

The Impact of Anxiety on Subjective and Physiological Sexual Arousal

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ABSTRACT

The Impact of Anxiety on Subjective and Physiological Arousal

Bitá Sharifzadeh, Ph.D.
Concordia University, 2009

Current findings on the impact of anxiety on sexual arousal are controversial and do not provide a clear picture of how anxiety is related to sexual arousal. Some studies report that anxiety inhibits sexual arousal and others report that anxiety actually facilitates sexual arousal. However, there is mounting evidence that suggest that these controversies might be due to the existing methodological limitations such as incomplete use of the concept anxiety. Two studies were conducted to examine the impact of anxiety on sexual arousal in healthy men and women. In both studies, participants completed questionnaires to measure anxiety and/or sexual arousal before and after watching anxiety provoking and/or sexually explicit film clips. In both studies, objective physiological measures were taken as the participants were watching the films using, a heart rate monitor. The first study examined the validity of a 10-minute anxiety/fear-provoking film clip in inducing anxiety and arousal in a non-clinical sample of 15 men and 15 women. In this study, anxiety was assessed as a multidimensional construct and as such subjective and objective anxiety were measured. Participants watched a neutral and an anxiety-provoking film in a counterbalanced order. Results of this study showed that a 10-minute anxiety film is long enough to adequately induce anxiety in a sample of non-clinical undergraduate students. A main effect of gender was found, with women exhibiting greater anxiety than men; as well, women demonstrated greater anxiety than

physiological arousal during the anxiety film. This study was an important step in validating the fear/anxiety-provoking film clip and its success in inducing anxiety and physiological arousal, permitting future studies using the film clip to examine the effect of anxiety on a variety of human experiences and functioning such as decision making and sexual functioning. The second study examined the impact of various components of anxiety on sexual arousal in healthy women ($n = 44$) and men ($n = 47$). In this study, participants watched either a neutral film followed by an erotic film clip or the anxiety provoking film followed by an erotic film clip. The results of this study showed that physiological and cognitive components of state anxiety have an enhancing effect on objective and subjective sexual arousal in both men and women, regardless of individual's sensitivity to anxiety. Furthermore, anxiety seems to favorably impact objective sexual arousal via increases in sympathetic nervous system, while it did not interfere with the subjective sexual arousal. In addition, sexual arousal seems to positively influence anxiety and successfully diminish it, at least for a short period. Implications of our understanding of the impact of anxiety on sexual arousal are discussed in relation to the importance of considering the different dimensions of anxiety.

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Relative Contributions

I proposed the overall research topic and focus of each study. For both studies I was the principal researcher responsible for the design of the studies, data collection, and interpretation of findings and manuscript preparation. Dr. Pfaus, the thesis supervisor, was available at all stages of research, particularly in research design, statistical analyses and manuscript preparation, for consultation and feedback. Undergraduate students helped with data collection in both studies as part of undergraduate thesis and Psyc 311 projects. Ladan Mohebian and Jessie Bendavid helped with data collection in study 1. I was responsible for testing approximately 50% of participants in study 1. Michael Zurek and Ladan Mohebian, and Sara Sylvester helped with data collection in study 2. I was responsible for testing approximately 50% of participants in study 2. For both studies I completed 80% of data analyses and 100% of manuscript preparation.

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Chapter 1

Introduction

Emotions can be divided into two functional categories, one that promotes approach and the other that promotes avoidance (Gray, 1982; Van den Hout & Barlow, 2000). The experience of sexual arousal (SA) is typically placed in the former category, whereas anxiety is typically placed in the latter. In their healthy forms, anxiety and SA are functional processes that promote survival, either by avoiding danger (anxiety) or by promoting sex and reproduction (survival of species). However, a high rate of the population experiences these emotions in dysfunctional forms, having anxiety disorders and/or sexual dysfunctions. For instance, studies report that 6% to 15% of the population suffers from anxiety disorders (e.g., Meyers et al., 1984; Wittchen, 1986) and 10% to as high as 50% of women or older men suffer from different sexual disorders or dysfunctions (e.g., Wincze & Carey, 1991; Barlow & Durand, 1998; Laumann, Paik & Rosen, 1999; Laumann et al., 2006). Some of those sexual disorders (e.g., Sexual Arousal Disorder, Hypoactive Sexual Desire Disorder, Orgasm Disorder) may stem from anxiety over sexual interaction. But those sexual disorders could also manifest themselves as a more general symptom of anxiety disorders (Figueria, Possidente, Marques, & Hayes, 2001). Indeed, some researchers have investigated the sexual functioning of clinically anxious individuals. For instance, Figueria et al. (2001) report significantly greater sexual disorders in panic disorder patients as compared to patients with social phobia (75% vs. 33.3%). This suggests that sexual dysfunctions are far from rare among clinically anxious individuals, which warrants further attention and investigation. How do sexual function and anxiety interact?

In the study of sexual behavior, anxiety has long been recognized as a source of sexual dysfunction (e.g., Masters & Johnson, 1966; Reich, 1937/1974), and moderate to high trait anxiety has been linked to sexual dysfunction (Barlow, 1986). However, more recent studies on the impact of anxiety on SA in men and women report contradictory results. For instance, some studies report a facilitative effect of anxiety on physiological SA (Hoon, Wincze, & Hoon, 1977; Palace & Gorzalka, 1990), but not on subjective SA (Palace & Gorzalka, 1990). Other studies do not find any effect of anxiety on physiological or subjective SA (Elliott & O'Donohue, 1997; Sipski, Rosen, Alexander, & Gomez-Marin, 2004), and still other studies report a decrease in genital and subjective SA (Beggs, Calhoun, & Wolchik, 1987; Both, Everaerd, & Laan, 2003; Laan, Everaerd, & Evers, 1995; ter Kuile, Vigeveno, & Laan, 2007). Several reasons can account for the inconsistent findings concerning the relationship between anxiety and SA, including a lack of adequate definition of SA and the measurement of anxiety as a unitary phenomenon. However, the degree of anxiety and activation of the autonomic nervous system, along with individual personality traits (e.g., temperament), may also hold a key to the understanding of how anxiety or stress could either enhance or inhibit SA.

Individuals can experience inhibited SA or desire in response to an obvious unconditional threat or a conditioned cultural proscription against particular sexual activity (compete with the possibility of getting caught). This last point, however, raises some interesting issues regarding the arousing nature of anxiety. Central excitation and inhibition both activate the autonomic nervous system. Typically, threatening stimuli activate the sympathetic nervous system (SNS), increasing blood flow and oxygen uptake to muscles and organs that need it. General activation of the SNS in response to a life-

threatening stimulus turns off blood flow to the genitals. Selective activation of both SNS and parasympathetic nervous systems (PNS) occurs in response to sexual stimuli, with the SNS increasing blood flow to the heart and the PNS increasing blood flow to the genitals (Pfaus, 1999). A small degree of stress or threat (i.e., something “naughty” or even painful) can be arousing, especially for individuals with low levels of arousability. Translated to a sexual situation, such arousal could be directed into sexual activity, perhaps to the point that in some individuals it becomes a necessary antecedent. In *Ars Amatoria*, Ovid (2CE/1930) suggested that anger, fear, or even short-lived terror, can be precludes to sex, specifically because they “stir passion” or arousal. The stimuli that evoke excitation and inhibition may be different for different individuals and what inhibits one person may actually excite another. Such individual differences in arousability and propensity for inhibition must be considered in any discussion of anxiety and sexuality.

Insights come from the animal literature. Although punishment with shock can suppress a variety of appetitive and consummatory behaviors in rats (Mackintosh, 1994), such punishment has never been reported to induce sexual inhibition in males (Beach & Fowler, 1959; Beach & Jordan, 1956a; Hayward, 1957; Zimbardo, 1958). In fact, shock, short-term pain (e.g., tail-pinch), or neutral stimuli paired with them, actually stimulate mounting in sexually sluggish or inactive male rats (Barfield & Sachs, 1968; Caggiula, 1972; Crowley, Poplaw, & Ward, 1973), and reduce the number of intromissions required for ejaculation in sexually active males (Beach & Fowler, 1959). Both male and female rats will readily cross the electrified grids to gain access to sexually receptive partners (Moss, 1924). Thus, the threat of punishment with shock or pain has not been workable as a method of suppressing SA or sexual behavior in animals. Indeed, arousal is a

necessary antecedent to sexual activity in both male and female rats. Drugs that decrease the activity of the SNS (e.g., α_2 adrenergic receptor agonists like clonidine) decrease sexual responding in both male and female rats (Clark, Smith & Davidson, 1985; Meston, Moe, & Gorzalka, 1996), and inhibit both physiological and subjective SA in women (Meston, Gorzalka, & Wright, 1997).

More reliable methods of punishment have been used. Rodents live in a predominantly olfactory world, and pairing estrous odors with gastrointestinal distress (induced by contingent injections of lithium chloride that make animals sick) induces a conditioned odor aversion in male rats and hamsters that translates to avoidance of female vaginal secretions (Zahorik & Johnson, 1976), increased mount and intromission latencies (Johnson, Zahorik, Immler, & Zakon, 1978), decreased proportion of males that ejaculate (Peters, 1983), or avoidance of copulation altogether (Peters, 1983; however see Lawrence & Keifer, 1987). This effect occurs if conditioning took place when the males were juveniles (Koch & Peters, 1987), and conditioned males utter distress vocalizations in the presence of vaginal secretions (Peters, Koch, Blythe, & Sufka, 1988).

Lawrence and Keifer (1987) demonstrated robust conditioned odor aversions using a second-order pairing of almond odor with lithium chloride injections. This conditioning paradigm led male rats to avoid copulation with almond-scented receptive female rats. That this conditioning was specific to the neutral odor was demonstrated by Ågmo (2002). Conditioned males in that study were allowed to copulate with females scented with capelin oil (a “fishy” smelling oil extracted from capelin, a fatty fish found off the coast of Iceland) to 1 ejaculation, after which they were injected with lithium chloride. Subsequently, those males avoided copulating with capelin-scented females,

although they continued to copulate normally with unscented females. Moreover, in subsequent partner preference tests, conditioned males avoided being near capelin oil-scented receptive females, indicating that their approach behavior was inhibited.

Finally, are there natural circumstances in which animals must inhibit their sexual responses? Adult male rats in the wild are rarely observed to attempt copulation with sexually nonreceptive females (Barnett, 1963; Calhoun, 1962). This is in marked contrast to most laboratory settings, in which males will attempt to copulate with nonreceptive females placed into chambers, where the males have previously copulated with sexually receptive females. Training sexually active male rats to differentiate between sexually receptive and nonreceptive females on alternating test trials leads quickly to a substantial reduction in the proportion of males that attempt to copulate with nonreceptive females (Pfaus & Pinel, 1989). The aversive stimuli provided by the nonreceptive females include a thwarting of attempted copulations due to the female's lack of receptivity, along with aggressive and defensive behaviors (e.g., boxing, biting, kicking) when the male attempts to mount. By virtue of the females being nonreceptive, these behaviors are paired with a lack of estrous odors. Males learn quickly to differentiate the presence of estrous odors with proceptive and receptive behaviors, and the lack of estrous odors with thwarted sexual advances and female aggression (which can be severe).

In the wild, such conditioning may occur normally during adolescence. As juveniles, male and female rats mount almost anything, including one another. As the expression of this behavior transitions into adult forms, males likely attempt to mount adult females that are not in heat. Of course, those females teach the males not to try it

again. Those data taken together suggest that expectancies of sexual reward and the degree of anxiety or stress play an important role in the ability of anxiety-inducing stimuli to either facilitate or inhibit sexual behavior in animals.

Anxiety and Sexual Function in Humans

In humans, the effect of anxiety on sexual responding has not been studied with as much experimental rigor, owing mainly to ethical constraints and practical considerations. The largely correlative nature of the effects may have given rise to contradictory interpretations. Anxious individuals (i.e., individuals high in trait anxiety) may be predisposed to develop worries and fears related to their sexuality, such as body-image and performance anxiety (Barlow, 1986). Equally, anxiety may also be associated with non-sexual concerns such as worry, obsessions, and hypervigilance to bodily sensations and as such function as cognitive distractions and interfere with sexual responding (e.g., Adams, Haynes, & Brayer, 1985; Elliott & O'Donohue, 1997). Contrary to some reports that link anxiety to impaired SA, others indicate a facilitative effect of anxiety on genital SA. For instance, Hoon, et al. (1977) and Palace and Gorzalka (1990) concluded that anxiety induced by an anxiety-evoking film enhanced genital responses to erotic stimuli in the laboratory.

Anxiety has various dimensions and can be defined in terms of state or trait (Spielberger, 1972), or in terms of its cognitive, emotive, physiological, and behavioral components (Fox & Calkins, 2003). As mentioned above, the physiological component refers typically to the activation of SNS, and it is manifested in symptoms such as faster heart rate and rapid breathing (as occurs in any form of arousal). The emotive component is the subjective and affective experience of anxiety, whereas the behavioral component

of anxiety directs the individual to fight or to flight (Fox & Calkins, 2003). In addition, beliefs about the meaning of anxious sensations (anxiety sensitivity), selective attention, expectations, and hypervigilance refer to the cognitive component of anxiety. For instance, cognitive models of anxiety disorders entail that patients with panic disorder misinterpret some fear-provoking cues as life-threatening catastrophe (Arntz, Rauner, & van den Hout, 1995). For many years, it was believed that anxious patients are aware of the irrationality of their fears and do 'not really' expect that fear-provoking cues would be followed by harm. However, when patients with panic disorder (Hibbert, 1984), generalized anxiety disorder (Butler & Mathews, 1983) and even spider phobia (Lavy, van den Hout, & Arntz, 1993) were asked, they reported that they do indeed expect harmful outcomes (expectation).

Although it was not introduced particularly for this function, the Anxiety Sensitivity Index (ASI) has found a useful place in examining a cognitive component of anxiety (Reiss, 1997). Anxiety sensitivity can be described as the misinterpretation of bodily sensations as reflecting danger, loss of control, or social embarrassment and as such give rise to anxiety. For instance, the fearful preoccupation of panic patients with bodily sensations such as dizziness, palpitations or unsteadiness may present possible hypersensitivity of panic patients to the anxiety response and the bodily sensations (Clark, 1993a).

Given that the SNS is also activated during SA, it is possible that individuals with high anxiety sensitivity (e.g., patients with panic disorder) could misinterpret the physiological changes during SA as something rather threatening or embarrassing and react anxiously to the physical experience of SA. For instance, research examining sexual

functioning in anxious populations report higher sexual dysfunctions in anxious individuals as compared to control participants, (Figueira et al., 2001; Van Minnen & Kampman, 2000). These findings lend more credence to the notion that anxiety sensitivity may affect interpretation of SNS activation during SA. Thus, it is not surprising that sexual aversion disorder and hypoactive sexual desire are more frequently observed among individuals with panic disorder as compared to individuals with social phobia (Figueira et al., 2001; Van Minnen & Kampman, 2000).

Although state and trait anxiety could be expected to interfere cognitively with SA for instance through distracting the individual from processing sexual cues, state anxiety is also associated with increases in physiological arousal similar to the ones observed in SA, such as increased heart rate and as such it may act as a catalyst and enhance SA (Hoehn-Saric & McLeod, 1988). Because of this additional influence of state anxiety on SA, differentiating between acute and chronic anxiety in SA studies may have important implications.

State anxiety is a transitory, heightened emotional response characterized by increased feelings of apprehension and activation of the SNS (Hoehn-Saric & McLeod, 1988; Spielberger, 1966). Since state anxiety is short-lived and can be influenced (e.g., Stoudenmire, 1975), it has been the focus of manipulation in the studies of anxiety and SA. For instance, Hoon et al. (1977) and Palace and Gorzalka (1990) demonstrated that elevations in state anxiety can facilitate increases in genital SA (e.g., vaginal blood volume, VBV; and vaginal pulse amplitude, VPA). However, in contrast to physiological measures, subjective measures in response to an erotic film were lower when sexual stimulus was preceded by an anxiety-provoking film rather than by a neutral film (Palace

& Gorzalka, 1990). The lower subjective SA means either that state anxiety is cognitively interfering the information processing or that the genital measures used for women are not specific to SA.

As a relatively stable measure, trait anxiety reflects an individual's dispositional tendency to experience state anxiety. According to Spielberger (1975), individuals higher in trait anxiety experience more frequent and more intense acute anxiety. From a cognitive perspective, high trait anxiety may interfere with subjective SA because the individual is readily predisposed to perceive threatening information, which may distract her from sexually arousing stimuli or cause negative interpretations of those stimuli. Although trait anxiety is related to state anxiety, previous research has indicated that it is not as reliably predictive of autonomic responses to stressors (Lamb, 1973). Given that trait anxiety represents only a tendency toward autonomic excitation (state anxiety), it is reasonable to assume that it would be less predictive of acute physiological sexual responses mediated by autonomic arousal. However, with regard to measuring the generalized effects of anxiety on sexual function over the long term, trait anxiety would be the more stable aspect of anxiety.

