POSITIVE EMOTIONS AND SEXUAL DESIRE AMONG HEALTHY WOMEN

by

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Dedication

This dissertation is dedicated to my Mom, Betty Brough and to my husband and best

friend, Paul Schnatz, without whom this work could not have been completed.

Importantly, this work is dedicated to the courageous women who participated in the

study and were willing to share their thoughts and feelings to advance the science of

positive psychology and sexuality among women.

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Abstract

Sexual desire disorders are highly prevalent, account for a significant proportion of sexual problems, and affect important aspects of women's lives. Sexuality research has traditionally focused on dysfunction models, rather than human strengths approaches. Recently, positive psychologists have developed models and methods to examine human strengths. This study used Frederickson's Broaden and Build model to examine links between positive emotions and sexual desire among women. Positive emotions words were examined relative to sexual domains frequently cited in clinical studies, and compared to sexual cognitions which have been linked to positive sexual outcomes in past studies.

One hundred sixty five women answered questionnaires sent via a secure online assessment and survey tool. Analysis revealed that (a) women use more positive than negative words to describe desire; (b) the frequency of using positive words related favorably to sexual desire; (c) positive emotion word use did not correlate with other measures of sexual satisfaction and functioning; and (d) women who used positive emotion words also expressed more positive sexual cognitions about the self. A clearer understanding of the role that positive emotions play in sexual desire using a positive psychology approach may provide a useful framework for researchers, educators, and clinicians who seek to develop successful strategies to help women increase sexual desire.

Chapter 1

Introduction

Sexual desire problems are reported to be the single largest sexual difficulty for women in national and worldwide studies (Laumann, Paik, & Rosen, 1999; Nicolosi et al., 2004). Desire problems are highly prevalent, more frequent among women than men and are influenced by both health and psychosocial factors (Basson, 2002, 2004; Dunn, Jordan, Croft, & Assendelft, 2002; Heiman, 2002; Oberg, Fugl-Meyer, & Fugl-Meyer, 2004; Simon, 2001). However, prevalence figures remain highly variable and must be interpreted with caution due to variable definitions, diagnostic labels and measures (Bancroft, Loftus, & Long, 2003). Yet, the prevalence of a problem is not sufficient to capture the psychological impact that a lack of sexual desire may have on a woman's life.

Sexual desire problems have been described as a serious cause for concern by women and are acknowledged by women's healthcare practitioners as one of the most common and distressing sexual complaints. Desire disorders are the most common sexual problems for women with reported ranges in prevalence of 8-39% in most nationally representative studies (Basson, 2004) and accounting for 30-50% of women who seek sexual therapy (Heiman & Meston, 1997). In the largest US population survey in recent years, researchers found that 43% of women had significant sexual complaints, including 33% with sexual desire difficulties (Laumann, Gagnon, Michael, & Michaels, 1994; Laumann et al., 1999). Moreover, nearly half of sexually active older adults report sexual problems with the lack of desire as the most common problem(43%) reported by

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women (Lindau et al., 2007). Similarly, in a large study of Swedish women (N=1056), sexual dysfunctions were commonly reported with sexual desire accounting for a low level of sexual well-being (Oberg et al., 2004). Moreover, in a large-scale treatment study, 65% of the 908 clients were diagnosed with hypoactive sexual desire (HSD), and within this diagnostic category, 81% (475) were women (Segraves & Segraves, 1991). Together, these studies suggest that in population and treatment studies, sexual desire disorders are highly prevalent, account for a significant proportion of sexual problems, and affect important aspects of women's sexual lives.

Obstetricians/ gynecologists who provide primary screening for women's sexual concerns tend to classify problems with sexual desire as sexual dysfunctions, defining them as psychophysiologic disturbances in desire and processes that characterize the sexual response cycle (ACOG, 1995; Baumeister, 1994). The American College of Obstetricians & Gynecologists (ACOG, 1995) reports that "…the physician's task is to reduce the patient's anxiety, gather information and treat or provide a referral" (p.268). Treatment includes "…identifying and modifying the emotions that inhibit appropriate responses and teaching the woman and her partner what types of physical and psychological behaviors are needed to augment their responsiveness" (p. 268). However, current research does not identify positive emotion links to sexual desire, thus making it difficult for clinicians to provide successful strategies to help women augment sexual desire.

Purpose

The purposes of this dissertation were to examine sexual desire from a positive psychology perspective, to explore the relationship between positive emotions and sexual

desire, to summarize current psychobiology and psychology research in women's sexual desire, and to make the case that using a positive psychology approach will result in a fuller understanding the experience of sexual desire among women. This positive psychology approach was used to form research questions, and to conduct an exploratory study designed to examine links between positive emotions and sexual desire among women.

After presenting a review of literature including an examination of the neurobiology of sexual desire, conceptual links between sexual desire and positive emotions research are explored. Important theoretical perspectives were examined, and questions were raised to examine the role of positive emotions in sexual desire. Finally, Fredrickson's Broaden and Build model of positive emotion (2004) and a clinical model of desire (Basson, 2000) are examined to provide organizing frameworks for the development of research questions. The purposes of the questions are to discover links between positive emotions and thoughts/feelings that women report when asked to describe sexual desire. The questions are designed to provide a first look at the role that positive emotions may play in the development of sexual desire among women.

Background

Sexual desire is commonly defined as a subjective psychological experience that includes interest in sexual activities (Regan & Berscheid, 1999) or as a wish or need to seek out sexual objects or engage in sexual activities (Bancroft, 1988; Kaplan, 1995). Researchers have posited that sexual desire can be thought of as an emotional response system (Levine, 1995) and may be more specifically examined in terms of positive emotions (DeLamater, 1991; Everaerd, 1988; Everaerd & Laan, 2001). While the study

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of emotional aspects of sexual desire has focused predominately on dampening effects of negative emotions such as anger and anxiety (Barlow, 1986; Beck, Bozman, & Qualtrough, 1991; Kaplan, 1995; van den Hout & Barlow, 2000) several research models suggest that positive affect (which includes emotions) may be likely to enhance women's desire to attend to sexual matters (Laan & Everaerd, 1995; Laan, Everaerd, van Bellan, & Hanewald, 1994; Mehrabian & Stanton-Mohr, 1985). These research efforts point toward the possibility that positive emotions may be linked to sexual desire in a favorable way.

Cultural, theoretical and methodological barriers have existed which have impeded progress in the study of sexual desire for women. For example, much more empirical work has been conducted to understand the psychophysiologic underpinnings of sexuality for men, but much less work exists for women (Bancroft et al., 2003). Furthermore, progress has been slow to describe important psychological variables linked to sexual desire for women. This may be due to few adequate models for studying desire (Everaerd & Laan, 2001), methodological problems (Beck, 1995) inadequate definitions (Basson, 2002, 2004), and the tendency to characterize women's sexual desire problems in dysfunctional rather than adaptational terms (Bancroft et al., 2003). More recently, challenges to thinking of the sexual response cycle in a linear way (thus defining sexual desire as preceding sexual arousal) rather than a cyclic feedback approach with overlapping phases (Basson, 2005, 2006; Basson et al., 2004) has led to recommendations to revise definitions of women's sexual desire disorders (see Figure 2.1).

While these lines of research suggest there are large gaps in our understanding of desire and emotions, no empirical work to date has specifically linked positive emotions to sexual outcomes for women. Sexuality research has traditionally focused on dysfunction models, rather than a human strengths approach. More recently, positive psychologists have developed models and empirical methods to examine human strengths. Positive emotions are not the absence of dysfunction but must be conceptualized and measured in unique ways. This dissertation is designed to examine such a model of positive emotion, including describing important relationships that positive emotions may play in defining and describing sexual desire. Changes in attitudes, appetitive behaviors and the propensity to engage in sexual activities will be examined in order to explore the role that positive emotions may play in sexual desire among women.

Significance of the Problem

The consequences of decreased sexual desire are of serious concern to those affected. Women with decreased sexual desire report serious psychological and interpersonal consequences including individual and relationship distress (Hurlbert, Apt, Hurlbert, & Pierce, 2000; Trudel, Ravart, & Aubin, 1996; Trudel, Ravart, & Matte, 1993). Hawton, Gath and Day (1994) suggested that sexual function includes not only procreation but also maintenance functions. These maintenance functions include preserving relationships, self-esteem, and mental and physical health. Clinical studies affirm that maintenance functions are affected including dissatisfaction with important dimensions of the self, decreased body image, and problems with gender roles (Schiavi, Karstaedt, Schreiner-Engel, & Mandeli, 1992). Other work suggests that decreased

desire has similar negative consequences for partners, resulting in overall increases in marital and partner dissatisfaction (Leiblum & Rosen, 1988b; Stuart, Hammond, & Pett, 1987).

Quality of life issues have been strongly associated with decreased sexual desire in women across the lifespan (Laumann et al., 2006; Laumann et al., 1999). In one representative clinical study, intimacy and quality of life variables were examined in women with (N=84) and without sexual dysfunctions (N=102) including women with low sexual desire (N=28) (McCabe, 1997). All quality of life and most intimacy measures were seriously hampered in women with low sexual desire compared to those without this problem. In a more recent study with a large sample (N=1,384) of women and men age 45 and older (DeLamater & Sill, 2005), researchers found that rating sex as important to one's self is significantly and positively related to sexual desire for women. Moreover, in a large cross-national study of women and men ages 40-80 years(Laumann et al., 2006) women reported decreases in sexual interest significantly affected sexual well-being and relationship satisfaction. Together, these studies suggest that decreased sexual desire has serious effects on women's quality of life and that these disruptions in sexual well-being may have serious consequences for their psychological and interpersonal lives.

Overall, these lines of research suggest that women value highly the quality of their sexual lives and have serious negative consequence when this quality of sexual life is impeded. Large national and cross-cultural studies support the notion that sexuality is a valued part of women's relationships which extends over the lifespan. Since women place high value and expectations on sexual well-being, the negative consequences of

sexual desire problems must be addressed. When psychological and interpersonal quality of life is affected, new approaches must be developed to more fully examine psychosocial factors that may affect problems of desire.

Theoretical and Research Model Challenges

A lack of research models and methodological issues has hampered the examination of sexual desire for women (Beck, 1995). Psychological interventions for desire problems have focused on resolving emotional or relationship problems, with the assumption that an improvement in desire will follow (Everaerd & Laan, 1995), however the results have been disappointing. Models of positive emotions have recently been explicated in positive psychology research and may provide important clues for examining sexual-motivation links. With this in mind, the review of literature will examine important roles of psychological characteristics of sexual desire, focusing on the role that positive emotions may play in understanding and ultimately promoting sexual desire for women.

Changes in desire over the lifespan have been difficult to interpret since sexual desire has not been defined specifically in many studies (Myers, 1995), has not been included in large scale epidemiological studies (Simon, 2001) and has been conceptually difficult to examine due to disagreements about definitions of characteristics and disorders of desire (Rosen & Leiblum, 1995).

Despite ongoing efforts to find interventions for decreased desire, there remain few controlled studies using psychological interventions and no pharmacologic interventions that have been found to be safe and effective for hypoactive sexual desire in women (Heiman, 2002). While efforts to find hormonal remedies for decreased sexual

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desire are ongoing, only testosterone has shown promise in both pre and post menopausal women, however, biochemical markers for normal testosterone levels remain elusive, and experts suggest more studies are needed before safety and efficacy can be assured (Davis, Guay, Shifren, & Mazer, 2004). Together, these challenges suggest that future study of this construct would benefit from a fuller examination of important psychological constructs and the use of more robust models to better develop intervention strategies.

Despite this identification of the importance of understanding emotions in order to adequately diagnose and treat sexual desire problems, clinicians have persisted in focusing on biological rather than psychological approaches. Though clinicians have identified the need for strategies that will help them "modify emotions" more work has focused on identifying pathology than strategies to strengthen desire. The Diagnostic and Statistical Manual of Mental Disorders (DSM–IV) (Association, 2000) classifies sexual desire disorders as having diagnostic features that include a lack of sexual thoughts (fantasies) or desire for sexual activity, personal distress, or interpersonal difficulty (p.539). It is beyond the scope of this work to critique in detail specifically when a problem ends and a diagnosis of disorder begins, however, in a recent review of clinical definitions, Basson (2006) concluded that treatment for sexual desire problems should be focused on strategies to help women alter maladaptive thoughts and enhance emotional closeness within the relationship rather than primarily focusing on physiology. However, since biology is important to consider, the next section briefly reviews biological factors that affect the sexual desire response system in women.

Chapter 2

Review of Literature

Psychobiology Approaches

Interest in understanding important psychobiological mechanisms that may affect sexual desire in women is growing, despite traditional biological approaches that have suffered from a lack of theoretical models (Abramson, 1990; Weis, 1998). Existing models may lack specificity for women, may fail to identify sexual desire as a part of sexual functioning (Kaplan, 1995) and many are based on research in males (Panksepp, 1998; Tiefer, 1991). Researchers admit that answers to basic questions about sexual desire are not well articulated, leaving an imprecise and weak framework from which to work (Heiman, 2001). Correspondingly operational definitions may lack specificity with the range of behaviors studied (Sbrocco, Weisberg, & Barlow, 1995), the timing of anticipatory versus consummatory behaviors (Leiblum, 1998; Leiblum & Rosen, 1988a), or may fail to identify multidimensional characteristics that more clearly define desire (Beck & Bozman, 1995; Leiblum & Rosen, 2000; Levine, 1995; Regan & Berscheid, 1999). In general, the lack of well articulated models along with problematic operational definitions has hampered the development of well articulated mechanisms needed to answer important questions about sexual desire in women.

Despite this, interest has grown remarkably in the neurobiology of sexual function and desire since the introduction of Sildenafil (Viagra) in the last decade (Goldstein et al.,

1998). The success in improving sexual function for men as well as the financial rewards has renewed research vigor in understanding sexual function in general (Jackson, Gillies, & Osterloh, 2005). Moreover it has resulted in more efforts to examine sexual problems and a search for "pink Viagra" for women (Agmo, Turi, Ellingsen, & Kaspersen, 2004; Wyllie, 2005).

Biological research has focused predominately on three research methods: (a) animal studies, (b) human sexual response studies, and (c) clinical reports of dysfunctions and interventions including drug studies (Meston, 2000). Animal studies have sought to demonstrate features of sexual desire through behavior (Panksepp, 1998; Pfaff, 1999; Wallen, 1990). However, researchers admit that a clear animal model which captures desire for women does not yet exist (Panksepp, 1998). Human sexual response studies of desire in women are most often studied using vaginal photoplethysmography in which a light source is introduced into the vagina and measures increases in blood flow during stimulation testing. Findings often are compared with subjective reports of arousal. In women, there are low correlations with subjective and physiologic measures (Meston & Gorzalka, 1996) suggesting that external stimulus information may play more of a role in the estimation of arousal. Studies of clinical dysfunctions have continued to report mixed results due to definition and measurement problems along with the co-occurrence of other sexual disorders (Beck, 1995). Women's responses to drugs have resulted in a number of studies which may provide indirect links to the mechanisms important to sexual desire (Meston, 2000; Meston & Frohlic, 2000).

Neurophysiology mechanisms of structure and function

Large gaps remain in our understanding of the neurophysiology of female sexual function. Much of what is known is taken from animal studies and from studies in males (McKenna, 2002). Traditionally the lordosis reflex has been used as a proxy for sexual desire in female rats (Pfaus, 1999a). More recently, researchers have suggested that attention must shift from a reflex model to one that captures more complex behavior in order for research to progress (Agmo et al., 2004).

Sexual arousal is the result of spinal reflexive systems which are under the control of the brainstem and hypothalamus. Neurotransmitters and neuropeptides are important to the process of vaginal blood flow and clitoral tumescence. For example, nitric oxide is thought to contribute to clitoral vasocongestion (it does in men) and vasoactive intestinal polypeptide (VIP) mediates vaginal lubrication and blood flow (McKenna, 2002). Important mechanisms that may affect sexual desire itself are less well known. Serotonin has been implicated in problems with sexual desire; however the mechanism by which it does this is not yet known (Meston & Frohlic, 2000). Dopamine has been shown to increase sexual desire in males and animal studies; and dopaminergic activity is thought to modulate desire in women. Selective dopamine depletion results in decreased appetitive responses (hopping, darting, and ear-wiggling) in female rats (Ikemoto & Panksepp, 1999). Recently, a small study using a dopamine reuptake inhibitor (bupropion) demonstrated an improvement in sexual desire in women with hypoactive sexual desire disorder (HSDD) (Segraves, Clayton, Croft, Wolf, & Warnock, 2004). More studies are needed to clarify these important mechanisms, however recent work suggests the dopaminergic system as an important possibility.

Neuroendocrine mechanisms

Endocrine functions, including the mechanisms of endogenous and exogenous hormones have, by far, received the most attention relative to sexual desire (Crenshaw & Goldberg, 1996; Meston & Frohlic, 2000; Regan, 1999; Schiavi & Segraves, 1995). However, with recent advances in the treatment of male sexual problems (the advent of vasoactive medications such as Sildenafil), negative sexual side effects of antidepressant drugs, and the identification of concerns related to hormonal changes over the life course, research has been increasingly devoted to discovering neurobiological mechanisms for sexual desire in women.

