identical to the pre-test except that subjects viewed two different neutral and erotic tapes, previously rated as sexually arousing as the pre-test tapes. Results of the study provide evidence for a relationship between genital vasocongestive responses and the subjective experience of sexual arousal in women. Although genital responses were not significantly altered by any intervention, audiofeedback of VBV responses as well as instructions to focus on bodily sensations were found to enhance subjects' experience of sexual arousal (as measured by continuous self-report) to an erotic stimulus in the post-test. This was not the case for the two control groups, suggesting that exposure to erotica, focussed attention to the stimuli, exposure to the test situation and practice effects were not responsible for these results. As well, the increases in reported sexual arousal noted for the two experimental groups were accompanied by significant positive correlations between VBV and VPA and both subjective measures of sexual arousal in the post-test. Vaginal blood volume-continuous subjective arousal correlations increased for both groups from the pre- to the post-test. By contrast, subjects asked to focus on the tapes only, showed a deterioration in subjective-genital correlations from the pre- to the post-test. In this study then, enhancement

of the subjective-genital relationship was associated with increased levels of subjective sexual arousal.

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The problem of defining the role of internal and external cues in the identification of emotional states has interested investigators since the controversy surrounding the James-Lange theory of emotions. This theory essentially regarded the perception of physiological responses to certain stimulus situations as crucial to the experience of emotion. Contemporary theories of emotion, of which there are many, focus for the most part on two fundamental features: 1) an evaluation of environmental events to be of crucial significance; and 2) the presence of bodily activity that is perceived in relation to these events (Grings and Dawson, 1978). However, the theories differ with respect to the relative impact of bodily responses on the labeling process. This issue is particularly difficult to resolve since the relationship between the subjective experience of an emotion and its associated physiological responses is extremely complex and is affected by a multiplicity of factors. In fact, attempts to uncover direct and specific relations between precise emotional states and particular physiological changes have been unsuccessful and current research is directed towards understanding those variables which may affect the nature of the relationship (individual response stereotypy, Grings and Dawson, 1978; patterns of

responses versus single response systems, Ax, 1953; intake-rejection patterns, Lacey and Lacey, 1958).

Attempts have been undertaken to establish physiological correlates of sexual arousal as well. With the exception of finger temperature (Boudewyns, 1978; Kabbash (Courey), Brender and Bowman, 1977), and perhaps blood pressure (Wenger, Averill and Smith, 1968), indirect physiological measures of sexual arousal (e.g., galvanic skin response, Romano, 1968; pupillary dilation, Chapman, Chapman and Brelje, 1969; respiratory rate, Davis and Buchwald, 1957; heart rate, Wenger et al., 1968; Wood and Obrist, 1968; biochemical response, Barclay, 1970; and evoked cortical response, Lifshitz, 1966) have tended to be either unresponsive or unreliable indices (Mann, 1971; Zuckerman, 1971). However, sexual arousal is distinct from other emotions such as anger, fear, and pain, in that it is accompanied by genital vasocongestion, genital secretions and rhythmic muscular movements (the latter being characteristic of the phase of sexual arousal just prior to and during orgasm, Kinsey, Pomeroy, Martin and Gebhard, 1953; Masters and Johnson, 1966). A major advance in this area has been the development of devices which measure the vasocongestive response in the genitals of both males

(Bancroft, Jones and Pullan, 1966; Barlow, Becker, Leitenberg and Agras, 1970; Freund, Sedlacek and Knob, 1965) and females (Sintchak and Geer, 1975; Hoon, Wincze and Hoon, 1976). Because of the uniformity of the genital response across all subjects (not present in other emotions) its role in the labeling of sexual arousal can be more easily studied. In addition to increasing our understanding of the process involved in the labeling of sexual arousal, it might be possible to shed light on the more general question of the relationship between bodily responses and the labeling of emotions.

That awareness of genital responses is involved in the labeling of sexual arousal would be suggested from Schacter's (1964) model of emotion. His formulation holds that both perceptible autonomic arousal and situational cues that point to an emotional label for the arousal are essential to the experience of an emotion. Rook and Hammen (1977) also reason that the subjective experience of sexual arousal may require both detectable physiological arousal and appropriate cues for erotic labeling. Given that the genital vasocongestive response is fairly reliably linked with sexual arousal and sexual activity but does not occur in association with other emotional states, it is plausible that awareness

of this particular response would be involved at least to some extent, in the labeling of sexual arousal.

The ability to detect genital vasocongestive changes during sexual arousal and to incorporate these responses in the labeling of oneself as sexually aroused probably varies as a function of several factors. In general, studies employing genital measures have demonstrated correlations between genital responses and subjective report which are higher than those found between most psychophysiological measures and subjective judgments (Geer, 1977). The reported correlations using male subjects have ranged from 0.67 to 0.70 (Bancroft, 1974), 0.55 to 0.74 (Barlow, 1977), 0.40 to 0.67 (Heiman, 1977), -0.26 to 0.93 (Farkas, Sine and Evans, 1979) and 0.89 (adjusted for response bias, Geer, 1977). Using female subjects, Heiman (1977) reported correlations between 0.44 and 0.78, Wincze, Hoon and Hoon (1977) 0.12 to 0.78, and Henson, Rubin and Henson (1979) 0.42 to 0.81. However, the findings of high subjective-genital correlations found in some studies have not been replicated in others (e.g., Osborn and Pollack, 1977; Quinsey, Steinman, Bergersen and Holmes, 1975; vanDam, Hannebier, vanZalinge and Barendregt, 1976; Wilson and Lawson, 1976a). Individual differences abound as can be seen by the range of correlations

reported above. Research by Heiman (1977) supports the view that females detect genital responses less accurately than males. She exposed college male and female subjects to a variety of tape-recorded erotic and non-erotic stimuli. Measures of genital vasocongestion (penile blood volume in males, vaginal blood volume (VBV) and vaginal pulse amplitude (VPA) in females) were compared to self-report measures of sexual arousal. The results indicated that females were less likely than males to report sexual arousal even though the plethysmographic records reflected genital vasocongestion. This sex difference was not related to prior sexual experience. If, as Heiman argued, the finding did not reflect sex differences in the tendency to report sexual arousal, it does suggest that women may be less accurate in detecting genital responses or may not rely as much on such responses to label themselves as sexually aroused. The reason for this is unclear. It has been pointed out that the sexes differ with respect to the clarity of their bodily reactions during sexual arousal. Because penile erection is readily discriminated, males may monitor their genital responses and use them to label themselves as sexually aroused to a greater degree than females. It is also possible that due to socialization experiences that direct females

attention away from their genitals (Gagnon and Simon, 1973), women may rely more exclusively on contextual cues to label themselves as sexually aroused. In fact, Geer (1977) has speculated that subjective arousal may be more independent of genital response in women than in men. Unfortunately, there are no studies in the literature which have been designed to directly assess the role of genital vasocongestive responses in the labeling of sexual arousal using female subjects.

Research on variables, other than gender, which may affect the role of genital responses in the labeling of sexual arousal is sparse. Most studies focus exclusively on variables affecting either the subjective or physiological response systems, and do not attempt to evaluate the effects of those variables on the subjective-physiological relationship. The factors that have been identified to date include: characteristics of the subject (i.e., sexual experience, personality variables, presence of sexual problems, degree of satisfaction with sexuality); physiological status (i.e., level of sexual arousal experienced, presence of residual physiological excitation); subjects' expectations concerning their sexual arousal, and training (with biofeedback). As well, several design and measurement issues (i.e., potential sources of error associated with

the recording device, type of genital response recorded, methods of data reduction and analysis, form and timing of administration of self-report instruments, validity of erotic materials, and the cognitive activity engaged in by subjects during exposure to erotic stimuli) may influence conclusions about the labeling process in sexual arousal. The purpose of the following discussion is to review these issues and suggest a method to investigate the role of genital vasocongestive changes in women in the labeling of sexual arousal.

Subject Characteristics

The relationship between physiological changes and subjective sexual arousal appeared to be a function of prior sexual experience in one study. Wincze, Hoon and Hoon (1977), using a continuous self-report device along with genital and other physiological measures, exposed six women to a wide variety of erotic videotapes. They found that the two subjects showing the least amount of correlation between subjective and physiological measures were also the least sexually experienced as measured by the Bentler Heterosexual Experience Scale (Bentler, 1968). However, Heiman (1976), using a larger sample of subjects, reported that sex experience was unrelated to both subjective and physiological responsivity for both males and females.

Whether or not the subjective-genital relationship during sexual arousal is related to degree of satisfaction with one's sexual responsivity is unclear. An application of multivariate techniques to self-reported trait and behavioral data from a large sample (N = 370) of North American women (Hoon and Hoon, 1978) revealed that women respondents who were most satisfied with their sexual responsivity were those who were most aware of physiological changes during sexual arousal. In a study comparing dysfunctional and non-dysfunctional subjects, Wincze, Hoon and Hoon (1976) reported that a small sample (N = 6) of dysfunctional women rated themselves as sexually aroused as a sample of non-dysfunctional women in response to an erotic stimulus, despite the fact that the non-dysfunctional group showed significantly greater VBV. It is possible that the dysfunctional group relied more on contextual than genital cues to label themselves as sexually aroused. However, the study suffers from several serious methodological flaws which limit the interpretation of their findings.

Discordance between physiological and subjective responses to sexually arousing stimuli has also been reported in the literature concerned with the treatment of sexual dysfunctions in both males and females. For

example, Morokoff and Heiman (1980) compared the VPA and sexual arousal ratings of a group of clinical and non-clinical female subjects in response to two erotic videotapes and sexual fantasies. The clinical group was tested before and after receiving treatment for sexual arousal deficits. Initially, the genital-sexual responses of the clinical group were found to be equivalent to those of the non-clinical group, despite lower subjective ratings of sexual arousal by the clinical group. These group differences disappeared in the post-testment evaluation. Thus, contrary to the findings of Wincze et al.,(1976), women experiencing sexual problems were reported to demonstrate physiological-sexual responses during sexual arousal equivalent to those demonstrated by a non-clinical sample. Despite these reactions, however, they did not label themselves as sexually aroused. It is interesting to note that, in response to a treatment approach that involved teaching the women to become more aware of their bodily and specifically, genital responses to erotic stimulation (Heiman, LoPiccolo and LoPiccolo, 1976), the ratings of subjective sexual arousal by the clinical group became indistinguishable from those of the non-clinical group.

Although several studies relate certain personality

characteristics to the tendency to report sexual arousal (high authoritarianism, Eliasberg and Stuart, 1961; Kogan, 1956; conservatism, Schmidt, Sigusch and, Meyberg, 1969; and sex guilt, Mosher, 1966, 1968, 1973) or to the level of penile blood volume responses in males to erotica (Farkas, Sine and Evans, 1979), no studies exist that relate these characteristics to the subject's awareness of genital responses during sexual arousal.

Physiological Status

The level of arousal experienced by subjects seems to influence the relationship between subjective and physiological sexual arousal. Of four studies on the influence of the level of arousal on this relationship, three used only male subjects. Studies conducted by Rosen (1973) and Schaefer, Tregerthan and Colgan (1976) revealed a tendency for weak erections to be over-estimated by their male subjects. Farkas, Sine and Evans (1979) found that the ability of males to monitor their sexual arousal on a continuous basis (as measured by the correlation between penile volume responses and subjective reports) was enhanced as tumescence levels increased. Heiman (1977) reported that subjective ratings of arousal by women were not correlated with genital responses at the low levels of arousal elicited

by a particular fantasy. This was in contrast to significant verbal-physiological agreement during the more arousing tape and film conditions. Clearly, further studies are in order, particularly those employing female subjects. However, these findings do support the notion of a threshold for the detection of genital responses. It may also be that some of the individual differences reported in the literature could result from the differences in the strength of the erotic stimuli and in the level of arousal at which subjects begin to detect genital responses or begin to incorporate them into their definition of the sexually arousing state. In addition, negative emotional arousal occurring in response to erotic stimuli (e.g., anger, disgust, guilt) may affect not only the level of physiological sexual arousal experienced by subjects, but also the subjective-physiological relationship. Unfortunately, this hypothesis has not yet been tested empirically. Studies of the relationship between subjective and physiological measures of sexual arousal should therefore include information regarding both the erotic strength of the stimuli used and the presence of negative emotional reactions to them.

In contrast to the findings presented above, there are a few studies which would suggest that under certain

conditions, subjects do not monitor their genital responses during sexual arousal, of if they do, their monitoring is impaired by other factors. Interventions that appear to increase the discrepancy between physiological-sexual responses and subjectively reported sexual arousal are described in the "missattribution" literature. For example, Cantor, Zillman and Bryant (1975) found that residual physiological arousal produced by physical exercise enhanced male subjects' self-reported sexual arousal and liking of an erotic film. The time interval between the exercise and viewing the film was varied, and the self-rated sexual arousal was most pronounced when there was measurable residual physiological activation that the men did not attribute to the exercise. Thus, it is possible, as Rook and Hammen (1977) have suggested, that non-erotic sources of arousal may be construed as erotic feelings when situational cues make such an interpretation plausible. This explanation relies on the assumption that subjects used cues from their physiological state to label themselves as sexually aroused. Since no genital measures were taken though, it is difficult to make assertions about the role of genital responses in the subjects' judgments concerning what they were experiencing.

Expectancy

There is some evidence to suggest that subjects' expectancies about their level of arousal is a crucial determinant of behavior. In an extension of Schachter's (1964) theory, Valins (1966) suggested that emotional reactions can be influenced by an individual's belief that he is aroused, even in the absence of physiological arousal. Several investigators (Briddell, Rimm, Caddy, Krawitz, Sholis and Wunderlin, 1978; Briddell and Wilson, 1976; Farkas and Rosen, 1976; Wilson and Lawson, 1976a, 1976b; Wilson, 1977) have been studying the effects of expectancies and alcohol on physiological-sexual arousal in male and female subjects. The findings regarding the effects of alcohol on genital sexual arousal generally have yielded a negative linear trend, i.e., rate and extent of tumescence and vaginal vasocongestion decreased with increasing doses of alcohol. Nevertheless, with increasing levels of intoxication, a greater proportion of subjects reported enhanced sexual arousal. Thus, in some cases it appears that subjects' expectancies regarding their sexual arousal contradict and supercede their genital-sexual responses.

Training

Some investigators (Cerney, 1978; Hoon, Wincze and Hoon, 1977) have attempted to enhance subjective sexual

arousal in females using continuous biofeedback of genital responses on the assumption that enhancing physiological changes via biofeedback will automatically result in an increase in perceived sexual arousal. Not surprisingly, Cerney (1978) found that subjective ratings of sexual arousal were not influenced by a training procedure using audiofeedback of the subject's own VBV responses during the viewing of an erotic videotape. However, it is interesting that as well, both studies demonstrated that audiofeedback of VBV responses alone was ineffective in enhancing voluntary control of the VBV responses of women viewing erotic stimuli. This is curious given the overwhelming evidence that suggests that control of cardiovascular functions is possible using biofeedback techniques (for a review, see Blanchard and Young, 1974). The failure of the training procedure to develop voluntary control of VBV responses in female subjects may have been due to several factors. First, the distractability of the feedback mode was noted in both studies. It would seem that this is easily resolvable by testing the subject's ability to voluntarily control their genital responses after the feedback training, during a no-feedback trial -- a procedure that is quite common in most biofeedback research (e.g., McFarland, 1975). Second, it is possible

that before teaching subjects to voluntarily control their genital responses, they must first learn to become aware of these responses. External monitoring of sexual arousal responses would seem to be a necessary step in the development of the subject's own cognitive-physiological feedback loop. It is interesting to note that the role of autonomic awareness is currently a controversial issue in the biofeedback literature. Although autonomic responses seem to be directly manipulable by feedback, some investigators feel that the development of autonomic awareness is a necessary pre-condition for voluntary physiological control (Shapiro and Surwit, 1976). There is unfortunately little research in this area although training in the ability to discriminate internal stimuli prior to biofeedback training has been shown to facilitate subsequent heart rate control (Brener, 1974) and finger temperature control (Gainer, 1978). Thus, as Heiman (1975) has suggested, "rather than teach a woman to become sexually aroused, a psychophysiological method might teach her to be subjectively sensitive to small bodily changes and to label those changes as 'sexual'" (p. 5). Central to this argument is the assumption that awareness of genital vasocongestive responses is important in the labeling of sexual arousal in "normal"

women. Just how important this awareness may be, or how it is used by non-clinical subjects is currently not known.

## DESIGN AND MEASUREMENT ISSUES

In any investigation of the relationship between cognitive and physiological measures of sexual arousal several important variables must be taken into account. These include: potential sources of error associated with the recording device, the choice of specific genital responses to be recorded, methods of data reduction and analysis, form and timing of administration of the self-report instruments, validity of the erotic stimulus materials, volunteer bias, and the cognitive activity engaged in by subjects during exposure to erotic stimuli. Before reviewing these issues, a brief description of the history of research on the measurement of genital responding in men and women is in order.

### Recording of Genital Responses

Until recently, most of the research in the area of physiological assessment of sexual arousal had been conducted on male subjects. The major techniques used to measure penile blood flow or erection include electromechanical strain gauges (Barlow, Becker, Leitenberg, and Agras, 1970; Laws, 1977), mercury in-rubber resistance gauges (Bancroft, Jones and Pullan,

1966), and volumetric plethysmographs (Freund, Sedlacek and Knob, 1965). The first two types of gauges are used to assess penile circumference, and the third to provide a relative measure of penile blood volume. Although subject to several potential sources of distortion (movement artifacts, Lader, 1967; adaptation effects, Cairns, 1968; voluntary control, Cairns, 1968; Laws and Rubin, 1969; and management by fantasy undetectable and uncontrollable by the experimenter, Bancroft, 1971, 1974), the use of direct genital measurement has provided a boon to the investigation of patterns of male sexual arousal. As well, recent work has begun to evaluate in a more precise manner, the role of cognitions (Abel, Barlow, Blanchard and Mavissakalian, 1975; Geer and Fuhr, 1978), subject characteristics (Farkas, Sine and Evans, 1978, 1979) and stimulus characteristics (Abel, Barlow, Blanchard and Mavissakalian, 1975; High, Rubin and Henson, 1979) on sexual arousal in a non-clinical population of male subjects.