A variety of subjective self-report questionnaires have been used to measure anxiety, such as Anxiety Sensitivity Index to measure anxiety sensitivity, a cognitive component of anxiety, and Spielberger State-Trait Inventory to measure state and trait anxiety. Arousal, the physiological component of anxiety, has been measured using a variety of tools that assess heart rate and blood pressure (SNS activation). Taken together, anxiety as a multidimensional construct of state or trait anxiety with cognitive,

emotional, physiological, and behavioral components, can have differential influences on the physiological and subjective SA in men and in women. *Sexual Arousal*

Attempts to define SA as a multidimensional concept that would capture various aspects and components of sexual response have been facing challenges and the definitions have been rather phasic. By and large, the sexual response cycle has been defined as a series of physiological events that occur as a result of SA and prompt the individual to engage in sexually stimulating activities. For instance, Masters and Johnson (1966) suggest in their four-stage linear model that sexual response has four phases. Phase 1 is the excitation and occurs during SA; the second phase is plateau, which occurs during sexual stimulation; the third phase is the orgasm, the release of sexual tension/excitement; and finally the last phase is called resolution, which is the period of relaxation. The shortcoming of this model is that it is mainly physiological, linear and neglects the psychological aspects of human sexual response.

To account for the lack of psychological aspect, Kaplan (1979) proposed a desire phase that would occur as the first phase of the sexual response cycle, before the excitation phase. However, there is evidence that sexual activity can occur without desire, especially for women (e.g., Beck, Bozman, & Qualtrough, 1991; Michael, Gagnon, Laumann, & Kolata, 1994). The diagnostic categories of sexual disorders such as hypoactive sexual desire disorder; female SA disorder and female orgasmic disorder, are in large influenced by this linear model (Diagnostic and Statistical Manual of Mental Disorders, DSM-IV-TR; American Psychiatric Association, 2000). However, one of the problems with this classification, as highlighted by feminists, is that such classification medicalize the diversity of sexual expression by making it fall into either normative or

nonnormative categories. Moreover, they view such classification as a misguided effort to place emphasis on the physical reaction (mainly genital responses) to sexual stimulation (e.g., Leiblum, 2001; Nicholls, 2008; Tiefer, 1995)

Some researchers emphasize the role of hormones, experience, and acculturation in sexual behavior (e.g., Hardy, 1964; Mead, 1949; Whalen, 1963). For instance, Whalen argued that sexual motivation could be reduced to hormonal and experiential factors. He distinguished between six elements of sexual behavior: 1) Sexual Identification (gender role); 2) Object Choice (direction of sexual attention); 3) Sexual Gratification (pleasure); 4) Sexual Arousal (momentary sexual excitation); 5) Sexual Arousability (solid physiological characteristics of an individual); and 6) Sexual Activity. While others proposed that human sexual response, in particular SA is a multidimensional event that involves four strongly interconnected non-linear components of cognition, emotion, motivation, and physiology (Redouté et al., 2000; Stoléro et al., 2003). The cognitive component is the process of evaluating a stimulus as a sexual enticement, while the emotional component refers to the affective feature of SA. The motivational component of SA promotes approach to a sexual target. And finally, the physiological component refers to the autonomic reactions (cardiovascular, genital response) associated with SA. The majority of these definitions; however, are primarily based on the research with men and do not consider gender differences.

Other researchers attempted to define SA as a function of SNS and PNS activation. For instance, Pfaus (1999) defines SA as “the momentary level of genital blood flow (parasympathetic) and indices of sympathetic activation of the heart, galvanic skin response, or breathing rate, in response to a sexual incentive” (Pfaus, 1999, p.136).

However, research looking at the role of SNS and PNS on SA report contradictory results. While some argue that an activation of SNS (e.g., anxiety) inhibits SA in both men and women and PNS activation facilitates SA in both sexes (e.g., Kaplan 1974, 1988; Wolpe, 1958), others report that in certain situations sympathetic activation may in fact facilitate or have no effect on SA (e.g., Barlow, Sakheim, & Beck, 1983; Heiman & Rowland, 1983; Hoon et al., 1977; Wolchik et al., 1980). For instance, performance anxiety has been speculated to be a cause of erectile difficulties in men (e.g., Ansari, 1975; Cooper, 1969). It is argued that anxiety activates SNS, and as a result, inhibits blood flow to specific organs, such as the penis and causes erectile difficulties (e.g., Carlson, 1994; Weiss, 1972). However, it is notable that there are also methodological limitations in measuring objective genital SA, especially in women, which may in part count for these incongruent reports.

Objective measures for men. Different dimensions of erection have been measured using a variety of methods. The dimensions usually measured are length (from the pubis along the upper side of the shaft to the tip of the glans) and circumference (around the girth of the shaft, variously at the base, below the glans and around the glans) of the penis. Clinical physiological methods include the Rigiscan (a device measuring penile tumescence and rigidity); volumetric plethysmography (techniques using air or water displacement to measure changes in penile volume); and strain gauge plethysmography (measuring penile circumference change). Another method of measurement is stretching of the flaccid penis. However, this method is thought to be unreliable as stretching may produce different results depending of force being applied. Where possible, the erect penis can be measured with less error than the flaccid penis

(Coxon, 1996). The use of paper strips for self-measurement has been found to be an acceptable alternative to these more intrusive and time-consuming methods of clinical measurement (Han, Park, Lee, & Choi, 1999). Typically, participants are given coded strips with instructions on how to measure the desired dimensions and are asked to mark the strips and return them. Although self-measurement procedures avoid the effects of fear and discomfort that may be induced in a clinical setting, thus affecting size of erection, there is a greater chance of bias by self-reporting at home (e.g., by exaggerating measurements) (Jamison & Gebhard, 1988).

Objective measures for women. To date, the assessment of physiological SA in women has focused primarily on detecting changes in vaginal blood flow, following the male model of sexual response, in which increases in penile blood flow results in erection and mostly indicates SA (Meston, 2000). Vaginal engorgement occurs along with vaginal lubrication and together these indices provide the first, at least up to date, measurable physiological signs of SA in women. The primary means of assessing female genital vasocongestion are vaginal photoplethysmography, and indirect measures of heat dissipation using labial thermistor (Meston, 2000). A labial thermistor is composed of a highly sensitive surface thermistor glued to one end of a metal clip that detect changes in vaginal heat such as labial temperature or clitoral blood flow measures (Payne & Binik, 2006).

Vaginal photoplethysmography, as the most frequently used method of measurement, is a technique introduced by Sintchak and Geer (1975). The vaginal photoplethysmograph is a clear tampon-shaped device used to detect engorged and un-engorged tissue. The participants easily insert the vaginal probe, while a positioning

shield on the probe's cable ensures that the depth of the insertion between users is standardized (Laan et al., 1995). The most reliable and sensitive components of the signal are VBV and VPA, which detect the vaginal blood volume and phasic changes in vaginal engorgement with each heartbeat, respectively. That means that higher amplitudes signify greater engorgement and blood volume (e.g., Geer, Morokoff, & Greenwood, 1974).

In summary, anxiety and SA are functionally two opposite emotions, which is why a negative impact of anxiety on SA is speculated. However more recent reports indicate an enhancing effect of anxiety on SA. While some of these studies may suggest a facilitatory role of sympathetic activation on SA, it is not clear to what extent the reported changes in SA could be attributed to changes in nervous system function or to cognitive factors associated with the anxiety stimuli (e.g., a relief phenomena following an anxiety provoking stimuli) and as such the role of anxiety on SA is not clear.

Interaction of Sexual Arousal and Anxiety

Research examining sexual disorders and anxiety disorders has regularly related the two emotions with each other. For instance, Freudian view holds that sexual impulses and defenses to these impulses are responsible for the formation and maintenance of anxiety disorders (van den Hout & Barlow, 2000). In addition, anxiety (especially performance anxiety) has been implicated in the origins of sexual dysfunctions. The reports on the effect of anxiety on sexual function are inconsistent.

For instance, Van Minnen and Kampman (2000) examined sexual functioning of women with anxiety disorders. More specifically, sexual functioning of women with panic disorder (PD) and obsessive-compulsive disorder (OCD) was compared to healthy women. The results indicated significantly higher sexual dysfunctions such as hypoactive

sexual desire and sexual aversion in anxious women (both in PD and OCD) as compared to healthy women. These findings suggest an anxiety basis for sexual dysfunction. Along these lines, the sexual functioning of female and male patients with social phobia was compared to male and female with panic disorders (Figueira et al., 2001). The results demonstrate a significantly higher prevalence of sexual dysfunctions in panic disorder patients (75%) as compared to patients with social phobia (33%). More specifically, sexual aversion represented the most common problem (50%) among patients with panic disorder (Figueira et al., 2001). Moreover, despite the fact that patients with panic attacks never had a panic attack during intercourse, they reported avoiding sexual intercourse because of fear of having a panic attack during intercourse. Consistent with the cognitive model of panic, the results suggest that patients with panic disorder are more sensitive to bodily sensations and are more likely to misinterpret the physiological changes that occur during SA as panic attack (Clark, 1986).

On the other hand, since there is some overlap between physiological activation in SA and in anxiety, such as heightened heart rate, other studies report that anxiety can enhance physiological SA (Barlow et al., 1983; Heiman & Rowland, 1983; Wolchik et al., 1980). For instance, in a study conducted by Barlow et al. (1983) anxiety was manipulated by shock threat during an erotic film. Participants were told that while watching an erotic film they would see one of three lights, each light indicating something different. The light signaled either no shock during the erotic film, 60% chance of receiving shock during the erotic film (noncontingent shock), or 60% chance receiving shock if they did not achieve at least as large an erection as the average male in the laboratory (contingent shock). The highest SA as measured by penile

plethysmography was in response to the contingent shock signal among sexually functional men, which is not in line with theories speculating that anxiety is a source of sexual dysfunction. In subsequent studies, researchers investigated the reaction of men with sexual dysfunction to the same paradigm and found that sexually dysfunctional men demonstrated significantly less SA, as measured by penile plethysmography, under shock threat (e.g., Beck & Barlow, 1984, Beck, Barlow, Sakheim, & Abrahamson, 1987; Bruce and Barlow, 1990). The results suggest that men without sexual dysfunction have a different information processing style than men with sexual dysfunction. In fact, among men without sexual dysfunction the results of these studies suggest that anxiety may in fact facilitate sexual response, while it seems to inhibit sexual response in sexually dysfunctional men.

The lack of concordance between subjective and physiological measures of SA in women has been shown in numerous studies. (e.g., Both et al., 2003; Laan et al., 1995; Meston & Worcel, 2002; ter Kuile et al., 2007). In a more recent study, the impact of psychological stressors in sexually functional women was examined by randomly assigning women to either an acute stress condition (stress was induced by a frustrating computer task) or a control condition (they had to solve simple computer tasks) followed by an exposure to an erotic film. (ter Kuile et al., 2007). Subsequently, they subdivided participants into high and low chronic stress as measured by the Everyday Problem Checklist (EPCL). The results show that acute stress condition negatively impacted both genital and subjective SA, whereas chronic stress only resulted in decreased genital SA and did not affect subjective SA. The results support hypothesis that various components of anxiety may affect SA differently.

Interestingly, discordance between subjective and physiological SA following exposure to an anxiety-provoking stimulus seems to be what distinguishes men with sexual dysfunction from sexually healthy functional men. Overall, the results indicate that sexually dysfunctional men exhibit lower levels of concordance between subjective and objective measures of SA as compared to sexually healthy men (Beck, Barlow, & Sakheim, 1983). For instance, the effect of three placebo pills on SA in men with and without sexual dysfunction was examined (Cranston-Cuevas, Barlow, Mitchell, & Athanasiou, 1993). Participants were told that one pill would enhance their erection, while another would decrease, and a third would have no effect on their erection. Results indicated that sexually functional males exhibited increased erection under detraction instructions (a reverse placebo effect), while men with erectile disorders evidenced a direct placebo effect, decreasing their erection response under the detraction relative to the enhancement and placebo conditions.

The authors hypothesized that sexually functional participants possibly demonstrate greater interoceptive awareness as compared to men with erectile dysfunction, which allowed them to detect their increased erectile response despite the detraction condition. This awareness of increased SA may in turn facilitate physiological SA further through a positive feedback process. Males with erectile disorder, on the other hand, were more responsive to the instructions since they were less (interoceptively) aware of actual erectile responding. On the other hand, Clark and Wells (1995) report that socially anxious individuals tend to be more attentive to interoceptive information and negative self-related cognitions. Consequently, it could be argued that sexually

dysfunctional men may be more sexually anxious and as such, allocate more attention towards negative self-related sexual cognitions.

A similar pattern could be observed in women with and without sexual dysfunction. Studies have found high levels of discrepancy between subjective and genital arousal in females with and without sexual dysfunction (Geer et al., 1974; Heiman, 1977, 1980; Morokoff & Heiman, 1980; Palace & Gorzalka, 1990; Wincze, Hoon, & Hoon, 1977). More specifically, there is evidence that despite the lack of significant differences in physiological SA responses to erotic materials in women with and without sexual dysfunction, those with sexual dysfunction rated their subjective SA as significantly lower (Morokoff & Heiman, 1980; Palace & Gorzalka, 1992).

Studies conducted with women when exposed to an anxiety-evoking film, yield similar results, with respect to physiological SA (e.g., Hoon et al., 1977). Hoon et al. (1977) examined the effect of anxiety on SA in sexually healthy women. The participants were shown an anxiety-provoking clip and an erotic film in a counterbalanced order. The results indicated an increase in VBV, as measured by vaginal plethysmography, when anxiety stimulus preceded the erotic film. However, when anxiety stimulus was presented subsequent to erotic stimulus, anxiety inhibited SA, as shown in VBV measures. In other words, when women were sexually aroused the subsequent anxiety seemed to be more aversive and disruptive. The authors speculate that the effect of anxiety on SA depends on the context, in which the participants perceive the stimulus, which highlights the importance of cognitive component of SA and anxiety. Along these lines, some of these studies suggest an enhancing role of sympathetic activation on SA. However, it is not clear if the reported changes in SA are attributable to changes in nervous system or to

cognitive factors associated with the anxiety stimuli (e.g., a relief phenomenon following an anxiety provoking stimulus; Wolpe, 1978).

In order to tease apart the role of cognition and physiology in SA, in a study conducted by Meston and Gorzalka (1995) exercise was used as a means to activate the SNS, since it has been shown that moderate to heavy exercise activates SNS (Nakamura, Yamamoto, & Muraoka, 1993; Yamamoto, Hughson, & Nakamura, 1992). Participants were exposed to exercise and no-exercise experimental conditions in a counterbalanced order. During the exercise condition, participants were instructed to cycle for 20 minutes, rest for 15 minutes and then watch a 7-min videotape (1 min. display of word relax, 3 min neutral film and 3 min erotic film). The no-exercise condition consisted only of the videotapes. The results showed a significant increase in VPA and a marginal increase in VBV during the exercise condition, as measured by vaginal plethysmography. In other words, increases in sympathetic activity enhanced the genital response to an erotic stimulus. Contrary to the reported increases in physiological SA, sympathetic activation had no impact on subjective measures of SA in the presence of an erotic stimulus. It could be concluded that possibly participants did not attribute their aroused state as SA, suggesting that the significant changes in physiological measures were not cognitively interpreted as changes in SA. An alternative explanation could be that in contrast to men that increases in penile blood volume most of the time indicates SA, increases in VPA and VBV are not automatically indicative of SA in women. Similarly, as increases in heart rate could signify different causes such as anxiety, exercise, or anger; increases in VPA and VBV in women could perhaps have other reasons than SA.

Sexual arousal and gender differences. In addition to the incongruent results concerning the effect of anxiety on SA, reports also indicate several differences between men and women SA. Differences in the relationship between subjective and objective measures of SA and preference in erotic film choice can be counted as some of the existing gender differences. There are several potential explanations underlying the discrepancies found in the objective and subjective measures of SA, especially in women. It has been argued that as compared to men, women may rely less on physiological cues when estimating their SA, which could explain the greater discordance between subjective and physiological SA in women (Korff & Geer, 1983; Laan & Everaerd, 1995a, 1995b). In contrast to men, women may not be able to detect subtle changes in genital blood flow. It could be argued that vaginal blood flow reaches maximal levels well before the woman's conscious subjective interpretation of it. Whereas, genital blood flow changes in men result in a rather more observable penile erection, which is directly at a conscious level.