A major focus of research in the neurobiology of women's sexual health has included the examination of hormones and their effects (Bancroft, 2002a). Women's studies specific to desire have centered on variations in endogenous hormone production such as during the menstrual cycle (Dennerstein, Smith, Morse, & Burger, 1994) and the situational use of exogenous hormones including oral contraceptives (Bancroft, Sherwin, Alexander, Davidson, & Walker, 1991a, 1991b)and hormone replacement therapy at menopause (Bachmann & Leiblum, 2004). Studies of desire when endogenous hormone production changes are by far the most frequent, with examinations before, during and after natural menopause (Avis, Stellato, Crawford, Johannes, & Longcope, 2000; Davis et al., 2004; Segraves et al., 2004), and after surgical procedures that interfere with hormone production (Galyer, Conaglen, Hare, & Conaglen, 1999; Shifren et al., 2000; Simon et al., 2005). The most frequently discussed sex steroids thought to affect sexual desire are estrogen, progesterone (or estrogen/progestin therapy) and testosterone. Other hormones thought to be involved in sexual desire such as progesterone, prolactin, and oxytocin will

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not be covered in detail here, as results remain mixed with regard to effects on sexual

desire (for a review see Meston & Frohlich, 2000).

In a recent international consensus panel opinion, experts reviewed literature on

the endocrine aspects of female sexual function and found no evidence for the use of

estrogen/progestin therapy for the treatment of sexual desire disorders (Davis et al.,

2004). However, the effects of testosterone are less clear (Davis, Davison, Donath, &

Bell, 2005). The effects of sex steroids on the sexual system are multifaceted, and may

indirectly affect a woman's sexual health while not directly stimulating sexual desire. For

example, sex steroid insufficiency, specifically estrogen, is associated with urogenital

atrophy in which women have pain with sex. Urogenital atrophy is characterized by

vaginal and urinary changes which may result in symptoms including vaginal dryness,

pruritis, dyspareunia, or incontinence (Cardozo, Bachmann, McClish, Fonda, &

Birgerson, 1998). Effective treatments include estrogen (either systemically or vaginally)

or vaginal moisturizers (which improve dryness but not other symptoms). In a meta-

analysis of the effects of estrogen on urogenital atrophy, estrogen remained the most

effective treatment (Cardozo et al., 1998). However, some clinicians and women have

concerns with the systemic administration of estrogen after the WHI (Women's Health

Initiative) results suggested negative cardiovascular and breast cancer risks. Alternatives

to estrogens, SERMs (selective estrogen receptor modulators) have been studied to

improve urogenital symptoms with disappointing results. In a double-blind placebo-

controlled trial, Raloxifene and Tamoxifen (both SERMs) did not improve urogenital

tissue symptoms while estrogen did (Vardy et al., 2003). Thus, for genital functioning,

estrogen plays an important role in preventing symptoms that may interfere with sexual

comfort and activities. Together these results suggest that for estrogen, there is currently no evidence that therapy improves sexual desire in pre or post menopausal women (Davis et al., 2004). However, estrogen given locally or systemically improves vaginal atrophy (Cardozo et al., 1998; Coope, 1996) by improving elasticity and lubrication resulting in less pain and discomfort during sexual activities (Basson, 2007). Ongoing research focuses on the effects of oral estrogen which may reduce desire in women with low testosterone levels through the reduction of steroid hormone binding globulin (SHBG)(Bancroft, 2002a).

Extensive research suggests a relationship between androgens and sexual desire and more recently pharmaceutical companies and clinicians have shown interest in their use to treat problems with desire (for a recent summary see Basson, 2007). However in a recent systematic review, important problems with diagnosis, monitoring and safety have emerged. As a result, recommendations do not support the routine use of testosterone for women due to the lack of empirical evidence for clear indications for use, effective laboratory studies, and evidence of long-term safety (Wierman et al., 2006).

Early work focused on observed changes in the menstrual cycle, aging, and frequency of sexual behavior as markers for the links between testosterone and sexual behavior (Morrell, Dixen, Carter, & Davidson, 1984; Morris, Udry, Khan-Dawood, & Dawood, 1987; Persky et al., 1982; Persky, Lief, Strauss, Miller, & O'Brien, 1978; Schreiner-Engel, Schiavi, Smith, & White, 1981). As the neurophysiologic mechanisms of some sex hormones have become clearer over time, the ability to monitor testosterone remains elusive (Davis et al., 2004; Wierman et al., 2006). Empirical investigations into the hormonal regulation of a woman's experience of desire have proceeded with few

clear conclusions (Regan, 1999; Schiavi & Segraves, 1995) and without a clear understanding of important sexual-emotional motivation variables that also may play important roles (Panksepp, 1998; Wierman et al., 2006).

Psychopharmacology

Despite increasing interest in drug studies, there remains no currently available medication that is effective or approved for female sexual desire disorders (Heiman et al., 2004; Segraves, 2003a). Research related to a variety of drug effects on desire has helped to uncover a fuller understanding of previously unknown sexual mechanisms, predominately hormone studies (Davis et al., 2004) and more recently, mechanisms related to neurotransmitters (McKenna, 2002; Panksepp, 1998), antidepressants (Segraves et al., 2004) and vasoactive drugs (Meston & Frohlic, 2000; Segraves, 2002). While most researchers acknowledge that gender differences exist within biochemical and hormonal physiologic mechanisms thought to effect sexual desire, specific mechanisms that regulate sexual desire remain little understood (Crenshaw & Goldberg, 1996; Meston & Frohlic, 2000; Segraves, 2002). In spite of increased attention, important conceptual issues that stand as barriers include defining important neurochemical mechanisms, finding suitable animal models, and finding physical markers for sexual desire in women in order for research to advance.

Antidepressants and antihypertensive medications have been responsible for serious problems with sexual function in both women and men (Pfaus, 1999b). The selective serotonin reuptake inhibitors (SSRI's) produce negative sexual side effects for women including problems with desire; however the mechanisms are poorly understood. In recent studies, the role of peripheral serotonergic responses has been examined relative

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to tactile responses for women (Frohlich & Meston, 2005). Another recent study demonstrated that level of sexual desire affects an acoustic startle response (ASR) (Giargiari, Mahaffey, Craighead, & Hutchison, 2005). Thus new measures may be effective in examining important physiologic mechanisms of desire.

Summary of Psychobiology

Empirical efforts to examine biologically important characteristics of variability have been problematic since sexual desire is a multidimensional construct that is both difficult to define and situated within cultural and social systems that are not clearly understood (Bancroft, 2002b; DeLamater, 2002; Pfaff, 1999; Pfaus, 1999a, 1999b). Similarly, biological research is hampered by methodological issues defining attitudes and behaviors that are most characteristic of desire, disentangling issues of definitional overlap with other sexual experiences, and problems differentiating respondents' reliance on various conscious cues in defining the experience of sexual desire in women (Beck et al., 1991; Panksepp, 1998; Regan & Berscheid, 1999; Tiefer, 1991; Tiefer & Kring, 1995). However, newer research into the roles of central nervous system neurotransmitters such as dopamine, and new research models such as tactile stimulation and acoustic response may more clearly target a better understanding of sexual desire mechanisms in women (Frohlich & Meston, 2005; Giargiari et al., 2005).

Sexual research which has examined emotions has focused predominately on biomedical models, with only a few researchers using cognitive or emotion-based models to examine desire [but see (Andersen & Cyranowski, 1995; Both, Spiering, Everaerd, & Laan, 2004; Cardozo et al., 1998; Everaerd & Laan, 1995; Laan, Everaerd, van der Velde, & Geer, 1995) for exceptions]. Since few sexual studies examine emotions and an

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overwhelming number focus on biomedical models, a significant gap exists in understanding important links to emotional dimensions of sexual desire for women.

Psychological Approaches to Research in Sexual Desire

Challenges and Opportunities for Positive Psychology Research

Attention to the dampening effects of negative emotions on sexual desire rather than possible positive effects that increasing positive emotions may have on healthy sexual functioning leaves serious gaps in our knowledge and deserves further exploration. Research which has identified emotional links to sexual desire among women has focused predominately on the effects of negative emotions on decreasing sexual desire. While researchers have postulated that negative emotions impede sexual desire, evidence for the role of positive emotions in sexual desire has not been articulated.

While specific characteristics of emotions that may be related to sexual desire are missing from current research, there is growing empirical evidence that emotional, relational and contextual components may be critical to understanding sexual functioning and desire in women (Basson, 2000). Thus, a clearer examination of important features of emotions that function to regulate sexual attitudes, responses, and behaviors is essential to understanding the nature of sexual desire for women. Sex researchers suggest that sexual desire is best construed as a multidimensional construct with important emotional underpinnings (Basson, 2004; Beck, 1995; Leiblum, 1988), however, to date; the realm of positive emotions has gone unnoticed by researchers.

Newer approaches in positive psychology suggest that understanding human strengths and possible links to health are important avenues of ongoing research. For example, researchers have found that an optimistic explanatory style predicts good

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health (Peterson, 2000). Moreover, findings suggest that optimistic attitudes protect against diverse health problems such as progression of atherosclerosis (Matthews, Raikkonen, Sutton-Tyrrell, & Kuller, 2004), recovery from surgery and radiation therapy (Ai, Peterson, Bolling, & Rodgers, 2006; Ai, Peterson, Tice, Bolling, & Koenig, 2004) and positive adjustment during pregnancy (Johnson, 1996). However these same approaches have not yet been applied to sexual constructs (Peterson, 2006).

Examining ways that emotions may interact with health-related phenomena is consistent with nurses' tradition of using evidence from a variety of sources to support the development of useful theories and interventions for patient care. Nurse researchers have recognized the importance of identifying emotional strengths and resources that individuals use to cope with health-related problems. Examples from nursing research include using human relatedness to examine psychological health and as a preventive factor for depression (Hagerty, Lynch-Sauer, Patusky, & Bouwsema, 1993; Hagerty, Williams, Coyne, & Early, 1996) or using preparatory sensory information interventions prior to stressful procedures (Christman, Kirchoff, & Oakley, 1999). Nurses need a variety of strategies that permit them to effectively intervene as they provide care in fast-paced acute or primary care settings. Strategies are needed that support patients' emotional strengths and prevent problems using the individual's own psychological resources while using theory-driven interventions (Hagerty & Patusky, 2003).

Current sexuality research has failed to fully examine important links to emotions and specifically positive emotions when studying sexual desire for women. This review seeks to find clues from psychology and sexuality research in order examine the most important variables and associations which deserve closer scrutiny. Dimensions to be

explored include whether positive emotions are likely to be associated with desire, and what the effects of positive emotions may be. Theoretical models will also be identified which may suggest ways that positive emotions might be related to sexual desire for women. New theoretical approaches for studying health-related phenomena using a positive psychology approach and applying rigorous methodologies are currently in use in psychology (Seligman, Steen, Park, & Peterson, 2005) and may help address the current knowledge gaps in sexual science. Understanding the role that positive emotions may play in improving sexual desire for women may lead to the development of useful strategies for both preventing problems and promoting strengths to enhance sexual wellbeing.

Defining Emotions

Emotions are generally considered to be responses to events which include domains of subjective, behavioral and physiologic experiences or reactions (Frijda, 1999, p. 191). These domains may be connected or only loosely connected, resulting in differing definitions depending upon the criteria used to judge what and when an emotion has taken place. As a result, emotions researchers do not have a single widely accepted definition of what constitutes an emotion. Definitions range from those which specify an emotion as a single or unique event as a response to a stimulus, to those that favor broad dimensional approaches (Frijda, 1999; Larsen & Fredrickson, 1999; Turner & Ortony, 1992) which conveys a predisposition to respond in predictable ways. Emotional models vary in structure, the importance given to various characteristics, and the proposed purpose of emotions. Moreover, theoretical models range in level of specificity from those which include a small number of specific emotions such as basic emotions

approaches (Ekman & Davidson, 1994; Izard, 1994; Ortony & Turner, 1990) to dimensional approaches in which emotions covary along a small number of dimensions (Russell, 1980; Watson, Watson, & Tellegen, 1985) and may include hierarchical appraisal models in which different levels of emotion exist in order to prepare the individual for something (Diener & Lucas, 1999; Tellegen, Watson, & Clark, 1999)such as taking action, or fleeing or withdrawing from a threat.

Attention to which specific criteria or components are considered most characteristic of an emotion also varies in affective research. For example, Frijda (1999) suggests that emotions are responses to significant events which consist of one or more components including subjective experience, behavior, and physiological reaction which may not always be connected nor co-occur (p. 191). However, Cabanac (2002) suggests that emotion is any mental experience that includes high intensity and hedonic content. Fredrickson (Fredrickson, 2001) suggests that despite ongoing debate (Diener, 1999; Ekman, 1999) a consensus is emerging among researchers that emotions are multicomponent response tendencies which unfold over a relatively short time span and fall into a larger category of affective phenomena.

Emotion theorists suggest that an emotion starts with an appraisal of whether the event is meaningful personally, and includes affect (the hedonic qualities or experience of pleasure or pain); an appraisal (the summary judgment that something is good or bad); action readiness (preparing the individual for changes within the environment) and may contain or result in autonomic arousal, though not always, and cognitive changes including attention shifts (Frijda, 1999; Lazarus, 1991). Appraisals need not be conscious to the individual. For example, Leventhal and Scherer (1987) proposed that

stimuli can be evaluated depending on different levels of processing. For example, an emotion such as fear is likely to be processed quickly in an automatic fashion at the sensory-motor level. Other stimuli may be evaluated using a checking system which increases the levels of processing to the schematic or learned pattern level or at the cognitive or recall level. According to this model, stimuli are evaluated at various levels based upon checking criteria such as novelty, pleasantness, current goals, coping potential, and compatibility with self norms. In another appraisal model, emotions are elicited by what Frijda (1986) calls constellations of events that are relevant to an individual's concerns and the resulting emotion that occurs when there is a match or a mismatch between the events and the individual's concerns. Frijda (1986) suggests that emotional experience can take three major forms which include an awareness of the situation and its meaning structure, autonomic arousal, and action readiness. According to this view, a full constellation of an emotional experience is made up of these three forms (or modes) plus a hedonic (good/bad) quality and the significance of the event to the person (Frijda, 1986, p. 193). The advantage of this and other appraisal views are that events alone may not be sufficient to elicit an emotion but rather the way a person evaluates the event, based on a number of individual differences such as personality and specific goals which are matched to particular concerns. In the case of desire, this view would allow for a variety of ways that people could appraise the possibility of engaging in sexual activities.

Purpose of Emotions

In general, emotions serve the purpose of getting one's attention; helping to decide if something is meaningful, whether the meaning is good or bad; and to prepare

the person to take some sort of action based on the summary judgment (Frijda, 1999).

Emotions researchers and theorists suggest that important functions of emotions include: (a) recognizing when a motivationally relevant event has occurred, and whether it is good or bad; (b) activating, deactivating, or inhibiting behavior; (c) motivating and activating classes of behavior such as desire which may take advantage of a satisfying situation, Frijda includes desire as an emotion; and (d) resetting priorities and re-evaluation of resource allocation after relevant events such as when the situation does not fit with current goals (Frijda, 1999).

Some effects of emotions include hedonic effects including the avoidance of pain, and the motivation toward pleasure (Cabanac, 2002). Similarly emotions are thought to be relational and shape and regulate our social relationships with others including how we appear to others, whether others wish to join or avoid us in our emotional experiences, and affect the content and direction of our relations with others (Frijda, 1999; Gonzaga, Turner, Keltner, Campos, & Altemus, 2006). Emotions differ from moods which are thought to be free floating, while emotions are about something or some circumstance which is personally meaningful (Fredrickson, 2001). Moreover, emotions differ from affective traits which include the propensity to experience certain types of emotion, thus existing at different levels of analysis (Rosenberg, 1998).

Factors which may encourage or impede one's ability to regulate emotional responses are equally important to understand. Research in humans and animals suggests broad variability in affective style, which includes individual differences in emotional reactivity and regulation. Davidson, Jackson & Kalin (2000) suggest that it is difficult to see where an emotion stops and emotional regulation begins. Emotional regulation refers

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to processes which may enhance, suppress, or maintain an emotional response (Davidson, 2001). Thus, knowing important characteristics in emotions which may be displayed in the affective style of individuals may allow interventions to be designed that strengthen the quality and intensity of positive and ameliorate negative emotional reactions. The potential for regulating and changing ones' responses when necessary would be a useful tool for clinicians.

Empirical work examining emotions has focused on negative emotions, in large part since researchers and clinicians have used a disease model of human functioning (Seligman, 2002) to solve serious emotional problems and concerns in clinical populations. However with the shift in focus from treating illness to prevention, empirical work is shifting to examine strengths and the positive side of emotions including positive subjective experiences, positive individual traits, and positive organizations and institutions (Peterson, 2006). While it is beyond the scope of this paper to trace the breadth of literature emerging in positive psychology, models which pertain to studies of emotion in sexual desire for women are examined on page 33 after a brief summary of positive emotions research.