Although the development of a genital device to measure vaginal vasocongestion in the female lagged far behind that for males, recent work has altered the situation. Shapiro, Cohen, DiBianco, and Rosen (1968) developed a vaginal diaphragm which used thermistors

to measure temperature changes in the vagina, thereby indirectly measuring vaginal blood flow. Tart (1969; reported in Zuckerman, 1971) developed a cliteroplethysmograph and Fisher and Davis (reported in Zuckerman, 1971) pioneered the use of a vaginal photoplethysmograph. Unfortunately, these devices were too cumbersome, difficult to calibrate and to validate (particularly since, in some studies they were used on sleeping subjects). The work of Geer, Morokoff and Greenwood (1974), Sintchak and Geer (1975) and Hoon, Wincze and Hoon (1976) has resulted in the more systematic use of the vaginal photoplethysmograph to measure vaginal engorgement. Other genital measures have been reported in the literature (for example, Cohen and Shapiro (1971), Bohlen and Held (1979), Perry (1977, 1978), Janovic (1970) and Henson, Rubin and Henson (1979)). However, their use has not been reported in more than one or two studies and therefore, their usefulness as indices of sexual arousal in women awaits further substantiation.

The vaginal probe used by Geer and his associates is made of clear acrylic with the shape and size of a menstrual tampon. A light source contained within the probe is directed at the wall of the vaginal lumen. A photoelectric transducer is also situated in the probe

in such a position that it detects only that light which is reflected from the vaginal tissue and blood circulating within it. The amount of incident light reflected back to the light detector is affected by changes in the volume of blood in the vagina. These changes can be recorded as changes in the output of the photoelectric transducer (Hatch, 1979).

Validity of the Vaginal Photoplethysmograph

Geer, Morokoff, and Greenwood (1974) presented some initial validating work with the device, suggesting that it is highly sensitive to sexual arousal. Hoon, Wincze, and Hoon (1976) modified the vaginal probe (using an infrared light emitting diode (LED) and phototransistor light detector) and examined the effects of sexual, dysphoric and neutral stimuli on heart rate, blood pressure, skin conductance and vaginal infrared light reflectance. These authors found that the vaginal measure most clearly discriminated the presence of erotic from non-erotic stimulation. Heiman (1977) also reported that both VBV and VPA were significantly greater in women listening to erotic versus non-erotic or romantic audiotapes. Gillan and Brindley (1979) found significant increases in subjects' VBV and VPA in response to both vibratory stimulation of the clitoris and sexual fantasy. Finally, Geer and Quartararo (1976) reported

increases in subjects' vasocongestive responses (as measured by the photoplethysmograph) in women asked to masturbate to orgasm. However, several potential problems have been isolated regarding the use of the photoplethysmograph. First, it is essential that the photoelectric transducer have a peak sensitivity in the infrared spectral region in order to avoid interpreting changes in blood oxygen saturation levels (due to changes in breathing patterns) as evidence of sexual arousal (Hatch, 1979; Weinman, 1967). Second, the temperature of the light detector and power dissipated by the light source must both be minimized since local temperature changes could affect the output of the photocell and as well, result in a vasodilation indistinguishable from sexual arousal. Third, the effects of light history on the DC component of the response (Hoon et al., 1976; Novelly, Perona and Ax, 1973; Sintchak and Geer, 1975; Tahmoush, Jennings, Lee, Camp and Weber, 1976) are sufficient to induce a significant source of error unless appropriate steps are taken (e.g., use of an LED, use of a silicon photodiode and phototransistor as a light source, controlled exposure of the cell to constant low-level illumination). Finally, Gillan and Brindley (1979) recently showed that raising pressure in the lungs, voluntarily contracting

the pelvic floor or the flexors or adductors of the hips all had significant effects on VBV, although these artifacts had no discernible effect on VPA. They suggested that this may be due to differences in the folding of the epithelial surface of the vagina and the firmness with which the probe rests against the vaginal wall.

Components of Vaginal Vasocongestion

Two components of vaginal vasocongestive changes can be recorded from the photoplethysmograph. When the signal is DC coupled, slow changes in VBV are observed and are thought to primarily reflect pooling of blood in the vagina. Vaginal pulse amplitude, also referred to as vaginal pressure pulse, can be observed with AC coupling (due to the arrival of the pulse wave on each cardiac cycle) and is recorded as changes in the amplitude of the oscillations of light reflectance at the heart-beat frequency (Gillan and Brindley, 1979). Both VBV and VPA appear to be related to the amount of blood in the vessels of the vagina but the physiological mechanisms responsible for this are poorly understood. Cook (1974) has reported that the correlations between pulse amplitude and blood volume have usually been low in psychophysiological studies of the cutaneous plethysmographic response. The data regarding this

relationship in the vagina are sparse and conflicting (Heiman, 1976; Zingheim and Sandman, 1978). Total blood volume is said to reflect the difference between the rate of inflow and rate of outflow in an organ and is affected by a complex set of cardiac and vascular reflexes on both the venous and arterial sides of the vascular bed (Hatch, 1979). Vaginal pulse amplitude is even more complex, reflecting neither pulsations of pressure nor blood flow as has commonly been assumed. Instead, it seems to result from a delicate interplay between blood volume and pressure in the arteries versus in the venules and capillaries, as well as the relative contributions of inertia, elasticity and viscosity to the impedance of flow (Cook, 1974; Gillan and Brindley, 1979). Nevertheless, both components are useful indices of changes in the local vasculature of the vaginal wall. Until more work is done comparing both measures simultaneously in the same subject, the understanding of what information they share and what information concerning sexual arousal is unique to each will remain obscure.

Experimenters in this area differ on which component of the photoplethysmographic response is the most informative measure of sexual arousal. Hoon and his coworkers appear to favor the VBV response (Hoon, Wincze

and Hoon, 1976, 1977; Wincze, Hoon and Hoon, 1977, 1978). They have suggested that VBV is the more sensitive measure since pulse amplitude changes represent only a fraction of the total blood volume at the recording site. However, Geer, Morokoff and Greenwood (1974), found that although both VBV and VPA discriminated between erotic and non-erotic stimuli, only VPA detected changes within stimulus conditions over time. Thus, they suggested that the latter response was the most sensitive measure. Both Heiman (1977) and Osborn and Pollack (1977) reported that VPA showed stronger relationships to subjective reports of sexual arousal than VBV. Nevertheless, recently Cerney (1978) reported that subjective arousal was significantly related to the blood volume component and not to pulse amplitude. The literature would suggest that any conclusions concerning the superiority of either measure are premature.

Methods of Data Reduction

Hatch (1979) has presented a detailed review of the variety of techniques in the literature for sampling and measuring change in levels of sexual arousal, as measured by VBV and pulse amplitude. He suggested that periodic time sampling was superior to the use of a single sample taken at the point of maximum responsivity

primarily because of the increased sensitivity and amount of information collected by the former procedure. As well, he reported on the different methods of inferring sexual arousal from changes in the VBV and pulse amplitude responses. (It is important to note that there are, at present, no means to calibrate the photoplethysmograph in volume units, and so arbitrary units such as millimeters of polygraph pen deflection are reported). These methods include: 1) direct comparison of mean values achieved in different experimental conditions (e.g., Geer et al., 1974); 2) comparison of scores in different experimental conditions which have been transformed (e.g., deviation from minimum change recorded in the entire experimental session, Hoon et al., 1976; deviation from one point in the experimental session, Wincze et al., 1976; percentage increase in responding recorded during different conditions, Wilson and Lawson, 1976a, 1978); 3) comparison of response levels during periods of repeated erotic stimulus exposure to response levels during immediately preceeding interstimulus intervals (e.g., Hoon et al., 1977); and 4) comparison of response levels during erotic stimulus exposure to a single initial baseline (Heiman, 1977; Osborn and Pollack, 1977). Each group of researchers appears to have their preferred method of

data sampling and data reduction. Currently, there are no data to suggest which of the methods are more sensitive and accurate. To what extent each of these methods would affect the correlation between subjective and physiological measures is difficult to assess and has not, as yet, been studied. However, it would seem that using only one or two data points for each subject (e.g., maximum response, latency to maximum response) would do more to obscure the relationship between these two variables than to clarify it. Extensive time-sampling and the use of multivariate statistical procedures would seem to be some improvement over data analyses in this area which have relied on a minimum number of data points and which often fail to meet the assumptions of univariate statistics (i.e., there is a tendency for researchers to use multiple univariate tests of significance on highly correlated data, violating the assumption of independence, as in Wincze et al., 1976).

Self-Report Instruments

Such factors as response measurement, sampling method and data reduction techniques are just as important to the accurate determination of subjective responses as they are in the measurement of physiological variables. It is unfortunate that for the most part,

techniques used to assess subjective sexual arousal are quite crude and simplistic.

Verbal report of sexual arousal has been used in a large number of studies as an indicator of subjects' immediate and delayed reactions to erotic stimuli and as a criterion to validate physiological measures under study as indices of sexual arousal. Sexual arousal has been assessed on scales of varying length and design (for example, Brady and Levitt, 1965; Bryne and Sheffield, 1965; Fehr and Schulman, 1978; Heiman, 1975, 1977; Levitt and Brady, 1965; Paris and Goodstein, 1966; Sigusch et al., 1970). The variation in such scales is considerable. For example, Boudewyns (1978) used a "sexual arousal thermometer" which was a white cardboard face with a vertical thermometer painted on it. One side of the thermometer was marked off in equal intervals (0 to 10) and the other side presented verbal descriptions of each interval (e.g., 0 = "completely unaroused" to 10 = "as aroused as I've ever been"). Other investigators have simply asked their subjects to rate erotic stimuli either on Likert scales of varying length (e.g., Hoon, Wincze and Hoon, 1976), bi-polar scales (Hamrick, 1974) or continuous scales (e.g., Kabbash, Brender and Bowman, 1977). The end-points of these scales have been labeled quite differently

depending on the experimenter's preferences (e.g., 1 = mildly sexually stimulating to 7 = very sexually stimulating, Osborn and Pollack, 1977; 1 = not at all (sexually stimulating) to 5 = a lot, Fehr and Shulman, 1978). Occasionally, the intervals between endpoints are labeled (e.g., Boudewyns, 1978) and, just as often, they are not (Heiman, 1977). These ratings have been taken either immediately following the presentation of the stimulus (e.g., Kutchinsky, 1971) or two minutes subsequent to the termination of the stimulus (Hoon, Wincze and Hoon, 1976). It is unfortunately not unusual to have the precise information on the type, length, design and timing of administration of these scales partially or totally absent from research reports (Heiman, 1977; Hamrick, 1974).

Interestingly enough, some investigators appear to equate ratings of sexual arousal and reports of genital responses (Henson, Rubin and Henson, 1978). This practice is highly questionable since it is quite likely that a) they are not equivalent for all subjects, and b) they may reflect two distinct yet interrelated components of the sexual response. This issue is currently under investigation with female subjects (Harris, 1980).

A variation on the method of asking subjects to rate

erotica using various scales of emotional responses requires subjects to answer specific questions about physiological-sexual responses to erotic stimuli (Griffit, 1975; Hoon et al., 1976; Mosher, 1973; Schmidt et al., 1969; Sigusch, Schmidt, Reinfeld and Weidemann-Sutor, 1970). Another technique used by Wiggins and his associates (Wiggins, Wiggins and Conger, 1968; Wiggins and Wiggins, 1969) involved asking subjects to indicate a series of preferences concerning pairs of stimuli. Somewhat less direct response measures have included response to a word association test (Galbraith and Mosher, 1968), and content of TAT stories (Clark, 1952; Clark and Sensibar, 1955; Wilson and Lawson, 1976b). However, measurement of sexual arousal by such indirect means as projective tests raises questions of validity.

A more recent development in the assessment of subjective judgments of sexual arousal has involved the use of the concepts and methodologies of psychophysical scaling (Cross, Tursky and Lodge, 1975). Geer (1977) asked subjects to set a tone to match the length of lines of varying but known lengths projected on a screen. By this procedure it was felt that each subject's response bias in judgments was determined. After this procedure subjects viewed 10 photographs

varying in erotic content and were asked to set the tone loudness to match the degree of sexual arousal they felt. Resulting correlations between genital responses to the photographs and subjective judgments were adjusted for the response bias and in fact, enhanced those correlations (from a mean of 0.83 to 0.89). This represents an interesting contribution to the area but more work is necessary to determine the appropriateness of the bias-determining procedure that was used.

Curiously, all of the above-mentioned methods for assessing subjective sexual arousal have one characteristic in common -- they are employed on an intermittent basis, usually at the end of each stimulus presentation. This practice assumes that subjects are able to recall their exact feelings in response to the stimulus at a later time. As well, Wincze et al., (1977) have suggested that experimenters do not always make it clear to subjects whether they expect them to report their highest, lowest, or average level of sexual arousal in response to the stimulus. It is quite likely then, that these methods could artificially reduce any subjective-physiological correlations that might exist under certain circumstances. A design permitting continuous assessment of both subjective and

physiological components of sexual arousal simultaneously would allow for a more precise determination of the relationship between these two variables. This procedure has, in fact, been used to track internal stimuli other than sexual arousal. Studies investigating heart beat discrimination have often involved the use of "production tasks" (Gannon, 1977) to assess interoception. Production tasks require the subject to continuously initiate motor responses according to his or her perception of heart rate or heart period. With regards to sexual arousal, this procedure has been reported in two studies (with male subjects, Farkas, Sine and Evans, 1979; with female subjects, Wincze, Hoon and Hoon, 1977). Farkas et al, (1979) employed a variable resistance potentiometer which could be rotated through 120°, with the end-points signifying high and low sexual arousal. The output of their device was amplified and recorded on a polygraph along with that of a strain gauge, measuring penile tumescence. The resulting correlations ranged from -0.26 to 0.95, suggesting large individual variability. The authors reported that they are currently subjecting their data to a more fine grain analysis. Wincze, Hoon and Hoon (1977), exposed six women to a variety of erotic videotapes while VBV, and

groin and breast temperature were being recorded. The women indicated their level of sexual arousal while viewing the tapes by positioning a lever device along a scale calibrated between 0 and 10. The correlations between VBV and the continuous subjective report for the six subjects ranged from 0.12 to 0.78, and were significant for five of the six subjects. In addition, the authors reported that physiological arousal preceeded subjective arousal although they did not give any details concerning this finding.

Erotic Stimuli

One critical aspect of experimental studies of sexual arousal is the selection of sexually arousing stimuli. It is clearly essential to assess the degree to which stimuli used in these experiments are, in fact, sexually arousing. But, as has been pointed out by several authors (Geer, 1977; Kabbash (Courey) et al., 1977; Zuckerman, 1971) researchers have often neglected the specification of their independent variables and have usually selected stimuli on the basis of intuitive judgments about their erotic value. This omission becomes more serious when the previously mentioned impact of level of sexual arousal experienced by the subjects on the relationship between subjective and physiological sexual arousal is taken into account. In

order to clarify the external validity of this research, some independent information concerning the sexually arousing nature of these stimuli is critical. In the present experiment the erotic stimuli were evaluated on an empirical basis. Videotapes of erotic scenes were pretested on males and females in order to obtain independent ratings of the erotic value of these stimuli. Two episodes judged equally arousing by the female subjects were employed in the present study. This use of parallel forms of stimuli permitted the assessment of change in the subjects' sexual responsivity due to the experimental interventions and avoided the potential problem of habituation effects.

Volunteer Bias

As volunteer bias in sex research has become accepted as inevitable, attempts have been made more recently to specify those variables which best discriminate between volunteers and non-volunteers. Barker and Perlman (1975) reviewed studies using an interview or questionnaire format, and basically concluded that volunteers for such studies do not differ from non-volunteers for other topics of research in terms of general personality measures. Conversely, volunteers were reported to be more sexually experienced, permissive and masculine (Diamant, 1970; Kaats and

Davis, 1971; Siegman, 1956). As studies of sexual behavior have begun to move away from total reliance on self-report as the dependent measure, and have begun to include the use of genital measuring devices, the need to assess subjects who volunteer for these studies becomes even more critical. Despite Rosenthal and Rosnow's (1975) contention that volunteers for "unusual" experiments may be more maladjusted, Farkas, Sine and Evans (1978) found no evidence to support that hypothesis. They asked males who participated in a questionnaire study of human sexuality to volunteer for a second, more intrusive laboratory study involving penile recording. The results demonstrated no marked differences between volunteers and non-volunteers on general personality measures. However, there were a few interesting findings relating to sexual experience and behavior. Volunteers for the second study tended to be significantly more experienced, less anxious, less guilty, and older than non-volunteers. They also tended to report having had a higher incidence of past erectile difficulties. There are no comparable studies using female subjects despite the likelihood that subject-selection factors would be even more implicated in studies of female sexual behavior. This is

supported by Heiman's (1977) report of a 22% attrition rate for females compared to a 7% rate for males in her study of sexual arousal which involved the use of genital measures. Clearly this study points to the issue of external validity and the necessary limitations that must be placed on generalizations from studies employing special subject samples.

Cognitive Activity

One final important obstacle for the assessment of subjective-physiological correlations in sexual arousal is the difficulty in controlling the cognitive activity of the subjects. For example, interfering cognitions, (Geer and Fuhr, 1976), instructions to reduce responses (Laws and Rubin, 1969; Henson and Rubin, 1971; Rosen, 1973) and high performance expectations (Wilson and Lawson, 1978) have all been found to interfere with both subjective and physiological indices of sexual arousal. By contrast, sexual fantasies have been found to have a facilitative effect on subjective and genital sexual arousal in men and women (Heiman, 1977; Hoon et al., 1977). This has led Geer (1977) to suggest that researchers must develop methods to ensure that desired cognitions occur. This would appear to be a prerequisite to any standardized assessment of the relationship between the subjective

and physiological components of sexual arousal.