Along these lines, there is evidence that women may attend to cues other than internal physiological states to estimate their SA. For instance, Pennebaker and Roberts (1992) demonstrated that men were more accurate than women at detecting physiological changes (e.g., heart rate and blood pressure). Further, Korff and Geer (1983) found that when specifically instructing women to attend to genital cues, the correlation between subjective and objective SA could be improved. These findings support the idea that women, in contrast to men, may not be consciously aware of the subtle changes in genital blood flow. In contrast to blood flow, women are consciously aware of vaginal lubrication (VL) in response to sexual stimulation (Toledano & Pfaus, 2006). Because the

detection of VL is at a conscious level (interoceptive awareness- much like detection of full erection in men), it may constitute a more reliable measure of conscious subjective SA than other physiological measurements of vaginal blood flow. However, currently, there is no valid device that would measure VL in women, and as such this warrants the attention of future studies.

Another factor that could play an important role in the reported discordance between physiological and subjective measures of SA in women is demand characteristics. In other words, it is possible that women and men are biased in reporting their SA. Consistent with this argument is the finding of Laan, Everaerd, van Aanhoud, and Rebel (1993), where they manipulated demand characteristics by asking a group of women to become as sexually aroused as possible. They found no significant differences between subjective and physiological SA in women. It is possible that due to gender role assigned by society men experience more performance pressure and women experience the pressure to hide/suppress their sexuality, resulting in discrepancy between subjective and physiological SA in women.

Taken together, the trends point to the direction that men exhibit concordance and women discordance between their subjective and physiological measures. There are several factors that might account for this gender difference, such as women's inability to accurately detect subtle physiological changes, incomplete or non-specific measurement (e.g. vaginal blood flow vs. lubrication), methodological shortcomings, and social/cultural factors. In addition to the difference in subjective and physiological experience of SA, it has been reported that women and men also differ in their preference of and response to erotic films.

According to the literature, erotic films are more effective in eliciting SA and inducing higher levels of physiological and subjective SA in the laboratory than stories, slides, or fantasy instructions (e.g., Graham, Janssen & Sanders, 2000; Heiman, 1980; Laan & Everaerd, 1995a), which is why erotic films have been the preferred media in inducing SA in studies of sexual behavior (e.g., Cranston-Cuebas & Barlow, 1990; Janssen & Everaerd, 1993; Laan & Everaerd, 1995b; Sakheim, Barlow, Beck, & Abrahamson, 1985). An important finding in research using erotic films has been the existing gender differences in response to such stimuli. This might reflect women's attitude toward sexually explicit films. It has been argued that the majority of erotic films display dominance of men and exploitation of women (Cowan, Lee, Levy, & Snyder, 1988), possibly leading to the development of a negative attitude toward sexually explicit films (Stock, 1995).

Along these lines, Laan, Everaerd, van Bellen, and Hanewald (1994) noted that most of the available erotica are produced by men for male audiences, thus it is not surprising that men report greater SA than women do. In fact, there is evidence that women do indeed report greater subjective SA to women-centered films compared to the men-centered films. For instance, Mosher and MacIain (1994) found that college-aged women reported more SA to woman-made films than to films made by men. Interestingly; however, they found that women in this study reported more interest and enjoyment, and less disgust, anger, shame, and distress in response to the woman-made erotic films. Consistent with Mosher and MacIain's (1994) findings, is Laan et al.'s (1994) and Jansson, Carpenter, and Graham's (2003) findings that women reported significantly more SA during the presentation of a woman-made, woman-centered erotic

film as compared to a conventional erotic film clip (i.e., man-made, man-centered), as well more positive and less negative affect to women-centered films compared to male-centered films.

Janssen et al. (2003) attempted to identify variables that influence SA and explore whether these variables differ for men and women. The researchers found that in men, both being an observer and imagining as being a participant predicted SA to the film clips, whereas in women, only the latter variable was related. Consistent with this finding is Money and Ehrhardt's (1972) distinction between "identification" (becoming the sexual object, in imagery) and "objectification," (perceiving the actor/actress as a sexual object) and speculated that the former would be more relevant to women and the latter to men. The findings from Janssen et al. (2003), suggest that while women may indeed be more likely to identify with female actors, men seem equally likely to "objectify" and "identify" when presented with visual sexual stimuli. Overall, it is conceivable that both men and women respond to visual sexual stimuli. Nevertheless, men seem to be more responsive to visual sexual stimuli than women seem to be. Furthermore, there seems to be some differences in their focus of attention when viewing erotic films. Whereas, men tend to perceive the actress as a sexual object while identifying themselves with the actor, women tend to only identify themselves with the actress.

In summary, reports indicate that men and women differ in their preference of sexual stimuli and in the relationship between physiological and subjective measures of SA. Furthermore, depending on the context, measures of anxiety, and how the sexual and/or anxiety stimuli are perceived anxiety can enhance and inhibit SA.

Current Studies

Taken together, the literature reports contradictory evidence supporting both inhibitory and enhancing effects of anxiety on SA. Furthermore, research examining the effect of anxiety on SA has been inconsistent in its use of anxiety provoking stimuli and there are no reports on the validity of the anxiety stimuli used in those studies (e.g., Hoon et al., 1977; Laan et al., 1995; Palaca & Gorzalka, 1990). Given that anxiety is a multidimensional construct and it has been treated it as a unitary construct, it may be that measuring different components of anxiety would shed more light in the existing debate (e.g., Hoon et al., 1977; Laan et al., 1995; Palace & Gorzalka, 1990). To date, studies examining the effect of anxiety on SA point to a number of methodological limitations. Lack of adequate anxiety-provoking stimuli, inadequate length of the video clips used to induce anxiety and/or SA, inadequate measure of genital arousal for women, and finally the measure of anxiety as a unitary construct, are some of the limitations (e.g., Hoon et al., 1977; Laan et al., 1995; Palace & Gorzalka, 1990; ter Kuile, et al., 2007). The purpose of the current studies was to investigate how SA might be influenced by various components of anxiety.

The present studies employed a variation of the exposure paradigm used by Hoon et al., (1977) and later by Palace and Gorzalka (1990). Participants in each study were asked to complete a series of questionnaires before and after a film-exposure session. During the exposure session they watched two 10-minute long film clips, while their pulse was recorded. Throughout this dissertation, the term gender refers to the biological sex, as to avoid confusion between sex, as in men and women, and sex as in the sexual response.

The first study examined the effect of an anxiety-provoking film in order to validate

its use in the second study. After careful review of a number of full-length anxiety-provoking horror and action films, one film was chosen as being highly anxiety-inducing. A particularly salient section of the film was chosen to present to participants, who were exposed to either this clip or a neutral napkin folding film of a similar length. Participants were exposed to either the anxiety film followed by the neutral film or vice versa. It was hypothesized that there would be a main effect of anxiety film and participants would show higher physiological arousal and anxiety, as assessed objectively and subjectively, during the anxiety film as compared to the neutral film.

The second study examined anxiety over the last week and immediately after the exposure to an erotic film clip (a film clip considered equally arousing by men and women, chosen from Janssen et al., 2003). The film was preceded by either the anxiety film (anxiety condition) or the neutral film clip (neutral condition). Anxiety sensitivity was measured in relation to men and women's physiological and subjective sexual responses to the erotic film. Based on the laboratory studies indicating that physiological SA increased in the presence of an anxiety-provoking stimulus (Hoon et al., 1977; Palace & Gorzalka, 1990), it was expected that state anxiety in the anxiety condition would be associated with greater objective and perceived SA in response to the erotic film, as compared with the objective and subjective responses to the erotic film in the neutral condition. Self-reported SA in the laboratory, on the other hand, was expected to decrease as a function of cognitive interference to process sexual cues, consistent with previous findings (Palace & Gorzalka, 1990). In light of previous findings that suggest a negative effect of dispositional anxiety on sexual function (e.g., Dunn, Croft & Hackett, 1999), it

was predicted that stable measures of anxiety (anxiety sensitivity) would be negatively associated with participants' self-reported SA.

Chapter 2

Introduction

Studies examining the impact of anxiety on sexual arousal (SA) report controversial results. For instance, some studies with sexually healthy women report a facilitative effect of state-anxiety on physiological sexual arousal as measured by vaginal photoplethysmography, a device that measures blood flow to the vagina (Hoon, Wincze, & Hoon, 1977; Palace & Gorzalka, 1990). However, anxiety and SA were induced by a 2-minute anxiety-provoking film followed by a 2-minute sexually explicit film and it could be argued that the length of the films were not adequately long to induce the investigated emotions. Moreover, results of these studies are difficult to interpret as some measured only physiological SA (e.g., Hoon et al., 1977). Further complicating the pictures, while some studies do demonstrate that anxiety did not influence subjective SA (Palace & Gozalka, 1990), others reported that anxiety/stress inhibited SA in women and have demonstrated a decrease in genital responding and subjective SA (Beggs, Calhoun, & Wolchik, 1987; Both, Everaerd, & Laan, 2003; Laan, Everaerd, & Evers, 1995; ter Kuile, Vigeveno, & Laan, 2007). However, in these studies stress was induced simultaneously with the presentation of the erotic stimulus (Beggs et al., 1987; Both et al., 2003; ter Kuile et al., 2007; Laan, et al., 1995). It could be argued that anxiety presented simultaneously with erotic stimulus may cognitively interfere with processing of sexual information and as such inhibit SA.

These contradictory findings may be related to some other methodological limitations such as the validity and the length of the anxiety-provoking stimuli, and the failure to assess anxiety as a multidimensional construct. For instance, research on the

role of anxiety on SA, primarily focuses on measuring state-anxiety related to sexual concerns and does not measure other components of anxiety, such as physiological, cognitive, emotional and behavioral aspects (Cranston-Cuebas & Barlow, 1990). The purpose of the current study is to validate an anxiety-provoking stimulus while accounting for the length of the clip, and considering the multidimensional quality of anxiety before conducting a follow-up study to investigate the effect of anxiety on SA.

Anxiety can be acute and transitory (state) or chronic (trait) and consists of physiological, cognitive, emotional and behavioral components (Fox & Calkins, 2003). State anxiety is defined as an unpleasant, transitory emotion in a situation that is perceived as threatening or dangerous. In contrast, trait anxiety refers to the stable individual differences that predispose individuals to respond with state anxiety in the anticipation of threatening situations (Spielberger, 1975). The physiological component, also called physiological anxiety or arousal, refers to the activation of the SNS, such as increased heart rate, sweating, and rapid breathing, and the emotional component of anxiety refers to the subjective experience and the feeling of anxiety. The cognitive component evaluates a situation as threatening, while the behavioral component directs the individual either away from the anxiety-provoking object (avoidance) or promotes confrontation (fight) (Fox & Calkins, 2003).

To date, laboratories have used either pictures or short clips (3 to 5.5 minutes) to induce anxiety. Although some studies report the nature of the clip (e.g., amputation scene; Palace & Gorzalka, 1990) they do not report the name of the film from which it was derived and its associate reference. As such, it is difficult to replicate the same methodology. In addition, it can be argued that 3 to 5.5 minutes clips are not long enough

for the participants to suspend disbelief. Suspension of disbelief is a term used to refer to a phenomenon that the individual employs in order to enjoy stories, fantasies, and films. This is a semi-conscious decision, in which a person puts aside his disbelief and for the duration of the story, accepts the idea as real (Holland, 2003). There is evidence that the longer men watch a movie, the more they suspend disbelief, which leads to a greater emotional reactivity to the movie. Consistent with this notion, research suggests that 6 and 9-minute film clips are more effective in inducing SA than shorter 3- minute film clips (unpublished observations). It may be that longer film clips are also necessary to provoke adequate levels of anxiety to be measured in the laboratory.

The current study attempts to address some of these methodological limitations of past research studying anxiety and SA, particularly concerning the reliability and validity of the anxiety stimuli used. More specifically, this study will investigate the effect of fear/anxiety-provoking film on subjective and objective reactions to anxiety (anxiety response) in a group of non-clinical men and women. In this study the term anxiety refers to the subjective component of the anxiety, while arousal refers to the physiological component of anxiety. It was hypothesized that 1) anxiety and arousal during the anxiety-provoking film clip would be significantly higher than during neutral film, and 2) perceived anxiety would be associated with greater arousal assessed both objectively, via heart rate, and subjectively, via self-report.

Method

Participants

A total of thirty English-speaking women and men between the ages 19 and 45 ($M = 25.5$ years, $SD = 6.77$) participated in the study. Participants included 15 women and 15

men who identified as Caucasian, except one woman and one man who identified as Asian. All but four men and three women reported being in relationship. Participants were informed that they could stop at any time during the study if they felt uncomfortable viewing an anxiety-provoking film. Participants were recruited via announcements made in psychology classes, advertisements posted on campus, and from acquaintances from members of the laboratory. Participants were compensated by either partial course credit or by participation in a \$250.00 draw.

Video stimuli

The film used in this study consisted of a 10-minute neutral film clip taken from the film *The Art of Napkin Folding* (Cambridge Educational Films Media Group, Princeton, NJ, USA) the first sequence and of a 10-minute anxiety-provoking film clip taken from the movie *The Ring* (DreamWorks Productions, Glendale, CA, USA). The sequence from *The Ring* was entitled “Well” and depicted a man and a woman discovering a well into which the woman falls and discovers the body of a little girl. Both of clips were excerpted from commercially available films and digitally edited.

Measures

Beck Depression Inventory II (BDI-II; Beck, Steer & Brown, 1996). The BDI-II is a 21-item, self-report questionnaire that assesses the symptoms of depression. Participants rate items based upon how they have generally been feeling during the past 2 weeks. The BDI-II was used to rule out the potential negative impact of depressive symptoms on physiological arousal. The measure has an excellent internal consistency and test-retest reliability in college-age and clinical samples (Beck et al., 1996; Wiebe &

Penley, 2005), along with demonstrated convergent and divergent validity (Beck et al., 1996).

Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988). The BAI is a 21-item questionnaire measuring anxiety symptoms over the last week and was used to obtain a baseline measure of anxiety over the last week. The BAI has excellent internal consistency, high test-retest reliability, and demonstrated convergent and divergent validity in both outpatient (Beck et al., 1988) and non-clinical samples (Creamer, Foran & Bell, 1995).

The Subjective Units of Distress Scale (SUDS; Wolpe, 1958). The SUDS is a simple scale that measures subjective intensity of anxiety and arousal. Participants were asked to use the SUDS scale to rate their perceived anxiety and perceived arousal following exposure to the clips in response to the neutral and anxiety film. For instance participants were asked to rate on a scale from 0 (not at all) to 10 (strongly anxious or aroused) how anxious or aroused each film made them feel.

The Cateye PL-6000 Pulse Monitor. The Cateye, a pocket-sized heart rate monitor with an ear clip sensor, was used and programmed to measure a person's pulse every 30 seconds.

Procedure

Each participant was tested individually in a laboratory without windows with two chairs on either side of a desk and a TV and VCR/DVD unit on a rack. Each testing session lasted 30 minutes. Upon arrival, participants' written consent was obtained. Before watching the film clips, participants were instructed to fill out the first questionnaire package, which consisted of an anonymous demographic questionnaire, the

BDI-II, and BAI. Once completed, they were asked to press play on DVD player and watch both film clips, which were separated by 10 seconds. To avoid distraction and interruption, it was decided that they fill out separate SUDS ratings for each clip at the end of both film clips. The clips were presented in a counter-balanced order; the anxiety-provoking clip was presented first followed by the neutral film clip or vice versa. The participants were randomly assigned to either group (order of the presentation). During the entire procedure participants' pulse was measured using the Cateye. Baseline recordings of heart rate were taken for 30 seconds before they watched the films.

Design

Subjective anxiety and subjective arousal (perceived physiological changes) were assessed respectively via SUDS anxiety and SUDS arousal. Objective physiological responses to the film clips were assessed via the heart rate monitor. The relative peak heart rate was determined by subtracting the participant's peak heart rate during each film clip from the baseline heart rate and dividing it by baseline heart rate. The relative peak heart rate during the anxiety-provoking clip was then compared to the relative peak heart rate during the neutral film. A 2 x 2 x 2 mixed factorial ANOVA was calculated separately for heart rate, SUDS anxiety and SUDS arousal. Gender (male vs. female) and order (anxiety/neutral vs. neutral/anxiety) were the between-participant factors, and film clips (anxiety vs. neutral) were the within subjects factors.

Results

Physiological arousal

For heart rate, the gender x order x film clip ANOVA revealed a main effect of film clip, $F(1, 26) = 7.36, p < .05$. Heart rate was overall significantly higher during the

anxiety film ($M = 22.9, SD = 11.98$) than during the neutral film ($M = 8.07, SD = 9.54$), as shown by t-test. There was no main effect of gender or order, nor were any of the interactions significant.