Positive Emotions

Most emotions research has focused on negative emotions, thus more is known about the negative effects of emotions. More recently, social psychologists have called for a more balanced approach that would include a clearer understanding of positive emotions and adaptive and strengthening effects that positive emotions may offer individuals who cope with adversity and who also flourish in daily life. Research on positive emotions grew from the observations that animals subjected to uncontrollable

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aversive events later failed to avoid the negative event even if they could have (Seligman & Maier, 1967). The "learned helplessness" phenomenon or helplessness after lack of control was first observed with animals that were exposed to uncontrollable situations (Maier & Seligman, 1976). When animals were exposed to situations that they could control and still did not jump to safety, researchers were stimulated to further examine persistence and resilience effects with animals and later humans. These experiments suggested that both persistence and optimism along with helplessness are adaptive strategies such that when control is possible, persistence and optimism are good strategies, while when events are uncontrollable, ceasing attempts at control or escape may be more useful. This work has helped psychologists further examine adaptations in humans and develop a model of explanatory style which suggests individuals have a propensity to explain events in optimistic or pessimistic ways (Peterson, 1993). However, this work does not merely focus on accentuating positive moods to relieve suffering, but rather as Peterson & Steen (2002, p. 252) point out, this work has important implications for outcome measures since measuring degrees of pathology is not the same as measuring wellbeing. In one study, optimistic explanatory style was correlated with good mood, but pessimism was not linked to mood (Peterson, 2000; Peterson & Steen, 2002). Thus, interventions designed to improve wellbeing must be evaluated based on measuring positive emotions rather than using negative emotion models. Explanatory style may be measured using self report measures such as the attributional style questionnaire (ASQ) (Peterson, Peterson, & Bossio, 1991) or with a content analysis approach using the Content Analysis of Verbatim Explanations (CAVE) (Peterson, Schulman, Castellon, & Seligman, 1992). This important work has led the way for a

more specific examination of what positive emotions are and possible mechanisms by which they may function to produce beneficial outcomes.

What are positive emotions and why may they be different? Researchers suggest that the form and function of positive emotions are unique and thus different from those seen in negative emotion. Positive emotions support coping and buffer against stress, even in very difficult circumstances (Folkman & Moskowitz, 2000). For example, Folkman (Folkman, 1997) found that coping improved with the search for positive meaning during care giving and bereavement (Folkman, 1997). Moreover, positive emotions have positive health effects (Rasmussen, Wrosch, Scheier, & Carver, 2006), provide undoing effects of cardioreactivity after negative emotions (Fredrickson, 1998a) and may foster resilience and coping (Tugade, Fredrickson, & Barrett, 2004). Another important function of positive emotions is their effects in social settings. Studies suggest that positive emotions lead to creative thinking and more flexible and successful problem-solving (Ashby, Isen, & Turken, 1999; Isen, 2002).

Along with understanding why positive emotions and the larger class of positive affects are different from other emotions include why they may exist. Positive emotions help people adapt and widen attention. Theorists suggest that positive emotions work to influence not only momentary responses, but facilitate longer-term motivation and goal seeking behavior such as approach behavior (Cacioppo & Gardner, 1999) and continued engagement (Carver & Scheier, 1990). Negative emotions are designed to narrow one's focus (as in fight or flight for fear) and thus, a narrowed action tendency is often characteristic. Fredrickson (2000) offers a model which suggests that positive emotions may be characterized as less focused on urging one specific action. This broaden-and-

build model of positive emotion proposes that positive emotions lead to broader action tendencies in which a wider array of thoughts and actions come to mind (Fredrickson, 2001; Fredrickson, 2004). These positive emotions are thought to support creative thinking, exhibit undoing of effects of negative emotions, and have an upward spiral effect which may over time help individuals deal with adversity by building psychological resiliency (Fredrickson, 2000).

Emotions and Sexual Desire

Early work by Hardy (1964) suggested that pleasure associated with genital stimulation serves as an affective base for developing sexual motivation and when relevant cues are presented, leads to sexual desire. In one model focused expressly on understanding psychological mechanisms that contribute to decreased sexual desire, Kaplan conceptualized desire as an emotional-motivational construct (Kaplan, 1977, 1995). In this model, sexual desire is "turned off" by negative emotions. Further, anxiety has been implicated in producing negative emotions, which directly affects sexual desire mechanisms. Barlow (1986) has suggested that affect plays an important role in understanding sexual function. His cognitive-affect model was developed from studies that found that sexually dysfunctional men had more negative affect than those without these sexual problems, and that this leads to significantly different behaviors in response to sexual stimulation. However links from negative emotions to sexual desire appear to function somewhat differently in women than in men with empirical studies providing mixed results (Wiegel, Scepkowski, & Barlow, 2006).

While there is a lack of knowledge regarding specific mechanisms by which emotions related to sexual desire in women may function, there is growing empirical

evidence that emotional/relational components are crucial to understanding sexual functioning and desire in women (Berman, Berman, & Goldstein, 1999). Research which examines emotions in relation to a woman's sexual desire is limited, and to date, no positive psychological models exist. However, a number of empirical studies suggest that important associations may exist between positive emotions and sexual desire for women (Heiman, 2001; Laan et al., 1994). Some come predominately from cognitive frameworks including incentive motivation models and cognitive schema models. Incentive motivation theories suggest that approach behavior is activated by appropriate incentives (Agmo et al., 2004; Andersen & Cyranowski, 1995; Singer & Toates, 1987). Relevant cognitive models include women's sexual self-schema theory which suggests that individuals develop cognitive structures or schemas that include self-relevant information to guide sexually relevant emotions and behavior (Andersen & Cyranowski, 1994). Emotional appraisal models have also been used to examine women's responses to sexual stimuli. An underlying assumption of this work is that affective and cognitive processes play a mediating role in regulating responses from genital and subjective arousal to sexual behavior (Everaerd & Laan, 1995; Singer & Toates, 1987).

Critique of Current Emotions Research

A review which seeks to link positive emotions to desire requires a brief critique of current studies focused on negative emotions and their dampening effects on sexual desire. Problems with previous work includes failure to describe the amount and frequency and timing of the emotion, failure to use female comparison models, and sorting out which emotions may be important since desire and arousal often co-occur with women (Everaerd, Laan, Both, & van Der Velde, 2000). For example, much work

that has identified important emotional variables for men has been extrapolated for women and has been used to inform research examining the role of negative mood on sexual desire disorders. This leaves out affect changes related to the menstrual cycle or menopause. Many studies converge to suggest that emotions, particularly negative moods may have negative effects on sexual desire (Althof et al., 2005). Since sex researchers and therapists have traditionally suggested that negative emotions play a key role in understanding sexual dysfunctions, this traditional approach will be briefly described.

Negative Emotions and Sexual Desire

Since the seminal work of Masters and Johnson (1970) and Helen Kaplan (1977), the inhibitory effects of negative emotions have served as a basis for therapy for both women and men. This has resulted in widely held beliefs among clinicians and researchers that negative emotions drive sexual dysfunctions. Unfortunately, these approaches have failed to provide the success that was anticipated in therapy (O'Donohue, Dopke, & Swingen, 1997) and empirical evidence has failed to consistently support the notion. For example, anxiety has been thought to play a seminal role in interfering with sexual function in psychodynamic theories (Kaplan, 1977, 1995; Masters & Johnson, 1970) however; more recent studies have not supported this view (Althof et al., 2005).

Scrutiny of negative emotional variables has been instructive in helping researchers understand sexual desire problems in men (Barlow, 1986), however similar links have not been consistently seen with women. Depression has been identified as both an antecedent and a consequence of decreased sexual desire (Schiavi et al., 1992).

However, Frohlich and Meston (2002) found that women with greater depressive symptoms reported higher levels of desire. Both anger and anxiety have been found to significantly reduce sexual desire in women, with anger showing a clear negative effect (Beck & Bozman, 1995) while anxiety has much less straightforward effects (Althof et al., 2005).

Negative emotions and conditions related to negative moods, especially anxiety and depression have been found to reduce sexual desire for women; however results are inconsistent (Clayton, McGarvey, Clavet, & Piazza, 1997; Cyranowski et al., 2004; Meston & Frohlic, 2000; Trudel, Landry, & Larose, 1997). In a non-clinical sample of women ages 19-35 years (N=48), anxiety and the effects of distraction were examined with mixed results. Anxiety did not decrease arousal; however an anxiety by distraction interaction emerged when women were asked about their arousal (Elliott & O'Donohue, 1997). In a recent review of experimental evidence, van den Hout and Barlow (2000) suggest that mechanisms involved with attention, biased expectancies and interpretation of response information may be likely candidates for explaining differences seen in sexually functional and dysfunctional individuals.

The presumption that removing negative emotions will necessarily result in positive sexual outcomes has resulted in an enduring implicit bias in sexual dysfunction research. However, Everaerd (1995) rejects the notion that reducing problems that lead to sexual dysfunction will necessarily result in healthy sexual functioning (Everaerd & Laan, 1995). The preponderance of studies have focused on individuals with sexual dysfunctions, yielded mixed results with regard to negative emotion effects on sexual desire for women, and presumed that taking away problems known to dampen sexual

desire will necessarily lead to positive sexual function. Together, the lack of research with women and inconsistent findings using a negative emotions approach to sexual dysfunctions suggests that a closer look at positive emotions and links to healthy sexual desire is warranted.

Opportunity to Link Positive Emotions to Sexual Desire

Little is known about the contribution of positive emotions to sexual desire, though researchers recognize the complex and important roles that psychological variables play. In an early attempt to examine a pleasure-arousal hypothesis Mehrabian and Stanton-Mohr (1985) explored the effects of emotional states on sexual desire and found that pleasant, unaroused states were more likely to produce desire while negative aroused states (such as anger) were linked to individuals with sexual problems. Despite these favorable findings, several problems exist with the study including the mood induction technique in which participants were asked to imagine a situation, and serious problems with defining desire and sexual dysfunction in non-standardized ways.

Even when negative emotional responses that may occur during sexual activities are studied, positive emotions have been seen. A recent Portuguese study (Nobre & Pinto-Gouveia, 2006) assessing emotional reactions to a list of thoughts that individuals might have during sexual activity was designed to describe negative emotions to sexual dysfunctions. While findings did support links to negative feelings of sadness, worry and fear, the largest contribution to group differences were related to pleasure and satisfaction. In two Canadian studies, specific content of sexual cognitions and the effects of positive and negative appraisals were tested with women and men. Women who had positive moods prior to the rating period experienced positive sexually-related

cognitions, more attraction, and these moods also extended to positive self feelings afterwards (Little & Byers, 2000; Renaud & Byers, 1999). Together these studies converge to suggest that positive emotions may be linked to sexual thoughts imagined and remembered. Moreover, studies designed to find links to sexual dysfunctions and negative emotions reveal that positive evaluations of sexual experience such as pleasure and satisfaction coexist and are important thoughts reported by women during sexual encounters.

Several studies from a cognitive perspective suggest that positive sexual self-schemas may play a role in improving women's propensity to behave sexually and have more openness and flexibility for processing sexual information (Andersen & Cyranowski, 1994, 1995; Basson et al., 2000; Cyranowski & Andersen, 1998). In this series of studies, women's sexual self-schemas or cognitive scripts for behaving sexually were measured using a trait-adjective technique which is unobtrusive to the participants. Factor analysis and subsequent testing divided women sexual self-schemas into three schemas; two positive schemas which positively influenced not only behaviors but also self reported arousal; and one negative aspect which was a deterrent to sexual behavior. In another study, positive sexual self-schemas predicted sexual responsiveness and return to sexual activities more quickly after gynecologic cancer and radiation therapy (Andersen, Woods, & Copeland, 1997). While this series of studies identified positive characteristics which enhance women's sexual attitudes, response and behaviors, the focus was on understanding cognitive schematic processes and the propensity for sexual problems. Moreover, the focus on the role of schematic processing of sexual information while intriguing did not lead these authors to analyze more specifically the role that

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positive emotions may have played to achieve beneficial effects for women with positive sexual self-schemas.

Recently, researchers from New Zealand have focused on information processing approaches and suggested the detection of sexual cues requires an individual must pay attention to the stimulus, appraise it, process the information, and decide whether or not to respond (Conaglen & Evans, 2006). In another line of studies using information processing models, researchers specifically defined sexual desire as an emotion (Everaerd, 1988; Everaerd & Laan, 1995), and suggested that emotional appraisals of sexual stimuli are important (Everaerd, 1995). However, these same researchers used a physiologic arousal model to examine ways that the sexual response system could be stimulated in order to define important response tendencies and links to subjective sexual experiences. Results showed that laboratory-induced sexual arousal generates approach tendencies and sexual behavior outside of the laboratory (Both et al., 2004) and appetitive sexual films stimulate the Achilles tendon (T) reflex which is modulated by emotional arousal (Both, Boxtel, Stekelenburg, Everaerd, & Laan, 2005). Other studies showed that female-produced erotica resulted in positive women's sexual responses which were linked to positive affect (Laan et al., 1994). An important finding in studies on performance demand and subjective arousal led these researchers to identify the lack of association between subjective and genital arousal in women (Laan & Everaerd, 1995). Along with other physiologic measures such as skin conductance these authors (Laan, Everaerd, van Aanhold, & Rebel, 1993) found that physiologic arousal alone is often not a strong enough cue to alert women that desire is present. Thus, these authors concluded that even in the presence of genital arousal, if the appropriate emotion is not attributed by

the woman as sexual, the situation may not be experienced that way (Laan & Everaerd, 1995; Laan, Everaerd, & Evers, 1995). In another study, these researchers found that women responded with more positive affect, less negative affect, and more subjective excitement to woman-made (versus man-made) erotic films (Laan et al., 1994). These studies suggest that emotions are important as women appraise sexual stimuli and that the emotions must be appraised as sexual in nature for women to allow them to be experienced as sexual. However, this series of studies has one limitation in not separating sexual desire from arousal. This may be due to the overlapping nature of arousal and desire. Never-the-less, findings that positive arousal may be linked to positive emotions provides clues that not only emotion, but positive emotions are likely candidates to clarify our understanding of sexual desire and subsequent sexual response.

While these lines of research are strongly suggestive that positive emotions may be linked to positive sexual outcomes for women, including positive changes in attitudes, appetitive behaviors and the propensity to engage in sexual activities they do not go far enough to describe important relationships that positive emotions may have with sexual desire nor do they define desire in the same manner.

Specific Positive Emotions Which May be Linked to Sexual Desire

If positive emotions are linked to sexual desire, which emotions are the most likely candidates? Though love may be thought of as linked directly to sexual desire, in fact, research has not borne this connection out. Many emotions theorists do not include love in a list of emotions; however most agree that love is related to the attachment system (Shaver, Morgan, & Wu, 1996). Diamond and Aspinwall (2004; 2003) define romantic love as the motivational state associated with feelings of attachment, and sexual

desire as a need to seek out sexual objects or engage in sexual activities (2004, p.116).

However, love and desire may be functionally independent systems. For example, Fisher

(2002) suggests that love and desire may be seen as biologically different and having

different goals. They have distinct neural systems that can and often do function

independently (Fisher, Aron, Mashek, Li, & Brown, 2002). Desire is most associated

with different neurochemicals (estrogen and androgens predominately) and is

characterized by craving for sexual gratification and behaviors designed to seek sex with

any appropriate member of the species while love is more closely associated with

attraction and attachment systems (Fisher et al., 2002). In a recent study of sexual desire

and romantic love, researchers found that romantic partners' momentary experience of

love during a brief interaction was related to distinct non-verbal displays and differences

in relationship commitment. Desire was more related to arousal emotions, sexual

satisfaction and related to less relationship commitment (Gonzaga et al., 2006). Thus,

recent research points to love as a less likely candidate as strongly connected to sexual

desire.

Given that research links desire to arousal types of emotions, perhaps interest or

joy as positive emotions might be closely connected to desire. Joy is characterized as an

excited type of appetitive emotion (Frijda, 1986) with feelings such as wanting to jump

up and down, smiling, and wanting the experience to last longer (Roseman, Roseman, &

Evdokas, 2004). In a recent series of studies aimed at showing distinctions between

interest and joy, researchers examined differing facets in the positive affect scale of the

PANAS and found differing characteristics depending upon the affective situation (Egloff

et al., 2003). Interest has been characterized as enhancing the motivation to learn and

explore (Fredrickson, 1998b) and as the feeling of being engaged, caught up, and fascinated or curious (Izard, 1977, p. 216). Recently, theorists have suggested that interest's appraisal structure involves two components, a novelty-complexity check and a coping potential check (Silvia, 2006). This exciting work is just beginning to describe important characteristics of interest as an emotion. However, empirically neither of these positive emotions has been directly linked to sexual desire. It would seem possible that further exploration of positive affects related to sexual desire may reveal desire as a special circumstance of the broader emotional category of interest.

Questions and Possible Approaches for Future Research

Despite the research approaches cited, emotions have only been indirectly studied relative to desire in women. Possible questions for examining positive emotions include the following: (a) Are positive emotions linked directly to sexual desire for women? (b) Which positive emotions are most relevant to sexual desire? For example, would high activation ones like joy or less activated ones like interest be more descriptive of the phenomenon? (c) How might these positive emotions change over time and in what contexts? (d) What is the role of emotions in leading to sexual desire? Given that desire can occur before or as a result of sexual stimulation, can pleasant affect lead to a broader thought action repertoire which also allows for stimulation to be effective? (e) Do positive emotions lead to broadened and creative thinking in relation to sexual matters as they do in other areas of functioning (Little & Byers, 2000)? (h) Would positive emotions lead to resilience and perhaps faster recovery after negative events that might affect sexual well being such as the recovery from cardiovascular reactivity with positive emotions seen by Fredrickson's model (Fredrickson, 2004)? (i) What about the positive

health effects that are seen with people who experience positive emotions? For example, when a woman or her partner experiences ill health which may affect sexual well-being; might positive emotions serve as a resource to optimize recovery and resiliency in regaining sexual health?