While certain cognitive activities have been found to interfere with sexual arousal, directed attention has been found to enhance the subjective experience of certain emotions in several studies. In order to assess the effects of instructions on physiological responses and self-reported affect during fear imagery, Bauer and Craighead (1979) asked 60 female students to imagine fearful and neutral situations. Subjects asked to focus on their imagined bodily responses to the scenes experienced significantly greater heart rate increases than subjects asked to focus on the physical properties of the scenes. Self-focussed attention (Duval and Wicklund, 1972; Scheier, 1976) has been found to increase subjects' responsiveness to transient affective states in general, and to result in higher ratings of attractiveness of nude women by male subjects in particular (Scheier and Carver, 1977). These findings would suggest that increasing attention to bodily responses associated with an affective state such as sexual arousal, might enhance the experience of that state. It is noteworthy here that one of the major components of therapy for individuals complaining of lack of sexual feelings involves focussed attention

to bodily and, more specifically, genital responses.

To summarize, such factors as subject characteristics, choice of photoplethysmographic component, artifacts associated with the use of the vaginal probe, data sampling and reduction of both physiological and subjective measures, and various kinds of uncontrolled cognitive activity must all be seriously considered in investigations of sexual arousal. In addition, there are so few studies recording both genital and subjective responses with female subjects that it is impossible to know whether low correlations (when they are found) reflect poor experimental procedure and data analysis or the independence of these two components of sexual arousal.

PRESENT EXPERIMENT

In the present experiment, direct (VBV and VPA) and indirect (finger temperature) indices of physiological sexual arousal were recorded in conjunction with both continuous and discrete measures of subjective sexual arousal in 40 women exposed to pretested erotic and non-erotic videotapes. The major hypothesis under investigation was whether or not modification of the genital-subjective relationship, by enhancing the salience of genital responses, would affect the level of subjective and/or physiological sexual arousal

experienced by subjects. Secondly, the degree to which the subjective-genital relationship is affected by a) the component of the vasocongestive response chosen, b) the characteristics of the situation (erotic or non-erotic); and c) subject characteristics, was investigated.

A third question concerned which of the interventions employed would be effective in altering the genital-subjective relationship. These interventions included: a) audiofeedback of the subject's own VBV changes in response to a 22-minute videotape of erotic and non-erotic segments of film, and b) instructions to concentrate on perceived bodily sensations during the viewing of the videotape. The purpose of the VBV feedback was not, as in other studies (Cerney, 1978; Hoon et al., 1977) to teach the women to control their VBV responses. Rather, its purpose was to enhance their ability to more easily discriminate changes in VBV during sexual arousal. Whether this intervention would enhance (due to its information aspects), interfere with (due to its distracting aspects) or leave unaffected (due to its irrelevance to the experience of sexual arousal) subsequent sexual responsivity and/or whether it would alter the relationship between genital and subjective

responses in subsequent no-feedback trials could not be predicted. The use of directed attention in the second intervention permitted a more direct evaluation of the role of specific information concerning genital responding versus general attention to bodily responses. Any effects due to these interventions could be explained by non-specific attentional factors and simple exposure to erotic stimuli, and therefore, two other interventions controlling for these variables were included in the study as well.

The fourth issue addressed by this research concerns that of subject variables. Farkas et al's (1978) procedure to determine volunteer bias was employed in the present experiment to determine the characteristics of women who volunteered for the second phase of the study (involving exposure to erotica and a vaginal measure) compared to women who only accepted to participate in the first part (a questionnaire study of female sexual arousal). Subject variables investigated included both sexual and personality characteristics. As well, this procedure enabled a thorough analysis of the relationship of subject variables to the degree of subjective-physiological correlation found during sexual arousal.

Finally, the fifth issue addressed in this study

involved the direct comparison of a discrete post-film self-report to a continuous subjective measure. Surprisingly, this issue has not been addressed in the literature to date.

## METHOD

### Subjects

Fifty-six female undergraduate students (primarily from the physiotherapy and occupational therapy departments of McGill University) volunteered to participate in a questionnaire study on female sexual arousal in response to a brief description of the study given in their classes by the experimenter. Following the completion of an extensive sexual history and personality questionnaire (individually), each subject was asked to participate in a second phase of the study involving the use of erotic videotapes and a vaginal measure. The subjects were shown the experimental lab, equipment and measuring devices and were given a brief explanation of the purpose of the study, (i.e., that the study involved an investigation of the physiological and subjective components of sexual arousal in women). Confidentiality and the opportunity to withdraw from the study or decline to participate were assured. To minimize coercion, subjects were told that, if they wished, the experimenter

would reach them by telephone a few days later to learn of their decision and to make an appointment for the second session. Effort was made to schedule the second session at the mid-point in the subjects' menstrual cycle.

Forty of the women (71.4%) agreed to participate in the second phase of the study and signed a consent form to that effect (see Appendix A). They ranged in age from 19 to 27 years old (mean = 21.9 years) and 33 of the subjects were single. All subjects reported being exclusively heterosexual and no subject reported the presence of sexual problems. No consistent use of medication (other than the birth control pill) was reported by any subject. Subjects received $10.00 for their participation. More detailed information on those variables that distinguished between participants in the second phase and those who declined will be presented in the results section.

Experimental Setting

The experiment was conducted in a laboratory in the Department of Psychology at McGill University. During the session the subject reclined on a chair in a darkened experimental chamber eight feet by nine feet. The experimenter and the recording equipment were located in an adjacent room.

## Apparatus

Physiological Recording. Changes in vaginal opacity were measured using a slightly modified version of Sintchak and Geer's (1975) photoplethysmograph manufactured by Farrell Instruments. This device is a plexiglass cylinder 4.45 centimeters long and 1.27 centimeters in diameter which has been hollowed out to accommodate a small light bulb, photoresistive cell and connecting wires. When it is inserted into the vagina, the photocell detects reflected infrared light. Its peak of response is approximately 7000 angstroms. The attached shielded cable is covered with soft vinyl tubing. The device is smooth and comparable to a tampon in size and weight, ensuring comfort and ease of insertion. The vaginal probe was sterilized in a solution of Cidex-7 (activated gluteraldehyde, manufactured by Arbrook Ltd as Aqueous Cidex, Product CX-250) prior to use. Changes in VPA and VBV (the AC and DC components of the signal) were recorded on a four-channel Physiograph (E & M Company, Type PMP-4A). To minimize light history effects the probe was always kept under low-level illumination.

Finger temperature was recorded continuously from a thermister attached to the subject's left index finger and was monitored by means of a Yellow Springs

Telethermometer and another two-channel physiograph.

Subjective Measures. Subjects indicated their level of sexual arousal throughout the viewing of two documentary and two erotic videotape segments by means of a lever device which was attached to the right arm of the reclining chair in which they were seated. This lever moved through an arc of approximately 90° with both end-points clearly marked. Subjects were told that these end-points indicated "not at all sexually aroused" and "extremely sexually aroused" and that they could move the lever between these two points to indicate how sexually aroused they were during the viewing of the videotapes. This lever was connected to a channel of the physiograph so that movements of the lever were continuously recorded.

Subjects also rated the documentary and erotic segments immediately after viewing them. These ratings were provided by placing a pencil mark at a point on 15 centimeter lines labeled "not at all sexually arousing" to "extremely sexually arousing" and "unpleasant" to "pleasant" (on a separate line). The rating scales are included in Appendix B.

Materials

Questionnaires. All 56 subjects completed a questionnaire on the following:

a) demographic information (e.g., age, marital status, education, sexual orientation;

b) awareness of physiological sensations accompanying sexual arousal (Griffit, 1973; Hoon et al, 1976; Schmidt and Sigusch, 1970, degree of satisfaction with their own sexuality, and current rate of intercourse and orgasm;

c) sexual arousal by means of the Sexual Arousability Inventory (a 28-item questionnaire which attempts to elicit self-ratings of the subject's arousability in response to a list of briefly described sexual interactions (Hoon, Hoon, and Wincze, 1976);

d) the Bentler Scale for Heterosexual Behavior Assessment (a 21-point ascending Guttman scale of sexual experiences, Bentler, 1968;

e) the Sex Attitude Survey (measuring liberalism-conservatism attitudes regarding sex, Wallace and Wehmer, 1972);

f) the Eysenck Personality Inventory (Eysenck and Eysenck, 1968).

In addition, subjects completing the second phase of the study were asked to fill out another questionnaire including:

a) their awareness of physiological-sexual sensations during the experiment;

b) the Scale for Internal-External Locus of Control (Rotter, 1966).

All of these questionnaires are included in Appendix C.

Stimuli. Twenty-two videotapes of colour film depicting nude or partly clad men and women engaged in various forms of explicit sexual behavior were rated by 52 female and 174 male undergraduate students at Concordia University. Only the ratings from the 45 heterosexual women who completed the task were used for the purpose of this study.

The videotaped sequences were rated on a seven-point ascending scale of sexual arousal and a seven-point scale labeled unpleasant to pleasant. Two three-minute segments were selected which had been given mean sexual arousal ratings of 4.1 and 4.0 by the students. The first segment depicted a woman masturbating in the presence of a male partner and then proceeding to have intercourse. The second segment depicted a couple caressing and then having intercourse. These segments were transposed to another set of videotapes and served as the erotic stimuli for the pre- and post-tests for all subjects. Half of the

subjects in each group viewed segment one during the pre-test and segment two at post-testing. The remaining subjects were shown the segments in reverse order.

Four erotic and two documentary film segments lasting from one to eight minutes were also retransposed onto the videotapes in random order. These segments were rated in the initial study from 1.0 to 5.5 on the seven-point scale of sexual arousal. There was a five-second interval between each segment. This 22-minute tape served as the training tape for three of the four groups of subjects. The fourth group saw a 22-minute documentary videotape.

Two three-minute documentary sequences were transposed to the videotape as well. These tapes received ratings of 1.0 on the seven-point scale of sexual arousal by the 45 subjects and served as the neutral tapes for the pre- and post-tests for all subjects.

Feedback Signal

The feedback signal was a continuous tone which was presented to the subjects through a speaker situated in the experimental chamber. The speaker was connected to a voltage oscillator which was driven by the amplitude DC (VBV) polygraph signal. The feedback tone ranged in

frequency from approximately 200 to 8,000 Hz, according to the subject's own VBV responses.

Experimental Design

Forty female subjects were randomly assigned to one of four groups. Following a ten-minute adaptation phase, three-minute baseline and a three-minute neutral tape, each subject viewed a three-minute erotic segment. This served as the pre-test. During the experimental session, VPA and VBV were recorded from the vaginal photoplethysmograph, finger temperature was recorded from a thermistor placed on the left index fingertip, and perceived level of sexual arousal was recorded continuously by each subject using the lever device. After viewing both segments (neutral and erotic) all subjects rated them on scales of sexual arousal and pleasantness. This procedure was repeated for all subjects (i.e., 10-minute adaptation, 3-minute baseline, 3-minute neutral and erotic tape) during the post-test. Subjects were treated during the training phase according to their group assignment.

Following the pre-test, all subjects were told to relax for two minutes and were given instructions during this time (presented in Appendix D). The VBV feedback (VBVF) group then viewed a 22-minute videotape of erotic and neutral film segments. During this time these

subjects heard a continuous tone that changed in frequency. These changes reflected shifts in their VBV responses. Subjects in this group were told that the tone represented their level of "physiological sexual arousal" as picked up by the recording devices (i.e., both finger and vaginal measures). They were instructed to listen to the tone so that they could become more aware of their own physiological sexual arousal responses to the erotic stimuli. At the conclusion of this tape they were asked to complete a series of timed cognitive tasks. These tasks were introduced to prevent the subjects from thinking about the training tape and thereby to maximize the chances of their physiological responses returning to baseline levels.

The no-feedback concentration (NFC) group did not receive any audiofeedback during the training tape but instead, were asked to concentrate on any bodily sensations they perceived while viewing the film segments. They were told that by concentrating on these sensations they could begin to become more aware of changes in their level of physiological sexual arousal.

The exposure control (EC) group was told that the study involved an investigation of the effects of sexual arousal on memory and other cognitive functions.

They were asked to watch the training tape carefully since they would be asked a series of questions at the end of the study that would test their ability to retain certain information.

Finally, subjects in the attention control (AC) group were given exactly the same instructions as subjects in the EC group. However, instead of the erotic training tape, they viewed a 22-minute documentary tape. This design is presented in Figure 1.

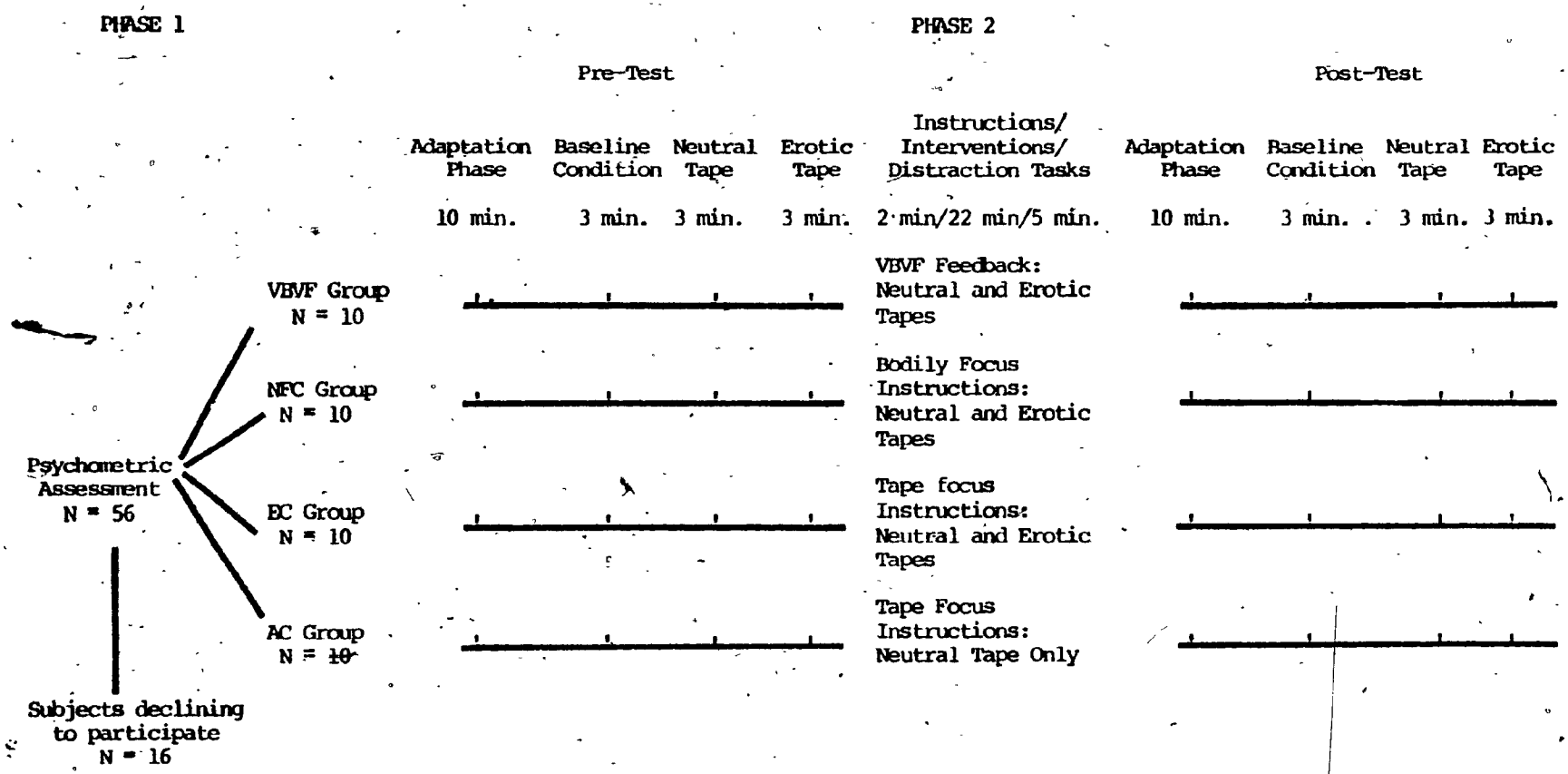
Insert Figure 1 about here

Procedure

Subjects were seen individually and were asked to sit in a reclining chair in a darkened experimental room. A thermistor was suspended from the ceiling permitting the sampling of room temperature which was conducted for two one-minute periods during the experiment. A television monitor was placed on a table approximately six feet from the chair. Subjects were given instructions on the method of inserting the vaginal probe (i.e., they were told to insert the device about one inch with the photocell facing their left inner thigh). The experimenter left the room while the subject inserted the device herself. A

Figure 1

Experimental Design


PHASE 1
PHASE 2
Pre-Test
Post-Test
Adaptation Phase
Baseline Condition
Neutral Tape
Erotic Tape
Instructions/ Interventions/ Distraction Tasks
Adaptation Phase
Baseline Condition
Neutral Tape
Erotic Tape
10 min.
3 min.
3 min.
3 min.
2 min/22 min/5 min.
10 min.
3 min.
3 min.
3 min.
Psychometric Assessment N = 56
VBVF Group N = 10
NFC Group N = 10
EC Group N = 10
AC Group N = 10
Subjects declining to participate N = 16
VBVF Feedback: Neutral and Erotic Tapes
Bodily Focus Instructions: Neutral and Erotic Tapes
Tape focus Instructions: Neutral and Erotic Tapes
Tape Focus Instructions: Neutral Tape Only

small, light blanket for the lap was available for the subject to use once she was seated and the device was in place. An intercom speaker was attached beside the chair so that the subject could indicate to the experimenter when she was ready.