Subjective arousal

For subjective arousal, as measured by SUDS arousal, the gender x order x film clip ANOVA revealed a significant main effect of film clip, $F(1, 27) = 30.10, p < .0001$. Subjective arousal was overall significantly higher during the anxiety film ($M = 2.03, SD = 1.43$) than during the neutral film ($M = 0.20, SD = 0.55$). There was a trend towards significant main effect of order, $F(1, 27) = 4.10, p < .052$. More specifically, anxiety/neutral ($M = 2.6, SD = 1.45$) generated more arousal than neutral/anxiety ($M = 1.38, SD = 1.2$). There was also a trend towards significant main effect of order x film clip. Anxiety/neutral generated more arousal than neutral/anxiety and both conditions generated more arousal during anxiety film than during neutral film, $F(1, 27) = 3.93, p = .058$. There were no significant main effects for gender or interactions involving gender.

Subjective anxiety

For subjective anxiety, as measured by SUDS anxiety, the gender x order x film clip ANOVA revealed a significant main effect of film clip, $F(1, 27) = 83.99, p < 0.0001$. Subjective anxiety was overall significantly higher during the anxiety film ($M = 2.87, SD = 1.31$) as compared to the subjective anxiety during the neutral film ($M = 0.26, SD = 0.77$). There was a significant main effect of gender, $F(1, 27) = 9.12, p < .005$. Female participants reported higher anxiety ($M = 3.5, SD = 0.97$) than male participants ($M = 2, SD = 1.36$). Furthermore, there was a significant interaction of gender x film clip,

$F(1, 27) = 9.12, p < .05$. Pairwise comparisons revealed that women had significantly higher SUDS anxiety in the anxiety condition relative to men, but women and men did not differ in the neutral condition. There was no significant main effect for order, nor any significant interactions involving order.

Correlations between physiological and subjective measures

To examine the relationship between heart rate (HR) and self reported anxiety and arousal, correlations between HR, SUDS anxiety, and SUDS arousal in response to the anxiety and neutral film clip were calculated. There was a significant correlation between SUDS anxiety and SUDS arousal during the anxiety clip ($r = 0.46, p = 0.009$), and SUDS anxiety and SUDS arousal during the neutral clip ($r = 0.62, p = 0.0001$). However, there was no significant relationship between HR with SUDS anxiety and SUDS arousal during anxiety or neutral film.

Discussion

This study examined the effect of an anxiety-provoking film on objective and subjective measures of anxiety, more specifically, objective and perceived physiological arousal and perceived anxiety. Objective physiological arousal was measured using a pulse monitor, while subjective measures of anxiety and subjective physiological arousal were assessed using SUDS anxiety and SUDS arousal. Methodologically, this study was one of the few studies to assess the impact of the anxiety film and to measure various components of the anxiety. More specifically, other studies attempting to investigate the impact of anxiety on SA, have not investigated the effect of the anxiety stimulus by itself prior to investigating its effect on SA or do not report the validity of their anxiety stimuli. (e.g., Laanet al., 1995; Palace & Gorzalka, 1990). Consistent with our expectations, the

current study found a significant main effect of anxiety producing film clip on objective and subjective measures of anxiety and arousal. In fact our 10-minute long anxiety-provoking film seems to be long enough to reliably provoke increases in both objective and subjective measures of anxiety, more specifically, in objective arousal, perceived arousal, and perceived anxiety.

Furthermore, the results showed a trend towards a significant main effect of the order of presentation. This means that anxiety film generated more anxiety when it was presented first than when the neutral film was presented first. This finding further confirms the effect of the anxiety-provoking film and its carry-over effect on the neutral film. This finding may have an important implication in our understanding of the effect of anxiety on SA. It might be that when anxiety precedes an erotic stimulus it may have a greater impact than when it follows the sexual stimulus, which warrants the attention of future studies. Moreover, we found a significant main effect of gender, with women exhibiting greater anxiety and perceived arousal than men in response to the anxiety-provoking film clip. This finding is consistent with the literature reporting higher prevalence of anxiety disorders in women (e.g., Kessler et al., 1994; Sheikh, Leskin, & Klein, 2002). In addition, when anxiety and perceived arousal were compared with each other, it was found that women demonstrated higher anxiety than arousal during the anxiety film. This finding is consistent with research reporting that women are less accurate than men in detecting physiological changes (e.g., Pennebaker & Roberts; 1992).

Contrary to our expectations, we did not find that state anxiety, as measured by SUDS anxiety, was associated with greater objective physiological arousal nor we found

that subjective arousal, as measured by SUDS arousal, was correlated with objective arousal (HR). These results are consistent with a body of research that distinguishes between components of anxiety and report no overlap between these components (e.g., Anderson & Hope, 2009). For instance, in a study examining the differences in objective and perceived physiological arousal between adolescents with social phobia and healthy adolescents, they found no significant relationship between state and trait anxiety with objective measures of arousal (heart rate and blood pressure; Anderson & Hope, 2009). These findings of lack of overlap between objective and subjective measures of anxiety confirm the importance of treating the construct anxiety as a multidimensional concept and as such measuring its various components. We found, however, that subjective anxiety significantly correlated with subjective arousal during the anxiety film, independent of the order of presentation. The findings suggest that the participants perceived the anxiety film as both anxiety provoking and arousing, while they did not experience anxiety or arousal during the neutral film.

This study was one of the few studies using anxiety as a multidimensional construct distinguishing between anxiety and arousal by examining the subjective, and objective components of anxiety. . More importantly, this is one of the first studies using an objective physiological measure assessing the HR during exposure to a film clip. For instance, some researchers equate stress to anxiety (ter Kuileet al., 2007), while others measure the effect of anxiety on SA without manipulating the anxiety (Bradford & Meston, 2006), whereas some are not precise in reporting their anxiety stimulus (Palace & Gorzalka, 1990). This meticulously measured method of anxiety will impact future studies examining the relationship between anxiety and SA. More specifically, the

methodology may offer a basis to understand the impact of state anxiety, objective and subjective physiological arousal on sexual arousal in men and women. Therefore, this study provides the first step in examining the effect of anxiety as a multidimensional construct on SA, which is being conducted in our laboratory as a follow up study.

However, there are a few limitations that need to be noted.

First, we measured anxiety over the last week and did not assess trait anxiety. Given that trait anxiety predisposes an individual to respond to an anxiety-provoking stimulus in a certain way, taking this dimension of anxiety in consideration would provide a more complete and stable measure of the construct anxiety.

Second, our group mostly consisted of undergraduate, young university students. The results would be more generalizable with a more heterogenous sample. However, it should be noted, that for the purposes of this study, which was mainly validating our anxiety-provoking stimulus, the mentioned characteristics of the group might not play a role in our concern.

Taken together, the results demonstrate that an anxiety-provoking clip can increase objective and perceived arousal as well as perceived anxiety. Interestingly; however, the results show strong correlation between state anxiety and perceived arousal but not between state anxiety and objective arousal. The lack of correlation between objective and subjective measure of anxiety supports the findings that show no overlap between objective and subjective measures of anxiety (e.g., Anderson & Hope, 2009). Moreover, the correlation between subjective measures of anxiety is consistent with the views of cognitive behavioral therapy, which posits that an individual's feelings and behaviors are influenced by his/her interpretations of the events. In regards to our finding,

this could mean that evaluating the anxiety film clip as anxiety provoking, may have influenced how they perceived their physiological arousal. Future studies need to investigate the impact of anxiety on SA by examining the cognitive components of anxiety and SA. This would facilitate our understanding of the impact of anxiety on SA by considering the individual's interpretation of the events or of the stimuli used to induce anxiety and/or SA, which will be part of the follow up study in our laboratory.

Chapter 3

Introduction

Healthy sexual functioning is one of the most basic, yet least understood, needs of humans, and is necessary for reproduction and pleasure. The prevalence of sexual disorders among human populations is high and affects a large number of men and women. For instance, erectile dysfunction is estimated to affect approximately 150 million men worldwide (Chew et al, 2000) and the prevalence of low sexual desire ranges from 26.7% among premenopausal women to 52 % among menopausal women (West et al., 2008). The treatment of sexual dysfunction to date has been largely based on the work of Masters and Johnson, which had a major influence on the existing diagnostic categories for sexual disorders in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR; American Psychiatric Association, 2000). However, there are serious limitations with this and many other existing models that warrant attention.

More specifically, researchers have been facing challenges to find a definition that would capture various components of human sexual response. In general terms, the sexual response cycle has been defined as the sequence of physiological events with little or no attention to psychological aspects of sexuality, such as fantasy, romance, and sensuality. For instance, Masters and Johnson's (1966) four-stage, linear, and physiological-based model suggests that sexual response has four phases of excitation (E: sexual arousal and desire), plateau (P: sexual stimulation), orgasm (O: release of sexual tension/excitement), and resolution (R: period of relaxation). Kaplan (1979) noted that the EPOR model neglects the importance of psychological aspects of human sexual response. He proposed that sexual desire (D) is an important first stage in human sexual

response and it would occur before the excitation phase. However, there is evidence suggesting that desire is not always a necessary prelude to sexual response. (e.g., Beck, Bozman, & Qualtrough, 1991; Michael, Gagnon, Laumann, & Kolata, 1994).

Others have proposed that human sexual response, in particular SA is, non-linear and consists of four interrelated components of cognition, emotion, motivation, and physiology (Redouté et al., 2000; Stoléru et al., 2003; Toledano & Pfaus, 2006). The cognitive component is required to evaluate a stimulus as a sexual incentive, whereas the emotional component constitutes the particular affective aspect of SA. Once a stimulus is evaluated as sexual, the behavior then is directed towards a sexual target, which is guided by the motivational component of SA. And finally, the physiological component refers to the sympathetic and parasympathetic changes that occur during SA, such as increased heart rate, erection in men and increased vaginal blood volume in women.

A common problem with the majority of these definitions is that they are mainly based on the research with male participants and do not take gender differences into consideration. Accordingly, some other researchers argued that focusing on genital response and traditional markers of sexual desire, ignores major components of women's sexual satisfaction such as trust, respect, communication, and intimacy (Basson, 2000; Leiblum, 1998; Tiefer, 1991, 2004).

Furthermore, the definition and understanding of human sexual response has been facing other challenges and as such has been the subject of debates. For instance, the exact role of sympathetic and parasympathetic nervous system (SNS and PNS, respectively) on SA is unclear and surrounded with contradictions. More specifically, anxiety has been associated with the activation of SNS and for years has been speculated

to be a root of sexual dysfunctions (Masters and Johnson, 1966). However, more recently it was argued that anxiety indeed can have a facilitative effect on SA in sexually functional men (e.g., Barlow, 1986). Given the reported contradictions, the following section attempts to further explore the relationship between anxiety and SA.

Anxiety and sexual arousal

Sex and anxiety are typically viewed as opposite extremes of a continuum, with anxiety promoting avoidance and sex promoting approach. Because of the opposing nature of these two emotions researchers believed that anxiety is the root of sexual dysfunctions. However, only a few studies, which are mostly dated, have examined the effect of anxiety on sexual function. In addition the existing findings yield contradictory results. For instance, van Minnen and Kampman (2000) examined the sexual functioning of women with panic disorder or obsessive compulsive disorder and found significantly higher sexual dysfunctions such as hypoactive sexual desire and sexual aversion as compared to healthy women, suggesting that anxiety may cause sexual dysfunction. Similarly, other researchers investigated the sexual functioning of men and women with either social phobia or panic disorders and found a significantly higher prevalence of sexual dysfunctions in panic disorder patients (75%) as compared to patients with social phobia (33%). Interestingly, 50% of patients with panic disorder presented also with sexual aversion, representing the most common sexual dysfunction among patients with panic disorders (Figueira, Possidente, Marques, & Hayes, 2001). Further exploration revealed that patients with panic disorder reported avoiding sexual intercourse because of fear of having a panic attack during intercourse, although they never had such experience before. This observation conforms with cognitive models of panic disorder, suggesting

heightened sensitivity to bodily sensations among patients with panic disorder. Thus, it could be concluded that and panic patients are more likely to misinterpret the physiological changes that occur during SA as panic attack (Clark, 1986).

For many years it has been argued that an activation of the SNS inhibits SA in both men and women and PNS activation facilitates SA in both sexes (e.g. Kaplan, 1974, 1988; Wolpe, 1958). For instance, it has been argued that erectile difficulties in men are caused by performance anxiety (e.g., Ansari, 1975; Cooper, 1969), and since anxiety results in sympathetic activation, blood flow to specific organs such as the penis would be inhibited, thus hindering erection (e.g., Carlson, 1994; Weiss, 1972). In contrast to this view; however, recent research on the effects of anxiety on SA has shown that in certain situations sympathetic activation may in fact facilitate or have no effect on SA. For example studies with men have shown that anxiety induced by a variety of techniques can heighten physiological SA via shared physiological activation between SA and anxiety, such as increased heart rate (Barlow, Sakheim & Beck, 1983; Heiman & Rowland, 1983; Wolchik et al., 1980).

Along these lines, Barlow and colleagues (1983) manipulated anxiety by shock threat during an erotic film. Participants in the experimental group were told that there would be 60% chance of receiving shock if they did not achieve at least as large an erection as the average male in the laboratory (contingent shock). Whereas the participants in the control group did not receive such instruction. The results showed the highest SA as measured by penile plethysmography, a device that measures penile erection, in response to the contingent shock signal among sexually functional men as compared to the control group. These finding do not support the notion that anxiety

inhibits SA.

Subsequent studies investigated the reaction of men with sexual dysfunction to the same paradigm, and results suggested that dysfunctional men demonstrated significantly less SA as measured by penile plethysmography under shock threat (e.g., Beck & Barlow, 1984; Bruce & Barlow, 1990). In other words, for sexually dysfunctional men, anxiety impeded SA suggesting that men without sexual dysfunction process information differently than men with sexual dysfunction. Taken together, anxiety enhanced SA for men without sexual dysfunction, while it inhibited SA for men with sexual dysfunction.

Similar results, with respect to physiological SA, were found in studies conducted with women when exposed to an anxiety-evoking film (e.g., Hoon, Wincze, & Hoon, 1977). While some of these studies may suggest a facilitatory role of sympathetic activation on SA, it is not clear to what extent the reported changes in SA could be attributed to changes in nervous system or to cognitive factors associated with the anxiety stimuli (e.g., a relief phenomena following an anxiety provoking stimulus; Wolpe, 1978).

Along these lines, a number of studies indicate that SNS activity becomes prominent during moderate to heavy exercise (Nakamura, Yamamoto, & Muraoka, 1993; Yamamoto, Hughson & Nakamura, 1992). Based on these findings, in a study conducted by Meston and Gorzalka (1995), exercise was used as a means to activate the SNS . Participants were exposed to two experimental conditions in a counterbalanced order, exercise and no-exercise conditions. During the exercise condition, participants had to cycle for 20 minutes, rest for 15 minutes and then watch a 7-min videotape (1 min. display of word relax, 3 min neutral film and 3 min erotic film), while during the no-exercise condition participants only watched the videotapes.

The results showed a significant increase in genital responses during the exercise condition, meaning, in the presence of an erotic stimulus, SNS activation facilitated genital responses. Interestingly, exercise had no significant influence on subjective measures of SA in the presence of an erotic stimulus. Authors speculate that participants possibly attributed their aroused state to having just exercised, and as such did not report higher subjective SA. Another explanation could be that increases in vaginal responses (VBV and VPA) are not necessarily indicative of SA in women, contrary to men where increases in penile blood volume results in erection and most of the time indicates SA. The same way as increases in heart rate could mean different processes such as anxiety, exercise, or anger, increases in VPA and VBV in women could indicate different emotions. Moreover, unlike in men, genital changes in women are not directly observable, emphasizing the importance of cognitive processes such as attention and attribution in SA.

Although both subjective and physiological measures of SA (e.g., Both, Everaerd, & Laan, 2003; Laan, Everaerd, & Evers, 1995; Meston & Worcel, 2002) have shown to reliably increase with exposure to erotic stimuli, the relationship between physiological response and subjective SA yields high correlations in men but not in women. In a more recent study, ter Kuile, Vigeveno, and Laan (2007) examined the impact of psychological stressors in sexually functional women. Participants were randomly assigned to an acute stress condition (stress was induced by a frustrating computer task) or a control condition (they had to solve simple computer tasks), after which they were exposed to an erotic stimulus. They also subdivided participants into high and low chronic stress as measured by the Everyday Problem Checklist (EPCL). They found that women in the acute stress

condition responded with a decreased genital and subjective SA, whereas chronic stress only resulted in decreased genital SA and did not affect subjective SA.

However most of the participants in this study were students without sexual complaints and it could be argued that the post hoc division of healthy participants in a high versus low chronic stress group on the basis of their scores on a daily stress questionnaire may not be representative of a normative group of women with high chronic stress. In addition, it could be speculated that engaging in a stress task during an erotic stimulus interferes cognitively with SA (Barlow, 1986), whereas an anxiety induction (film) as a psychological stressor prior to an erotic stimulus may affect SA physiologically via activation of SNS (Exton et al., 1999; Meston & Frohlich, 2000), without interfering cognitively with processing of the erotic stimulus.