Sexual Desire Model and Positive Emotion-Desire Model

Sexuality researchers have struggled to find models which will better fit the unique properties identified as more typical of sexual desire for women. Basson (2001) recently described a cyclic model (Figure 2.1) shows that women may or may not experience desire initially during a sexual encounter. Thus, desire may occur before, during, or after arousal for women. This circular model shows that desire affects attention to sexual stimuli, the processing of stimuli and subjective arousal. Subjective and autonomic nervous system responses to desire and the processing of the sexual experience lead to enhanced arousal, which may subsequently trigger desire if it has not already been recognized by the woman. How the woman processes the sexual stimuli, including whether or not it is processed as sexually relevant at all, is thought to be tightly linked to both biological and psychological factors. Once arousal occurs, and if sexual satisfaction and arousal have occurred in the past without interfering physical problems such as pain, other non-sexual outcomes may join the cycle to influence motivations to continue or to engage in future sexual activities (Basson, 2001, 2005).

Figure 2.1 Circular model of human sexual response

Multiple motivations

Other rewards-emotional intimacy, increased wellbeing

Initial sexual desire (variable)

Deliberate attention to stimuli

Sexual satisfaction and absence of pain

Biological factors

Arousal triggers desire

Selective arousal and autonomic nervous system response

Processing of stimuli

Psychological factors

Adapted from Basson (2001)
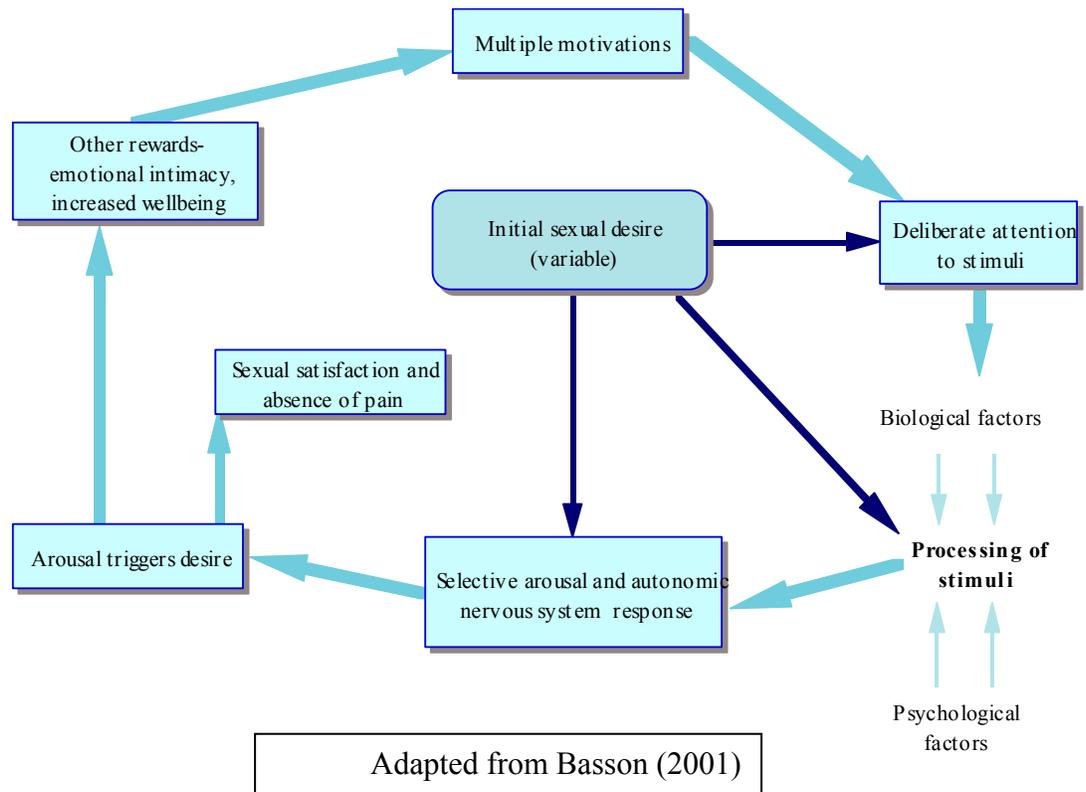
Despite this, an important gap exists in our understanding of what takes place during the processing of emotional stimuli within this model. This includes the lack of empirical evidence for what emotions are important to the current circular model and how positive emotions may play a role in contributing to the progression of desire through the cycle. For example, though emotions are thought to accompany this model, studies of positively valenced emotions are not linked to specific mechanisms designed to stimulate or enhance desire. Fredrickson's Broaden and Build Model (Fredrickson, 2004) of emotion may provide a good framework to develop a clearer understanding of links from positive emotions to desire. A positive emotion model of sexual desire based on Fredrickson's Broaden and Build model (Fredrickson, 2004) is suggested in Figure 2.2.

Figure 2.2 The Broaden and Build Model Applied to Sexual Desire
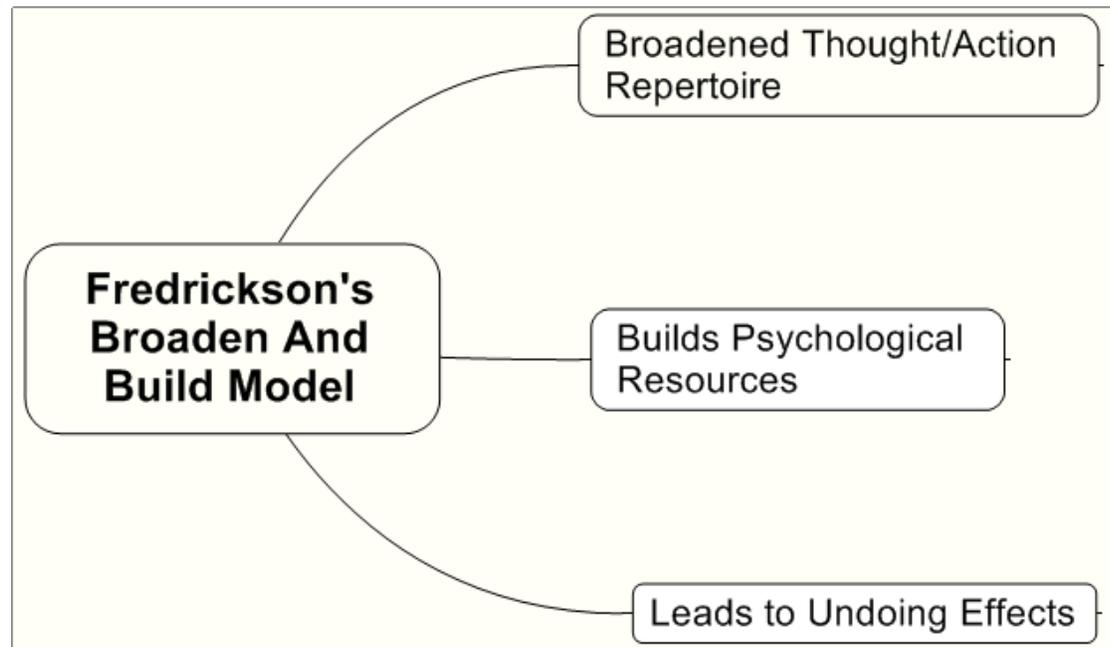
This model proposes that positive emotions (whether activated by arousal or desire) lead to characteristics of positive emotions including a broadened thought-action repertoire, positive psychological resiliency, and undoing effects of previous negative sexual experiences. Some advantages of using this model include the ability to make sense of evidence from a variety of sources in the sexuality literature which have been reviewed earlier. Using the main concepts of the model, Figure 2.3 shows examples from sexuality research which may be more usefully explained by the over-arching framework for understanding how positive emotion functions.

Figure 2.3 Broaden and Build Model with Examples from Sexuality Research
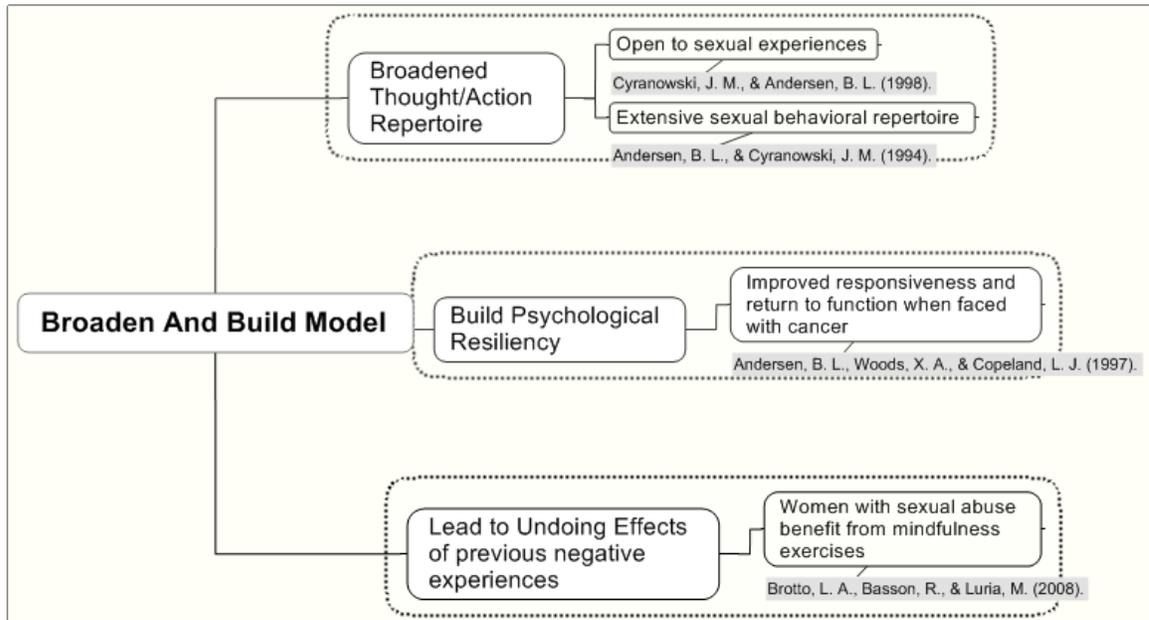
For example, perhaps the flexibility and creativity that Andersen and Cyranowski (1998)found among women with positive sexual self-schemas in processing sexual information fits with the broadened thought-action repertoire found in Fredrickson's positive emotion model. It would seem possible that positive emotions such as interest and joy may be linked to sexual desire though this would need to be tested.

Moreover, if these positive emotions persist over time, they may well build resilience and improve coping with regard to sexual desire challenges faced by women during times of illness or treatments known to reduce sexual desire (Fredrickson, Tugade, Waugh, & Larkin, 2003). In fact, Andersen, Woods & Copeland (1997) found that women with more positive sexual self-schemas who had cancer returned to sexual functioning more quickly after treatment. In a more recent study, Rellini & Meston (2007) found that contrary to expectations, women who had experienced childhood sexual abuse were able to express positive emotions when asked to write a fantasy essay,

and that these positive emotions were linked to sexual desire. This suggests that resilience may be built and that women may draw upon enduring positive resources to facilitate coping, even in the face of previous negative sexual experiences.

Finally, Fredrickson (1998a) has shown that positive emotions lead to undoing effects of negative experiences. Links to positive emotions and sexual desire may well have similar effects and would allow clinicians to develop strategies for women who have had negative sexual experiences. Recently researchers found that among women with sexual arousal and desire problems those who had a history of sexual abuse benefited more from a mindfulness meditation intervention than those without such a history (Brotto, Basson, & Luria, 2008). Implicit in these studies is the remarkable strengths and abilities that women possess, even in the face of previous serious illness or abuse. The traditional view of examining what is problematic leaves out the role of human strengths and a more accurate portrayal of how positive emotions may explain these observed phenomena.

The advent of models from positive emotion research provides a unique opportunity to examine women's sexual desire from a human strength perspective. As clinicians, nurses routinely help patients identify and develop strategies that will enhance strengths to meet health challenges. I believe that using perspectives from positive psychology including models which may more fully explain the role of positive emotions will allow researchers to develop important new findings, and extend the work of positive psychologists in order for clinicians to develop effective strategies to improve the sexual lives of women.

Summary Literature Review

Though sexual desire problems have been identified as a serious and pervasive problem for women, important psychological features have received little attention in empirical work. One important line of research that may be implicated in understanding sexual desire includes newer findings from positive emotions theory and research. But important components of positive emotions have not been defined for sexual desire. Researchers attempting to find clarity in understanding sexual aspects of women's lives have cited the lack of a strong theoretical approach as problematic in advancing this work (Andersen, Cyranowki, & Aarestad, 2000). This review has examined recently developed models from positive psychology which may be useful in extending this knowledge.

Concurrently, some work in population studies has focused on concerns about sexual desire for women and its relationship to negative health and psychological variables. In this work, researchers have cited a high prevalence of lower sexual desire, high importance placed on sexuality, with the potential for serious consequences for women and their partners. While emotions are often cited as important to developing and maintaining sexual desire, empirical work to identify positive emotional characteristics has been lacking, with the predominance of work focusing on evidence for pharmacologic interventions. Together, these bodies of work suggest that it is time for a closer examination of emotionally related factors associated with the experience of sexual desire for women.

Despite increasing numbers of nurses who provide primary care for women in adult psychiatric/mental health and in women's reproductive health practitioner roles,

assessment and treatment strategies have typically focused on physiologically-based rather than multidimensional models that include important psychological factors. When women seek care for decreased sexual desire, there is a dearth of knowledge to which practitioners to turn. Nurses have often recognized the significant role that emotions play in understanding psychological and physical well-being. Since nurses are in a unique position to use knowledge of specific health-related phenomena as it relates to important emotional changes in those persons they treat, an empirical knowledge base is needed for developing effective assessment and treatment strategies. While nurses have written relatively little about sexual desire in women, they are in a position to observe women's concerns directly; ask effective, targeted questions; and help women learn more about their own sexuality, especially when concerns arise. Nurses who work with women have a unique opportunity to help them learn more about changes that may occur over time, during life transitions, and to dispel myths as more knowledge of sexual phenomena are generated.

Specific Aims

Previous work suggests that emotions play an important role in sexual desire among women. The current study examined the words that women use when asked to describe sexual desire to discover important emotional characteristics. If positive emotion words were used, they were examined relative to sexual domains including sexual cognitions were cited in previous theoretical and clinical studies. This study examined the following: (a) whether women will use emotion words when they describe sexual desire; (b) whether and how often women will use positive emotion words when describing sexual desire; (c) whether women who use more positive than negative

emotion words will also score highly on other measures of desire, satisfaction and sexual functioning; and (d) whether women who describe positive emotions also express more positive sexual cognitions about themselves.

Since little is known about the emotions related to sexual desire among women, an exploratory approach to answer these questions will be used to encourage women to describe (and thereby define) their own experiences of sexual desire. Data will be examined for individual differences in relation to language use and dispositional variables related to sexual desire and motivation will be identified. Emotions expressed in language descriptions will be compared to sexual disposition variables to examine if and what patterns may exist. Thus, this study seeks to answer whether positive emotions are systematically related to sexual desire in healthy young women and whether they are linked to positive cognitions and sexual function variables which have been previously linked to sexual desire.

Research Questions

The purpose of this study was to examine the experience of sexual desire among healthy women to define whether positive emotions are related to sexual desire and other important sexually-related outcomes and to test the Broaden and Build Model of positive emotions as it relates to sexual desire. Patterns of emotional responses were examined for individual differences and compared to variables known to affect sexual motivation and response.

Previous research studies have not examined the role that positive emotions may play in sexual desire among women nor have they used a positive psychology model to

drive the research questions when examining this phenomenon. Fredrickson's Broaden

and Build Model (2004, p. 1365) will guide the research questions.