The experimenter then reentered the room and attached the temperature thermistor to the tip of the finger of the subject's left hand. In addition, she gave the subject general instructions concerning the tapes that would be shown, the use of the lever device and the rating scales. Subjects were asked to practice using the lever in order to become more familiar with the device. Once the subject was comfortable with the recording procedures the experimenter left the room and began to take baseline recordings. All subsequent instructions had been pre-recorded onto the videotape, so that subjects were not disturbed by visits from the experimenter during the testing and training periods. Once the subject completed the post-test ratings, the experimenter reentered the room and removed the thermistor from the subject's hand. The experimenter then left the room while the subject removed the probe. When the subject signaled, via the intercom, that she was ready, the experimenter reentered the room and asked the subject to complete a

questionnaire related to her physical and emotional responses to the tapes, as well as the Internal-External Locus of Control Scale (Appendix E). Once this questionnaire was completed the subject was "debriefed" (i.e., informed of the experimental hypotheses, given a chance to see their records and to talk about their perceptions of the tapes, recording instruments and the experiment in general).

Data Reduction

Physiological Measures. Changes in vaginal blood volume (VBV), vaginal pulse amplitude (VPA) and finger temperature were monitored continuously throughout the experiment. Data from the three minutes of the base-line, three minutes of the neutral (documentary) and the three minutes of the erotic conditions were then converted from analogue to digital form and sampled at 2.5 second intervals. This was accomplished with the aid of a Summagraphics ID Digitizer which includes a processor, tablet and sensing stylus and which was used in conjunction with a Multi-Channel Graph Acquisition Program. The experimenter, who reduced the data for all subjects, was blind as to the group assignment of each individual subject. These data were printed and then transferred to computer tape for later analysis. Values obtained by this technique were compared to

manually scored measures of VBV, VPA and finger temperature. Pearson r correlations, based on 15 randomly sampled data points per measure, yielded reliability coefficients of 0.98, 0.99, and 0.98 (p's < .001), respectively.

Values for the VBV responses during the baseline condition were measured by recording the height of the pulses in millimeters (mm) from an arbitrary zero point. Responses during the neutral and erotic conditions were then recorded in millimeters deviation from the mean VBV response recorded during the three minutes of the baseline condition. Thus, all the VBV data here represent difference scores from the mean VBV recorded during the baseline condition.

A similar procedure was followed for the VPA response. The amplitude of the pulses occurring at 2.5 second intervals during the baseline condition was recorded in millimeters. Responses during the neutral and erotic conditions were then recorded as difference scores from the mean VPA in the baseline period.

Finger temperature, measured in degrees Centigrade, was sampled at 2.5 second intervals during the neutral and erotic conditions.

Subjective Measures

The lever device deflected a polygraph pen for a

maximum of 35 mm. Lever responses were measured in millimeters in precisely the same manner as VBV. Although instructed to do so, subjects did not always return the lever to the extreme left position before the beginning of the neutral condition. Since the position of the lever at the beginning of the neutral condition was not exactly the same for each subject, difference scores were used. The correlation between the analogue to digital conversion technique with manual scoring of the lever response was 0.98 ($p < .001$).

The sexual arousal ratings were measured in centimeters deviation from the end-point of a 15-centimeter line.

The appropriateness of the use of difference scores for VBV, VPA and lever responses was tested by comparing all four groups with respect to these measures recorded during the initial baseline condition. A mean score was computed for the VBV, VPA and lever responses during the three-minute baseline period for each subject. The mean group responses are presented in Table 1. A one-way Multivariate Analysis

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Insert Table 1 about here

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Table 1

Mean Vaginal Blood Volume (VBV), Vaginal Pulse Amplitude (VPA) and Lever responses for all groups in the initial baseline*

| | VBV | VPA | Lever Response |
|---|---|---|---|
| VBVF Group | 5.56 | 1.41 | 10.61 |
| NFC Group | 5.71 | 1.77 | 10.51 |
| EC Group | 4.46 | 1.37 | 10.82 |
| AC Group | 5.66 | 1.85 | 10.52 |

*Note: All scores represent millimeters deviation from an arbitrary point on the polygraph scale.

of Variance (MANOVA) revealed no significant differences between the groups ($F = 0.7006$, $p > .05$; Pillai-Bartlett Trace Criterion).

## RESULTS

### Subject Characteristics

Scores on seven dependent measures (awareness of body sensations during sexual arousal, Sexual Arousability Inventory, Scale of Heterosexual Behavior Experience, extraversion, neuroticism and the lie scale scores of the Eysenck Personality Inventory and the sexual attitude scale) were calculated for the 16 subjects who declined to participate in the part of the experiment involving genital measures and for the 40 subjects who agreed to participate. The mean scores for these variables for both groups are presented in Table 2. These scores were subjected to a Discriminant

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Insert Table 2 about here

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Function Analysis to determine those subject characteristics which maximally distinguished these two groups (presented in Table 3). A highly significant

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Insert Table 3 about here

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Table 2

Characteristics of Volunteers and Non-Volunteers

| | | | | Eysenck Personality Inventory | | | |
|---|---|---|---|---|---|---|---|
| | Bodily Awareness | Sexual Arousal Inventory | Sex Experience | Extraversion | Neuroticism | Lie Scale | Sex Attitudes |
| Volunteers | 53.1 | 85.6 | 18.2 | 13.0 | 9.9 | 2.3 | 66.7 |
| Non-Volunteers | 52.8 | 81.4 | 11.9 | 11.1 | 12.8 | 3.3 | 77.1 |

Table 3

Discriminant Function Analysis: Volunteers versus Non-Volunteers

| Variable | Wilks Lambda | Equivalent F | p | Correlations between Canonical Discriminating Functions/ and Discriminating Variables |
|---|---|---|---|---|
| Sex Experience | 0.7035 | 22.34 | <.001 | 0.66747 |
| Eysenck Personality Inventory: Lie Scale | 0.6070 | 16.84 | <.001 | -0.33667 |
| Eysenck Personality Inventory: Neuroticism | 0.5267 | 13.82 | <.001 | -0.28341 |
| Eysenck Personality Inventory: Extraversion | 0.5267 | 11.23 | <.001 | 0.26707 |
| Bodily Awareness | 0.5138 | 9.27 | <.001 | 0.04088 |

discriminant function was derived (Wilks-Lambda = 0.514, $p < .001$). Scores on the body awareness question, sexual experience scale and the Eysenck Personality Inventory resulted in 87.27% of the 56 subjects being correctly classified as to group assignment. Inspection of the significant Wilks Lambdas and the means for each variable suggested that volunteers were more sexually experienced, more extroverted, less emotional, less likely to score highly on lie scale items, and more likely to report bodily sensations accompanying sexual arousal than subjects who refused to participate in the second, more intrusive phase of the experiment.

Erotic Stimuli

Two different erotic videotapes were used in the experiment, with the order of presentation counter-balanced across subjects. In order to interpret the post-test results it was necessary to determine whether the two tapes were equally sexually arousing in the pre-test presentation. A t-test procedure was used to compare subjects' sexual arousal ratings of the two different pre-test tapes. The mean ratings of tapes 1 and 2 were 8.71 and 8.81, respectively. The results of the t-test indicated no differences in these sexual arousal ratings ($t = 1.04$, $p > .05$).

Room Temperature

The room temperature, which was not under the experimenter's control, varied from a mean of 23.53° Centigrade at the beginning of the experimental session, to 24.09° Centigrade at the completion of the session (range = 21.2° C to 26.6° C). This difference was found to be statistically significant with the use of a t-test procedure ($t = 2.196$, $p < .05$).

Training Effects: Physiological Responses

In order to determine the effects of the training and control procedures on the physiological responses to the neutral and erotic tapes, a 2 x 2 x 4 (time by condition by group) repeated measures MANOVA was conducted. The MANOVA was considered superior to a series of univariate comparisons due to the problem of potential alpha-inflation associated with repeated tests. Univariate F tests were employed to interpret significant MANOVA's only (Brag and Maxwell, 1979). The three dependent measures included mean VBV, VPA and finger temperature responses in each time (pre-test versus post-test) and condition (neutral versus erotic). These means are presented in Tables 4, 5 and 6.

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Insert Tables 4, 5 and 6 about here

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Table 4

Mean Vaginal Blood Volume for all groups in all conditions*

| | Pre-Test | | Post-Test | |
|---|---|---|---|---|
| | Neutral Condition | Erotic Condition | Neutral Condition | Erotic Condition |
| VBVF Group | 3.185 | 20.80 | 4.45 | 23.0 |
| NFC Group | 2.450 | 13.85 | 1.36 | 17.78 |
| EC Group | 2.215 | 15.70 | 1.215 | 12.95 |
| AC Group | 3.155 | 15.90 | 2.77 | 13.75 |

*Note: All scores represent deviations (in millimeters) from the baseline condition.

Table 5

Mean Vaginal Pulse Amplitude for all groups in all conditions*

| | Pre-Test | | Post-Test | |
|---|---|---|---|---|
| | Neutral Condition | Erotic Condition | Neutral Condition | Erotic Condition |
| VBVF Group | 0.665 | 7.90 | 1.00 | 8.40 |
| NFC Group | 0.840 | 7.40 | -1.665 | 9.05 |
| EC Group | -3.070 | 6.00 | -2.42 | 6.40 |
| AC Group | 3.315 | 7.15 | -1.77 | 4.85 |

*Note: All scores represent deviations (in millimeters) from the baseline condition.

Table 6

Mean Finger Temperature for all groups in all conditions*

| | Pre-Test | | Post-Test | |
|---|---|---|---|---|
| | Neutral Condition | Erotic Condition | Neutral Condition | Erotic Condition |
| VBVF Group | 30.05 | 31.2 | 31.5 | 31.4 |
| NFC Group | 31.4 | 31.7 | 30.3 | 31.0 |
| EC Group | 31.0 | 31.1 | 30.2 | 29.8 |
| AC Group | 29.9 | 30.1 | 29.8 | 29.8 |

*Note: All scores represent degrees Centigrade.

The MANOVA revealed a significant main effect for time ($F = 6.51$, $p < .001$). This and all subsequent MANOVA's were evaluated with the use of the Pillai-Bartlett Trace Criterion. A series of 2 x 2 x 4 univariate analyses of variance (ANOVA's) were computed to interpret these results. The MANOVA and its accompanying ANOVA's are presented in Table 7.

Insert Table 7 about here

(Discriminant Function Analyses were also used to interpret the results. However, they revealed no further information which would alter the interpretation of the results afforded by the univariate tests and so, are not presented.) Finger temperature was found to be significantly lower in the post-test ($F = 20.11$, $p < .001$). Thus, it appears that pre- to post-test differences occurred primarily with finger temperature which decreased from the pre- to the post-test period.

The MANOVA revealed a significant main effect for groups ($F = 7.71$, $p < .001$). Analyses of variance computed separately on the three dependent measures, revealed that VBV, VPA and finger temperature differed significantly as a function of group ($F = 8.88$, $p < .001$ for VBV; $F = 5.31$, $p < .001$ for VPA; $F = 32.31$, $p < .001$

Table 7

Multivariate and Univariate Analyses of Variance:

Physiological Measures*

| Source | df | Pillai-Bartlett | F |
|---|---|---|---|
| Between | 39 | - | - |
| Groups (G) | 3 | 1.17 | 7.71*** |
| VBV | | | 8.88*** |
| VPA | | | 5.31*** |
| Finger Temperature (FT) | | | 32.31*** |
| $Error_b$ | 36 | - | - |
| Within | 121 | - | - |
| Time (T) | 1 | 0.37 | 6.51** |
| VBV | | | 0.07 |
| VPA | | | 0.002 |
| FT | | | 20.11*** |
| Condition (C) | 1 | 0.94 | 172.53*** |
| VBV | | | 366.05*** |
| VPA | | | 381.24*** |
| FT | | | 0.59 |
| G x T | 3 | 0.71 | 3.70*** |
| VBV | | | 1.28 |
| VPA | | | 0.34 |
| FT | | | 17.10*** |
| G x C | 3 | 0.37 | 1.70 |
| T x C | 1 | 0.14 | 1.89 |
| G x T x C | 3 | 0.29 | 1.28 |
| $Error_{g \times t}$ | 36 | - | - |
| $Error_{g \times c}$ | 36 | - | - |
| $Error_{g \times t \times c}$ | 36 | - | - |

*Note: The values for the multivariate analysis are presented first, followed where appropriate, by the univariate analyses. Double asterisks represent $p < .01$, and triple asterisks, $p < .001$.

for finger temperature). Pairwise comparisons using the Tukey HSD procedure revealed the following. The mean VBV of the Vaginal Blood Volume Feedback (VBVF) group was significantly greater than the mean VBV of all other groups ($p < .05$). The mean VPA of the No-Feedback Concentration (NFC) group was significantly greater than that for the Attention Control (AC) group ($p < .05$). Finally, both training groups (VBVF and NFC) had significantly higher mean finger temperatures than either control group ($p < .05$).

The MANOVA also revealed a significant condition effect ($F = 172.53$, $p < .001$). Subsequent ANOVA's using the three physiological measures demonstrated that both VBV ($F = 366.05$, $p < .001$) and VPA ($F = 381.24$, $p < .001$) were significantly more elevated in the erotic condition than in the neutral condition. The mean VBV responses for the neutral and erotic conditions were 2.415 and 16.72 mm, respectively. The mean VPA responses for these conditions were -3.22 and 7.15 mm, respectively. Finger temperature was not responsive to the effects of condition.

The groups x condition, time x condition and groups x time x condition interactions were all non-significant. However, the MANOVA revealed a significant groups x time interaction ($F = 3.70$, $p < .001$). Finger

temperature was the only measure to change significantly in the post-test. ($F = 17.10$, $p < .001$). The finger temperature of subjects in the NFC and EC groups decreased significantly as a function of time ($p < .05$).

Subjective Measures. The effects of the training and control procedures on the subjective measures of sexual arousal were evaluated by means of a 2 x 2 x 4 (time x condition x group) repeated measures MANOVA (presented in Table 8). A mean score was calculated

Insert Table 8 about here

for the lever response in each time and condition for all subjects. The mean lever responses and sexual arousal ratings for each group in all conditions are presented in Tables 9 and 10, respectively. The

Insert Tables 9 and 10 about here

MANOVA yielded a significant main effect due to condition ($F = 420.50$, $p < .001$), and subsequent ANOVA's on both the lever response and sexual arousal ratings were significant ($F = 362.72$, $p < .001$ for the lever response; and $F = 762.67$, $p < .001$ for the sexual

Table 8

Multivariate and Univariate Analyses of Variance: Subjective Measures*

| Source | df | Pillai-Bartlett | F |
|---|---|---|---|
| Between | 39 | - | - |
| Groups (G) | 3 | 0.54 | 4.40*** |
| Lever | | | 6.12** |
| Sexual Arousal Ratings (SAR) | | | 6.17** |
| $Error_b$ | 36 | - | - |
| Within | 121 | - | - |
| Time (T) | 1 | 0.14 | 2.82 |
| Condition (C) | 1 | 0.96 | 420.50*** |
| Lever | | | 362.72*** |
| SAR | | | 762.67*** |
| G x T | 3 | 0.34 | 2.45* |
| Lever | | | 5.48** |
| SAR | | | 1.89 |
| G x C | 3 | 0.29 | 2.07 |
| T x C | 1 | 0.10 | 1.97 |
| G x T x C | 3 | 0.31 | 2.32* |
| $Error_{g \times t}$ | 36 | - | - |
| $Error_{g \times c}$ | 36 | | - |
| $Error_{g \times c \times t}$ | 36 | - | - |

*Note: The values for the multivariate analysis are presented first, followed by the univariate analyses. Single asterisks represent $p < .05$, double asterisks represent $p < .01$, and triple asterisks, $p < .001$.

Table 9

Mean Lever Responses for all groups in all conditions*

| | Pre-Test | | Post-Test | |
|---|---|---|---|---|
| | Neutral Condition | Erotic Condition | Neutral Condition | Erotic Condition |
| VBVF Group | .545 | 8.30 | .945 | 14.75 |
| NFC Group | -.939 | 6.10 | -.422 | 9.90 |
| EC Group | -.192 | 9.20 | -.123 | 5.45 |
| AC Group | -.975 | 10.30 | -0.710 | 11.45 |

*Note: All scores represent deviations (in millimeters) from the baseline condition. Maximum deflection was 35 millimeters. Post-hoc analyses revealed the following significant differences ($p < .05$): erotic pre-test versus erotic post-test for the VBVF and EC groups; lever response during the erotic post-test for the EC group versus all other groups.

Table 10

Mean sexual arousal ratings for all groups in all conditions*

| | Pre-Test | | Post-Test | |
|---|---|---|---|---|
| | Neutral Condition | Erotic Condition | Neutral Condition | Erotic Condition |
| VBVF Group | 1.64 | 9.57 | 2.70 | 11.85 |
| NFC Group | 0.72 | 8.65 | 0.55 | 9.94 |
| EC Group | 0.86 | 9.09 | 0.98 | 8.38 |
| AC Group | 0.99 | 8.99 | 1.33 | 9.28 |

*Note: All scores represent points on a 15 centimeter line.

arousal ratings). This suggests that the erotic tapes were effective in increasing subjects' reported sexual arousal.

A significant main effect due to groups ($F = 4.40$ $p < .001$) was reflected in both the subjective measures (as indicated by the individual ANOVA's $F = 6.12$, $p < .01$ for the lever response; $F = 6.17$, $p < .01$ for the sexual arousal ratings). Subsequent pairwise comparisons using the Tukey procedure revealed that the lever responses of the VBVF and AC groups were significantly higher than those of the NFC and EC groups ($p < .05$). With respect to the sexual arousal ratings, the VBVF group demonstrated significantly higher sexual arousal ratings than all the other groups ($p < .05$).