In summary, the research suggests that physiological and subjective measures of SA are largely independent, especially among women. Furthermore, complicating our understanding of the cognitive factors involved in SA, some studies suggest that anxiety facilitates SA, whereas others suggest that anxiety inhibits SA. Research that explores sexual functioning among individuals with panic disorder suggests that anxiety sensitivity may moderate whether anxiety plays a facilitative or an inhibitory role. A review of the studies looking at the effect of anxiety on SA reveals certain methodological limitations that can account for the existing contradictions in the field. The purpose of the present study was to examine the impact of anxiety in SA among men and women, while correcting for the existing methodological limitations. Lack of adequate anxiety-provoking stimuli, inadequate length of the film clips used to induce anxiety and/or SA, incomplete measure of physiological SA (PNS vs. SNS) and finally the measure of

anxiety as a unitary construct, are some of the limitations addressed in the present studies.

More specifically, there is evidence that moderate state-anxiety differentially improves performance in individuals with normal to low trait-anxiety (Hainaut & Bolmont, 2006). Other researchers demonstrated that state-anxiety increases muscular tension (Hoehn-Saric, Hazlett, Pourmotabbed, & McLeod, 1997), physiological arousal (Noteboom, Fleshner, & Enoka, 2001) and attention (Azais, 1995; Bolmont, Thullier, & Abraini, 2000; Peretti, 1998), which can modulate sensory processing (Driver & Frackowiak, 2001). For this reason, the present study measured anxiety over the last week, anxiety prior to the experiment (baseline), and then immediately after watching the film clips.

In addition, it has been reported that people with panic disorder are more prone to sexual dysfunctions, especially sexual aversion and are also more sensitive to physiological changes and become easily anxious following perception of those changes (e.g., Figueira et al., 2001; Van Minnen and Kampman, 2000). Therefore, anxiety sensitivity, as a cognitive component of anxiety, was measured in the present study to examine how sensitivity to anxiety plays a role in sexuality and more specifically in SA.

The present study utilized an erotic video clip, since it has been found that erotic films induce higher levels of genital and self-reported SA than stories, slides, or fantasy instructions (Heiman, 1980; Koukounas & McCabe, 1997; Laan & Everard, 1995b). However, given that women usually report less SA than men to these stimuli (Murnen & Stockton, 1997), a “female-centered” erotic film was used to counter this effect (Jansen, Carpenter, & Graham, 2003; Laan, Everaerd, van Bellen, & Hanewald, 1994). The anxiety inducing film clip was chosen on the basis of the experiment in Chapter 2, as it

successfully and reliably induced anxiety in men and women.

Additionally, the recurrent finding of low correlations between physiological and subjective SA in women has led researchers to question whether physiological changes that occur in the absence of a subjective sexual experience should even be considered as a sexual response. Hence, given the reported discordance between the physiological and subjective measures in women, it could be argued that VBV and VPA, as measures of PNS, might not be specific indicators of SA in women. For this reason, in this study only heart rate, as an indicator of SNS activation, will be measured.

The current study is one of the first attempts to understand the effect of anxiety as a complex construct on SA, taking the physiological and subjective/cognitive components of anxiety into consideration. It is also the first study examining the effect of anxiety on SA in both men and women. It is hypothesized that there will be an effect of anxiety on SA, with individuals high in anxiety sensitivity index experiencing an inhibition and individuals low in anxiety sensitivity index and high in state-anxiety a facilitatory effect on SA. Given the higher prevalence of panic disorder among women (e.g., Kessler et al., 1994; Sheikh, Leskin, & Klein, 2002), we also expect to find gender differences with women exhibiting more anxiety sensitivity, thus less SA following exposure to the erotic film clip.

Method

Participants

Ninety-one English-speaking healthy, sexually functional women ($n = 44$) and men ($n = 47$) between the ages 19 and 45 ($M = 23.45$ years, $SD = 2.94$) participated in the study. All participants were assured of anonymity and confidentiality and their consent

was obtained prior to participation. They were informed that they could stop at any time during the study if they felt uncomfortable viewing an anxiety-provoking and/or sexually explicit film. Participants were recruited via announcements made in psychology classes, advertisements posted on campus, and from acquaintances from members of the laboratory. Participants were compensated by either partial course credit or by participating in a draw for \$250.

Stimulus

Three 10-minute-film clips were used as part of the study consisting of a neutral, anxiety provoking, and sexually arousing film clips. The neutral film was from the first sequence of the film *The Art of Napkin Folding* (Cambridge Educational Films Media Group, Princeton, NJ, USA). The anxiety-provoking film was taken from the “Well” sequence of the movie *The Ring* (DreamWorks Productions, Glendale, CA, USA) and depicted a man and a woman discovering an “evil” well into which the woman falls and discovers the body of a little girl. In a previous study, the validity of the film has been tested (Sharifzadeh & Pfaus, 2009). The sexually arousing film clip was taken from the “Under a Gazebo” sequence of the movie *Outdoor Ecstasy* (Adam & Eve Productions, Beverly Hill, CA, USA). The sequence depicts a heterosexual couple engaging in sexual activity in and around an outdoor gazebo. The sequence has previously been rated as being equally and moderately arousing for both men and women (Jansen et al., 2003). All the clips were excerpted from commercially available films and digitally edited.

Measures

The Sexual Arousal and Desire Inventory (SADI; Toledano & Pfaus, 2006). The SADI is a 54-item, descriptor-based, multidimensional assessment scale used to measure

the trait level of SA in general and state SA in response to a stimulus. The questionnaire contains four subscales labeled evaluative, motivational, physiological, and negative/aversive. The evaluative subscale contains 27 descriptors of cognitive labeling and emotional attribution of SA (e.g., passionate). The motivational subscale consists of ten descriptors reflecting the psychological processes that describe an individual's drive to act upon the desire to engage in sexual contact or behavior (e.g., tempted), and the physiological subscale contains 17 descriptors reflecting the subjective sensations that accompany autonomic and endocrine changes that result from SA (e.g., sensitive to touch). Finally, the negative/aversive subscale contains 17 descriptors related to aspects of sexual aversion or inhibition (e.g., resistant). Participants rate how well each item describes their experience of arousal and desire on a 5-point Likert scale for each of the 54 terms, which ranges from 0 = "does not describe it at all" to 5 = "describes it perfectly". The sum of the subscale scores, except for the negative/aversive subscale, represents a total score for the SADI. The negative/aversive subscale serves to provide information on aversive qualities of the experience and to act as a negative control (i.e., to permit the discrimination of participants who answer in the same direction at all times). The SADI has demonstrated strong divergent validity and internal consistency in evaluating both state and trait aspects of subjective SA and desire in men and women (Toledano, & Pfaus, 2006).

Beck Depression Inventory II (BDI-II; Beck, Steer, & Brown, 1996). The BDI-II is a 21-item, self-report questionnaire assessing symptoms of depression over the past two weeks. The BDI-II was used as a screening tool to measure depression, as it is known that depression can impact SA negatively and it was administered before participants

viewed the film clips. The measure has an excellent internal consistency and test-retest reliability in college-age and clinical samples, along with demonstrated convergent and divergent validity (Beck et al., 1996).

Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986). The ASI is a 16-item questionnaire assessing fear of physical sensations using a 4-point Likert scale. Sample items include “It scares me when my heart beats rapidly” and “Unusual body sensations scare me”. The ASI has demonstrated excellent internal consistency and test-retest reliability in college students and in psychiatric population (Cox, Endler, Norton, & Swinson, 1992).

The Subjective Units of Distress Scale (SUDS; Wolpe, 1958). The SUDS is a simple scale that ranges from 0 (totally relaxed) to 10 (the most anxiety-provoking/arousing) measuring subjective intensity of disturbance and distress. Participants were asked to provide SUDS for anxiety and arousal at the beginning of the study (SUDS-pre) and just after (SUDS-post) watching all film clips. Participants were asked to provide SUDS-post ratings for each film clip viewed. If participants reported feeling anxious or aroused they were asked what they thought was causing their anxiety or arousal.

Beck Anxiety Inventory (BAI; Beck, Epstein, Brown & Steer, 1988). The BAI is a 21-item questionnaire measuring anxiety symptoms over the last week and was used to obtain a baseline measure of anxiety over the last week. The BAI has excellent internal consistency, high test-retest reliability, and demonstrated convergent and divergent validity in both outpatient (Beck et al., 1988) and non-clinical samples (Creamer, Foran, & Bell, 1995).

Beck Anxiety Inventory-modified. A modified version of the BAI (BAI-modified) was used to assess state anxiety in response to the film clips after participants have viewed the clips. Instructions on the BAI were modified from "... to what degree you have been affected by each of these symptoms during the last weeks" to "... to what degree you have been affected by each of these symptoms after viewing the film clips".

The Cateye PL-6000 Pulse Monitor. The Cateye, a pocket-sized heart rate monitor with an ear clip sensor, was used and programmed to measure a person's pulse every 30 seconds.

Procedure

Each participant was tested individually in a laboratory without windows with two chairs on either side of a desk and a TV and VCR/DVD unit on a rack. Each testing session lasted 45 minutes. Upon arrival, participants' written consent was obtained. Before watching the clip, participants were instructed to fill out the first questionnaire package, which consisted of anonymous demographic questionnaire, the BDI-II, BAI, SUDS-Pre, and the ASI. Once completed, they were asked to press play on the DVD player and watched either anxiety film followed by erotic film (anxiety/erotic condition) or the neutral film followed by erotic film (neutral/erotic condition). The film clips were recorded and presented within 10 seconds from each other. To avoid distraction and interruption in the effect of the film clips, it was decided that they fill out SADI, BAI-modified, and SUDS-Post, at the end of both film clips. The participants were randomly assigned to either condition. During the entire procedure participants' pulse was measured using the Cateye.

Statistical Analysis

In order to assess the impact of anxiety on SA, physiological and subjective measures of anxiety were assessed. Physiological anxiety was assessed via changes in heart rate in response to the film clips. Heart rate was measured as a proportion change from baseline (e.g., peak heart rate during each film minus heart rate at baseline divided by heart rate at baseline). The relative peak heart rate during the first film was then compared to the relative peak heart rate during the second film, which was the erotic film. Subjective anxiety and arousal were assessed via changes in SUDS ratings from baseline to post film viewing. Two by two by two mixed factorial ANOVAs were calculated separately for objective physiological arousal (heart rate), SUDS anxiety, SUDS arousal. For these analyses, between participant factors were gender (male vs. female), condition (anxiety/erotic vs. neutral/erotic), and the within-participant factor was film (first film vs. the erotic film). Furthermore, 2 x 2 between-participant ANOVAs were calculated for three SADI subscales: physiological, motivational & evaluative. For these analyses, between participant factors were gender (male vs. female) and condition (anxiety/erotic vs. neutral/erotic).

Results

Physiological arousal

For heart rate, the 2 (gender) x 2 (condition) x 2 (film: 1st film vs. the erotic film) mixed factorial ANOVA revealed a significant main effect of film, $F(1, 80) = 6.77, p < .01$. T-test revealed that heart rate was significantly higher during the erotic film ($M = 11.21, SD = 14.6$) than during the first film ($M = 7.52, SD = 10.09$).

Subjective arousal

For subjective arousal at baseline as measured by SUDS arousal, the gender x

condition ANOVA revealed a significant main effect of gender $F(1, 83) = 5.7, p < .01$. T-test indicated greater subjective arousal at baseline for women ($M = 1.3, SD = 2.04$) as compared to men ($M = 0.5, SD = 0.95$). There was no significant interaction.

For subjective arousal as measured by SUDS arousal at baseline and after watching the film clips, the 2 (gender) x 2 (condition) x 3 (film: SUDS-pre vs. during the film 1 vs. during the erotic film) mixed factorial ANOVA revealed a significant main effect of gender, $F(1, 83) = 5.22, p < .05$. T-test revealed that women reported overall greater arousal as compared to men. There was also a significant main effect of film, $F(2, 166) = 117.81, p < .0001$. Posthoc Tukey test revealed that subjective arousal for both men and women was overall significantly higher during the erotic film ($M = 4.54, SD = 2.79$) than during the first film ($M = 0.62, SD = 1.76$) and at baseline ($M = 0.91, SD = 1.64$). None of the interactions were significant.

Subjective anxiety

For anxiety at baseline, as measured by SUDS anxiety, the gender x condition ANOVA revealed a significant main effect of gender, $F(1, 83) = 7.97, p < .005$, with women ($M = 2.75, SD = 2.78$) reporting significantly higher anxiety at baseline than men ($M = 1.36, SD = 1.81$), as shown by t-test.

Table 3.1

Subjective Arousal at Baseline, during the First Film and during the Erotic Film, as Measured by SUDS-Arousal

		Women			Men		
		Condition 1			Condition 2		
		Baseline	First Film	Erotic Film	Baseline	First Film	Erotic Film
Arousal	M	1.3	0.91	4.95	0.5	0.32	4.18
	SD	2.04	2.29	2.99	0.95	0.88	2.54

For anxiety pre vs. post, as measured by BAI and BAI-modified, a gender x condition x time (pre vs. post) mixed factorial ANOVA revealed a main effect of time, $F(1, 82) = 6.56, p < .01$. T-test revealed that anxiety-post ($M = 5.26, SD = 5.69$) was significantly lower than anxiety at baseline ($M = 13.05, SD = 8.80$).

For anxiety during the first film, as measured by SUDS anxiety, the gender x condition ANOVA revealed a significant main effect of condition, $F(1, 83) = 26.89, p < .0001$. T-test revealed greater anxiety during the anxiety condition ($M = 3.27, SD = 2.46$) than during the neutral condition ($M = 0.93, SD = 1.86$). There was also a significant interaction of gender x condition, $F(1, 83) = 11.22, p < .001$, with women reporting significantly higher anxiety during the anxiety film ($M = 4.13, SD = 2.74$) than men ($M = 2.36, SD = 1.79$) but not during the neutral film. For anxiety during the erotic film, the gender x condition ANOVA revealed a significant main effect of gender, $F(1, 83) = 7.27, p < .01$. T-test revealed that women ($M = 2.25, SD = 2.53$) reported significantly higher anxiety during the erotic film as compared to men ($M = 0.98, SD = 1.84$). There were no significant interactions.

The 2 (gender) x 2 (condition) x 3 (film: SUDS-pre vs. during the film 1 vs. during the erotic film) mixed factorial ANOVA revealed a significant main effect of gender, $F(1, 83) = 8.37, p < .005$. T-test revealed that women reported overall greater anxiety as compared to men. Finally, there was a significant three-way interaction between gender, condition and film, $F(2, 166) = 5.84, p < .01$. More specifically, women reported higher anxiety during the first film in the anxiety condition ($M = 2.43, SD = 2.52$) than men but not in the neutral condition ($M = 2.05, SD = 2.6$).

Table 3.2

Subjective Anxiety at Baseline, during the First Film and during the Erotic Film, as

Measured by SUDS-Anxiety

		Women			Men		
		Condition 1			Condition 2		
		Baseline	First Film	Erotic Film	Baseline	First Film	Erotic Film
Anxiety	M	2.75	2.30	2.25	1.36	1.95	0.98
	SD	2.78	2.79	2.53	1.81	2.12	1.84

Anxiety sensitivity

For subjective SA as measured by SUDS arousal and by SADI the gender x condition x ASI ANOVA revealed no significant main effects or significant interaction.

Subjective reports of sexual arousal

For subjective SA, as measured by SADI, the gender x condition ANOVA revealed no significant main effect or significant interactions for SADI-E or SADI-P, but there was a trend towards a significant main effect of gender for SADI-M, $F(1, 82) = 3.11, p = .08105$, with women ($M = 20.12, SD = 12.98$) reporting more sexual motivation than men ($M = 15.77, SD = 9.43$) following exposure to the erotic film. There was also a trend towards a significant main effect of gender for SADI-N, $F(1, 82) = 3.11, p = .082$, with women ($M = 12.67, SD = 13.34$) reporting more negative feelings towards the erotic film than men ($M = 8.45, SD = 8.28$).

Depression

For depression, the gender x condition ANOVA revealed no significant main effects nor was there a significant interaction.

Correlations between physiological and subjective measures

To examine the relationship between heart rate (HR) and self reported anxiety and arousal, separate correlations for participants who watched anxiety film and those who watched neutral film were calculated between HR, SUDS anxiety at baseline, during first film, during the erotic film, and SUDS arousal at baseline, during the first film, during the erotic film. There was a significant correlation between SUDS arousal at baseline with SUDS arousal during the erotic film, and during the first film. SUDS anxiety at baseline correlated significantly with SUDS arousal during the neutral film, and SUDS

anxiety during the erotic film but not with SUDS anxiety during the first film. There was a significant relationship between anxiety sensitivity with SUDS anxiety during erotic film, SUDS anxiety during the first film, but not with SUDS arousal during the erotic film. Moreover, heart rate correlated significantly with SUDS arousal during the erotic film.