Figure 2.4 Applying the Broaden and Build Model to Sexual Desire
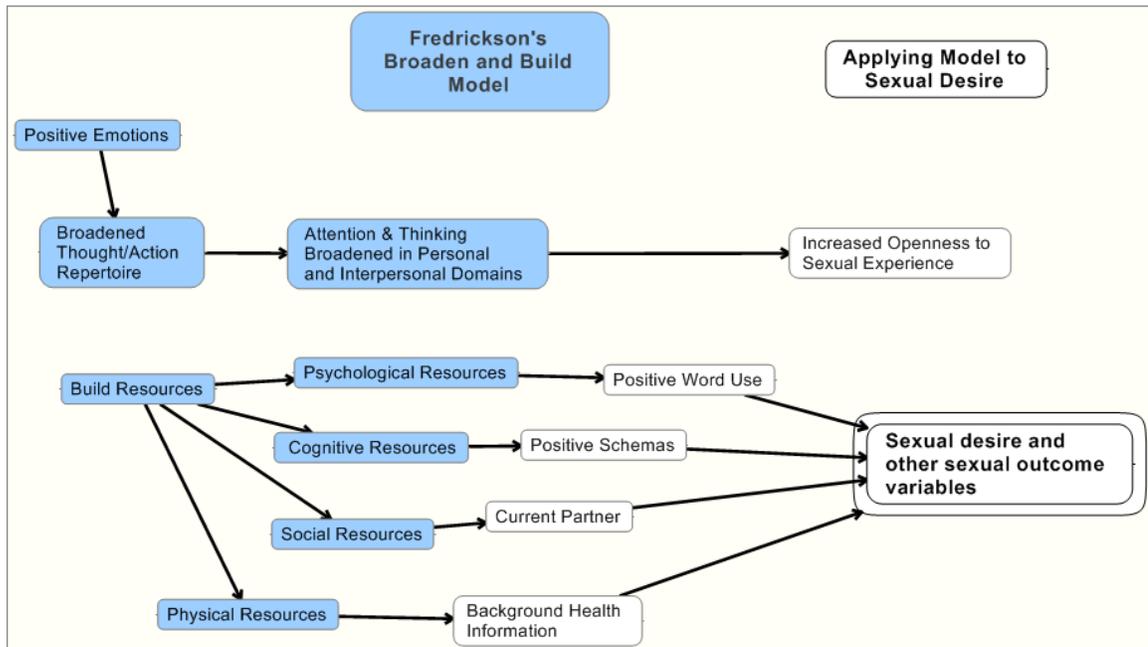
(Note: Shaded figures are conceptual and white figures were measured in this study.)

Figure 2.4 shows the first two components of Fredrickson's model (seen in blue)

which suggests that positive emotions occur in response to diffuse opportunities which

result in broadened attention and thinking. Fredrickson suggested that this broadened

thinking leads people to draw upon and to build personal resources including

psychological, cognitive, social and physical resources (Fredrickson, Cohn, Coffey, Pek,

& Finkel, 2008).   In short, do positive emotions lead to broadened and creative thinking

in relation to sexual matters as they do in other areas of functioning (Little & Byers,

2000)? Moreover, when women are called upon to think about sexual matters, do they

also call upon psychological, cognitive, social and physical resources? Thus the

following research questions were used to guide the study: (a) What patterns of emotion-

related words will women use when asked to describe sexual desire? (b) When

describing a sexual desire experience, if emotion words are used, do specific patterns of

positive and negative word use emerge? (c) Will women who use positive emotion

words also describe higher levels of sexual desire, satisfaction and overall positive sexual

function than women who use less positive words? (d) When women use positive

emotion words to describe desire, will they also describe positive cognitive

representations about the self (positive sexual self schemas) and are these schemas

associated with sexual outcome variables?

Chapter 3

Research Design and Methods

Design

In a cross-sectional correlational design, participants were asked to answer survey questions online during a single survey time period. They were asked to write a free-text narrative about their thoughts and feelings about the experience of sexual desire and to answer questions from two standardized sexuality instruments, which have been used in both clinical and non-clinical populations of women. The survey was delivered online in a secure web-based site used predominantly for delivering tests, quizzes and lessons to currently enrolled university students. The study was approved by an appropriate institutional review board.

Participants

Participants were 165 women from a convenience sample of student volunteers who were currently enrolled in classes at a major research university. Criteria for enrollment included age 18-30 years, the ability to read and write English and a willingness to share thoughts and feelings. Individuals were excluded if they could not read and write English. Women who felt uncomfortable writing about sexual desire or who thought they may have difficulty recalling sexual emotions were also be asked not to participate. The participants were notified on flyers, consent forms and at study end that

their answers to study questions were blinded to the researchers from the point of the online server, thus their anonymity was ensured.

Since this exploratory study sought to have women express emotions and cognitions about sexual desire experiences, a conservative age range was selected so that hormonal changes that may interfere with desire would be less likely to affect results. The 18 to 30 year old age criteria was chosen for inclusion since studies suggest that hormonal changes (estrogen decline) which may indirectly interfere with sexual desire may begin as soon as age 30 (Hayes et al., 2007; Stuckey, 2008). In a recent large international study (n=3,589 women), sexual desire problems increased with age, and American women in the 30-39 year age group had a higher incidence of low desire than the European sample (Hayes et al., 2007). Women are under-represented in sexuality research (Catania, McDermott, & Pollack, 1986) and sexual interest research among college-aged populations (Gaither, Sellbom, & Meier, 2003). Thus college-aged women were selected as participants based on gaps in current sexuality literature.

Research suggests that respondents to sexual surveys may not reflect a normative population of women. Moreover, participant selection bias may be a concern in studies of sexual phenomena. Systematic differences in who responds to sexuality surveys have been identified as problematic in past research. Those who may feel most comfortable talking about sex may be over-represented and methods which rely on researcher-defined concepts may also bias sexuality research among women (Boynton, 2003). Thus, this study was not initially advertised as a sexuality survey and all women who met age criteria were encouraged to participate. To examine cognitions, it is important not to prime women by asking specifically about sex before the measure is given. The first

measure is Andersen's(1994) unobtrusive sexual self-schema scale (SSS-F) designed to be used without priming. As a result, the title of the study, the flyer and the first consent form documents did not indicate that this was a sex survey.

Measures

Background Characteristics

Background characteristics thought to affect sexuality were collected at the start of the survey including age, education level, relationship status (whether in a current relationship and for how long), income, employment, and use of specific medications. A number of medications have been implicated in interfering with sexual desire; however the mechanisms are poorly understood. Participants were asked specifically whether they regularly took any medication, and if so whether they took medications which have been linked to desire problems in the past. These include birth control pills, antidepressants, pain medications, anti-anxiety medications, gastrointestinal medications, and blood pressure or other heart medications (Rosen, Lane, & Menza, 1999; Rosen & Marin, 2003; Segraves, 1988a, 1988b, 2003b; Segraves, 2008; Segraves et al., 2004). See Appendix 2.

Depression Screening

The Patient Health Questionnaire-2 (PHQ-2) is a brief screening inventory that was added to the survey since the incidence of depression is reported to be approximately 25% in the college-aged population (Hagerty & Williams, 2008) and depression is closely linked to problems with sexual desire (Cyranowski et al., 2004). The PHQ-2 (see Appendix 4) consists of two brief questions that assess the presence of anhedonia and dysphoria; (Kroenke, Spitzer, & Williams, 2003; Thibault & Steiner, 2004) and is

suggested for use in primary care as an efficient screening tool (Thibault & Steiner, 2004). The PHQ-2 consists of two questions (from the larger PHQ-9) and asks how often the individual has been bothered over the past two weeks. The PHQ-2 has been validated in a large scale study (n=6,000) in 8 primary care and 6 obstetrics-gynecology clinics (Kroenke et al., 2003). Criterion validity has been demonstrated when compared with independent interviews in 585 patients, while construct validity was established by PHQ-2 scores showing strong associations with functional status, disability days, healthcare utilization and symptom-related difficulties. The positive predictive value ranged from 48% for a PHQ-2 cut point score of 2 (all persons with that score or higher) to 85% for a cut point score of 5. At a cut point score of 3 or higher, the PHQ-2 had a likelihood ratio for major depression of 2.92 which is similar to that reported in 9 other depression case finding instruments in a meta-analysis (Mulrow et al., 1995). The PHQ-2 compares favorably to the PHQ-9, showing good operating characteristics for diagnosing major depressive disorders with an AUC (area under the curve) of 0.93 (vs. 0.95 for PHQ-9) and for any depressive disorder with an AUC of .90 (vs. 0.92 for PHQ-9) in an ROC (receiver operating characteristic) analysis. When the PHQ-2 was compared with the Mental Health Inventory (MHI-5) scores the PHQ-2 scores were strongly correlated in primary care patients (r = .70) and in obstetrics-gynecology patients (r=.63) (Kroenke et al., 2003). Despite these positive findings, the PHQ-9 is the preferred instrument for diagnosis and assessment; however in settings when screening is the first step, the PHQ-2 may be used effectively (Thibault & Steiner, 2004).

Emotion Word Use

Recent work examining language and word use has resulted in evidence that linguistic styles may be meaningful markers of social and psychological processes. This work led to the development of a computerized program to detect ways that people use words and to correlate them to individual differences in a variety of contexts. The Linguistic Inquiry and Word Count program (LICW) (Pennebaker, Booth, & Francis, 2007) calculates the proportion of words in a given text sample into one of 70+ word categories which include linguistic categories, psychological processes (such as emotions) social processes (friendship) temporal or spatial context (past tense verbs) and words that describe an explicit topic (such as sex)(Groom & Pennebaker, 2005). This natural language use method has revealed that positive emotion word use is related to health (Pennebaker, Mayne, & Francis, 1997) and that linguistic style such as pronoun use is similarly linked to health including reduced physician visits (Campbell & Pennebaker, 2003). More recently, this method has been used to examine the social effects of expressive writing in romantic relationships using instant messaging exchanges among couples. The use of more positive (and not negative) words affected positive romantic relationship outcomes in this study (Slatcher & Pennebaker, 2006). Together, these studies suggest that this method may be useful in examining characteristic emotions that women experience when thinking about sexual desire. Wording for the questions used to direct the text-response was written similarly to previous instructions in related research using the linguistic word count strategy (Slatcher & Pennebaker, 2006).

Recent work in computerized text analysis provides promising new approaches which allow researchers to analyze self-report data without using overwhelming analysis

tasks (Pennebaker, 2007). Computerized text analysis allows researchers to reliably

examine natural word use and linguistic style linking them to emotional and other

psychological variables (Pennebaker, Mehl, & Niederhoffer, 2003). The Linguistic

Inquiry and Word Count (LIWC) (Pennebaker, Francis, & Booth, 2001) analysis

program was originally designed to discover how writing about negative experiences

predicts health improvements (Pennebaker et al., 1997; Petrie, Fontanilla, Thomas,

Booth, & Pennebaker, 2004). The LIWC has also been used to examine individual

differences over the life span (Pennebaker & Stone, 2003) personality differences

(Pennebaker & King, 1999) and more recently, to examine relationship stability (Slatcher

& Pennebaker, 2006) and psychological gender differences models (Groom &

Pennebaker, 2005). Given the exploratory nature of this work, the LIWC provides a

realistic way of examining women's thoughts and feelings about sexual desire in a

naturalistic setting.

Words are scored according to a predefined dictionary in the LIWC program

which searches for over 4,500 words or word stems within each file (Pennebaker, Booth

et al., 2007). Subcategories that result include descriptive information such as number of

total words (word count) mean words per sentence, and total percentage of words

containing more than six letters. Overall the program analyzed over 70 linguistic

dimensions which include standard speech categories such as percent of pronouns used

(broken down by first, second, and third person) articles and prepositions. Psychological

process categories are designed to find emotional, cognitive, sensory and social

processes. Words within the psychological processes category include positive emotion

and negative emotion words (see Table 3.1).

Table 3.1 Examples of Words Captured by the LIWC Dictionary

Affective Processes	
Positive Emotions	Happy, Nice
Negative Emotions	Angry, ugly
Affect	Happy, Ugly, Bitter
Linguistic Dimensions	
First Person Singular	I, Me, My
First Person Plural	We, Us, Our
Pronoun	I, Our, They, You're
Cognitive Processes	
Cognitive mechanisms	Think, Doubt, Recall
Causation	Because, Reason
Insight	Realize, Think
Exclusive	But, Exclude

From Pennebaker, J. W., & Stone, L. D. (2003). Pennebaker, J.W., Booth, R.J, & Francis, M.E. (2007).

Positive Cognitive Representations

Research in understanding sexual motivations and desire have led researchers to the develop unobtrusive measures using trait-adjective techniques to measure women's sexual self schema (Andersen & Cyranowski, 1994). The Sexual Self-Schema Scale (SSS-F) was developed in order to examine the role that cognitive scripts or sexual self-schemas play in women's sexual attitudes and behaviors. Factor analysis and testing identified three schemas; two schemas which positively influence behaviors and self-reported sexual arousal; and one negative aspect which is a deterrent to sexual behavior.

Internal consistency (Cronbach's coefficient α = .82) and 2- week test-retest reliability (r=.91) estimates were high (Andersen & Cyranowski, 1994). Subscale reliabilities are seen in Appendix 8. Several studies found that positive sexual cognitions improve women's openness and flexibility for processing sexual information and an increased propensity to behave sexually (Andersen & Cyranowski, 1994, 1995; Basson et al., 2000; Cyranowski & Andersen, 1998). Positive sexual self-schemas predicted sexual responsiveness and more rapid return to sexual activities in a study among women treated for gynecologic cancer, (Andersen, Woods, & Copeland, 1997) demonstrating the measure's use in a clinical population. Given the unobtrusive nature and experience with measuring sexual outcomes in women, this measure will be helpful in examining positive emotions from a cognitive perspective.

Meston, Rellini and Heiman (2006) have used the Sexual Self-schema Scale to examine the role of schemas in survivors of childhood sexual abuse (CSA). In this study 48 Women with a history of CSA had significantly less positive sexual self-schemas and experienced greater negative sexual affects than controls. The romantic/passionate schema explained negative sexual affect independently from depression and anxiety. Consequently, consideration of self-related schematic processing of sexual information may be useful when examining affective variables related to sexuality in women.

In a revision of the sexual self-schema model Cyranowski & Andersen (1998) conceptualize the construct as a bivariate model, that is that positive and negative sexual self-schemas are independent, and can clarify sexual self-views more clearly for women who exist between positive and negative sexual schematic representations. The four categories that result from using median scores on both the positive self-schema scale

(which is the result of positive trait variables endorsed during the survey) and the

negative self-schema scale (the result of the negative trait variables endorsed within the

survey). This reconceptualization resulted in a cognitive-affective mediation model

which allows researchers to examine the independent effects of women's positive and

negative sexual self-views (Cyranowski & Andersen, 1998).

Figure 3.1 Bivariate Schema Categories

Total Sample N=156	**Positive Low**	**Positive High**
Negative Low	**Aschematic (n= 24)** • Lack coherent framework to guide evaluations • Neither positive nor negative structures • Sexual behavior driven by situation Pos↓ (49-74) Neg↓ (6-19)	**Positive Schema (n=48)** • ↑evaluation sex behaviors • ↑ arousal • ↑ frequency sex activities Pos↑ (75-102) Neg↓ (6-19)
Negative High	**Negative Schema (n=50)** • ↓evaluation sex behaviors • ↑sex anxiety • ↓freq. sex activities Pos↓ (49-74) Neg↑ (20-36)	**Co-Schematic (n=34)** • Conflicting Positive and Negative schemas • Preoccupied with sexual thoughts with ↑anxiety • ↑Approach/avoidance which restricts activity Positive Schema↑ (75-102) Negative Schema↑ (20-36)

The four categories in the revised bivariate model more effectively explain the

experience of women which is generally acknowledged by sex researchers to be

complicated. Women in the positive sexual self-schema group show positive evaluations

of sexually relevant behaviors. In the positive high category (shown in upper right box,

shaded light gray in Figure 3.1), women score above the median (shown as Pos ↑ in

Figure 3.1) on the romantic-passionate and open-direct scales of the SSS-F while also

scoring below the median (shown as Neg ↓ in Figure 3.1) on the conservative-

embarrassed dimension. Women in the negative high group (see lower left block shaded

in darker gray in Figure 3.1) have the reverse pattern of scoring (more negative and less

positive scores on schema scales. The result for their sexual lives is more negative

evaluations of sexual behaviors, more anxiety, and the propensity to avoid sexual

encounters. Women who score in the co-schematic category show conflicted cognitive

representations to guide behaviors which typically results in anxiety about sexual matters

and avoidance of sexual behaviors. Co-schematic women have both high levels of

positive and negative schemas the same time scoring in the upper median on both

positive and negative scales (seen in the lower right box in Figure 3.1). Women who fall

into the aschematic group, by contrast, show more neutral sexual self evaluations, with

neither high anxiety nor avoidance of sexually behaviors, resulting in a lack of guidance

during sexual situations. Women in the aschematic group score lower on both positive

and negative schema scales (seen in the upper left box of Figure 3.1). Sexual behavior

for this group is driven more by situational factors (Cyranowski & Andersen, 1998). The

four groups and the scores used to determine the sexual self-schema categories in the

current study are seen in figure 3.1.

Sexual Desire, Satisfaction and Function

The Brief Index of Sexual Functioning for Women (BISF-W) (Taylor, Rosen, & Leiblum, 1994) is a brief 22-item self report inventory designed to assess current levels of women's sexual functioning and satisfaction (Meston & Derogatis, 2002). The instrument includes scores for overall sexual function and a sexual thought/desire dimension. Although originally developed as a 3-factor scale, the BISF-W was revised and revalidated as a 7-factor scale to conform to the author's conceptualization of important categories of sexual functioning (Mazer, Leiblum, & Rosen, 2000). The recent scoring guidelines were revised to include seven dimensions, sexual thoughts/desire, arousal, frequency of activity, receptivity, orgasm, relationship satisfaction, and sexual problems. A composite score was developed (weighted scores on each dimension were added together and the problems score was subtracted) and all 7 dimensions were tested with a clinical and non-clinical populations. Scoring for scale questions are shown in Appendix 7. Internal consistency for the dimension scores of interest were Cronbach's α = .72 for thoughts/desire; α= .61 for satisfaction and α=.74 for satisfaction. Used successfully with healthy samples of women, this scale reliably discriminates between samples with and without sexual complaints (Arrington, Cofrancesco, & Wu, 2004; Mazer et al., 2000). Appendix 8 shows the reliabilities for the BISF-W instrument for this study. Cronbach's alphas were similar to those reported in previous studies with the subscales of major interest desire (α=.837) satisfaction (α = .817) and total sexual function (α= .813) showing good consistency.