There were no significant effects due to time, groups x condition, or time x condition. However, there was a significant groups x time interaction ($F = 2.45$, $p < .05$). Analyses of variance yielded a significant groups x time interaction for the lever responses only ($F = 5.48$, $p < .01$). Pairwise comparisons revealed that only the VBVF group reported higher sexual arousal ratings in the post-test than in the pre-test ($p < .05$).

Finally, the multivariate analysis yielded a significant groups x time x condition interaction ($F =$

2.32, $p < .05$). This effect was due mainly to changes in the lever response ($F = 5.10$, $p < .01$). The mean lever responses for each group in each time and condition are presented in Figure 2. Post-hoc pairwise

Insert Figure 2 about here

comparisons revealed that only the VBVF group reported higher levels of sexual arousal in the erotic post-test condition than in the erotic pre-test condition ($p < .05$). By contrast, the EC group rated the second erotic tape significantly less arousing than the first (pre-test) erotic tape ($p < .05$) and significantly less arousing than the three other groups ($p < .05$).

Correlations between Subjective and Physiological Measures

A mean score was computed for each of the three physiological and two subjective dependent measures recorded during the neutral and erotic conditions of the pre-test for all subjects. Pearson r correlation coefficients were recorded for all possible pairs of these five dependent measures. The resulting correlation matrix is presented in Table 11. These correlations

Insert Table 11 about here

Figure 2

Mean Lever Responses for the Vaginal Blood Volume Feedback, No-Feedback Concentration, Exposure Control and Attention Control Groups in all Conditions of the Pre- and Post-Tests

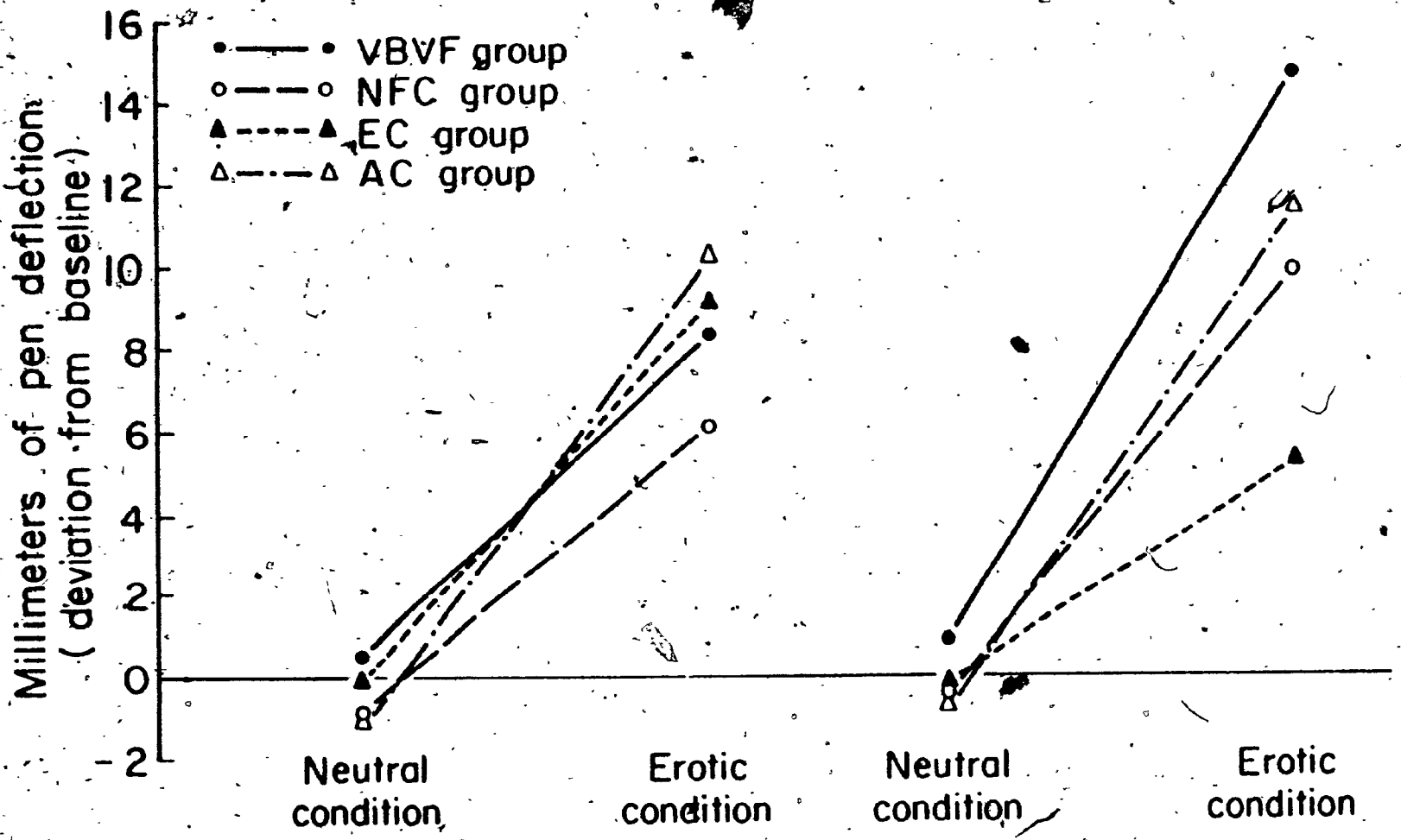
VBVF group
NFC group
EC group
AC group
Millimeters of pen deflection
(deviation from baseline)
16
14
12
10
8
6
4
2
0
-2
Neutral condition
Erotic condition
Neutral condition
Erotic condition

Table 11

Correlational matrix of Vaginal Blood Volume (VBV), Vaginal Pulse Amplitude (VPA), finger temperature, lever response and sexual arousal ratings during the pre-test conditions

| | VBV | VPA | Finger Temperature | Sex Ratings | Lever Response |
|---|---|---|---|---|---|
| VBV | - | .68* | -.02 | .62* | .55* |
| VPA | - | - | -.03 | .63* | .49* |
| Finger Temperature | - | - | - | .03 | -.04 |
| Sex Ratings | - | - | - | - | .78* |
| Lever Response | - | - | - | - | - |

*Note: Bonferroni alpha level, $p < .05$.

were evaluated with Bonferroni alpha levels for $p < .05$ in order to control for potential alpha-inflation due to repeated tests. Of particular relevance to this study are the significant correlations between VBV and VPA, and the two subjective measures of sexual arousal. As well, the intermittent sexual arousal ratings were highly correlated ($r = 0.78$, $p < .05$) to the continuous subjective measure. Finger temperature appeared to be unrelated to any of the other dependent measures. Finally, subjective-genital correlations appeared to be equivalent during the erotic and neutral conditions, as can be seen in Table 12.

Insert Table 12 about here

A great deal of information is sacrificed when mean responses are used to characterize the relationship between the continuous subjective and genital responses. In order to clarify the nature of this relationship the data from two subjects chosen at random (Subject #5 from the NFC group, and Subject #6 from the EC group) are presented in detail. A mean score was computed for VBV, VPA and the lever responses recorded over 15-second periods during the neutral and erotic conditions of both the pre- and post-tests. The mean VBV and lever

Table 12

Correlational matrix of VBV, VPA, finger temperature, lever response and sexual arousal ratings in the neutral and erotic conditions*

| | VBV | VPA | Finger Temperature | Sex Ratings | Lever Response |
|---|---|---|---|---|---|
| VBV | – | 0.35*(0.51)* | 0.07(-0.07) | 0.32*(0.34) | 0.27*(0.33)* |
| VPA | – | – | 0.08 (-0.10) | 0.13(0.15) | 0.06(0.12) |
| Finger Temperature | – | – | – | 0.20(-0.04) | 0.13(-0.10) |
| Sex Ratings | – | – | – | – | 0.58*(0.66)* |
| Lever Response | – | – | – | – | – |

*Note: Correlation coefficients for the erotic condition are presented in parentheses. Bonferroni alpha level $p < .05$.

responses for both subjects are presented in Figure 3.

Insert Figure 3 about here

Figure 4 presents the mean VPA and lever responses for

Insert Figure 4 about here

the two subjects.

Visual inspection of Figure 3 suggests that for both subjects the lever responses were only moderately related to VBV changes during the neutral pre-test condition, and that this pattern remained unaffected by the experimental interventions. By contrast, the relatively close VBV-lever relationship in the erotic pre-test condition for the subject in the EC group seemed to deteriorate in the erotic post-test. The opposite pattern can be seen for the VBVF subject, i.e., an enhancement of the VBV-lever relationship in the erotic post-test. The relationships between the VPA and lever responses depicted in Figure 4 seem less consistent and less affected by the experimental interventions for both subjects.

In order to determine the effect of the experimental interventions on the relationship between subjective

vaginal-subjective correlations in the erotic pre-test were compared to those in the erotic post-test condition. The difference between the VBV-lever correlations in the erotic conditions of the pre- and post-tests for the VBVF group approached significance ($z$ = 1.41, $p$ <.08), however, the difference between those correlations in the neutral conditions of the pre- and post-tests did not ($z$ = 1.00, $p$ >.05). The difference between VBV-lever correlations in the erotic conditions of the pre- and post-tests was significant ($z$ = 1.79, $p$ <.05) for the NFC group, indicating a response by subjects in this group to the concentration procedure. Finally, the difference between the VBV-lever correlations in the pre- and post-test neutral conditions for the AC group approached significance ($z$ = 1.59, $p$ <.06). With regards to the VPA-lever correlations, the pre- and post-test erotic conditions differed significantly for the EC group ($z$ = 2.34, $p$ < .001). Inspection of these correlations suggests a deterioration in the relationship between these two variables as a result of this experimental intervention.

Correlations between the VBV responses and the sexual arousal ratings, and the VPA responses and the sexual arousal ratings are presented in Tables 15 and 16, respectively. Significant VBV-sex rating correlation

Insert Tables 15 and 16 about here

coefficients were found in the neutral and erotic conditions of the post-test for the VBVF group ($r$'s = 0.68, 0.69, $p$'s <.05), in the erotic condition of the post-test for the NFC group ($r$ = 0.56, $p$ <.05) and in the erotic pre-test condition for the EC group ($r$ = 0.59, $p$ <.05). Significant VPA-sex rating correlations occurred in the erotic condition of the pre-test for the NFC and EC groups, and approached significance ($p$ <.10) in the erotic post-test condition.

In order to determine whether the relationship between sexual arousal ratings and the vaginal responses changed as a function of training, all correlation coefficients were transformed to Fisher's z scores. The only significant changes in this relationship occurred for the NFC group ($p$ <.05). Both the VBV and sexual arousal correlations and the VPA-sexual arousal rating correlations increased significantly in the post-test in response to the erotic tapes.

Individual Pre-Test Subjective-Genital Correlations

In order to examine the relationships between the vaginal and subjective responses in individual subjects regardless of group assignment, and before any

Table 15

Correlations between VBV and sexual arousal ratings for all groups in all conditions

| | Pre-Test | | Post-Test | |
|---|---|---|---|---|
| | Neutral Condition | Erotic Condition | Neutral Condition | Erotic Condition |
| VBVF Group | -.21 | .32 | .68* | .60* |
| NFC Group | .05 | -.41 | .17 | .56* |
| EC Group | -.40 | .59* | -.22 | .30 |
| AC Group | .03 | .26 | .13 | .14 |

*p <.05.

Table 16

Correlations between VPA and sexual arousal ratings for all groups in all conditions

| | Pre-Test | | Post-Test | |
|---|---|---|---|---|
| | Neutral Condition | Erotic Condition | Neutral Condition | Erotic Condition |
| VBVF Group | -.27 | -.27 | -.43 | .07 |
| NFC Group | .27 | -.67* | .34 | .45 |
| EC Group | -.02 | .56* | -.20 | .13 |
| AC Group | .28 | .50 | .07 | -.06 |

*p <.05.

experimental intervention, a mean score based on data recorded over 15-second periods was computed for the VBV, VPA and lever responses for all subjects. This resulted in a total of 12 means per subject per condition. Pearson r correlation coefficients, based on these means, were computed for each individual subject during the neutral and erotic conditions of the pre-test. These coefficients are presented in Appendix F.

Before training six subjects in the VBVF, NFC and AC groups and seven subjects in the EC group demonstrated significant positive correlations between VBV and the lever response ($p < .05$) in the erotic condition. One subject in the VBVF, EC and AC groups showed a significant negative correlation between VBV and the lever response ($p < .05$) in the pre-test erotic condition. With respect to VPA-lever correlations in the erotic pre-test condition, six subjects in the VBVF group, three subjects in the NFC group, four subjects in the EC group and seven subjects in the AC group showed significant positive correlations ($p < .05$).

In order to determine whether certain personality or sexual characteristics differentiated subjects with high and those with low subjective-genital correlations before training, subjects were divided into two groups.

Seventeen subjects whose VBV-lever, and VPA-lever correlations exceeded 0.70 ($p < .01$) in the pre-test erotic condition comprised the High Correlation group. The remaining 23 subjects, whose correlations fell below this point comprised the Low Correlation group. A discriminant function analysis was performed using subjects' scores on the Sexual Arousability Inventory, the Heterosexual Behavior Assessment Scale, the Internal-External Locus of Control Scale, the extraversion, neuroticism and lie scale scores of the Eysenck Personality Inventory, and the number of physiological-sexual sensations noticed by the subjects throughout the experiment. The mean responses on all seven dependent measures for both groups are presented in Table 17. No significant function emerged,

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Insert Table 17 about here

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suggesting that the groups were not significantly different with respect to those variables tested.

Pleasantness Ratings

The mean pleasantness ratings (measured on 15 centimeter lines) of the neutral and erotic tapes for all subjects were 9.24 and 9.04 centimeters, respectively. A t-test procedure, used to compare the

Table 17

Mean Personality and Sexual Scores of the High and Low Correlation Groups

| | | | | Eysenck Personality Inventory | | | |
|---|---|---|---|---|---|---|---|
| | Sexual Arousal Inventory | Sex Experience | Internal-External Locus of Control | Extraversion | Neuroticism | Lie Scale | Bodily Awareness |
| High | 82.59 | 18.7 | 12.35 | 12.88 | 11.1 | 2.2 | 5.5 |
| Low | 91.48 | 18.2 | 11.30 | 12.87 | 12.9 | 2.3 | 4.9 |

subjects' ratings of the neutral and erotic tapes, revealed no significant differences between the ratings ($t = 0.37$, $p > .05$). This suggests that both the neutral and erotic tapes were considered pleasant by the subjects and that the erotic videotapes were not considered significantly different from the neutral tapes on the dimension of pleasantness.

## DISCUSSION

### Level of Sexual Arousal

The results of this study suggest that awareness of or attention to genital responding may be an important factor in the labeling of sexual arousal in women. Interventions designed to enhance the saliance of genital vasocongestive changes resulted in increased levels of subjective sexual arousal in a sample of sexually non-dysfunctional women. More specifically, women receiving continuous audiofeedback of their VBV responses to erotic and non-erotic videotapes demonstrated increased levels of sexual arousal on the continuous subjective measure during a subsequent exposure to erotica. An increase in sexual arousal obtained on the continuous measure in the post-test approached significance for the NFC group as well. These changes were not found for the two control groups, suggesting that focussed attention to the erotic

material itself or to non-erotic visual stimuli, exposure to the test situation and practice effects were not responsible for the findings. No significant increases in genital responses to the erotic and non-erotic stimuli were noted in the post-test for any group. Thus, the effects of the VBV feedback and concentration procedures were primarily cognitive in nature, and were not mediated by increases in the level of genital sexual arousal.

The mechanism responsible for this increase in reported sexual arousal might lie in the increase in subjective-genital correlations noted for the VBVF and NFC groups during the post-test. In this period significant positive correlations were demonstrated in both the erotic and neutral conditions between VBV and the continuous subjective measure, and VBV and the discrete sexual arousal ratings by the VBVF group. These correlations were much smaller and non-significant in the pre-test exposure to the neutral and erotic tapes. As well, a near significant ($p < .06$) increase in the VBV-lever correlation for the erotic pre- versus the erotic post-test was found for this group.

Subjects in the NFC group demonstrated a response similar to those in the VBVF group. Vaginal blood volume-lever and VBV-discrete sex ratings correlations

were small and non-significant in the erotic and neutral pre-test conditions. In the post-test, significant correlations emerged for these measures in the erotic post-test condition only. As well, the VBV-lever, VBV-discrete sex ratings and VPA-discrete sex ratings correlations all increased significantly from the erotic pre-test to the erotic post-test.

Thus, the higher correlations demonstrated by the VBVF and NFC groups, possibly reflecting increased attention to or awareness of genital responses, were associated with the enhancement of the subjective experience of sexual arousal in the post-test. The findings for the two control groups (EC and AC) also demonstrated an association between those two events, although in the opposite direction. In addition to the fact that no significant increases in reported sexual arousal occurred for the EC and AC groups, there were far fewer significant subjective-genital correlations for these two groups. No significant correlation emerged in the post-test condition with the exception of a significant VBV-lever correlation in the neutral condition for the AC group. As well, a decline in the relationship between the lever response and VPA was accompanied by a significant decrease in the level of reported sexual arousal

(measured by the continuous lever device) for subjects in the EC group from the erotic pre- to the erotic post-test condition.

Although it is tempting to speculate that the enhanced subjective-genital correlations noted for the VBVF and NFC groups were in some way responsible for the enhanced levels of sexual arousal, the design of the present study does not permit such a conclusion. It is possible that the audiofeedback and bodily concentration procedures modified variables other than those measured -- variables highly correlated with the subjective reports of sexual arousal and/or the subjective-genital correlations. Nevertheless, the findings are highly suggestive and warrant further controlled investigation.

