiley, 1967.
- Wallin, P. A study of orgasm as a condition of women's enjoyment of intercourse. Journal of Social Psychology, 1960, 51, 191-198.
- Weiner, D. N. Sexual problems in clinical experience. In C. B. Broderick and J. Bernard, (Eds.), The Individual, Sex, and Society. Baltimore: The Johns Hopkins University Press, 1969, 327-342.
- Wickramasekera, I. Electromyographic training and tension headache: Preliminary observations. In N. E. Miller, T. X. Barber, L. V. DiCara, J. Kamiya, D. Shapiro, and J. Stoyva, (Eds.), Biofeedback and Self-Control: 1973. Chicago: Aldine Publishing Company, 1974.
- Winer, B. J. Statistical Principles in Experimental Design. New York: McGraw-Hill, 1971.
- Wolpe, J. Psychotherapy by Reciprocal Inhibition. Stanford: Stanford University Press, 1958.
- Zuckerman, M. Physiological measures of sexual arousal in the human, Psychological Bulletin, 1971, 75, 297-329.