Procedures

Prior to delivering the online survey a pilot test was conducted with a convenience sample of 5 participants to ensure that the narrative question was clear, the process of data collection straightforward and to examine alternative methods prior to the final data collection (Hulley, Siegel, & Cummings, 1988). Once the process and methods were clearly established, recruitment and data collection began. Students were recruited with online and paper flyers and the survey was delivered online using a secure university-based web server, UM.Lessons (Michigan, 2007). Links from the online flyer took students directly to a university authentication window (to ensure they were currently enrolled students) and then a consent form. If students agreed to participate, they answered background questions designed to examine criteria known to affect sexual desire (such as age and medication use).

The survey was delivered in two parts. First women were asked to fill out background information including whether or not they used medications and if they did, which medications they regularly used. Medications known to interfere with sexual desire were asked about specifically including birth control pills, antidepressants, gastrointestinal, pain, and anxiolytic medications. Next participants filled out the Sexual Self-schema Scale Female Version (SSS-F) (Andersen & Cyranowski, 1994). Third, a brief two question depression screening inventory, the PHQ-2 was given. Next women were informed that the next part of the survey would be about sex, and they were given the option of opting out of the study. Those women who continued to part two of the study were asked complete a free-text question by writing for 20 minutes continuously about their thoughts and feelings about the experience of sexual desire. The Linguistic

Inquiry and Word Count program (LIWC); (Pennebaker, Booth et al., 2007) was used to examine the text that women wrote in response to this question. Finally, the Brief Index of Sexual Functioning for Women (BISF-W) (Taylor et al., 1994) was given to collect information about sexual desire, satisfaction and overall sexual function variables. See Appendices 3, 4, 5 and 6 for the, the SSS-F, the PHQ-2, text-writing instructions, and the BISF-W questionnaires. After the last questionnaire, participants were taken to a debriefing page which explained the specific purpose of the study, offered detailed references, including links to articles about the development of survey instruments, and were thanked for their participation.

Of the women who consented to participate, 165 completed part one and a total of 125 participants completed all questions in both parts of the survey. Mean age was 21.5 (SD2.45) for the women who completed the surveys (n=125) and mean age of those who dropped out was 20.36 (SD1.84). At the end of both parts of the survey, participants were taken to a page which thanked them and were linked to a debriefing document which described the specific purpose and details of the study.

Since the study was blinded to the researchers before the data were able to be downloaded and released for analysis, a list of participants independent of their data identification numbers was provided and all participants were offered a $10.00 gift card which was mailed to them after participation. All participation was voluntary, and women were given the option of having their data rescinded. One participant asked to have her data removed and this was done. Since the data was blinded to the researchers, and it was an online survey, it was not possible to analyze characteristics of non-responders.

Data analysis procedures

Survey results and text narratives were collected from UM.Lessons. Background and survey data were downloaded into excel files, and transferred into SPSS files. Text question data were downloaded into comma separated text files, separated into individual files, saved in Word files (Microsoft, 2007) and the words were corrected for spelling in each file. The LIWC program (Pennebaker, Booth et al., 2007) was used to create the variable output (Pennebaker et al., 2001; Smyth & Pennebaker, 2008) from the individual Word files and transferred into SPSS. Data from the two parts of the study were merged into one file, matching them using the participant identification numbers. Variable output from the LIWC SPSS data file was merged with parts 1 and 2 data files and statistics were completed using SPSS (SPSS, 2008) to examine the background, text and questionnaire data. Data analysis proceeded in order to answer the research questions. See Figure 3.2.

Figure 3.2 Analysis Plan
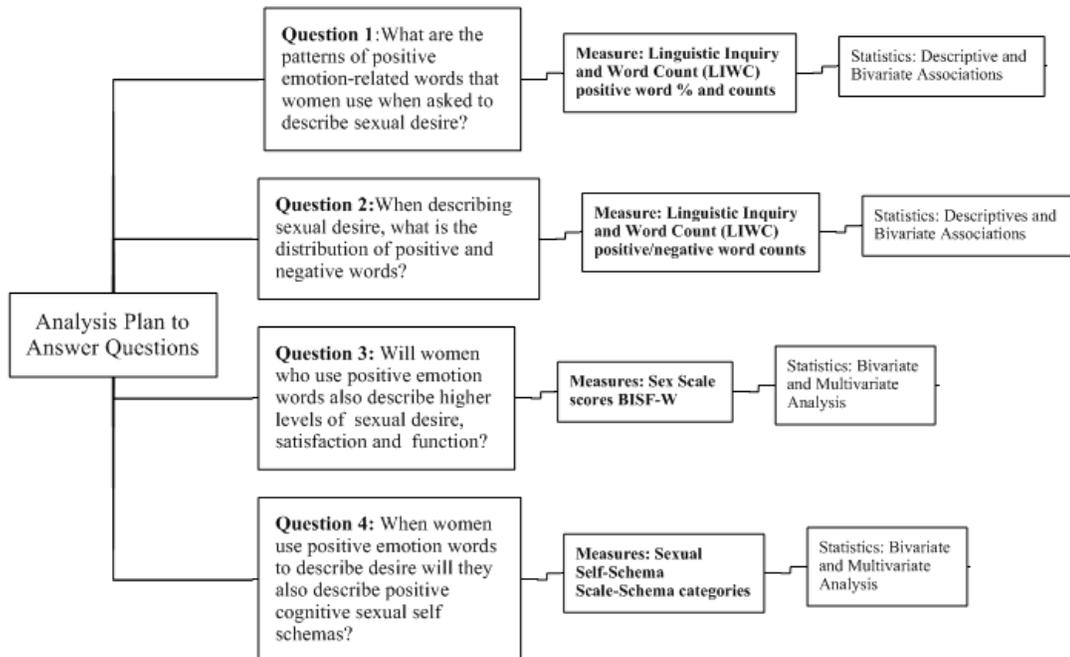
The first question asked what patterns of positive emotion-related words may be used by women when asked to describe sexual desire. Word counts and linguistic dimensions (types of words) were measured and data was produced using the LIWC program (2007) to describe the emotions women reported. Descriptive and bivariate associations were used to examine this question. The same measure (LIWC) and statistical methods (descriptives and bivariate associations) were used to examine the distribution of positive and negative words. The third question asked whether women who use positive emotion words also will have higher sexual desire, satisfaction and function scores than those who use fewer positive words. Scales from the BISF-W were used to measure these outcome variables, and bivariate statistics guided the selection of variables for the development of multivariate models. Finally, question four asked whether women who used positive emotion words would also show positive sexual self-schema scores. Measures to test this question were the SSS-F and bivariate and multivariate models were used to examine these relationships.

Given the exploratory nature of the study and the expectation that the analysis would include bivariate statistics followed by multivariate analysis if significant bivariate results were found, the target sample size was estimated to be at least 125 participants. The effect size is hypothesized to be a medium effect, and the alpha coefficient for significance was specified at p=.05. According to Cohen (1992) given the tests planned, the α specified and the medium effect size expected, the appropriate number of participants needed for this sample is 125. Since pilot testing revealed some difficulty answering the text writing question, and drop outs were expected, the population was sampled until at least 125 participants had filled out the text writing question. Though

165 women started the survey in part one, only 156 had usable answers due to missing data. In the second part of the survey 141 participants answered the sexuality survey (BISF-W) which is a forced choice instrument. Of those who started part two of the survey, 125 completed answers to the text writing question.

Correlations were estimated to explore the frequency and word category use when writing about sexual desire in the narrative. Next scores for the cognitive variables (SSS-W) and the sexuality variables (BISF-W) were examined and demographic and scale scores determined. Once the data were explored a series of comparative statistics were used to examine the major research foci including emotion words women used when writing about sexual desire, sexual cognitions, and dimensions of desire, satisfaction, and function on the sexual measures.

Chapter 4

Results

Demographic and Background Characteristics

One hundred sixty five women began answering the survey questions. Appendix 9 provides details about background characteristics of the sample. The average age was 21.23 (SD=2.36) with the majority of women in the undergraduate (94%) versus graduate school in this sample. The majority of students did not have children (97%) were employed at least 20 hours per week (70%) earned less than $50,000 per year (65%) and were in some type of relationship with another person (60%). The most commonly used medication in the sample was birth control pills (53%), however a smaller percentage of students reported they took no medications regularly (27%). Relatively few participants reported depression symptoms (4.8%) which is a smaller number than anticipated in an undergraduate college age population (Hagerty, B.M., and Williams, R.A., personal communication, April 10, 2008).

Sexuality Related Characteristics

The sexuality related background characteristics of the sample are reported in Appendix 10 which shows that 60% of the sample reported being sexually active with 58% identifying a current partner within the last month. Changes in sexual interest, arousal activity and satisfaction over the last month ranged from 52-69% reporting no

change. The most change reported was in the sexual interest category with 30% of the

women reporting somewhat or much higher interest in sex in the last month. .

Bivariate statistics were used to examine relationships between participant

relationship categories and scores from the BISF-W. Relationship categories included;

no current relationship, relationship less than one year, married or committed relationship

less than one year, married or committed relationship between 1 and 5 years, married or

committed relationship greater than 5 years, and divorced or ended committed

relationship within the last year. Analysis of variance showed no significant differences

in desire scores for women no matter which relationship category they reported, however

significant differences were seen on all other sexual inventory scales including total

sexual function. See Appendix 11 for details.

There were significant differences in age and education level between the group

of women who finished all three parts of the survey (n=125) and those who dropped out

before finishing (n=39). T-tests and Chi Square tests show that on average, the survey

completers were older (21.5 years old versus 20.36 years old for those who dropped out)

and further along in level of education (68% completers versus 47.5% who dropped out)

at senior or higher level (see Appendix 9). Analysis of variance and t-tests showed that

higher age was significantly related to education $(F(4,159)=31.85,p=.000)$, having a

current partner $(t(139)=2.47,p=.015)$, and being sexually active $(t(139)=3.11,p=.002)$.

Mean ages are seen in Figure 4.1. Of the 39 participants who failed to complete all three

parts of the survey, 16 women dropped out in the second part of the survey by skipping

the free-text writing question but finishing the forced choice BISF-W sexuality survey.

Figure 4.1 Sample Mean Ages and Education, Partner, Sexually Active
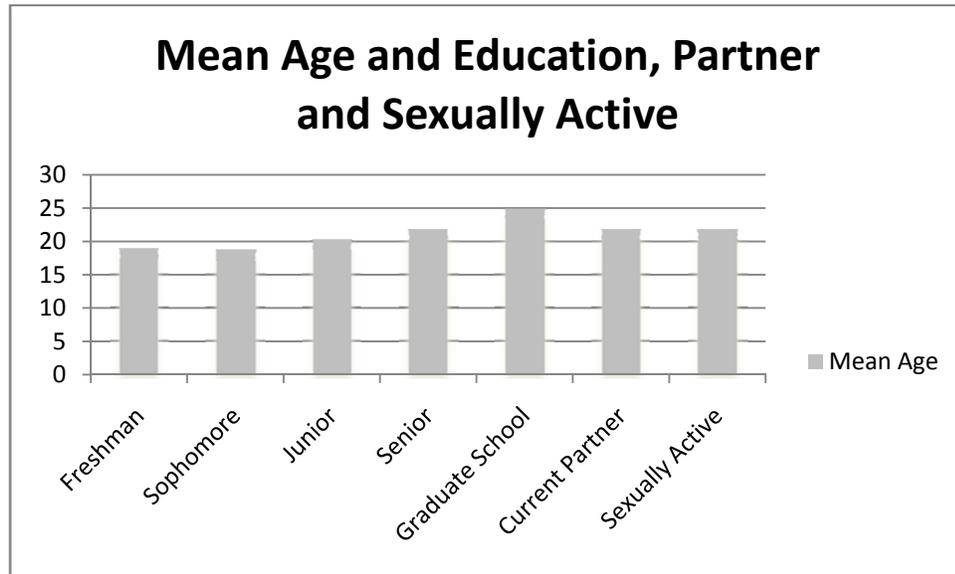
Those who completed versus those who dropped out showed no differences on any of the sexually related demographic characteristics except in reported changes in sexual activities. This question from the BISF-W asked women if there had been recent changes (much lower, somewhat lower, no change, somewhat higher, or much higher) in sexual activity over the past month. Sixteen percent of those who completed the text writing sample reported having increased sexual activity versus 28.5% in the drop out group who reported increased sexual activity. Appendix 10 shows specific percentages for each group on sexuality demographic questions.

Medication Use

Since research studies report negative effects for a variety of medications on sexual desire and function, these variables were examined more fully (see Table 4.1). Analysis of variance comparing medication use with sexual scale variables showed significant positive relationships for the majority of women who used birth control pills

on the sexual function inventory (BISF-W) scales which measure desire, arousal, frequency of sexual activity, receptivity, orgasm, relationship satisfaction, problems and total sex score.

Table 4.1 Medication Use Comparisons with BISF-W Sexual Scale Scores

	Birth Control Pills t (df), p-value Mean(SD)(n)	Other Medication Use t(df), p-value Mean(SD)(n)
D1 Thoughts/Desire	t(136)=2.28, p=.024	t(60)= 4.66, p=.151
Yes Taking Meds	6.91 (2.13) (n=73)	6.70 (2.13) (n=97)
Not Taking Meds	6.01 (2.52) (n=65)	5.99 (2.80) (n=41)
D2 Arousal	t(136)=4.66, p=.000	t(136)= - 4.66, p=.000
Yes Taking Meds	6.51 (2.88) (n=72)	6.16 (2.92) (n=96)
Not Taking Meds	4.20 (2.94) (n=66)	3.66 (2.88) (n=42)
D3 Frequency-Activity	t(138)=4.75, p=.000	t(138)= - 4.05, p=.000
Yes Taking Meds	4.35 (2.10) (n=74)	4.04 (2.06) (n=98)
Not Taking Meds	2.72 (1.95) (n=66)	2.50 (2.08) (n=42)
D4 Receptivity/Initiation	t(130)=3.30, p=.001	t(69)= - 3.23, p=.002
Yes Taking Meds	7.86 (4.49) (n=74)	7.47 (4.69) (n=99)
Not Taking Meds	5.12 (5.31) (n=67)	4.40 (5.34) (n=42)
D5 Pleasure/Orgasm	t(137)=5.16, p=.000	t(137)= - 5.15, p=.000
Yes Taking Meds	4.62 (2.27) (n=73)	4.33 (2.33) (n=97)
Not Taking Meds	2.61 (2.34) (n=66)	2.14 (2.24) (n=42)
D6 Relationship Satisfaction	t(137)= 4.59, p=.000	t(137)= - 3.37, p=.001
Yes Taking Meds	8.32 (3.61) (n=73)	7.64 (3.79) (n=98)
Not Taking Meds	5.39 (3.91) (n=66)	5.22 (4.07) (n=41)
D7 Problems	t(136)= .989, p=.325	t(136)= - 2.01, p=.045
Yes Taking Meds	4.45 (2.32) (n=73)	4.53 (2.37) (n=96)
Not Taking Meds	4.05 (2.36) (n=65)	3.66 (2.17) (n=42)
Composite BISF-W	t(131)= 4.78, p=.000	t(131)= - 4.28, p=.000
Yes Taking Meds	34.01 (14.48) (n=70)	31.93 (14.56) (n=93)
Not Taking Meds	22.17 (14.03) (n=63)	20.20 (14.30) (n=40)

Finally, bivariate analyses were used to examine whether sexual partner and sexual activity variables had significant relationships with outcome variables. T-tests showed that having a sexual partner [t (96.56) =4.14, p=.000] and being sexually active [t (96.96) =4.00, p=.000] were related to sexual desire and to all other sexual scale scores on the BISF-W. Analysis of variance showed that depression scores were related to the pleasure /orgasm scale but not desire or other function scale scores from the sexual function survey (see Appendix 12).

Together, the background characteristics of this sample show a population of young women predominately in the last two years of their undergraduate program. Those who dropped out from the start of the study did not vary significantly except by age and education level. Given the narrow age range and education levels available in this sample, the differences may well be less clinically significant. Medication use did not appear to significantly reduce sexual desire scores. Rather birth control pill use enhanced desire. Predictably, having a current sexual partner and being sexually active were significantly related to all areas of desire and function.

Were Emotion Words Used When Writing about Desire?

The first research question asked which patterns of emotion-related words women would use when describing sexual desire. The roles of emotions were explored using bivariate statistics, followed by multivariate statistics to answer the research questions. First, word category use was explored when women wrote about sexual desire. Each essay was analyzed separately using the LIWC computer program. The LIWC program analyzes 72 dimensions of language use; including both style and content of words used. There are 4 general word descriptors (word count, dictionary terms), 22 standard

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linguistic dimensions (pronouns, articles, verbs, adverbs), 32 word categories which tap

into psychological constructs, 7 personal concerns (work, religion, home), and 3

paralinguistic dimensions (assents, fillers, non-fluencies). Punctuation is also captured

by the program but was not used for this analysis (Smyth & Pennebaker, 2008).