Thus, it appears that when women are given information about their VBV responses or when they are simply instructed to focus on their bodily sensations while viewing erotic material, they report being more sexually aroused and demonstrate significantly higher subjective-genital correlations than in a prior exposure to erotica. Findings for the control groups suggest that simple concentration, attention to visual stimuli, exposure to erotica and practice effects were not responsible for these results. An alternate explanation

of these findings lies in the demand characteristics inherent in the procedure. Subjects receiving audio-feedback or instructions to focus on bodily sensations were given the expectation that they were supposed to have learned something about their sexual arousal. This expectation was probably not raised by the instructions for the two control groups. Thus, those expectations may have led subjects to report increased sexual arousal in the post-test.

Post-experiment discussions with the subjects did not support this interpretation for subjects in the VBVF group. Most of the subjects in this group reported being somewhat disconcerted by the idea of a biofeedback device telling them when and how much sexual arousal they were experiencing. As well, the increased arousal, noted for the VBVF and NFC groups, was manifested in only one of the subjective measures. The continuous subjective measure, and not the final discrete ratings, was sensitive to the increase in subjective sexual arousal. It might be expected that if demand characteristics were operating on the subjects' reports of sexual arousal, both subjective measures would be affected. However, this remains an empirical question.

Subjective-Genital Relationships

Significant positive relationships between two

components of the genital vasocongestive sexual response and two measures of subjective sexual arousal were demonstrated in women exposed to erotic and non-erotic videotapes before any experimental intervention. Unlike previous reports of the differential sensitivity of VBV and VPA to changes in perceived sexual arousal (Cerney, 1978; Hoon et al., 1976, 1977; Geer et al., 1974; Heiman, 1977; and Wincze et al., 1977, 1978) these two components of the vasocongestive response were almost identically correlated to discrete ratings of sexual arousal and to the continuous subjective measure in the pre-test conditions prior to any intervention. This pattern changed, however, when post-test scores were taken into account. It appears that VBV became the most sensitive of the two genital measures to changes in perceived sexual arousal in the post-test. The reason for this is not immediately apparent. It is possible that the association between subjective sexual arousal and VBV is mediated by variables other than those affecting the VPA-subjective relationship. This might account for the discrepancies in the literature concerning which genital measures is the most sensitive reflection of subjective sexual arousal.

These findings confirm earlier evidence of significant positive subjective-genital correlations in

women (Heiman, 1977; Henson, Rubin and Henson, 1979; Wincze et al, 1977). One interpretation of these correlations is suggested by a recent study involving biofeedback of VBV to female subjects (Hoon, Wincze and Hoon, 1977). In addition to VBV, the authors recorded systolic and diastolic blood pressure, skin conductance, finger pulse amplitude and heart rate from two female subjects. Despite significant increases in VBV in one of the experimental conditions, no changes occurred in any of the other five measures. Subjects thus appeared to have no other cues by which to alter their VBV responses. This, in addition to the previously-mentioned research findings on the poor association between numerous physiological responses and perceived sexual arousal, would suggest that in the present study subjects were attending primarily to genital vasocongestive responses and not to other autonomic functions. Nevertheless, awareness of several other responses that might be highly correlated with VBV and/or VPA, such as localized muscle tension, clitoral vasocongestive changes or lubrication of the vaginal barrel, may have been responsible for the high subjective-genital correlations. Inclusion of such measures in future research might elucidate the mechanisms responsible for the high correlation between

these measures.

The relationship between genital and subjective components of sexual arousal was not enhanced during exposure to erotic videotapes in comparison to that during exposure to neutral or non-erotic tapes. Unlike the findings of Heiman (1977) subjects in this experiment seemed willing to focus on genital responses or label them as sexual in nature despite the fact that the external conditions did not provide appropriate cues, i.e., the situation (exposure to a taped documentary) was not labeled as a sexual one. One explanation for the discrepancy lies in the use of the continuous lever device in this study. Requiring subjects to continuously monitor changes in subjectively felt sexual arousal may have, in and of itself, enhanced the subjective-genital correlations. Subjects may have focussed less on external, contextual cues while using the device. This would have had the effect of obscuring the differences between the neutral and erotic conditions with respect to subjective-genital correlations. A study in which these two measures are compared using two different subject samples would clarify this issue. It also must be recalled that the erotic stimuli used in this study were judged to be only moderately sexually arousing by an independent

sample of subjects (4.0 and 4.1 on a seven-point scale). It is possible that these stimuli produced lower levels of physiological sexual arousal than those utilized by Heiman (1977), and consequently, lower subjective-genital correlations. This interpretation of the data underscores the necessity for the specification of the independent variables (in this case strength of the erotic stimuli) in research of this kind. Generalizations concerning those factors affecting the subjective-genital relationship cannot be made until this is accomplished.

Subject characteristics were surprisingly not found to be related to the degree of relationship between subjective and genital measures. Several explanations are possible. First, it is possible that variables other than those measured (sex experience, reports of bodily sensations accompanying sexual arousal, sexual arousability, internal-external locus of control, extraversion, neuroticism and social desirability) are related to the subjective-genital relationships. Secondly, it is quite possible that subjective-genital relationship is a state rather than trait characteristic. Thus, attempts to correlate stable individual traits with this relationship might be inappropriate. The nature of the demand

characteristics and stimuli presented, or the subjects' transient mood states and cognitive activity occurring at the time of testing, might be better predictors of the subjective-genital correlations occurring for each subject. It is also possible that the method of determining individual correlation coefficients (essentially comparing genital and subjective responses at the same points in time) obscures the idiosyncratic nature of the genital-subjective relationship. Auto-lag correlations, in which the genital responses are correlated with subjective responses occurring at different points in time might be more sensitive to individual differences in the thresholds at which genital responses are detected. Visual inspection of the data revealed that, for the most part, physiological arousal preceeded sexual arousal. However, this was not the case for all subjects, nor was the time lag between both measures consistent across conditions within the same subject. It is possible that single-case statistical procedures, such as time series analysis (Box and Jenkins, 1970) would yield more precise information on the subjective-genital relationship for an individual subject. By determining the subjective-genital relationship in this more individual-specific manner, personality characteristics

associated with different subjective-genital relationships may be more easily highlighted. As well, data generated in this manner would provide a more empirically-based approach to the assessment of subjective-physiological relationships in sexual arousal. Finally, this relationship was evaluated in only one situation for each subject. Repeated exposure to a wide variety of erotic and non-erotic stimuli might be needed to reveal stable patterns in a subject's tendency to accurately monitor vasocongestive changes.

Subjective-Genital Relationships: Group Effects

The pattern of subjective-genital relationships for the VBVF group, reported above, suggests that VBV feedback was effective in significantly enhancing subjective-genital correlations. It also appears that exposure to VBV feedback had effects that were restricted to VBV alone and did not affect VPA-subjective correlations. This is surprising since VBV and VPA were found to be highly correlated ($r = 0.68$) in the present study. Thus, it is possible that the VBV feedback altered the VBV-subjective relationship by increasing subjects' awareness of their VBV independently of VPA changes.

Despite the fact that subjects in the NFC group were not instructed to focus specifically on their

genital responses but on bodily sensations in general, this procedure was effective in enhancing subjective-genital correlations. Two interpretations of this finding are possible. First, since genital vasocongestive responses seem so highly related to subjective sexual arousal and seem to differentiate sexual arousal from other emotional states, asking subjects to focus on bodily sensations accompanying sexual arousal may be tantamount to asking them to focus on their genital sensations. Alternatively, the only two physiological measuring devices employed in the study were a digital thermistor and a vaginal probe. This may have created expectations in the subjects that vaginal responses were of interest to the experimenter and should therefore be focussed on. The use of multiple physiological recording sites could eliminate this problem.

Interesting differences emerged between the effects of the VBVF and NFC groups. First, unlike the VBVF group, the concentration group displayed a significant VPA-discrete sex ratings correlation in the erotic post-test condition. It is tempting to speculate that the concentration procedure fostered a more general awareness, i.e., one that included both VBV and VPA, whereas the feedback condition centered subjects'

attention only on the target response (VBV). Second, is the significant VBV-lever and VBV-discrete sex ratings correlations that occurred during exposure to the non-erotic post-test stimulus for the VBVF group. It may be that the specific information provided by the VBV feedback modified subjects' awareness of their VBV responses even during conditions that were not at all sexually arousing. Unfortunately, it is difficult to separate the effects of learning from demand characteristics here. For the first time (in the feedback period) subjects were exposed to their own VBV fluctuations during exposure to neutral stimuli. This may have altered their perception of the neutral stimuli used in the experiment, i.e., from not capable of eliciting physiological sexual arousal, to effective in producing such physiological changes. Thus, they may have expected some physiological-sexual arousal to the second non-erotic tape, and the increased correlation simply reflected this expectation.

In comparison with the findings for the VBVF and NFC groups, there were no consistent patterns of subjective-genital correlations in the two control groups (EC and AC), with one exception. The VPA-lever correlation declined significantly from the erotic pre- to the erotic post-test condition for subjects in

the EC group. One possible explanation of this finding is that subjects may have been attempting to follow the training instructions (to memorize as many aspects of the stimuli as possible) during the post-test. This competing cognitive activity might have interfered with their perception of internal stimuli as in Geer and Fuhr (1976). This would suggest that attention to internal stimuli (most probably genital responses) rather than to the external characteristics of a sexual situation, facilitates the experience of sexual arousal in women.

Subjective Measures of Sexual Arousal

For the most part, the discrete sexual arousal ratings and the continuous lever device generated similar conclusions concerning women's subjective responses to sexually arousing material. Both discriminated between erotic and non-erotic tapes and were highly and positively correlated with genital measures of sexual arousal. However, the sexual arousal ratings were not responsive to the effects of the experimental interventions, suggesting that they were less sensitive to changes in perceived sexual arousal. On the other hand, the use of the lever device may have affected the variables under consideration (in particular, the subjective-genital relationship). As

with VBV and VPA, until it becomes clear what information is unique to each and what information these measures share, psychophysiological studies of sexual arousal should include both techniques of measuring subjective sexual arousal. Studies on the potential reactive effects of both measures should be undertaken as well.

Subjects

Volunteers for a study of sexual arousal involving genital measurement differed from subjects who declined to participate in the intrusive phase of the study on several personality and sexual characteristics. Specifically, volunteers were more sexually experienced, more likely to report bodily changes accompanying sexual arousal, less emotionally labile, more extroverted and less affected by social desirability than non-volunteers. These results parallel those of Farkas, Sine and Evans (1978) who found that male volunteers in that study were also more sexually experienced than non-volunteers. However, contrary to the present findings, they reported no differences between the two groups of subjects with respect to personality measures. It is possible that subject-selection factors operate on a more general, personality level as well as on a sexual level when women are

employed as subjects in such experiments. The effects of these differences on sexual parameters measured in the laboratory are not known. Therefore, generalizations concerning the results of this research are limited by the characteristics of this subject sample.

Erotic Stimuli

The procedure of selecting erotic stimuli by pretesting them on a large group of subjects comparable to the experimental group proved successful. Film segments rated as erotic or non-erotic in the first study were similarly rated in the present experiment. As well, two erotic tapes rated equally sexually arousing by the pre-test sample, were also judged equally arousing by the experimental subjects.

It is interesting that two different samples of undergraduate students (in different universities) showed such a high level of agreement with respect to the erotic value of certain videotapes. This finding, demonstrated in a previous study (Kabbash (Courey), Brender and Bowman, 1977) points to the feasibility of developing standardized psycho-physiological assessment procedures for the evaluation of normative or dysfunctional sexual response patterns in women.

Subjects were also required to provide pleasantness ratings of the visual stimuli. This procedure was used to check for the presence of strong emotional reactions in addition to sexual arousal to the erotic stimuli. Subjects found the erotic stimuli used in this study to be quite pleasant (a mean of 9.04 cm on a 15 mm scale). As well, the erotic stimuli were not judged significantly different from the neutral stimuli on this dimension. Thus, it is likely that the subjects' sexual arousal responses to the erotic tapes were not confounded with any negative emotional responses.

Finger Temperature

Significant fluctuations in room temperature occurred during the recording sessions. Thus, the conditions necessary for the accurate and unconfounded measurement of finger temperature were not met in this study. For this reason, no interpretation of the findings concerning finger temperature are offered.

Implications and Suggestions for Future Research

The finding that information given to subjects regarding their VBV responses as well as instructions to focus on bodily changes in response to erotic and non-erotic stimuli modify subjects' experience of sexual arousal is interesting. First, it suggests that

awareness of genital vasocongestive responses is linked to the subjective state of sexual arousal (particularly since increased levels of reported sexual arousal accompanied increased subjective-genital correlations). Thus, the predictions made by the Rook and Hammen (1977) extension of Schacter's (1964) model of emotion have been supported in this study.

Second, it suggests that increasing a women's awareness of genital changes through instructions to focus on them or with the aid of biofeedback, might lead to improvement in sexually dysfunctional women whose primary complaint is lack of sexual feelings. Morokoff and Heiman (1980) presented evidence to suggest that such women experienced the same levels of genital responding to erotic stimuli as non-clinical subjects but label themselves as less sexually aroused. For such clinical groups the use of biofeedback to enhance genital responding with the aim of increasing subjective sexual arousal would be inappropriate. The results of the present study suggest that discrimination training techniques designed to enhance awareness of ongoing genital responding would be more likely to enhance the subjective experience of sexual arousal. However, given the analogue nature of this experiment, only further controlled studies with clinical populations will

clarify this issue.

The fact that women responded to such a limited intervention suggests that, at least with a non-dysfunctional, sexually experienced sample, information about genital responses is quite readily assimilated. It may be that due to socialization experiences, women's attention is diverted from their genitals. However, in a sample of women who have repeated experiences of becoming sexually aroused, it is possible that a modest reversal of this training is possible. Thus, under instructions to focus on bodily reactions (NFC group) or with external feedback, (VBVF group) coupled with "permission" from the experimenter to do so, subjects attended more closely to their genital responses and appeared to incorporate them in their experience of sexual arousal. Further research will be needed to clarify the generalizability of this subjective-genital correlation in both clinical and non-clinical samples.

In this study both VBV and VPA were significantly related to both continuous and discrete subjective measures of sexual arousal. As well, no differences emerged between these measures with regards to their ability to discriminate erotic from non-erotic material There was a difference between the two measures, however.

Vaginal blood volume seemed to be more easily discriminated by subjects in both VBVF and NFC groups following the experimental interventions. Further research in which both measures are compared is clearly indicated.

Conclusion

This study attempted to investigate the role of genital vasocongestive changes in the experience of sexual arousal in women. Variables such as ongoing information about genital changes, and focus of attention (internal or external) altered both the association between genital and subjective measures and the experience of sexual arousal. These variables did not significantly alter genital responding. Further research, designed to explore other parameters affecting the subjective-genital relationship and its significance for the experience of sexual feelings should be carried out.

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# Appendix A

## Consent Form

I, _____ freely and voluntarily and without undue inducement or any element of force, fraud, deceit or other form of constraint or coercion consent to be a participant in the research project entitled "Psychological and physiological evaluation of psychosexual arousal in university women" conducted in the Department of Psychology, McGill University, during the period of March, 1979 to August, 1979, with Linda Courey, M.A. as the principal investigator, (doctoral student at Concordia University). The procedures to be followed, and their purposes, have been explained to me. As I understand it, as a subject in this study, I will be asked to:

a) watch and rate videotape segments, some of which depict men and women engaged in various forms of explicit sexual behavior;

b) continuously monitor the level of my own sexual arousal for two six-minute periods of time;

c) wear a monitoring device on my finger and a vaginal probe throughout the experiment.

I am also assured that:

a) all information collected from me in this study is strictly confidential;

b) all recording equipment is safe (i.e., no pain or danger will be created by this recording) and, in the case of the vaginal probe, completely sterilized in a solution of activated gluteraldehyde;

c) I will insert the probe myself in total privacy.

Any benefits reasonably to be expected from my participation have been explained to me and are as follows:

a) I will be able to see my own records after the experiment and will be able to have access to the results of the study as a whole, once the data is analyzed. I also understand that this information may not be in any way helpful to me personally, but is designed to contribute to the understanding of sexual arousal of women in general;

b) I will be paid $10.00 for my participation.

I understand that this consent and data collected on me may be withdrawn at any time without prejudice. I may also decide to terminate the experiment at any time if I feel uncomfortable.

I have been given the right to ask and have received answers on any inquiry concerning the foregoing.

Questions, if any, have been answered to my satisfaction.

I have read and understand the foregoing.

_____ _____

(Witness) (Research Participant)

## Appendix B

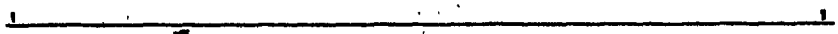
### RATINGS OF THE VIDEOTAPE SEGMENTS

I found segment #1 to be:

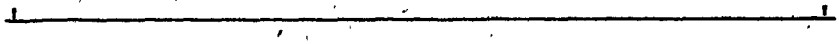
not at all sexually arousing — extremely sexually arousing

extremely unpleasant — extremely pleasant

I found segment #2 to be:



not at all sexually arousing — extremely sexually arousing



extremely unpleasant — extremely pleasant

# Appendix C

## Questionnaires Completed by Subjects

### SEXUAL AROUSAL INVENTORY

# SEXUAL AROUSAL INVENTORY

ALL RESPONDENTS REMAIN ANONYMOUS

The experiences in this inventory may or may not be sexually arousing to you. There are no right or wrong answers. Read each item carefully and then circle the number which indicates how sexually aroused you feel when you have the described experience, or how sexually aroused you think you would feel if you actually experienced it.