To examine the relationship between SADI subscales and heart rate during the erotic film, and anxiety sensitivity correlations were calculated. Heart rate correlated significantly with SADI-E and SADI-P but not with SADI-M and SADI-N. Moreover, there was a correlation between anxiety sensitivity with SADI-N but not with SADI-P, SADI-M, and SADI-E.

To examine the relationship between the subscales of SADI correlations were calculated. SADI-N correlated significantly with all other subscales. There was also a significant relationship between SADI-E and SADI-M.

Table 3.3

Correlations Between Physiological Measures and SUDS

Variable	Baseline	First Film	Erotic Film	ASI ^a	HR
SUDS arousal (<i>n</i> = 91)					
Baseline	--	.41**	.24*	--	--
First Film	.41**	--	--	--	--
Erotic Film	.24*	--	--	-.01	.37*
ASI ^a	--	--	-.01	--	--
HR	--	--	.37*	--	--
SUDS anxiety (<i>n</i> = 91)					
Baseline	--	.13	.36*	--	--
First Film	.13	--	--	.23*	--
Erotic Film	.36*	--	--	.36*	--
ASI ^a	--	.23*	.36*	--	--
HR	--	--	--	--	--

* $p < .05$, ** $p < .01$

^a Anxiety Sensitivity Index (Reiss, Peterson, Gursky, & McNally, 1986)

Table 3.4

Correlations Between ASI, Physiological Measures and SADI

Variable	SADI-E ^b	SADI-M ^c	SADI-P ^d	SADI-N ^e
ASI ^a	.06	.12	- .10	.38*
HR	.33*	.21	.35*	-.15

* $p < .05$

^a Anxiety Sensitivity Index (Reiss, Peterson, Gursky, & McNally, 1986)

^b The Sexual Arousal and Desire Inventory-Evaluative (Toledano & Pfaus, 2006)

^c The Sexual Arousal and Desire Inventory-Motivational (Toledano & Pfaus, 2006)

^d The Sexual Arousal and Desire Inventory-Physiological (Toledano & Pfaus, 2006)

^e The Sexual Arousal and Desire Inventory-Negative (Toledano & Pfaus, 2006)

Table 3.5

Correlations Between Components of SADI

Variable	SADI-E ^b	SADI-M ^c	SADI-P ^d	SADI-N ^e
SADI-E ^b				
SADI-M ^c	.88***			
SADI-P ^d	.11	.06		
SADI-N ^e	.40**	.48**	.40**	

** $p < .001$, *** $p < .0001$

^a Anxiety Sensitivity Index (Reiss, Peterson, Gursky, & McNally, 1986)

^b The Sexual Arousal and Desire Inventory-Evaluative (Toledano & Pfaus, 2006)

^c The Sexual Arousal and Desire Inventory-Motivational (Toledano & Pfaus, 2006)

^d The Sexual Arousal and Desire Inventory-Physiological (Toledano & Pfaus, 2006)

^e The Sexual Arousal and Desire Inventory-Negative (Toledano & Pfaus, 2006)

Discussion

The current study investigated the effect of different components of anxiety on SA in sexually healthy men and women. We predicted that physiological component of state anxiety would increase the objective reports of arousal in both men and women. Furthermore, we predicted that people with low anxiety sensitivity would also experience a facilitatory effect of anxiety on subjective SA, and individuals high on anxiety sensitivity would more likely misinterpret the physiological changes in response to the anxiety and erotic films as something rather threatening and as such report less SA than individuals low in anxiety sensitivity. We also predicted that women would report more anxiety sensitivity and as such less SA than men. Results were partially consistent with our predictions.

As predicted, the physiological component of state anxiety was positively correlated with subjective physiological arousal during the erotic film for both men and women. Participants demonstrated higher heart rate during the erotic film than during the anxiety or the neutral film. In addition, the heart rate was higher when the erotic film followed the anxiety film than the neutral film. The results are consistent with findings that physiological component of state anxiety increases physiological SA via activation of SNS (Exton et al., 1999; Meston & Frohlich, 2000). In addition, the results are consistent with Hoon et al's (1977) findings of increases in physiological responses when anxiety stimulus preceded the erotic film, confirming once again that the physiological component of state anxiety enhances physiological measures of SA. Moreover, the results suggest that the recordings of heart rate may be a valid tool in measuring sympathetic changes of SA.

Inconsistent with our predictions, anxiety sensitivity was unrelated to laboratory ratings of subjective SA, which is consistent with Bradford and Meston's findings (2006) of lack of correlation between anxiety sensitivity and SA. The results suggest that individuals high in anxiety sensitivity were equally able to correctly interpret the physiological changes and attribute them either to the effects of anxiety film or erotic film, which is in contrast to the cognitive models. According to the Cognitive models of anxiety, anxious individuals have a propensity to over-interpret the significance of some fear-provoking cues and bodily changes (e.g., Arntz, Rauner & van den Hout, 1995; Clark, 1993a). However, it is notable that the individuals in our sample were not clinically anxious and it may be that their interpretations of their increased physiological arousal were not catastrophic, as one would expect to see by panic patients. However, individuals higher on anxiety sensitivity were more likely to evaluate the erotic film as negative but seemingly not enough to negatively affect the level of subjective SA

In addition to the increases in objective measures of SA, we also found that subjective reports of SA were significantly higher during the erotic film than the neutral film for both men and women, as measured by SUDS arousal, suggesting that the physiological changes during the erotic film were also interpreted subjectively as SA. This is in contrast to the findings of low or no subjective SA in the presence of an erotic stimulus preceded by an anxiety stimulus for women, while they exhibited high objective measures (Bradford & Meston, 2006; Elliott & O'Donohue, 1997; Palace & Gorzalka, 1990). This could be due to the differences in the objective measures in the previous studies and our study. While we only measured heart rate, they measured genital responses (VBV and VPA) to the erotic film. The high correlation between heart rate and

subjective SA in our study and the lack of correlation between objective and subjective measures in the previous studies, may suggest that VBV and VPA are not specific or accurate measures of SA in women. In addition, the reports of low or lack of subjective SA in women in previous studies might reflect that the 3-5.5 minute-erotic films might not be long enough in adequately inducing SA. However, Bradford and Meston (2006) used a 10-minute erotic film, which like the one used here, was female-centered and female-made. Given that they did not manipulate state anxiety, it could be argued that the existence of anxiety manipulation in our study contributed to the high subjective SA, confirming once again the enhancing effect of state anxiety on SA.

Furthermore, we found a trend towards greater SA, with higher sexual motivation in women than in men, as measured by SADI-M. Once more, this finding is surprising, given the existing reports of low subjective SA in women in the presence of an erotic stimulus when it followed an anxiety-provoking stimulus (e.g., Elliott & O'Donohue, 1997; Palace & Gorzalka, 1990). Given that the previous studies were conducted more than a decade ago, it could be argued that the increasing emancipation of women and the resulting rapid changes in social values concerning women's sexuality, may explain why we found high levels of subjective SA among women, whereas previous studies did not. Thus, the young, mostly university/college-educated women in our sample may have fewer cultural proscriptions against reporting subjective SA compared to previous generations. For instance, it has been argued that the subjective measures could be biased, with women underreporting and men over-reporting their subjective SA due to the social norms and assigned gender roles. In other words, social norms and the resulting gender roles could influence and dictate the expression of sexuality in men and women (e.g.,

Andersen, Cyranowski & Espindle, 1999; Kaplan, 1979; Lo Piccolo & Friedman, 1988). For example, although the open expression of sexuality in men has been indicative of manhood, strength, and health for a number of generations in Western culture, women have had to hide their sexuality. The sexual self-schema model developed by Andersen et al.(1999) postulates that the sexual schemas are developed through life experiences and guide sexual behavior. Consistent with the suggestion of women's emancipation in their sexual schema was our finding that men and women did not differ significantly in their negative evaluation of the erotic clip, even though there was a trend towards women evaluating the erotic film more negatively than men. This may be indicative of a shift in sexual attitudes in heterosexual college-age women that are reminiscent of the dominant heterosexual male standard.

Moreover, we found that people who reported higher sexual evaluation and higher subjective physiological SA exhibited higher heart rate, suggesting that increases in heart rate may indeed be a valid indicator of sympathetic activation in response to an erotic stimulus, as found by others (Exton et al., 1999; Meston & Frohlich, 2000). In addition, the motivation to engage in sexual activity and negative attitude towards sexual stimulus did not correlate with changes in autonomic arousal.

Some results were unexpected. Women not only reported higher anxiety during the anxiety film than men did but also they reported significantly higher anxiety during the erotic film than the neutral film. In fact their level of anxiety during the erotic film was as high as the reported anxiety during the anxiety film. Those results could be interpreted in light of the subjective component of anxiety and its effect on SA. In other words, it could be argued that state anxiety facilitated SA via activation of SNS, and did not interfere

cognitively with subjective SA, despite the high anxiety felt during the erotic film. The enhancing effect of anxiety on subjective SA in men has been reported in numerous studies (e.g., Barlow et al., 1983; Cranston-Cuevas, Barlow, Mitchell, & Athanasiou, 1993) but not in women. In contrast, studies examining the effect of anxiety on SA in women have reported an increase in physiological SA but not in subjective SA (e.g., Bradford & Meston, 2006; Elliott & O'Donohue, 1997; Palace & Gorzalka, 1990). The reported significantly high SA in women in our study and not in the others might be due to the length of the clips, providing support to our hypothesis that longer clips would be more effective in suspending disbelief. We used a 10-minute long anxiety-provoking clip and a 10-minute long erotic film; whereas, except for Bradford and Meston (2006), others used 3 to 5.5 minute clips. This is consistent with findings that longer clips are more effective in provoking emotional responses (i.e., more effective in suspending disbelief (unpublished observations).

In an attempt to examine the effect of anxiety on SA, Bradford and Meston (2006) used a 10-minute long erotic film, but they did not find an increase in subjective SA in women. It is notable; however, that they did not manipulate state anxiety. In their study, they asked women to fill out Spielberger's state-trait anxiety inventory and then asked them to watch a 3-minute neutral film followed by a 10-minute erotic film. Therefore, it could be argued that since they did not measure the effect of state anxiety in response to an anxiety stimulus, they did not find a facilitative effect of anxiety in their study

Moreover, as our data collection was taking place during the exam period, our participants reported high anxiety at baseline and over the past week, as measured by SUDS anxiety and BAI, respectively. Anxiety over the last week and at baseline did not

impact SA negatively. This is consistent with ter Kuile et al.'s (2007) findings that chronic stress did not lower subjective SA. Consistent with Wolpe's (1978) line of reasoning, it could be argued that watching the erotic film during the stressful exam period may well have functioned as a relief or distraction from their stress and anxiety.

There are several methodological limitations that are noteworthy. Firstly, our sample size consisted mostly of healthy young university students, and as such makes it difficult to generalize our findings to a more heterogeneous and/or clinical population. Secondly, a great part of our experiment took place during the exams. Thus the high level of stress that they were experiencing might have influenced our findings, and as such it would be important for future studies to account for this factor. Thirdly, even though we examined anxiety as a multidimensional concept, we did not measure trait anxiety. Therefore, it would be important to include the measure of this component when investigating the effect of anxiety on SA in future studies.

Despite these limitations, there are several strengths in our design that merit mentioning. Our study was the first to examine the effect of anxiety on SA in both men and women, which allowed for a direct comparison between the two. In addition, our study was the first and the only study, to our knowledge, utilizing anxiety and erotic stimuli that have been previously validated for their effects and that have been long enough to allow suspension of disbelief. This advantage allows us to infer that the reported results are indeed the impact of anxiety, as the participant reported anxiety during both clips (indicates carry-over effect of anxiety film) and arousal only during the erotic clip. Moreover, we examined anxiety as a multidimensional construct by measuring various components of anxiety such as state anxiety, anxiety sensitivity,

objective and subjective components. This methodology allowed us to examine the effect of different components of anxiety on SA individually.

Should findings from this study be replicated in a clinically anxious sample, this will suggest that improving and increasing sexual activity may be an important approach to decrease anxiety. As it has been shown in several studies, that increasing pleasure is one of the most effective ways to manage anxiety and stress (Leahy & Holland, 2000). Replication of the findings of this study in a sample of sexually dysfunctional individuals would suggest that diversion from sex-related worries may improve SA, consistent with Barlow's (1986) model of inhibited SA, which postulates that sexually dysfunctional individuals focus their attention on non-sexual anxiety-provoking cues. It would be therefore important for cognitive behavioral therapists to teach coping skills to sexually anxious individuals that are also arousing such as sensate focus and not traditional relaxation techniques. Sensate focus is usually used in the treatment of sexual problems in couples, where the focus starts by partners giving non-erotic massages to each other and graduate to erotic massage and ultimately sexual activity and orgasm. This technique helps because it eliminates the pressure of performing sexually, while directing the attention to the sexual cue.

Taken together, the data from Study 2 suggest that while physiological component of state anxiety has an enhancing effect on objective and subjective SA, the cognitive component of anxiety does not interfere with SA, regardless of gender and individual's sensitivity to anxiety. In addition, acute and longer-standing anxiety seems to favorably impact objective and subjective SA via different mechanisms, namely increases in SNS and shift of attention from anxiety/stress to sexual stimulus.

Chapter 4

General Discussion

The purpose of the current studies was to examine the impact of anxiety on sexual arousal (SA) in healthy men and women. Research on SA and the impact of anxiety on SA demonstrate contradictory results. This contradiction could be explained by various factors. Inconsistent/inadequate stimuli to provoke anxiety and SA, inappropriate use of the concept anxiety, and the lack of adequate definition of SA might be some of the factors explaining the existing inconsistencies in the field.

To date, the majority of definitions of SA are based on studies on men, and as such it has been common for women's SA responses to be categorized along male dimensions. Definitions of SA that are based primarily on physiological responses or genital blood flow ignore the subjective or psychological components of SA. Both Leiblum (1998, 2001) and Tiefer (1991, 2004) stressed that the focus on genital responses ignores major psychological components that facilitate women's SA and pleasure, such as trust, intimacy, respect, communication, affection, and pleasure from sensual touching. Basson (2000), proposed a new model of the female sexual response, where the psychological and emotional aspects of sexuality are emphasized. According to this model, arousal and desire co-occur and reinforce each other. In addition, Basson (2000) argues that women can initiate or be engaged in sexual activities for many incentives, sexual and non-sexual.

For a number of years there have been debates between researchers arguing that various sexual dysfunctions are caused by anxiety and others reporting that anxiety has sexual etiology, while others report an enhancing effect of anxiety on SA (e.g., Beck &

Barlow, 1984; Hoon, Wincze, & Hoon, 1977; Masters & Johnson, 1966). The exact role of anxiety on SA has been unclear. There are a number of reasons that could account for these inconsistent results in the field of sexual behavior. To date, only few studies have examined the impact of anxiety on SA and they have been treating the concept anxiety as a unitary construct. The mentioned studies have employed designs assessing state anxiety, in which anxiety is manipulated and the individual reaction is measured. However, as any other emotion, anxiety has various components and dimensions and unless these components are considered, one cannot conclude an effect of anxiety but rather one effect of state anxiety, for instance. Furthermore, there is an important limitation in the research investigating the effect of anxiety on SA, which is the use of not-validated and inadequate anxiety-provoking stimuli.

The two studies presented in this dissertation attempted to correct these limitations and it was hypothesized that the impact of anxiety on SA depends on various factors, including state anxiety, physiological and subjective measures of anxiety and SA, and anxiety sensitivity as a cognitive component of anxiety. We hypothesized that there will be an effect of anxiety on SA, with individuals high in anxiety sensitivity index experiencing an inhibition and individuals low in anxiety sensitivity index and high in state-anxiety a facilitatory effect on SA. We also expected to find gender differences with women exhibiting more anxiety sensitivity, thus less SA following exposure to the erotic film.

The results of these studies partially supported our expectations. Study one examined the effect of an anxiety-provoking film on subjective and physiological measures of anxiety and overall physiological arousal in men and in women. Participants

were asked to watch a 10-minute anxiety-provoking clip and a 10-minute neutral film, which was presented in a counterbalanced order. They were then asked to rate their perceived anxiety and arousal (emotive and subjective physiological components of anxiety, respectively) in response to the films. Objective measures of physiological arousal were taken using a pulse monitor. It was found that both men and women exhibited greater objective and subjective arousal and anxiety in response to the anxiety film. In addition, women reported significantly more subjective anxiety (state) and arousal than men. Though the objective physiological arousal was not associated with state anxiety, it was found that greater state anxiety was associated with higher perceived arousal for both conditions. In summary, our results confirmed the effectiveness of our anxiety film in inducing physiological and subjective anxiety in both men and women, with women responding with greater objective and subjective anxiety and arousal than men.