General descriptors

The percentage of words in each category that matched the LIWC dictionary was

computed along with general descriptors such as word count, words per sentence and use

of six letter words.

Figure 4.2 Word Counts Compared to LIWC Base Rates
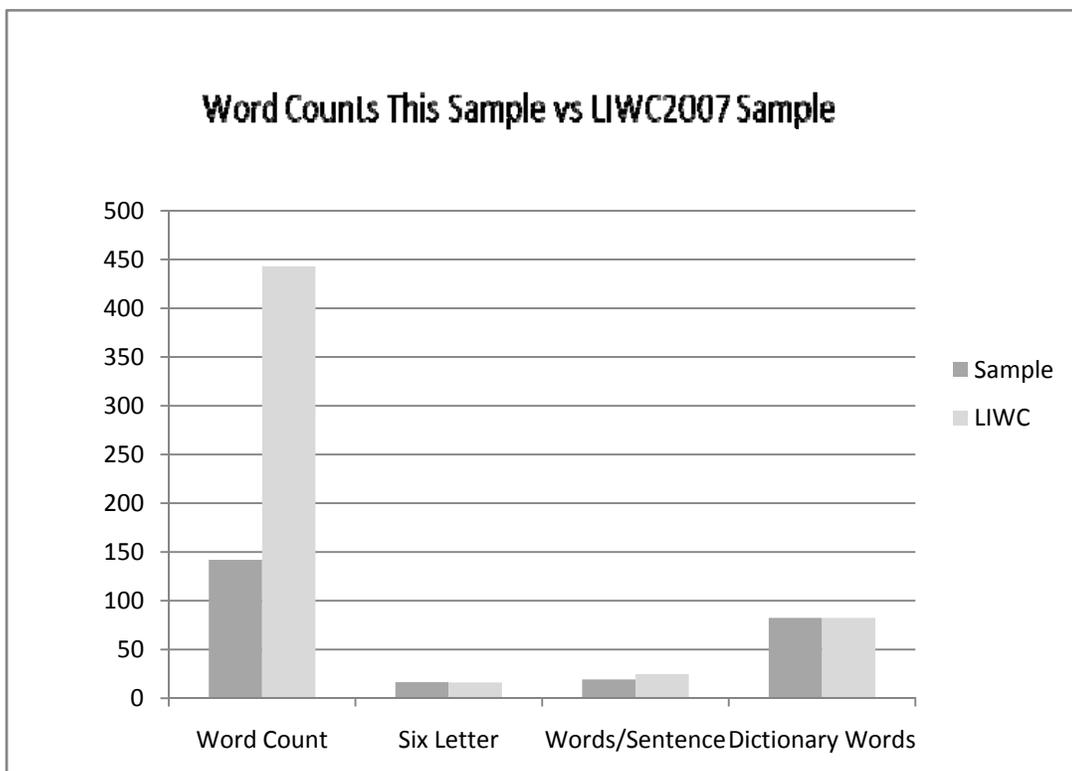
Figure 4.2 shows mean sample word counts in this study compared to base rate

means from the LIWC2007 variable information table (Pennebaker, Chung, Ireland,

Gonzales, & Booth, 2007). A detailed table of the current sample's means and standard

deviations by word categories is seen in Appendix 13.   Except for the smaller number of

words participants used and higher rate of positive affect word use, this sample showed

similar mean word use when compared to previous emotions writing samples.

What Patterns of Positive and Negative Words Were Used?

The second research question asked what patterns of positive and negative emotion word

use emerged. Participants did use positive emotion words when writing about their

experience of sexual desire. In fact, positive word use was higher than negative word

use; both in percentage of emotion words used and in the absolute number of positive

versus negative words used. Figure 4.3 shows the means of both percentage of positive

words used per text example and the means of the absolute numbers of positive and

negative emotion words use.

Figure 4.3 Mean Percentage and Number of Positive and Negative Words
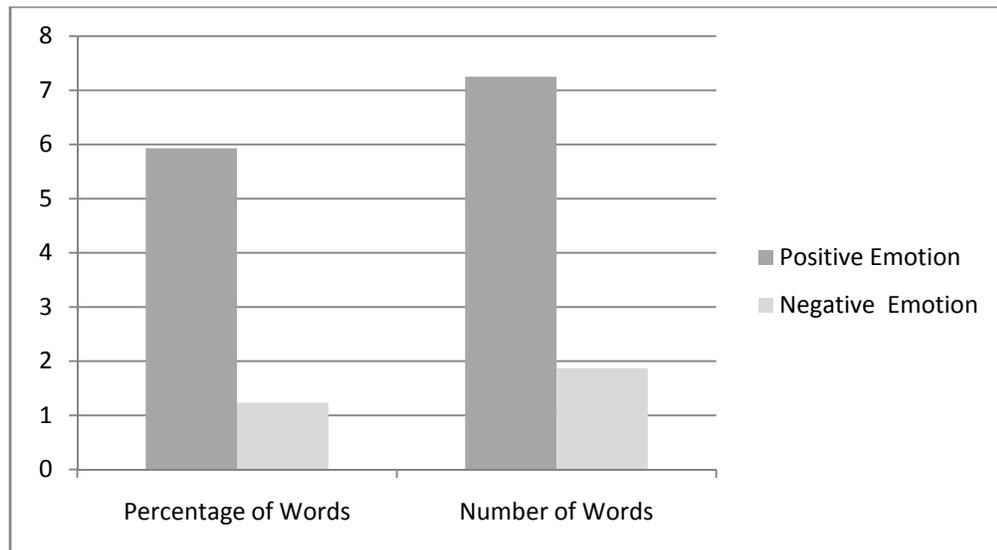
**Note: Number of positive words and number of negative words were computed as follows:
nposword=(wc *posemo)/100. And nnegword=(wc *negemo)/100.**

When the positive emotion word variable (Mean=5.53, SD=3.31) was examined, one outlier was observed with a very large percentage (66.67%) of positive words. Further examination of the text revealed that this participant wrote, "excited happy loved connected / happiness calm quiet relaxed sleepy" (with no punctuation). Since the writing paradigm was designed for participants to write for a longer period of time and more words are often used, percentages are typically a realistic way to measure word use. This single score was far outside the next highest score (15.09) and more than 3 standard

Table 4.2 Selected Examples of High Positive and High Negative Word Use

Verbatim Text Sample	Positive Words Study Mean =7.25 (SD=5.14)	Negative Words Study Mean=1.87 (SD=2.82)	Schema Category
"… We have a strong relationship with one another where we are comfortable talking to each other about anything or are open to our wants. We give each other compliments when we are in bed together… Something just feels right when I am with him and it is something I cannot explain."	Positive =15.09	Negative =2.00	Positive
"…The simple act of realizing that I am desired turns me on and it is even better when you are physically attracted to the person or to that person's energy. It is the best feeling in the world when two people feel the same chemistry…"	Positive =12.00	Negative =.00	Positive
"…When I realize I am turned on, I just want to achieve orgasm... that is all that I can think about. I feel a little guilty about this feeling at the time (I blame that on Catholic K-12 schooling)..."	Positive =.00	Negative =5.11	Negative
"…I hate going to the bar and having the guy I'm talking to assume that I should sleep with him at the end of the night. If I do sleep with him I'm just another notch on his belt and I never speak to him again and if I don't have sex with him then I'm labeled a prude. In these days I almost think it is better to be labeled a slut than a prude…"	Positive =2.99	Negative =6.99	Negative

deviations above the mean. Since this study was designed to examine whether a woman's thought/action repertoire would become more expansive with positive word use, and participants used more positive than negative emotion words when writing about

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desire, it seemed reasonable to calculate the number of positive emotion words variable. I believe using the absolute number of positive words variable was a realistic approach for the measurement of positive emotions. In order to keep the valenced emotion words the same; an absolute number of negative emotion words variable was also computed.

The number of positive words and number of negative words were computed as follows: number of positive words = (word count x percent of positive emotion words)/100. The number of negative words were similarly computed = (word count x percent of negative emotion words)/100). Selected examples from participants who had higher (than mean) positive emotion word scores versus those who used more negative words (along with sexual self-schema categories for each participant) are seen in Table 4.2. While this is a brief sampling of text, it offers a glimpse of the thoughts and feelings that women were able to express when asked to write about their experiences of desire.

Is Positive Word Use Related to Sexual Outcome Variables?

The third research question asked whether positive word use was related to sexual outcome variables including desire, satisfaction, and sexual function. Most words captured by the LIWC dictionary correlated with arousal, frequency, receptivity, satisfaction and total sexual function scores but seldom with desire or problems (see Appendices 12 and 13). Given that few women reported problems with sexual function in this sample, few of the word variables correlated with the problem scale. Among other general descriptors, no significant correlations were seen with word count, six letter words used, or words per sentence and BISF scales.

Linguistic Categories

Correlations were used to estimate relationships between all 22 linguistic categories and sexuality outcome variables (BISF scales). Among linguistic categories, no significant correlations were seen between desire scores and articles, verbs, adverbs prepositions or conjunctions. Among the other 6 BISF scales scores, only adverbs (very, really, quickly) and conjunctions (and, but, whereas) correlated consistently with most scores. Since these words were not related to the theoretical constructs guiding the study questions, they were not examined further. Correlations estimated with pronoun use and other function words showed a similar pattern. Pronouns, especially personal pronouns were variously correlated with sexual scale scores but did not correlate with desire. See Appendix 14 for details. Since Pennebaker suggests that pronoun use relates to social behavior, pronoun use was used as a predictor in subsequent multivariate models.

Psychological Processes and Current Concerns

Bivariate correlations were estimated with the word variables in the psychological process categories including affective, social, cognitive, perceptual process and current concerns categories. See Table 4.3 for examples of process categories and word types that LIWC captures within each category. See Appendix 17 for word example details. Social process category words that correlated with sex variables included friend words which correlated with all scale scores except desire, and the use of words referring to humans which negatively correlated with receptivity scores. From the cognitive process category, only certainty words negatively correlated (r= - .18, p=.04) with desire and receptivity (r= -.19, p=.04). Other words from the cognitive process category that correlated with sex variables included insight words (which correlated with arousal,

frequency of activity and total sexual function) and cognitive mechanism words (which correlated with satisfaction scores). Only feeling words from the perceptual processes category correlated with sex variables (arousal and frequency). In the current concerns category, achievement words ($r = .19$, $p = .04$) showed positive correlations with desire while religion words showed negative correlations with all other sex variables except desire and sexual problems. See Appendix 15 for details. Interestingly, biological process words were not correlated with any sexual outcome variables. All word variables which correlated with sex variables were tested in subsequent regression models.

Table 4.3 Psychological Processes Word Use in LIWC

Social Processes	Family	
	Friends	
	Humans	
Affective Processes	Positive Emotion	Anger
	Negative Emotion	Sadness
	Anxiety	
Cognitive Processes	Insight	Certainty
	Causation	Inhibition
	Discrepancy	Inclusive
	Tentative	Exclusive
Perceptual Processes	See	
	Hear	
	Feel	
Biological Processes	Body	Sexual
	Health	Ingestion
Current Concerns	Work	Money
	Achievement	Religion
	Leisure	Death
	Home	

Affective process category words showed a different pattern with regard to sexual variables. Initial examination of bivariate correlations with positive and negative emotion word percentages did not correlate with sexual desire, but the absolute number of positive words did. Positive and negative word variables were used to estimate correlations, and

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the number of positive words was correlated with sexual desire, but not with other sexual

scale scores. The number of negative words also correlated with sexual scale scores (all

except desire and problems). Consequently, these two number of positive and negative

emotion variables were used in further multivariate models. Table 4.4 shows correlation

results.

Use of Positive and Negative Words

Two affective word variables correlated positively with sexual desire. Number of

positive words (r=.19,p=.04) and anxiety (r=.19,p=.04) positively correlated with desire

(see Table 4.4). Both variables (number of positive words and anxiety) were

subsequently used in multivariate analyses of sexual outcome variables.

Table 4.4 Correlations Affect Variables and BISF Scores

Pearson Correlation Sig (2 tailed) N	Number Positive Words	Number Negative Words	Anxiety	Sad
Desire	.190* (.036)		.186* (.039)	
Arousal		-.193 (.033)		
Frequency		-.224* (.012)		
Receptivity		-.182* (.042)		
Orgasm		-.251** (.005)		-.194* (.031)
Satisfaction		-.293** (.001)	-.198* (.028)	
Problems				
BISF-Composite		-.234* (.011)		

Negative affect variables showed a different pattern. The number of negative

words was negatively correlated with all sexual score variables except desire and sexual

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problems. Anxiety was negatively correlated with satisfaction and sadness was

negatively correlated with orgasm (see Table 4.4). All affect words with significant

correlations with the BISF-W sex scale scores were subsequently tested in multivariate

models (using their respective sexually-related dependent variable).

Relationships between the word predictor variables and sexual self schema

predictor variables were examined using one way analysis of variance (since schema

scores were converted to 4 categories, see Figure 3.1). Only 6 of the 68 word variables

were significantly related to schema categories (number of positive words, word count,

certainty words, exclusive words, motion words, and number words). See Appendix 16.

Figure 4.4 Number of Positive Words Compared to Schema Groups
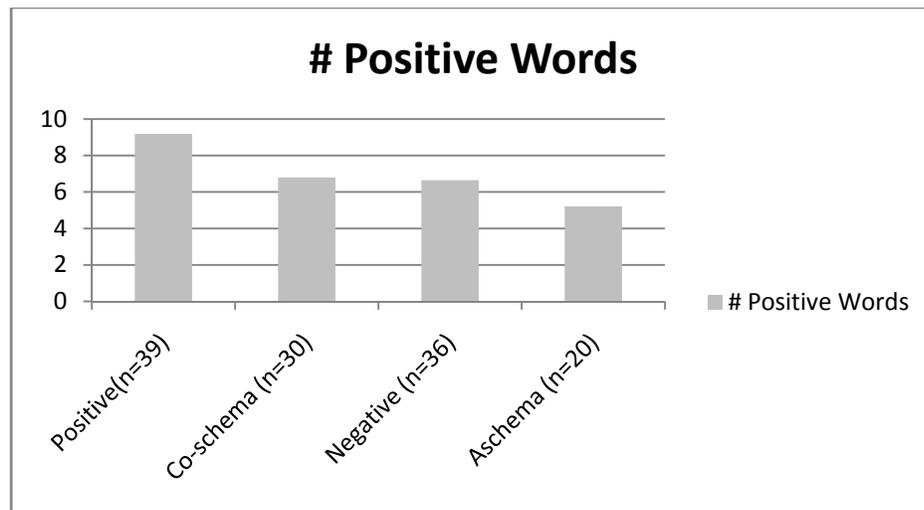
Of these, the only affective process variable significantly related to schema was the

number of positive words $F_{(3,121)} =3.21$, p=.022. As predicted from the definition of

schema categories, women in the positive schema category used the highest number of

positive words (mean=9.19, SD=5.76); women in the aschematic category used the least

number of positive words (mean=5.21,SD=5.53), and women with negative schemas

used the next lowest number (mean= 6.65,SD=4.06) . See Figure 4.4. An examination of total word counts resulted in a similar pattern of findings.

Figure 4.5 Total Word Count by Schema Group
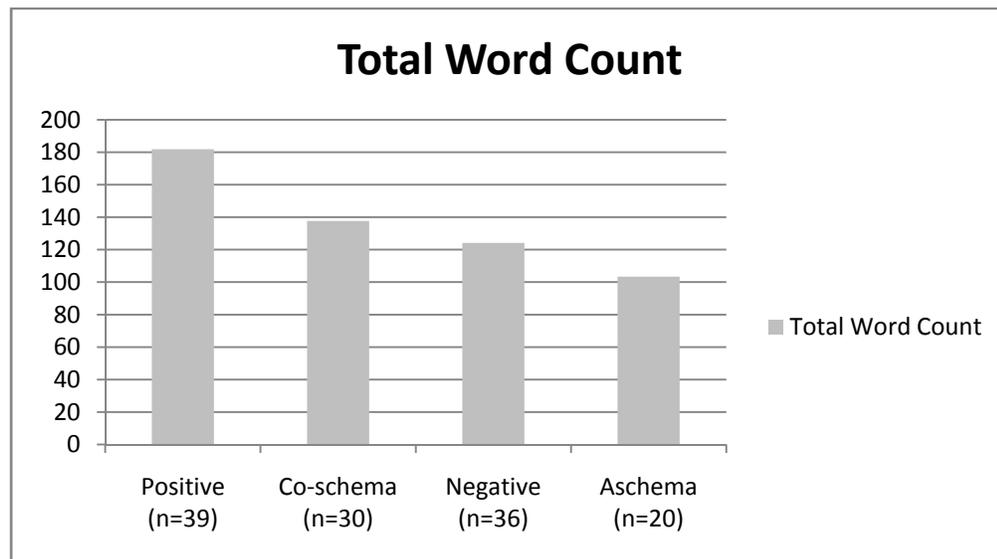
One-way analysis of variance showed that word count was significantly related to schema $F_{(3,121)}=3.89$, p=.01, in which women in the positive schema group (mean= 181.90, SD=106.59) showed higher mean word counts for the text-writing question than women in the aschematic group (mean= 103.35,SD=87.93). See Figure 4.5. This is in keeping with Cyranowski & Andersen's (1998) conceptualization of characteristics of women in bivariate schema groups. The positive schema group wrote the most number of words about desire, while aschematic women (those with presumably less well-elaborated cognitive representations about the sexual self) wrote the least number of words. See Appendix 16 for details.