The meaning of the numbers is given below:

-1 adversely affects arousal; unthinkable, repulsive, distracting

0 doesn't affect sexual arousal

1 possibly causes sexual arousal

2 sometimes causes sexual arousal; slightly arousing

3 usually causes sexual arousal; moderately arousing

4 almost always sexually arousing; very arousing

5 always causes sexual arousal; extremely arousing

ANSWER EVERY ITEM

-1 adversely affects arousal; unthinkable, repulsive, distracting
0 doesn't affect sexual arousal
1 possibly causes sexual arousal
2 sometimes causes sexual arousal; slightly arousing
3 usually causes sexual arousal; moderately arousing
4 almost always sexual arousing; very arousing
5 always causes sexual arousl; extremely arousing

How you feel or think you would feel if you were actually involved in this experience.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1. When a loved one stimulates your genitals with mouth and tongue | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 2. When a loved one fondles your breasts with his/her hands | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 3. When you see a loved one nude | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 4. When a loved one caresses you with his/her eyes | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 5. When a loved ore stimulates your genitals with his/her finger | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 6. When you are touched or kissed on the inner thighs by a loved one | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 7. When you caress a loved one's genitals with your fingers | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 8. When you read a pornographic or "dirty" story | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 9. When a loved one undresses you | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 10. When you dance with a loved one | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 11. When you have intercourse with a loved one | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 12. When a loved one touches or kisses your nipples | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 13. When you caress a loved one (other than genitals) | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 14. When you see pornographic pictures or slides | -1 | 0 | 1 | 2 | 3 | 4 | 5 |

ANSWER EVERY ITEM

-1 adversely affects arousal; unthinkable, repulsive, distracting
0 doesn't affect sexual arousal
1 possibly causes sexual arousal
2 sometimes causes sexual arousal; slightly arousing
3 usually causes sexual arousal; moderately arousing
4 almost always sexually arousing; very arousing
5 always causes sexual arousal; extremely arousing

How you feel or think you would feel if you were actually involved in this experience.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 15. | When you lie in bed with a loved one | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 16. | When a loved one kisses you passionately | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 17. | When you hear sounds of pleasure during sex | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 18. | When a loved one kisses you with an exploring tongue | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 19. | When you read suggestive or pornographic poetry | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 20. | When you see a strip show | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 21. | When you stimulate your partner's genitals with your mouth and tongue | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 22. | When a loved one caresses you (other than genitals) | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 23. | When you see a pornographic movie (stag film) | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 24. | When you undress a loved one | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 25. | When a loved one fondles your breasts with mouth and tongue | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 26. | When you make love in a new or unusual place | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 27. | When you masturbate | -1 | 0 | 1 | 2 | 3 | 4 | 5 |
| 28. | When your partner has an orgasm | -1 | 0 | 1 | 2 | 3 | 4 | 5 |

CIRCLE A NUMBER INDICATING TO WHAT DEGREE (IF ANY) YOU NOTICE THE FOLLOWING CHANGES WHEN YOU ARE SEXUALLY AROUSED

| | | Never | | | | | | Always |
|---|---|---|---|---|---|---|---|---|
| 29. | Vaginal lubrication (dampness) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | Mild genital sensations (warmth, pulsations) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | Moderate genital sensations | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | Strong genital sensations | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | Nipple erection | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | Breast swelling | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | Muscular tension | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | Sex flush (reddening skin) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | Hyperventilation (rapid breath) | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | Heart rate increases | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| | Decreasing awareness of the environment | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 30. | In general, how often are you aware of body sensations when you are sexually aroused? | 1 | 2 | 3 | 4 | 5 | 6 | 7 |

31. How old are you? _____

32. Circle the last year of schooling you have completed.

| 1 2 | 1 2 3 4 | 1 2 3 4 |
|---|---|---|
| C.E.G.E.P. | University (undergrad.) | University (graduate student) |

33. Occupation _____

34. Circle your marital status: single married separated divorced remarried unmarried but living with partner

35. How many children do you have? _____

36. Circle the number of times per year (approximately) you have intercourse (make a reasonable estimate).

none 1-5 6-10 11-49 50-100 100 or more

37. Circle your present frequency of intercourse.

never experienced intercourse | presently not occurring | 1-10 times per year | 1-4 times per month

2 - 4 times per week | 5 or more times per week

38. Circle how often you have experienced orgasms.

never | sometimes | frequently | always

39. Circle the method of reaching orgasm you most prefer:

masturbation | intercourse | vibrator | pertner's fingers

pertner's mouth and tongue

40. Do you prefer sex with: one of the opposite sex? one of the same sex?

sometimes male, sometimes female? by yourself? (Circle appropriate response)

41. Circle the number of different partners with whom you have experienced sexual intercourse (make a reasonable estimate):

none 1 2 3-6 7-10 11-14 15 or more

42. Are you using some method of birth control at the present time? YES_____

NO _____

If so, what method are you using? _____

43. How many days have passed since the first day of your last menstrual period

(make a reasonable estimate):_____days.

44. Check how pleased you are with your present state of sexual responsiveness:

a) _____not at all pleased. I/we have a problem.

b) _____I don't care, one way or the other.

c) _____I'm pleased some of the time.

d) _____I'm usually pleased, hope it improves.

e) _____I'm pleased most of the time.

f) _____I'm extremely happy, it couldn't improve.

45. Please circle every number that describes a sexual activity that you have experienced at least once.

1. one minute continuous lip kissing
2. manual manipulation of female breasts, over clothes, by male
3. manual manipulation of female breasts, under clothes, by male
4. manual manipulation of female genitals, over clothes, by male
5. kissing nipples of female breasts, by male
6. manual manipulation of female genitals, under clothes, by male
7. manual manipulation of male genitals, over clothes
8. mutual manual manipulation of genitals
9. manual manipulation of male genitals, under clothes
10. manual manipulation of female genitals to massive secretions, by male
11. manual manipulation of male genitals to ejaculation
12. oral contact with female genitals, by male
13. oral contact with male genitals
14. sexual intercourse, face to face (ventral-ventral)
15. oral manipulation of female genitals, by male
16. oral manipulation of male genitals
17. mutual oral-genital manipulation
18. mutual manual manipulation of genitals to mutual orgasm
19. sexual intercourse, ventral-dorsal (rear entry)
20. oral manipulation of male genitals to ejaculation
21. mutual oral manipulation of genitals to mutual orgasm

Appendix C (Continued)

IDENTIFYING YOUR SEX ATTITUDES

# IDENTIFYING YOUR SEX ATTITUDES

## Instructions to the Reader

The test items that follow are designed to help you identify some of your most important feelings, attitudes, and beliefs regarding human sexual behavior. You are to administer the entire attitude scale to yourself, then score it yourself and, by following the suggestions in the book, interpret your own scores.

This sex attitudes scale consists of twelve brief self-tests, each of which deals with a specific area of sex. The twelve self-tests vary in length; but there are, altogether, exactly thirty-one items in the entire scale. You are urged to answer each of the thirty-one items. Omit none of them.

Each item consists of a case study or a statement of some people's belief, followed by five alternate choices. Read each item carefully, choose the best answer, underline the choice, and record the number of the choice in the blank space enclosed in parentheses on the right margin. For example, try this sample item:

100. Some people believe that all elementary school children should be required to take a course in sex education.

Do you agree with this point of view?

(1) (2) (3) (4) (5) 100: ( )

Underline (1) if you very strongly agree with this point of view. Then enter "1" in the answer space in the margin. 100: (1)

Underline (2) if you tend to agree with it, but do not feel strongly about it. Then enter "2" in the answer space in the margin. 100: (2)

Underline (3) if you are undecided. Then enter "3" in the answer space. 100: (3)

Underline (4) if you tend to disagree but do not feel strongly about it. Then enter "4" in the answer space. 100: (4)

Underline (5) if you very strongly disagree. Then enter "5" in the answer space. 100: (5)

To clarify further the various possible meanings of the five choices, the author suggests the following connotations:

(1) I very strongly agree. I agree absolutely. Yes, without a doubt. Yes, unquestionably. Yes, absolutely.

(2) I agree, but do not feel strongly about it. I agree more than I disagree.

(3) I don't know. I cannot make up my mind. It makes no difference to me. I have no opinion. I must know more about it before agreeing or disagreeing.

(4) I tend to disagree. I disagree more than I agree. I disagree, but do not feel strongly about it.

(5) I definitely disagree. I very strongly disagree. I disagree entirely. No, absolutely not. This attitude is absolutely wrong - no doubt about it.

Be sure to make one choice on each of the thirty-one items in the scale. Underline your choice, and enter the numeral (1, 2, 3, 4 or 5) that designates your choice in the answer space in the right margin.

Remember this is a test of sex attitudes, not of knowledge, skill, or behaviour. The choices you make will not be correct or incorrect; rather, they will merely suggest your inner feelings.

There is neither a passing mark nor a failing one on this scale. A high-numbered choice has no more value in scoring than a low-numbered choice. Answer each question honestly, therefore, if you expect to learn more about your sex attitudes. Now, go ahead to Test A, Item 1, and begin.

TEST A: Nudity
(Items 1-5)

1. Some parents permit young children during social play at home to examine their playmates' genitals and have their own genitals examined in return.

   Do you think these parents are dealing wisely with this kind of behavior?

   (1) (2) (3) (4) (5) 1: ( )

2. Some men and women spend time together unclothed, by their own choice, in isolated nudist camps and similar semi-public private settings.

   In your opinion, are these people morally justified in doing this?

   (1) (2) (3) (4) (5) 2: ( )

3. Photographs of nude women in seductive poses, and other stimuli - such as sexy cartoons, stories, and poems - deisgned to amuse males and stimulate them sexually, are sometimes found in the possession of adults, adolescents, and - in some instances - school-age children.

   Some people believe that such items as these are generally harmless to adults and children alike and should not be viewed with alarm or deep concern.

   Do you agree with these people's point of view?

   (1) (2) (3) (4) (5) 3: ( )

4. A famous painting by an 18th century master depicts nude men and women visiting together unconcernedly in a rich vineyard. Two of the men and three of the women are in full view of the observer, and their genitalia are clearly visible.

   Some people believe this painting should be permitted unrestricted viewing by all visitors, regardless of age or sex, in a public art gallery, and without concealing the genitals of the art subjects.

   Do you agree with these people's point of view?

   (1) (2) (3) (4) (5) 4: ( )

5. A famous sculptor's statues appear with genitals realistically present and in full view.

Some people believe that these statues should be displayed unashamedly in respected public places, such as museums and government buildings, with the genitalia present and unconcealed by fig-leaves, clothing, or anything else.

Do you agree with these people's point of view?

(1) (2) (3) (4) (5) 5: ( )

TEST A, Total Score: _____

TEST B: Sex Before Marriage
(Items 6-12)

6. Some people believe that children, including adolescents, who masturbate should not be made to feel guilty about it or ashamed of it.

Do you agree with this point of view?

(1) (2) (3) (4) (5) 6: ( )

7. Some people believe that sexual intercourse before marriage should ordinarily be regarded as moral, rather than immoral, behavior.

Do you agree with these people?

(1) (2) (3) (4) (5) 7: ( )

8. Some people believe that all sexually mature, single, unengaged individuals who hope to marry are morally justified in having sexual intercourse with similarly qualified members of the opposite sex if both partners desire it and give their consent.

Do you agree with this point of view?

(1) (2) (3) (4) (5) 8: ( )

9. Some people believe that unmarried females should not feel more guilty, shameful, or remorseful than unmarried males for participating in sexual intercourse.

   Do you agree with these people?

   (1) (2) (3) (4) (5) 9: ( )

10. An engaged couple, George T. and Myra N., discuss their mutual sexual desires, then deliberately have sexual intercourse with each other.

    Do you think they are morally justified in doing so?

    (1) (2) (3) (4) (5) 10: ( )

11. Some people believe virginity of the bride is no longer important in this modern age.

    Do you agree with this point of view?

    (1) (2) (3) (4) (5) 11: ( )

12. Some parents, fearful that their teenage sons and daughters will "get into trouble" while dating, provide contraceptives and teach them how to use them effectively.

    Do you think parents are morally justified in doing this?

    (1) (2) (3) (4) (5) 12: ( )

TEST B, Total Score: _____

TEST C: Sex Without Marriage
(Items 13-17)

13. Miss W., a middle-aged spinster, is permanently sterile, (unable to conceive) and intends to remain single; yet, she has sexual intercourse regularly with Mr. K., a middle-aged bachelor.

    Do you think Miss W. is morally justified in doing this?

    (1) (2) (3) (4) (5) 13: ( )

14. Mrs. Z., an elderly widow and grandmother, knows she is too old to conceive; nevertheless, she enjoys sexual intercourse periodically with her neighbor and devoted companion, Mr. B., an elderly widower. Neither Mrs. Z. nor Mr. B ever intend to remarry.

    In your opinion, are these two elderly people morally justified in maintaining this illicit sexual relationship?

    (1) (2) (3) (4) (5) 14: ( )

15. Mrs. Bertha R., an attractive young widow, is childless because her late husband was sterile. She would remarry, but wants a husband who will definitely make her pregnant. She does not know whether her bachelor friend, Mr. T., will ever marry her; nevertheless, she has sexual intercourse with him periodically, hoping she will conceive. Thenpperhaps he will marry her; but if he refuses, she will accept his decision.

    Do you think Mrs. R. is justified in doing this?

    (1) (2) (3) (4) (5) 15: ( )

16. Miss S., a wealthy, socially prominent spinster, wants to have a baby, but does not want to get married. She knows she will love her child and take better care of it than most modern wives. After due consideration, she deliberately gets pregnant by Mr. Y., whom she has meticulously selected as the ideal man for this task.

    Do you think Miss S. was morally justified in carrying out her plans?

    (1) (2) (3) (4) (5) 16: ( )

17. Some individuals believe that Mr. B., who is neither married nor engaged to be married, is morally justified in having sexual intercourse with a prostitute whenever he definitely feels a strong urge to do so.

    Do you agree with this point of view?

    (1) (2) (3) (4) (5) 17: ( )

TEST C, Total Score: _____

TEST D: Sex in Marriage
(Items 18-24)

18. Some people believe the primary purpose of sexual intercourse in marriage is to express affection and enjoy sexual pleasure, rather than procreate.

Do you agree with this point of view?

(1) (2) (3) (4) (5) 18: ( )

19. Some people think all types of sexual expression, including manual-genital and oral-genital contacts that produce orgasm, are morally justifiable in marriage, if they are pleasurable to, and desired by, both the husband and the wife.

Do you agree with this point of view?

(1) (2) (3) (4) (5) 19: ( )

20. Mrs. L. believes that wives should express their sexual desires with as much aggressiveness, initiative and enthusiasm as husbands.

Do you agree with Mrs. L.?

(1) (2) (3) (4) (5) 20: ( )

21. Mrs. F., an attractive young matron, definitely does not enjoy coitus, which invariably leaves her feeling cold, nervous, and emotionally upset. She believes she should not feel morally obliged to submit when her husband wants to have sexual intercourse with her.

Do you agree with Mrs. F.?

(1) (2) (3) (4) (5) 21: ( )

22. Mr. J. definitely does not enjoy sexual intercourse, which leaves him cold, ungratified, and emotionally depressed. He believes he is not morally obliged at any time to have sexual intercourse with his wife, even when she, hopeful of conceiving, demands it.

Do you agree with Mr. J.?

(1) (2) (3) (4) (5) 22: ( )

23. Mr. B. leaves his wife sexually frustrated and emotionally upset because he consistently ejaculates too soon after intromission. His doctor recently advised him to masturbate to orgasm shortly before bedtime, so that later, in bed, he may be able to maintain an erection sufficiently long to gratify his wife. Mr. B. agreed to do this.

Do you think Mr. B. will be morally justified in following the doctor's advice about masturbating?

(1) (2) (3) (4) (5) 23: ( )

24. Some people believe masturbation is a morally justifiable way to relieve sexual tension when the marital partner is not able to participate in coitus or prefers not to do so.

Do you agree with this point of view?

(1) (2) (3) (4) (5) 24: ( )

TEST D, Total Score: _____

TEST E: Extramarital Sex
(Items 25-31)

25. Some people believe that wife-swapping (the practice of temporarily exchanging marital partners for the purpose of enjoying sexual variety, adventure, and pleasure) is morally justifiable if all the participants desire it and give their consent.

Do you agree with this point of view?

(1) (2) (3) (4) (5) 25: ( )

26. Mrs. T. feels that sex is repulsive and thoroughly degrading, so she urges her husband, whom she loves, either to abstain totally or have extramarital sexual relations.

Do you think that Mr. T. is morally justified, under the circumstances, in having extramarital sexual relations?

(1) (2) (3) (4) (5) 26: ( )

27. Mrs. E. feels frustrated and unhappy because her husband, whom she loves, now absolutely refuses to have sexual relations with her, although he says he still loves her. He will not consider the possibility of divorce, and he positively rejects marriage counseling. Mrs. E., who has strong sexual desires, says that since her husband refuses help, she will have extramarital sexual intercourse to secure the gratification she needs.

In your opinion, will Mrs. E. be morally justified in having extramarital sexual relations?

(1) (2) (3) (4) (5) 27: ( )

28. Mr. F., who is organically impotent and permanently unable to participate in coitus, urges his wife, whom he loves, to have sexual relations with an unmarried man of her choice.

Do you think Mrs. F., as the wife of a man who has this permanent handicap, will be morally justified in having sexual intercourse regularly with an unmarried man of her choice?

(1) (2) (3) (4) (5) 28: ( )

29. Mrs. C. knows that her husband frequently commits adultery. She does not resent his behavior, but believes quite simply that under these circumstances she is morally justified in committing adultery too.

Do you agree with Mrs. C.?

(1) (2) (3) (4) (5) 29: ( )

30. Some individuals believe that a married man is morally justified in having sexual intercourse with a prostitute whenever he definitely feels a strong urge to do so.

Do you agree with this point of view?

(1) (2) (3) (4) (5) 30: ( )

31. A new motion picture tells the story, based on an actual case, of a middle-aged man and woman who, while living together adulterously (each partner being unable to obtain a divorce from an unwanted spouse), are gaining success, wealth, fame, and worldwide acclaim for their remarkable artistic accomplishments. Neither the man nor women feels guilty or remorseful for living adulterously, and neither is to be punished in any way.

Some people believe this movie should be permitted unrestricted showing in commercial theaters everywhere.

Do you agree with these people's point of view?