The second study examined the effect of various components of anxiety on SA in healthy men and women. Participants watched an anxiety film or a neutral film followed by a sexually explicit film and were asked to rate their subjective anxiety and subjective SA. The objective physiological arousal was taken using a pulse monitor. Though all participants exhibited an increase in SA in response to the erotic film, those in the anxiety condition exhibited an increase in the heart rate in response to the erotic film. No such increase was observed among participants in the neutral film condition.

The results suggest that the physiological component of state anxiety positively influenced the physiological arousal and the subjective arousal during the erotic film. The results confirm the enhancing effect of physiological component of state anxiety on

SA, as demonstrated by Exton et al. (1999) and Meston and Frohlich (2000). The authors suggest that anxiety stimulus that precedes an erotic film activates the SNS and as such increases objective (physiological) SA regardless of cognitive interference.

Importantly for our hypotheses, we also found that SA was greater when the erotic film followed the anxiety film than the neutral film. These results are consistent with Hoon et al's (1977) findings. They had women watch an anxiety film and an erotic film in a counterbalanced order and measured their genital responses during both clips in both conditions. They found increases in genital responses when anxiety stimulus preceded the erotic film, and decreases in genital responses when anxiety film followed the erotic film, suggesting that the physiological component of state anxiety enhances physiological measures of SA when it is immediately preceded by the erotic stimulus.

Subjective reports of SA, as measured by SUDS arousal, were higher during the erotic film regardless of whether participants viewed a neutral or anxious film prior to the erotic film. Given the reported higher heart rate during the erotic film, the higher subjective arousal during the erotic film suggests that the participants not only were sexually aroused during the erotic film but also they interpreted the physiological changes as SA. This is in contrast to the findings of low or no subjective SA in the presence of an erotic stimulus when it followed an anxiety stimulus for women, as well as to the consistently reported lack of correlation between objective and subjective measures of SA in women (Bradford & Meston, 2006; Elliott & O'Donohue, 1997; Palace & Gorzalka, 1990), however, in line with previous findings in men that report an enhancing effect of anxiety on subjective and objective SA (e.g., Barlow, Sakheim, & Beck, 1983; Beck & Barlow, 1984; Cranston-Cuevas, Barlow, Mitchell, & Athanasiou, 1993). These

controversial findings could be due to the differences between our design and the one of the previous studies.

More specifically, there are some important methodological differences in measuring anxiety and SA between the current study and the previous studies. For instance, in an attempt to examine the effect of anxiety and distraction on SA in women, Elliott and O'Donohue (1997) assigned women to three distraction-levels. Women had to listen to an erotic story in one ear and simultaneously were distracted in the other ear (e.g. listening to the sentences and being asked to repeat them). Anxiety was induced in one group of participants by making them believe that they were videotaped during the experiment, whereas the remaining participants were explicitly told that they were not videotaped. They reported that SA decreased as a function of distraction level and only women who did not receive the anxiety manipulation reported higher SA in the low distraction condition. No other significant effects of anxiety were found. Genital and subjective measures of SA were taken using vaginal plethysmography and questionnaires, respectively. Interestingly, however, they did not find higher genital arousal in the anxiety group, which is in contrast with other studies reporting higher genital arousal but not subjective arousal. As compared to our study, they differ in their anxiety and erotic stimuli, which might explain the different findings between our study and theirs. In addition, in our study heart rate was recorded as physiological measure, whereas Elliott and O'Donohue (1997) measured the vaginal blood volume (VBV) and vaginal pulse amplitude (VPA) as indicators of physiological SA in women. Given the consistent findings of lack of concordance between the physiological and subjective measures in women (e.g. Bradford & Meston, 2006; Elliott & O'Donohue, 1997; Palace

& Gorzalka, 1990) and the high correlation between the two measures in our study, it could be deduced that VBV and VPA are not specific tools in measuring female SA, as the changes are rather subtle and not at a conscious awareness to women.

The reported findings of high objective and subjective SA in our study lend support to Barlow's (1986) model of positive feedback loop. The model postulates that anxiety facilitates SA in sexually functional individuals via a positive feedback loop. According to Barlow (1986), in the presence of explicit or implicit performance demands for sexual performance, sexually functional individuals have an increased attentional focus on sexual cues (in the presence of a sexual stimulus), which in turn increases autonomic arousal and the awareness of this autonomic arousal increases the attentional focus on sexual cue, which once again leads to increased SA. Since women are not aware of the subtle changes of VBV and VPA, these changes would not feedback positively to increase SA. However, the increased heart rate in the presence of an erotic stimulus is more likely noticed and interpreted as a response to the erotic film, and as such increases SA, particularly in women. These findings lend support to the critics on DSM-IV classification system, that it mainly focuses on the genital responses to sexual stimulus, neglecting psychological and other sociological responses (Leiblum, 2001; Nicholls, 2008; Tiefer, 1995, 2004).

Inconsistent, with our predictions, anxiety sensitivity was not related to subjective SA, which is in line with Bradford and Meston's findings (2006). As the first study attempting to measure anxiety as a multidimensional concept, Bradford and Meston (2006) predicted, as we did, that anxiety sensitivity would be related to SA but did not find any correlation between anxiety sensitivity and SA. It could be argued that, contrary

to our expectations, individuals high in anxiety sensitivity were not different from individuals without high anxiety sensitivity in interpreting the physiological changes as the effects of the anxiety film or as SA and as such were not negatively influenced by the cognitive component of anxiety. This finding is inconsistent with the cognitive models postulating that anxious individuals tend to misinterpret the meaning of some fear-provoking cues and bodily changes as catastrophe (e.g., Arntz, Rauner & van den Hout, 1995; Clark, 1993a). However, it could be argued that our participants were not clinically anxious and as such did not have cognitive distortions as seen by panic patients. Moreover, it could also be related to the type of anxious arousal. People with panic attacks and high anxiety sensitivity are fearful of unexplained anxious sensations and unexpected panic attacks. Given that participants may have attributed their arousal to the film, it is possible that they were not alarmed by the increases in arousal. In order to assess this relationship, it would be interesting for future studies to induce arousal without people awareness, such as CO₂ challenge and then expose them to a sexually provoking film.

In contrast to our predictions, when examining the scores of the SADI, we did not find any significant effects or interactions. These results are rather surprising since using a different tool to measure SA (SUDS arousal) we did find a significant increase of subjective SA but not when the scores of SADI were considered. One possible explanation for this could be due to the length of SADI. SADI has 54 items describing subjective SA, whereas SUDS arousal consists of 4 simple questions and as such easier to fill out, especially for our already stressed student participants, who reported being under time pressure and lack of sleep because of exams. Another explanation could relate to the

fact that SUDS were measured for 3 different times (baseline, during the first film (anxiety or neutral), and during the neutral film), whereas the SADI was measured only once at the end of the erotic film. It may be that the SADI is more sensitive as a trait measure of SA relative to a state measure. However, previous studies have used the SADI reliably for state measures of SA and desire, for example, after having participants view the same clip used in this study, but with an altered ending and accompanying it with or without the soundtrack (Personal communication with Pfaus on Pfaus, Toledano, Mihai, Young, & Ryder, in preparation). It may also be the case that the state change induced by exposure to the anxiety or neutral clips was not enough to budge the overall rating of sexual arousal and desire as measured by the SADI subscales, which were in agreement with the values found previously for women and men in the original study by Toledano and Pfaus (2006) and in subsequent studies (Pfaus et al., in preparation).

Despite the fact that we were unable to find changes in scores on the SADI following the erotic clip when it was preceded by an anxiety film, we did find a trend towards greater sexual motivation in women as compared to men, as measured by SADI-M. This finding was surprising, given the previous reports of low subjective SA in women in the presence of an erotic stimulus (e.g., Elliott & O'Donohue, 1997; Palace & Gorzalka, 1990). For years, it has been speculated that women may underreport their SA and men may exaggerate to conform to the expected social norms for each gender (Catania, Gibson, Chitwood, & Coates, 1990). However, it could be argued that the previously assigned gender expectations might have been undergoing a rapid change due to the emancipation of women.

These findings are consistent with Wouters' (2004) theory suggesting that the

changing rules of etiquette, which are mostly linked to gender roles, has impacted these roles developed throughout the twentieth century. This may explain why we were able to find significantly high subjective SA, whereas previous studies had failed to do so, as those studies were conducted over 10 years ago. In addition, our finding is consistent with the sexual schema model of Andersen, Cyranowski, and Espindle (1999) that entails that sexual beliefs and values are a product of life experiences and influence our sexual behavior and functioning. For examples, in some cultures the expression of sexuality in men may indicate manhood, strength, and health, while the same behavior for women would signify a negative portrayal of being “too easy”. Along these lines, Loe’s (2008) “New View Manifesto” emphasizes a multifaceted view of sexuality that integrates the educational, social, relational, psychological, and physical factors that shape a person’s sexual responses in individual ways depending on the temperament of each person. This makes it imperative to understand sexuality both from the bottom up (in terms of physiological responses) and from the top down in terms of the control exerted by society in shaping sexual expectations, defining what is “normative” and “deviant” to the point of creating boundaries for sexual expression that people attempt to maximize their own sexual pleasure within.

Moreover, as compared to sexually healthy individuals, participants with sexual dysfunction seem to report more conservative values regarding sexuality (Fisher, Byrne, White, & Kelley, 1988) and erroneous beliefs about male and female sexual response (Nobre, Pinto-Gouveia, & Gomes, 2003). Similarly, Morokoff (1985) found that women with high sexual guilt (erotophobic) reported lower subjective SA but showed significantly higher genital arousal as compared to women with low sex guilt during

exposure to erotic material. It could be argued that erotophobic women have more negative expectancies regarding erotica and their responses to it, leading them to experience or to report less subjective SA despite their increased genital response.

It is also likely that women have more erroneous beliefs and negative expectancies as a result of social, cultural, and religious factors than men do, accounting, at least in part, for the low correlation between subjective and physiological SA observed in women that have been reported in the previous studies. The socialization of women in many cultures exercises a prohibitive and conservative influence on their sexual behavior. For instance, in some cultures there is no name for women's genitals, and in other cultures/religions women have to save their virginity until marriage and it is considered morally wrong for women to talk openly about sex (Huang & Akhtar, 2005).

Indeed, several clinical and theoretical reports point to some recurrent beliefs as etiologic factors of sexual dysfunction (e.g., Kaplan, 1979; Lo Piccolo & Friedman, 1988; Rosen & Leiblum, 1995; Tevlin & Leiblum, 1983). It is important to note, that despite the existing evidence emphasizing the impact of non-physical factors on SA, such as culture, society, religion, and beliefs, the DSM-IV classification system for sexual dysfunction continues to mainly focus on the physical aspects of sexual response. Along these lines, feminists argue that the recent popularity of research on female sexual dysfunction and diagnosis is a sign of neglecting the multidimensionality of sexuality and medicalizing sexual problems with profit-driven intentions (e.g., Kaschack & Tiefer, 2001; Loe, 2004; Tiefer, 2004). This issue obviously warrants further research. Indeed, some sexual disorders may be treated well with talk therapy, while others require medical intervention because the etiology is physical rather than "psychological" (e.g., erectile

dysfunction in men with cardiovascular disorders, or loss of sexual desire in postmenopausal women).

Our finding that men and women did not differ significantly in their scores on SADI, even though there was a trend towards women evaluating the erotic film more negatively than men, lend more support for the suggestion that women exhibit an increase in emancipation in their sexual schema. Furthermore, one could argue that the sexual schemas could condition a person in his/her response to sexual stimuli. For instance, in the case of a sexual abuse it is expected that one may have a more negative sexual schema, possibly leading to sexual aversion; whereas a person who has been exposed to positives sexual experiences (for example from pornography) is more likely to demonstrate an increase sexual desire and arousal in the presence of similar sexual stimuli. This is in line of findings from animal research demonstrating a conditioned response in male rats for partners associated with the reward state induced after ejaculation (e.g., Kippin & Pfaus, 2001a, 2001b). Taken together, these findings emphasize the importance of learning in sexual responses, more specifically, in displays of courtship and sexual partner preferences, SA and copulatory behaviors, and the short- and long-term influences of sexual experiences (Pfaus, Kippin, & Centeno, 2001).

Surprisingly, we found that in addition to the high anxiety during the anxiety film, women also reported significantly higher anxiety during the erotic film than the neutral film, and it was as high as the reported anxiety during the anxiety film. It could be argued that the carryover effect of state anxiety has presented itself in two ways, physiologically and cognitively. This finding is in contrast to the studies reporting a facilitative effect of state anxiety via SNS activation but an inhibitory effect of state anxiety via cognitive

interference (e.g., Bradford & Meston, 2006; Elliott & O'Donohue, 1997; Palace & Gorzalka, 1990).

It could be argued that the length of the clips used in our study might explain the discrepancy in findings. More specifically, our study is the first using a 10-minute long anxiety-provoking clip and a 10-minute long erotic film; whereas, others, in exception of Bradford and Meston (2006), used 3-5.5 minute film clips. These findings lend support to our hypothesis that longer clips would be more effective in suspending disbelief, and is consistent with previous findings that longer clips were more effective than shorter clips in provoking emotional responses (unpublished observations).

Moreover, not only did women report higher anxiety at baseline and over the last week as compared to men, but also they reported the highest anxiety during the anxiety film and highest subjective SA during the erotic film, which may be indicative of a facilitative effect of anxiety on SA. Consistent with Wolpe's (1978) line of reasoning, it could be argued that watching the erotic film during the stressful exam period may well have functioned as a distraction from their stress and anxiety and a relief phenomenon. Therefore, sex can have a positive effect on anxiety by distracting the focus from an anxiety cue to a sexual cue.

Implications

In *Ars Amatoria*, Ovid (2CE/1930) counseled that taking a woman to the games in ancient Rome was a surefire prelude to sex, so long as the increased arousal the woman experienced while watching acts of extreme violence could be translated subsequently into sexual arousal with the appropriate intimate interactions. A similar phenomenon was reported in the 1930s as young men began taking their girlfriends to horror films.

Berenstein (2002) described this as a dating strategy, and offered support in the famous quote by columnist J.E. Mitchell of the *Los Angeles Enquirer* (1932) who wrote in his review of the Warner Brothers film *Dr. X*: “Take the girlfriend, and by the middle of the first reel she’ll have both arms around your neck holding on for dear life”. Those social phenomena suggest that non-life-threatening stressors or anxiety-inducing stimuli can potentiate arousal in general, which can subsequently enhance sexual arousal in appropriate sexual circumstances.

The conclusion derived from the current studies is that state anxiety can facilitate sexual arousal in two ways. Physiologically state anxiety acts as a catalyst for SA because of the activation of SNS, and cognitively it can function as a positive distracter from stressful personal problems. Interestingly, not only anxiety seems to be influencing SA, but also SA seems to have a positive decreasing effect on anxiety, as anxiety after the erotic film was lower than anxiety at baseline, as measured by BAI-modified and BAI. Moreover, anxiety sensitivity as another cognitive component seems to be unrelated to SA in clinically healthy non-anxious population. The reported findings extend our knowledge of the relationship between anxiety and SA and may have some implications for the treatment of sexual dysfunction and anxiety disorders.

In the DSM-IV-TR (2000) different categories of sexual disorders, which are influenced by Masters and Johnson's EPOR model (1966), are found under the rubric Sexual and Gender Identity Disorders and include Sexual Desire Disorders, Sexual Arousal Disorders, Orgasmic Disorders, Sexual Pain Disorders, and Sexual Dysfunction Due to a General Medical Condition. Sexual disorders are often treated using a cognitive-behavioral approach. Like CBT for anxiety disorders, the CBT of sexual dysfunction is

also multidimensional, in which physiological symptoms are treated by using relaxation techniques, psychological symptoms are addressed through use of cognitive reevaluation, and behavioral and motivational symptoms are treated using gradual exposure.

Given the present findings of an enhancing effect of the physiological component of state anxiety, clinical techniques such as relaxation training, which focus on anxiety reduction, may be counterproductive since overall sympathetic activity is reduced. However, sensate focus and related techniques that teach the client to focus on erotic sensations and develop positive attitudes about their SA and behavior would continue to be useful because they do not aim at decreasing the SNS activation. At the cognitive level, in addition to the cognitive restructuring, clients may also benefit from cognitive distraction from anxiety-provoking worries. It is understood that a patient with sexual dysfunction may be preoccupied by thoughts related to the problem and as such create a negative feedback loop. Future studies are needed to evaluate the effectiveness of cognitive distraction in the treatment of sexual dysfunctions. Furthermore, assessing for the sexual attitudes would provide a better picture of the patient's sexual schema and using schema-focused CBT would enhance the understanding of one's sexual schema and as such it might provide more effective results.

There might also be some implications for the treatment of anxiety disorders. CBT has been the approach of choice in the treatment of various anxiety disorders. Our data show that watching an erotic film had a diminishing effect on their anxiety. It could be argued that a focus on increasing pleasure, such as improving sexual functioning, would benefit patients both physiologically and cognitively. Physiologically they may benefit from the mood-enhancing effect of sexual activity (for instance by activating the reward

system in the brain) and cognitively sexual activity (or other pleasurable activity) may distract patients from their anxiety-provoking thoughts.

Concluding Remarks

The results from the current studies should be considered in light of several methodological limitations. Firstly, our sample size was homogenous and consisted mostly of young university students. It would be difficult to generalize our findings to a more heterogeneous population, such as community adults or individuals with sexual dysfunction. Secondly, because a great part of our experiment took place during exams participants were already experiencing a high level of stress, as measured by SUDS pre and as such the high level of stress might have influenced our findings in favor of increased SA during the erotic film as an anxiety relief phenomenon (Wolpe, 1978). Future studies may wish to account for this factor and perhaps compare a high anxiety (at baseline) group to a low anxiety group. Thirdly, despite examining anxiety as a multidimensional concept, we did not measure trait anxiety. Therefore, it would be important for the future studies to include a more complete measure of anxiety when investigating the effect of anxiety on SA.

Our methodology had also several strengths that deserve to be mentioned. Our study was the first to examine the effect of anxiety on SA in both men and women, allowing us a direct comparison between men and women's sexual response. Previously the comparisons between men and women have been drawn based on separate studies. In addition, our study was the first and the only study, to our knowledge, that implemented previously validated anxiety and erotic stimuli, which are long enough to allow suspension of disbelief. This advantage allows us to conclude that the reported anxiety

during both film clips may be carry-over effect of anxiety film and the reported arousal only during the erotic clip is due to the effects of our erotic film. Moreover, we examined anxiety as a multidimensional construct by measuring various components of anxiety such as state anxiety, anxiety sensitivity, as well as objective and subjective components of anxiety. This methodology allowed us to examine the effect of different components of anxiety on SA separately.

In summary, the results indicate that physiological and cognitive components of state anxiety have an enhancing effect on objective and subjective SA, regardless of gender and individual's sensitivity to anxiety. In addition, acute and longer-standing anxiety seems to favorably impact objective and subjective SA via different mechanisms, namely increases in SNS and a shift of attention from anxiety/stress to sexual stimulus. Moreover, SA seems to positively influence anxiety and successfully diminish it, at least for a short period.

In conclusion, the results of the present study point to the relevance of measuring anxiety and SA as multidimensional constructs in both clinical and laboratory settings. Future research involving the physiological measurement of SA would perhaps benefit from including measures of SNS in addition to the traditional measures of genital response, which measure parasympathetic activation. Moreover, future studies may wish to replicate the design with clinically anxious and with sexually dysfunctional individuals to examine the role of anxiety on sexual dysfunction.

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Participant # _____

Researcher: _____

Appendix A – Consent Form

I agree to participate in a research project being conducted by Dr. Jim Pfaus of the Department of Psychology, and his graduate student Bitia Sharifzadeh, on the impact of anxiety on arousal.

A. PURPOSE

The purpose of this research is to examine how emotional states are modified following exposure to film clips that make people feel anxious or sexually aroused. Anxiety and sexual arousal have much in common (e.g., increased heart rate), and we are interested to see whether the two states can cancel each other out or synergize with one another.

B. PROCEDURES

You will be asked to fill out some questionnaires about your day-to-day levels of anxiety and sexual functioning, then view two short (10 min.) video clips, and then fill out more questionnaires that assess how the video clips made you feel. The entire session is expected to last 30-40 minutes.

C. RISKS AND BENEFITS

You might feel anxious or sexually aroused after watching the video clips. If either of these emotional states induces great discomfort, we can offer you a referral to see a clinician as soon as possible.

D. CONDITIONS OF PARTICIPATION

- I understand that I am free to withdraw my consent and discontinue my participation at any time without negative consequences, and that the experimenter will gladly answer any questions that might arise during the course of the research.
- I understand that my participation in this study is confidential (i.e. the researchers will know, but will not disclose my identity).
- I understand that the data from this study may be published, though no individual scores will be reported.

I HAVE CAREFULLY STUDIED THE ABOVE AND UNDERSTAND THIS AGREEMENT. I FREELY CONSENT AND VOUNTARILY AGREE TO PARTICIPATE IN THIS STUDY.

PARTICIPANT'S _____ NAME _____ (please print)

SIGNATURE _____ DATE _____

I would be interested in participating in other studies in future (yes/ no): _____

If at any time you have questions about your rights as a research participant, please feel free to contact Adela Reid, Research Ethics Compliance Officer, Concordia University, at (514) 848-2424 ext 7481 or by email at adela.reid@concordia.ca

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Appendix B – SUDS (Pre and Post)

SUDS_Pre

1. On a scale from 0 (not at all) – 10 (most), how anxious are you feeling now?

2. If you are feeling anxious now, what do you think is causing your anxiety?

3. On a scale from 0 (not at all) – 10 (most), how aroused are you feeling now?

4. If you are feeling aroused now, what is causing your arousal?

SUDS-Post

Have you ever watched the movie from which the video clip you were exposed to was extracted and are you familiar with the actors in the video clip? Please specify.

On the scale from 0 (not at all) – 10 (most):

5. How anxious did the 1st clip made you feel?

6. How aroused did the 1st clip made you feel?

7. How anxious did the 2nd clip made you feel?

8. How aroused did the 2nd clip made you feel?

Appendix C- BAI and BAI-Post (Modified)

BAI

This questionnaire consists of a list of 21 symptoms associated with anxiety. Please read each carefully and indicate, by circling a number (0 to 3), to what degree you have been affected by each of these symptoms during the last week.

	Not at all	A little	Some what	A lot
1. Numbness or tingling.	0	1	2	3
2. Feeling hot.	0	1	2	3
3. Wobbliness in legs.	0	1	2	3
4. Unable to relax.	0	1	2	3
5. Fear of the worst happening.	0	1	2	3
6. Dizzy and lightheaded.	0	1	2	3
7. Heart pounding or racing.	0	1	2	3
8. Unsteady.	0	1	2	3
9. Terrified.	0	1	2	3
10. Nervous.	0	1	2	3
11. Feelings of choking.	0	1	2	3
12. Hands trembling.	0	1	2	3
13. Shaky.	0	1	2	3
14. Fear of losing control.	0	1	2	3
15. Difficulty breathing.	0	1	2	3
16. Fear of dying.	0	1	2	3
17. Scared.	0	1	2	3
18. Discomfort in abdomen	0	1	2	3
19. Faint.	0	1	2	3
20. Face flushed.	0	1	2	3
21. Sweating (not due to heat).	0	1	2	3

BAI-Post

This questionnaire consists of a list of 21 symptoms associated with anxiety. Please read each carefully and indicate, by circling a number (0 to 3), to what degree you have been affected by each of these symptoms while you were watching the video clip.

	Not at all	A little	Somewhat	A lot
1. Numbness or tingling.	0	1	2	3
2. Feeling hot.	0	1	2	3
3. Wobbliness in legs.	0	1	2	3
4. Unable to relax.	0	1	2	3
5. Fear of the worst happening.	0	1	2	3
6. Dizzy and lightheaded.	0	1	2	3
7. Heart pounding or racing.	0	1	2	3
8. Unsteady.	0	1	2	3
9. Terrified.	0	1	2	3
10. Nervous.	0	1	2	3
11. Feelings of choking.	0	1	2	3
12. Hands trembling.	0	1	2	3
13. Shaky.	0	1	2	3
14. Fear of losing control.	0	1	2	3
15. Difficulty breathing.	0	1	2	3
16. Fear of dying.	0	1	2	3
17. Scared.	0	1	2	3
18. Discomfort in abdomen	0	1	2	3
19. Faint.	0	1	2	3
20. Face flushed.	0	1	2	3
21. Sweating (not due to heat).	0	1	2	3

Appendix D- ASI

Circle the one phrase that best represents the extent to which you agree with the item. If any of the items concern something that is not part of your experience (e.g. "It scares me when I feel shaky" for someone who has never trembled or had the "shakes") answer on the basis of how you think you might feel *if you had* such experience.

1. It is important to me not to appear nervous.

Very Little A Little Some Much Very Much

2. When I cannot keep my mind on a task, I worry that I might be going crazy.

Very Little A Little Some Much Very Much

3. It scares me when I feel "shaky" (trembling).

Very Little A Little Some Much Very Much

4. It scares me when I feel faint.

Very Little A Little Some Much Very Much

5. It is important to me to stay in control of my emotions.

Very Little A Little Some Much Very Much

6. It scares me when my heart beats rapidly.

Very Little A Little Some Much Very Much

7. It embarrasses me when my stomach growls.

Very Little A Little Some Much Very Much

8. It scares me when I am nervous.

Very Little A Little Some Much Very Much

9. When I notice that my heart is beating rapidly, I worry that I might have had a heart attack.

Very Little A Little Some Much Very Much

10. It scares me when I become short of breath.
- Very Little A Little Some Much Very Much
11. When my stomach is upset, I worry that I might be seriously ill.
- Very Little A Little Some Much Very Much
12. It scares me when I am unable to keep my mind on a task.
- Very Little A Little Some Much Very Much
13. Other people notice when I feel shaky.
- Very Little A Little Some Much Very Much
14. Unusual body sensations scare me.
- Very Little A Little Some Much Very Much
15. When I am nervous, I worry that I might be mentally ill.
- Very Little A Little Some Much Very Much
16. It scares me when I am nervous.
- Very Little A Little Some Much Very Much

Appendix E – SADI

Participant Code: _____

This section of the questionnaire is concerned with **SEXUAL AROUSAL and DESIRE**. We define **sexual arousal** as the **physiological responses that accompany or follow sexual desire**. For example, when you feel sexually aroused, your heart might beat faster or your palms may get sweaty. Men may experience penile erection and women may feel a moistness of the vagina. Sexual Arousal involves the more physiological aspects of wanting sex. We define **sexual desire** as an **energizing force that motivates a person to seek out or initiate sexual contact and behavior**. You can think of it as a hunger or a sexual "drive" that leads you to seek out sexual contact. Sexual Desire involves the more psychological aspects of wanting sex.

Following is a list of words that might describe how you felt while viewing the video clip you just watched. Different people experience **sexual arousal and desire** in distinct, individual ways. There is no "right" or "wrong" answer. Please indicate to what extent each word describes how you felt while watching the video clip you were exposed to, by placing the number that describes the feeling most accurately. Please use the following scale to rate each of the words below. **Please rate all of the words. Do not skip any.**

0	1	2	3	4	5
does not describe it at all			describes it moderately well		describes it perfectly
Anticipatory _____			Frustrated _____		
Tingly all over _____			Lustful _____		
Restrained _____			Entranced _____		
Anxious _____			Aversion _____		
Driven _____			Hot _____		
Frigid _____			Tempted _____		
Sensitive to touch _____			Passionate _____		
Sluggish _____			Fantasize about sex _____		
Urge to satisfy and/or be satisfied _____			Repressed _____		
Enthusiastic _____			Disturbed _____		
Unhappy _____			Flushed _____		
Wet (women only) _____			Impatient _____		
Hard (men only) _____			Sensual _____		
Resistant _____			Breathe faster/ Pant _____		
Warm all over _____			Displeasure _____		
Excited _____			Stimulated _____		
Tingling in genital area _____			Tingling sensation in gut _____		
Uninterested _____			I forget about everything else _____		
Pleasure _____			Repulsion _____		
Heart beats faster _____			Sexy _____		

Happy _____
Angry _____
Attractive _____
Powerful _____
Naughty _____
Alluring _____
Lethargic _____
Horny _____

Quivering sensations _____
Insensible _____
Seductive _____
Genitals Reddish _____
Unattractive _____
Good _____
Throbs in genital area _____

Appendix F- BDI-II

BDI-II

This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the one statement in each group that best describes the way you have been feeling during the past two weeks, including today. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for each group.

1) Sadness

- 0 I do not feel sad.
- 1 I feel sad much of the time.
- 2 I am sad all the time.
- 3 I am so sad or unhappy that I can't stand it.

7) Self-Dislike

- 0 I feel the same about myself as ever.
- 1 I have lost confidence in myself.
- 2 I am disappointed in myself.
- 3 I dislike myself.

2) Pessimism

- 0 I am not discouraged about my future.
- 1 I feel more discouraged about my future than I used to be.
- 2 I do not expect things to work out for me.
- 3 I feel my future is hopeless and will only get worse.

8) Self-Criticalness

- 0 I don't criticize or blame myself more than usual.
- 1 I am more critical of myself than I used to be.
- 2 I criticize myself for all the faults.
- 3 I blame myself for everything bad that happens.

3) Past Failure

- 0 I do not feel like a failure.
- 1 I have failed more than I should have.
- 2 As I look back, I see a lot of failures.
- 3 I feel I am a total failure as a person.

9) Suicidal Thoughts or Wishes

- 0 I don't have any thoughts of killing myself.
- 1 I have thoughts of killing myself, but I would not carry them out.
- 2 I would like to kill myself.
- 3 I would kill myself if I had the chance.

4) Loss of Pleasure

- 0 I get as much pleasure as I ever did from the things I enjoy.
- 1 I don't enjoy things as much as I used to.
- 2 I get very little pleasure from the things

10) Crying

- 0 I don't cry any more than I used to.
- 1 I cry more now than I used to.
- 2 I cry over every little thing.
- 3 I feel like crying but I can't.

- I
used to enjoy.
- 3 I can't get any pleasure from the things
I used
to enjoy.

5) Guilty Feelings

- 0 I don't feel particularly guilty.
- 1 I feel guilty over many things I have
done or
should have done.
- 2 I feel quite guilty most of the time.
- 3 I feel guilty all the time.

6) Punishment Feelings

- 0 I don't feel I am being punished.
- 1 I feel I may be punished.
- 2 I expect to be punished.
- 3 I feel I am being punished.

13) Indecisiveness

- 0 I make decisions about as well as ever.
- 1 I find it more difficult to make
decisions
than usual.
- 2 I have much greater difficulty in
making
decisions than I used to.
- 3 I have trouble making any decision.

14) Worthlessness

- 0 I do not feel I am worthless.
- 1 I don't consider myself as worthwhile
and

11) Agitation

- 0 I am no more restless or wound up
than usual.
- 1 I feel more restless or wound up than
usual.
- 2 I am so restless or agitated that it's
hard to stay still.
- 3 I am so restless or agitated that I have
to keep moving or doing something.

12) Loss of Interest

- 0 I have not lost interest in people or
activities.
- 1 I am less interested in other people or
things than before.
- 2 I have lost most of my interest in
other people or things.
- 3 It's hard to get interested in anything.

18) Changes in Appetite

- 0 I have not experienced any changes in
my appetite.
- 1a My appetite is somewhat less than
1b usual.
My appetite is somewhat greater than
usual.
- 2a My appetite is much less than usual.
- 2b My appetite is much greater than
usual.
- 3a I have no appetite at all.
- 3a I crave food all the time.

19) Concentration Difficulty

- 0 I can concentrate as well as usual.
- 1 I can't concentrate as well as usual.
- 2 It's hard to keep my mind on

- useful as I used to.
- 2 I feel more worthless as compared to other people.
- 3 I feel utterly worthless.

- anything for very long.
- 3 I find I can't concentrate on anything.

15) Loss of Energy

- 0 I have as much energy as ever.
- 1 I have less energy than I used to have.
- 2 I don't have enough energy to do very much.
- 3 I don't have enough energy to do anything.

20) Tiredness or Fatigue

- 0 I am no more tired or fatigued than usual.
- 1 I get more tired or fatigued more easily than usual.
- 2 I am too tired or fatigued to do a lot of the things I used to do.
- 3 I am too tired or fatigued to do most of the things I used to do.

16) Changes in Sleeping Pattern

- 0 I have not experienced any changes in my sleeping pattern.
- 1a I sleep somewhat more than usual.
- 1b I sleep somewhat less than usual.
- 2a I sleep a lot more than usual.
- 2b I sleep a lot less than usual.
- 3a I sleep most of the day.
- 3b I wake up 1-2 hours early and can't get back to sleep.

21) Loss of Interest in Sex

- 0 I have not noticed any recent change in my interest in sex.
- 1 I am less interested in sex than I used to be.
- 2 I am much less interested in sex now.
- 3 I have lost interest in sex completely.

17) Irritability

- 0 I am no more irritable than usual.
- 1 I am more irritable than usual.
- 2 I am much more irritable than usual.
- 3 I am irritable all the time.