(1) (2) (3) (4) (5) 31: ( )

TEST E, Total Score: _____

Appendix C (Continued)

EYSENCK PERSONALITY INVENTORY

# EYSENCK PERSONALITY INVENTORY

## FORM A

By H. J. Eysenck
and Sybil B. G. Eysenck

Name _____ Age _____ Sex ____

Grade or Occupation _____ Date _____

School or Firm _____ Marital Status ____

## I N S T R U C T I O N S

Here are some questions regarding the way you behave, feel and act. After each question is a space for answering "Yes", or "No".

Try and decide whether "Yes", or "No" represents your usual way of acting or feeling. Then blacken in the space under the column headad "Yes or "No".

Work quickly, and don't spend too much time over any question; we want your first reaction, not a long drawn-out thought process. The whole questionnaire shouldn't take more than a few minutes. Be sure not to omit any questions. Now turn the page over and go ahead. Work quickly, and remember to answer every question. There are no right or wrong answers, and this isn't a

test of intelligence or ability, but simply a measure of the way you behave.

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BOX 7234, SAN DIEGO, CALIFORNIA 92107

| | | | |
|---|---|---|---|
| 1. | Do you often long for excitement? ..... | Yes | No |
| 2. | Do you often need understanding friends to cheer you up? ..... | Yes | No |
| 3. | Are you usually carefree? ..... | Yes | No |
| 4. | Do you find it very hard to take no for an answer? ..... | Yes | No |
| 5. | Do you stop and think things over before doing anything? ..... | Yes | No |
| 6. | If you say you will do something do you always keep your promise, no matter how inconvenient it might be to do so? ..... | Yes | No |
| 7. | Does your mood often go up and down? .... | Yes | No |
| 8. | Do you generally do and say things quickly without stopping to think? ..... | Yes | No |
| 9. | Do you ever feel "just miserable" for no good reason? ..... | Yes | No |
| 10. | Would you do almost anything for a dare? | Yes | No |
| 11. | Do you suddenly feel shy when you want to talk to an attractive stranger? ..... | Yes | No |
| 12. | Once in a while do you lose your temper and get angry? ..... | Yes | No |
| 13. | Do you often do things on the spur of the moment? ..... | Yes | No |
| 14. | Do you often worry about things you should not have done or said? ..... | Yes | No |
| 15. | Generally do you prefer reading to meeting people? ..... | Yes | No |
| 16. | Are your feelings rather easily hurt? ... | Yes | No |
| 17. | Do you like going out a lot? ..... | Yes | No |
| 18. | Do you occasionally have thoughts and ideas that you would not like other people to know about? ..... | Yes | No |

19. Are you sometimes bubbling over with energy and sometimes very sluggish? ..... Yes No

20. Do you prefer to have few but special friends? ..... Yes No

21. Do you daydream a lot? ..... Yes No

22. When people shout at you, do you shout back? ..... Yes No

23. Are you often troubled about feelings of guilt? ..... Yes No

24. Are all your habits good and desirable ones? ..... Yes No

25. Can you usually let yourself go and enjoy yourself a lot at a gay party? ..... Yes No

26. Would you call yourself tense or "highly-strung"? ..... Yes No

27. Do other people think of you as being very lively? ..... Yes No

28. After you have done something important, do you often come away feeling you could have done better? ..... Yes No

29. Are you mostly quiet when you are with other people? ..... Yes No

30. Do you sometimes gossip? ..... Yes No

31. Do ideas run through your head so that you cannot sleep? ..... Yes No

32. If there is something you want to know about, would you rather look it up in a book than talk to someone about it? ..... Yes No

33. Do you get palpitations or thumping in your heart? ..... Yes No

34. Do you like the kind of work that you need to pay close attention to? ..... Yes No

35. Do you get attacks of shaking or trembling? ..... Yes No

36. Would you always declare everything at the customs, even if you know that you could never be found out? ..... Yes No

37. Do you hate being with a crowd who play jokes on one another? ..... Yes No

38. Are you an irritable person? ..... Yes No

39. Do you like doing things in which you have to act quickly? ..... Yes No

40. Do you worry about awful things that might happen? ..... Yes No

41. Are you slow and unhurried in the way you move? ..... Yes No

42. Have you ever been late for an appointment or work? ..... Yes No

43. Do you have many nightmares? ..... Yes No

44. Do you like talking to people so much that you would never miss a chance of talking to a stranger? ..... Yes No

45. Are you troubled by aches and pains? .... Yes No

46. Would you be very unhappy if you could not see lots of people most of the time? Yes No

47. Would you call yourself a nervous person? ..... Yes No

48. Of all the people you know are there some whom you definitely do not like? ..... Yes No

49. Would you say you were fairly self-confident? ..... Yes No

50. Are you easily hurt when people find fault with you or your work? ..... Yes No

51. Do you find it hard to really enjoy yourself at a lively party? ..... Yes No

52. Are you troubled with feelings of inferiority? ..... Yes No

53. Can you easily get some life into a rather dull party? ..... Yes No

54. Do you sometimes talk about things you know nothing about? ..... Yes No

55. Do you worry about your health? ..... Yes No

56. Do you like playing pranks on others? .. Yes No

57. Do you suffer from sleeplessness? ..... Yes No

# Appendix D

## Taped Instructions to Subjects

1. End of baseline: In a few minutes you will see two three-minute films. While you are viewing both of these films, please use the lever on your right to indicate how sexually aroused you are, and any changes you may pick up in your level of sexual arousal. When the lever is in the extreme left position it means that you are not at all sexually aroused, and when it is in the extreme right position, it means that you are extremely sexually aroused. Now, please relax until the first film starts. Try and remember not to move during the rest of this session.
2. After pre-test: Fine. Now would you please indicate on the rating scale beside you how sexually aroused you were in response to each tape segment, and how pleasant or unpleasant it was to view each of them (Leave 15 seconds). As soon as you have completed the ratings please turn the page. (Leave 10 seconds). You have a few moments before the next sequence of film starts, so just relax. The next sequence of film will last approximately 22 minutes.

VBVF group: While you are watching these segments you will hear a tone that will be changing pitch. This tone reflects your own level of physiological sexual arousal as picked up by our recording instruments. By listening closely to the changes in the tone as you watch the film segments you will begin to become more aware of your own level of physiological sexual arousal and how it fluctuates. Increases in the tone indicate that you are becoming more aroused while decreases in the tone indicate that you are becomine less aroused. So, all you have to do is to watch the video-segments on the monitor and listen carefully to the tone. Do not use the lever during this time.

NFC group: While you are watching these segments it is important that you try and pay close attention to any sensations that you perceive in your body. By concentrating in this way you will become more aware of your own level of physiological sexual arousal and how it fluctuates. So, all you have to do is to watch the videotape monitor and concentrate on any body sensations you may perceive. Do not use the lever during this time.

EC group: While you are watching these segments it is important that you try and pay close attention

to as many details in the films as possible. As we are examining the effects of sexual arousal on memory, you will be asked to respond to a series of questions at the end of the study to see how much of these details you are able to remember. So, all you have to do is to watch the videotaped segments on the monitor and look at them as closely as you can. Do not use the lever during this part of the study.

AC group: Same as above.

3. End of training tape: (All Subjects): Fine. Now you are going to complete a series of "brainteasers". Each question will be read aloud on the TV monitor. You will have ten seconds to respond to each question. Please write your answer on the sheet in front of you. Try and answer each question even if you are not sure of the answer. This part of the experiment will last for five minutes. Please remember not to move during this time. Ready?

"In each question below, you will find three capitalized words and, in parentheses, a group of four non-capitalized words lettered a, b, c, and d. You are to select from the four non-capitalized words that word which best completes the analogy with the three capitalized words and underline your answer.

1. ICE : GREEN : : IRE : (a. angry b. fin c. red d. ear)
2. APPAL : (a. inveigle b. relegate c. wreak d. palliate) : : SALMON : MONEY
3. (a. point b. fear c. minus d. motion) : LESS : : STOCK : STILL
4. UNITED : AMERICAN : : (a. national b. political c. constitutional d. western) : EASTERN
5. PART : TRAP : : WAR : (a. cruel b. raw c. gay d. peaceful)
6. (a. tram b. slam c. scram d. gram) : LEAVE : : JERK : FOOL
7. LION : COWARDICE : : DOVE : (a. war b. dive c. bird d. love)
8. MANAGEABLE : (a. batallion b. amiability c. harrassment d. harangue) : : KNOLL : INNOCULATE
9. FAULTLESS : (a. amorous b. imperfect c. strong d. sinless) : : AUDACIOUS : TIMID
10. CEYLON : SATIN : : SPURN : (a. grain b. velvet c. worsted d. neglect)
11. DEPRESSION : RECESSION : : (a. psychiatrist b. psychosis c. abnormality d. normalcy) : NEUROSIS

12. LIVER : SILVER : : (a. live b. exit c. nurture d. exile) : EXIST

13. OREGON : ORE : : MAINE : (a. timber b. me c. state d. snow)

14. MILK : CHEESE : : (a. grapes b. liquor c. cream d. liquid) : WINE

15. BUS : (a. subway b. rush c. group d. car) : : SPORTSCAR : COUPLE

16. (a. steam b. coal c. water d. wood) : EXTERNAL COMBUSTION : : GAS : INTERNAL COMBUSTION

17. FRESH : PERCH : : (a. discourteous b. place c. salt d. fish) : SHARK"

4. <u>End of cognitive tasks</u>: Fine. Now you can relax for the next ten minutes. You may even close your eyes if you like. We are simply using this time to recalibrate our equipment.

5. <u>After baseline</u>: Now, you have one more series of segments to view. As in the beginning of the experiment you will see two three-minute films. While you are viewing both of these films, please use the lever on your right to indicate how sexually aroused you are, and any changes you may pick up in your level of sexual arousal. Try and remember not to move during the remainder of the experiment.

6. <u>After post-test</u>: Fine. Now would you please indicate on the rating scale beside you how sexually aroused you were in response to each tape segment, and how pleasant or unpleasant it was to view each of them. (Leave 15 seconds). Thank you very much for your help. The experimenter will come in in a few moments to remove the device from your finger. Once this is done she will leave in order to allow you to remove the vaginal probe in privacy.

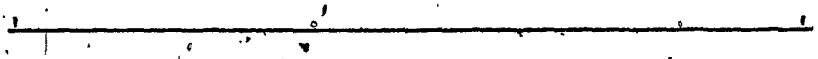
## Appendix E

### Rating form and post-test questionnaire

RATINGS OF VIDEOTAPE SEGMENTS: PART TWO

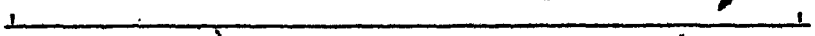
I found segment #1 to be:

not at all sexually arousing — extremely sexually arousing

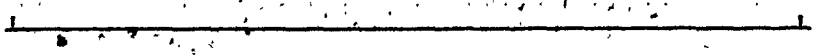


extremely unpleasant — extremely pleasant

I found segment #2 to be:



not at all sexually arousing — extremely sexually arousing



extremely unpleasant — extremely pleasant

1. a. Children get into trouble because their parents punish them too much.

   b. The trouble with most children nowadays is that their parents are too easy with them.

2. a. Many of the unhappy things in people's lives are partly due to bad luck.

   b. People's misfortunes result from the mistakes they make.

3. a. One of the major reasons why we have wars is because people don't take much interest in politics.

   b. There will always be wars, no matter how hard people try to prevent them.

4. a. In the long run people get the respect they deserve in this world.

   b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.

5. a. The idea that teachers are unfair to students is nonsense.

   b. Most students don't realize the extent to which their grades are influenced by accidental happenings.

6. a. Without the right breaks one cannot be an effective leader.

   b. Capable people who fail to become leaders have not taken advantage of their opportunities.

7. a. No matter how hard you try some people just don't like you.

   b. People who can't get others to like them don't understand how to get along with others.

8. a. Heredity plays the major role in determining one's personality.

   b. It is one's experiences in life which determine what they're like.

9. a. I have often found that what is going to happen will happen.

   b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

10. a. In the case of the well-prepared student there is rarely if ever such a thing as an unfair test.

    b. Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.

    b. getting a good job depends mainly on being in

the right place at the right time.

12. a. The average citizen can have an influence in government decisions.

    b. This world is run by the few people in power, and there is not much the little guy can do about it.

13. a. When I make plans, I am almost certain that I can make them work.

    b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyway.

14. a. There are certain people who are just no good.

    b. There is some good in everybody.

15. a. In my case getting what I want has little or nothing to do with luck.

    b. Many times we might just as well decide what to do by flipping a coin.

16. a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.

    b. Getting people to do the right thing depends upon ability, luck has little or nothing to do with it.

17. a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.

    b. Each of us can have an influence on important political decisions.

18. a. Most people don't realize the extent to which their lives are controlled by accidental happenings.

    b. There really is no such thing as "luck".

19. a. One should always be willing to admit mistakes.

    b. It is usually best to cover up one's mistakes.

20. a. It is hard to know whether or not a person really likes you.

    b. How many friends you have depends upon how nice a person you are.

21. a. In the long run the bad things that happen to us are balanced by the good.

    b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.

22. a. With enough effort we can wipe out political corruption.

    b. It is difficult for people to have much control over the things politicians do in office.

23. a. Sometimes I can't understand how teachers arrive at the grades they give.

    b. There is a direct connection between how hard I study and the grades I get.

24. a. A good leader expects people to decide for themselves what they should do.

    b. A good leader makes it clear to everybody what their jobs are.

25. a. Many times I feel that I have little influence over the things that happen to me.

    b. It is impossible for me to believe that chance or luck plays an important part in my life.

26. a. People are lonely because they don't try to be friendly.

    b. There's not much use in trying too hard to please people, if they like you, they like you.

27. a. There is too much emphasis on athletics in high school.

    b. Team sports are an excellent way to build character.

28. a. What happens to me is my own doing.

    b. Sometimes I feel that I don't have enough control over the direction my life is taking.

29. a. Most of the time I can't understand why politicians behave the way they do.

b. In the long run the people are responsible for bad government on a national as well as on a local level.

INDICATE WHETHER OR NOT YOU EXPERIENCED THE FOLLOWING REACTIONS AT ANY TIME DURING THE VIEWING OF THE VIDEOTAPE SEGMENTS

| | | | |
|---|---|---|---|
| Vaginal lubrication (dampness) | Yes | No | Not Sure |
| Mild genital sensations (warmth, pulsations) | Yes | No | Not Sure |
| Moderate genital sensations | Yes | No | Not Sure |
| Strong genital sensations | Yes | No | Not Sure |
| Nipple Erection | Yes | No | Not Sure |
| Breast swelling | Yes | No | Not Sure |
| Muscular tension | Yes | No | Not Sure |
| Sex flush (reddening skin) | Yes | No | Not Sure |
| Hyperventilation (rapid breath) | Yes | No | Not Sure |
| Heart rate increases | Yes | No | Not Sure |
| Decreasing awareness of the environment | Yes | No | Not Sure |

1. How confident were you in your ability to monitor your level of sexual arousal with the lever device during the experiment?

   I was accurate: 25% of the time.
   50% of the time.
   75% of the time.
   100% of the time.
   none of the time.

2. Did you notice any difference in your awareness of your level of sexual arousal through the experiment?

   Yes No Not Sure

3. Your ideas, comments or suggestions concerning this study are most welcome. Please write them here or discuss them with the experimenter.

## Appendix F

Individual Pearson r Correlation Coefficients between VBV, VPA and lever responses during the Neutral and Erotic Conditions of the Pre-Test for all Subjects

| | Neutral Condition | | Erotic Condition | |
|---|---|---|---|---|
| Subjects | VBV-Lever Correlation Coefficient | VPA-Lever Correlation Coefficient | VBV-Lever Correlation Coefficient | VPA-Lever Correlation Coefficient |
| 1 | .49 | -.01 | .96 | .86 |
| 2 | -.06 | .29 | .96 | .94 |
| 3 | -.23 | -.26 | .88 | .91 |
| 4 | .04 | -.26 | .82 | .83 |
| 5 | -.01 | .02 | .91 | .74 |
| 6 | .29 | .27 | -.48 | .46 |
| 7 | .40 | -.34 | .18 | .31 |
| 8 | .78 | -.33 | .91 | .88 |
| 9 | .63 | .44 | -.13 | .27 |
| 10 | .02 | -.43 | -.86 | .21 |
| 11 | -.08 | -.20 | .83 | .76 |
| 12 | -.31 | .12 | -.28 | .49 |
| 13 | -.21 | .07 | .91 | .40 |
| 14 | -.21 | -.47 | .73 | .86 |

Appendix F (Cont'd)

| | Neutral Condition | | Erotic Condition | |
|---|---|---|---|---|
| Subject | VBV-Lever Correlation Coefficient | VPA-Lever Correlation Coefficient | VBV-Lever Correlation Coefficient | VPA-Lever Correlation Coefficient |
| 15 | .10 | .28 | .27 | .54 |
| 16 | -.27 | .31 | .70 | .36 |
| 17 | .23 | -.58 | -.15 | .55 |
| 18 | .06 | .12 | .51 | .24 |
| 19 | -.0003 | -.16 | .60 | .44 |
| 20 | .36 | -.11 | .73 | .81 |
| 21 | .03 | -.36 | .61 | .45 |
| 22 | .17 | .19 | .76 | .73 |
| 23 | .08 | .07 | .92 | .96 |
| 24 | -.71 | -.49 | .96 | .71 |
| 25 | .16 | -.02 | .57 | .62 |
| 26 | .30 | .16 | .65 | .36 |
| 27 | -.11 | -.35 | .15 | .32 |
| 28 | .38 | -.36 | -.89 | .52 |
| 29 | -.08 | .23 | .63 | .49 |
| 30 | .56 | -.08 | .54 | -.06 |
| 31 | -.40 | -.29 | .90 | .96 |
| 32 | .53 | .34 | .91 | .69 |