How Do Positive Emotions and Cognitions Link to Sexual Variables?

The last research question was designed to examine relationships among women who use positive emotion words and those who also have positive cognitive representations about the self (positive sexual self schemas) and possible links to sexual outcome variables. Significant bivariate results were used to develop the models which were tested. The most parsimonious models which explain the most variance in the dependent variable were used to examine the relationships. No models emerged to explain orgasm or sexual problems variables. Since sexual desire was the primary outcome variable of interest, more detail will be presented about that model.

Desire, Satisfaction and Sexual Function

One-way analysis of variance was completed with schema group means compared to BISF-W sex scale scores. While women in positive schema categories predictably had higher mean scores (than women in the other three schema categories) on all sexuality scales, the only significant relationship occurred with the desire scale ($F(3,134)=3.06$, $p=.043$) with positive schema scorers showing the highest mean desire scores. However, in this case the lowest mean desire scores were for women in the negative schema group rather than women in the aschematic group as occurred for number of positive words and for word count variables. See Figure 4.6 for mean scores and Appendix 18 for bivariate schema group comparisons with all of the BISF-W sexuality scales.

Twenty-two percent (22%) of the variance in sexual desire was explained by the multivariate model (Table 4.5). The standardized regression coefficients and t-tests indicate the strongest predictors for desire were using positive words, sexual self-schema, and anxiety words and having a partner. Dummy variables were created for having a

sexual partner (compared to no partner) and the sexual self-schema categories. Positive

schema was the referent group against which the three other schemas were compared.

This is consistent with the theory that negative, coschematic and aschematic groups

experience negative or at least less positive sexual outcomes (see Figure 3.1).

Figure 4.6 Mean Sexual Desire Score by Schema Category
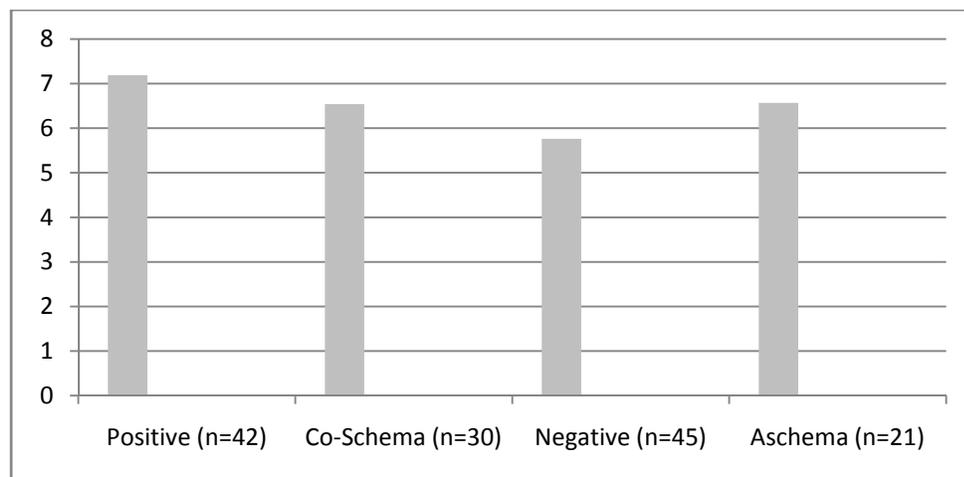
Women in the negative schema group have previously been found to negatively

evaluate sexual experiences, those in the co-schematic group have conflicting schemas

which may restrict sexual activities, and those in the aschematic group lack a coherent

framework to guide relevant sexual self-evaluations leading to sexual behaviors driven by

circumstance (Cyranowski & Andersen, 1998). The predictor having a partner

(compared to no partner) accounted for the most variance in the model (β=.38), followed

by negative sexual schema (β= -.24) and anxiety (β=.24) and finally the number of

positive words (β=.19) with a standardized regression coefficient of 0.22 which was

modest, but significant. See Table 4.5.

Sixty percent (60%) of the variance in sexual relationship satisfaction was

explained in the regression model tested. The standardized regression coefficients and t-

tests (seen in Table 4.5) indicate the strongest predictors for arousal are having a partner, followed by recent changes in sexual interest, use of third person singular pronouns, and the use of friend words. The total sexual function model also showed high variance explained (66%) with having a partner accounting for the most variance (β=.77) followed by changing sexual interest, use of causation words, and use of religion words (not significant but close, p=.07). See Table 4.5.

Sexual Arousal, Frequency, and Receptivity

Fifty-six percent (56%) of the variance in sexual arousal was explained in the regression model. The standardized regression coefficients and t-tests (seen in Table 4.5) indicate the strongest predictors for arousal are having a partner, recent changes in sexual interest, and the number of positive words used. Models for sexual frequency (60%) and receptivity (53%) showed similar large amounts of variance explained. As with all of the other models, having a partner was the largest predictor of variation in the sexual scale scores. This was followed by the use of friend words in the frequency model and the use of third person pronouns (she, he) in the receptivity model.

Together these models, showed different patterns. The desire model, though modest in the amount of variance explained, was predominately driven by affect and sexual self-schema variables (after accounting for the effect of having a partner). Among the other sexual outcome variables, only arousal was similarly influenced by positive word use (after partner and changes in sexual interest). Moreover, the other sexual variables were influenced predominately by having a partner (with standardized regression coefficients ranging from .68 to .69) and variously by changes in sexual interest and other word variables. Though having a partner was important to desire, the

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overall influence (β=.38) accounted for less than any other model tested with current

partner as predictors and BISF-W sexual outcomes.

Table 4.5 Regression Models

Predictor Variable	Standardized Regression Coefficient	t	p- value
Desire (adjusted R^2=.22)			
Number Positive Words	.19	2.30	.027*
Anxiety	.24	2.94	.004**
Negative Schema	-.24	2.31	.014*
Co-Schema	-.09	1.56	.350
Aschema	.009	1.82	.926
Current Partner	.38	4.29	.000**
Arousal (adjusted R^2=.56)			
Number Positive Words	.13	2.21	.029*
Change in Interest	.13	2.10	.038*
Current Partner	.75	12.31	.000**
Frequency (adjusted R^2=.60)			
Use Friend words	.13	1.98	.049*
Current Partner	.74	12.57	.000**
Receptivity (adjusted R^2=.53)			
Use She/He pronouns	.14	2.17	.032*
Current Partner	.69	10.84	.000
Relationship Satisfaction (adjusted R2=.60)			
Use Friend words	.13	2.17	.013
Use She/He pronouns	.15	2.52	.010*
Change in Interest	.18	3.05	.005**
Current Partner	.68	11.18	.000**
Total Sexual Function (adjusted R^2=.66)			
Use Cause Words	.11	2.06	.041*
Religion Words	-.10	-1.83	.070
Change in Interest	.18	3.24	.002**
Current Partner	.77	13.98	.000**

Chapter 5

Discussion

The Broaden and Build theory of positive emotion states that positive emotions result in more creative, flexible thinking and openness to new experiences by broadening one's thought-action repertoire (Fredrickson, 1998b; Fredrickson, 2001). Findings from this study provide modest but emerging evidence that applying a positive emotions approach has potential for developing a clearer understanding of emotions most closely associated with sexual desire. While links between positive emotion and sexual desire were modest, they were present, and were similarly supported by cognitive (sexual self-schema) variables which have previously been shown to predict positive sexual desire and responsiveness among women. Although the importance of having a current sex partner was central to all sexual outcome measures, the pattern with desire was less robust, suggesting affective and cognitive variables play important roles which deserve further scrutiny. This suggests that desire may function differently from other sexual outcomes, perhaps as an emotion response system suggested in previous work by Everaerd and Laan (2001).

Unexpected results include that while having a partner matters in terms of each of the sexual outcome variables measured, it matters less when asking women about desire. The way the desire questions were asked and how the questions about desire were interpreted by participants may account for this variation. Also unexpected were findings that body and sex words, while frequent, were not related to any of the sexual outcome

variables. Use of both body and sex words was higher than in non-sexually related writing tasks in past studies (Pennebaker, Chung et al., 2007), and sexual words were higher than groups who had written about sexual matters in the past (Rellini & Meston, 2007), but body words were lower.

Sexuality Related Findings

While almost 85% of the sample reported entirely heterosexual experiences in the past, only 67% reported entirely heterosexual desires. This finding supports similar findings in studies which conclude that women have more flexibility in sexual capacity and desire than labels of strictly heterosexual or homosexual orientation would imply (Diamond & Diamond, 2004; Nichols, 2006). The percentage of homosexual experience is in keeping with recent population estimates of 2-3% in adult women (Rubio-Aurioles & Wylie, 2008).

Women who used no medications regularly showed a positive relationship on all sex scale scores (except for the desire scale). Past studies have indicated that birth controls pills have a negative effect on sexual desire and function; however, findings from the present study do not support this notion. More recent literature reviews conclude that birth control pills with newer hormonal formulations containing smaller amounts of progesterone probably interfere with sexuality much less and the freedom of fear of pregnancy may enhance sexual desire and other sexual function(Stuckey, 2008).

Word Counts

The mean number of words per text sample was 142 (SD=97.75) which is smaller than typically seen in previous emotion writing sample (mean=443) studies (Smyth &

Pennebaker, 2008) but compares to clinical samples in a previous study (Pennebaker & King, 1999) in which participants wrote an average of 166 words. Since participants were only asked to write for 10 minutes and self-monitored the time it took to complete the writing task, it is possible that many wrote for considerably less than 10 minutes. While overall word count was less than expected; the number of six-letter words in this sample and dictionary words captured by the LIWC program were similar to baseline rates (see Figure 4.2) found in previous studies (Pennebaker, Booth et al., 2007).

What Patterns of Emotion Word Use Emerged?

The first two research questions asked what patterns of emotion word use would emerge when writing about desire and whether positive words would occur more often than negative emotions. Positive emotion words were expressed and reported more frequently than negative emotions when women were asked to write about desire. Compared to non-sexual writing samples (Pennebaker, Booth et al., 2007) mean positive emotion words in this study were higher. Moreover, this study's mean positive emotion word scores were higher than a clinical or a control group in a study in which women were asked to write about sexual topics (Rellini & Meston, 2007). The strategy employed here did not examine the intensity nor the specific relationship of the emotions expressed, but rather whether such a relationship may exist. While multivariate regression models did show a relationship with desire, whether positive emotion was a response to thinking about desire or whether thinking about desire initiated positive emotions is not clear. This relationship and its implication deserves further scrutiny.

Anxiety was also expressed and positively accounted for a significant amount of variance when explaining desire beyond the effects of currently having a partner. Since

no anxiety specific scale was used, the use of anxiety words by women was the predictor in this model. The mean use of anxiety words was higher than the grand mean for anxiety reported across studies (see Appendix17) but lower than means reported in emotional writing samples in LIWC2007 reliability studies (Pennebaker, Booth et al., 2007). Previous research regarding anxiety has been mixed with regard to anxiety effects on desire among women. Studies have suggested a facilitative effect of anxiety on desire (Barlow, 1986; Elliott & O'Donohue, 1997; Hamilton, Rellini, & Meston, 2008; Nobre & Pinto-Gouveia, 2006) however recent studies of physiologic responses to sexual stimuli show that increases in cortisol (associated with responses to stressful situations) are negatively related to desire{Hamilton, 2008 #1137)however recent studies of physiologic responses to sexual stimuli show that increases in cortisol (associated with responses to stressful situations) are negatively related to desire (Hamilton et al., 2008). Thus, a closer look at how anxiety was measured in this study is warranted. Since a measure of anxiety was not included as part of the present study, it is not possible to know whether the use of anxiety words is related in any way to a clinical measure of anxiety. Given the relatively sexually inexperienced population, it is possible the words may relate to uncertainty about sexual feelings, sexual frustration, or perhaps anxiousness about not having a partner (Sugrue, 2008).

How Do Emotions Relate to Sexual Desire?

Correlations show that the percentage of positive words (and negative words) did not correlate with desire scores. When the absolute number of positive words was used however, correlations did emerge and these positive effects persisted in the multivariate model. In large part, this may have been due to the small number of words written

overall. Though participants were asked to write continuously for 10 minutes without stopping, it appears this was more difficult for some than others. A timer which cues participants as to when the time is up has been used effectively in previous studies (Pennebaker, 2008). It is possible that women did not know how long they were taking to write, thus a timer may be more helpful as a cue in future studies. Analysis of word counts showed that women who wrote more words also wrote more positive words. Moreover, the text writing method was designed for individuals to write for a longer period of time in order to get a better sample of words. It may be the case that with longer writing duration the percentage of positive words would become significant in another sample. Also, an additional non-sexual writing sample may provide a way of examining the pattern of positive word use within individuals depending upon whether or not the topic is sexual. A second writing sample was considered for this study, but not carried out due to concerns about participant fatigue. Since it took much less time than anticipated to fill out the standardized scales using the computer, adding a second writing task could be considered in the future.

More important for future research and clinicians is the interpretation of the correlation between positive emotions and desire. First, establishing a link from positive emotion to desire is important, as it challenges previous views that desire may be fragile and easily affected by negative emotions. While this population of hormonally and presumably healthy young women were less likely to have physiologic problems that interfere with desire (and were chosen expressly for that purpose), if anxiety, fear, and negative emotion easily interfere with desire, negative emotions would likely have emerged as playing a role in desire. But negative emotions did not relate to desire. This

replicates findings from a recent study with women with childhood sexual abuse (Rellini & Meston, 2007). The authors expected negative emotion to interfere with desire, but negative emotion did not link to sexual desire, rather positive emotion did.

Additionally, anxiety (which is typically thought to interfere with desire) showed a positive influence on desire in the multivariate model. While this finding needs to be further investigated, it is possible that anxiety in this context may suggest that curiosity has been signaled, especially as women explore thoughts about what motivates them to feel desire. What might this mean for developing strategies to treat desire problems? Empirically based strategies (Kashdan & Fincham, 2004) for curiosity interventions include creating tasks that capitalize on novelty, complexity, ambiguity, and surprise (p. 490). Currently multiple strategies are used to treat women with desire problems for example, viewing or reading about romantic stories (Levine & Risen, 2003), exploring external cues which ignite desire (Goldstein & Brandon, 2004) or experimenting (with sex toys or visualization)(Leiblum & Sachs, 2002) to discover what works. In these examples, discovering cues that signal desire along with capitalizing on novelty and recognizing the complexity of desire are principles currently used by clinical experts. Perhaps targeting strategies to induce positive emotion may also be effective by inducing curiosity towards the exploration of one's sexual environment.

What are possible candidates for positive emotion producing strategies? First, targeting strategies to not only recognize cues, but to recognize one's strengths to apply to those cues may be a good approach. The Values in Action Classification of Strengths (VIA strengths) is a classification scheme for character strengths which can be used to measure positive traits (Peterson & Seligman, 2004) and allow researchers and clinicians

to speak the same language [much as the diagnostic and statistical manual was designed to help researchers and clinicians use similar language to define and describe mental illness and sexual dysfunction (Vroege, Gijs, & Hengeveld, 1998)]. For example, individuals could be directed to take the VIA signature strengths questionnaire (found at http://www.authentichappiness.sas.upenn.edu/) and start work in areas for which they have a preference and some ability. This approach not only allows one to focus on a strength, but offers a woman support for the notion that she has strengths that can be built upon (in addition to working on problems that need to be solved). Second, exercises can be targeted to specific strengths. If a woman's highest strength is playfulness, exploring the use of sexual play and toys may be more useful versus applying a standard approach to using play which may not work as well for a woman who may find this strategy unfulfilling and perhaps exhausting.

Using gratitude may be another useful approach for inducing positive emotions and enhancing desire. Research on marriages that flourish shows that happy marriages are characterized by ratios of positive to negative emotions of approximately 5 to1 (Gottman & Levenson, 1999). Showing appreciation and expressing admiration and gratitude are suggested as useful way of moving towards this goal (Lyubomirsky, 2008). One strategy that is useful for inducing positive emotions through gratitude is called counting your blessings(Emmons, 2007). Counting blessing helps individuals identify what to be grateful for and to communicating the gratitude to oneself and others (in this case perhaps to a partner). It may be possible that helping women count their blessings may improve desire through improving positive affect. This has not been measured, but is an intriguing possibility for future research.

Recent work in positive psychology has begun to demonstrate the use of meditation as a possible way of building personal resources and elevating positive emotions. Researchers have found that loving-kindness meditation had specific enhancing effects on positive emotions, especially in typical life situations that involved other people (Fredrickson et al., 2008). Sexuality researchers have also explored the positive effects that meditation may have on sexual desire problems (Brotto et al., 2008). This approach has been shown as useful for women with desire problems and perhaps (though not yet tested) may offer possibilities for preventing desire problems.

How Do Positive Emotions and Positive Sexual Self-Schemas Relate to Desire?

Women who used positive emotion words to describe sexual desire also had the highest positive sexual self-schema scores. Sexual self-schema scores in this study replicate and extend the findings of Cyranowski and Andersen (1998) who studied a similar population of young, undergraduate women. Women with positive versus negative self-schemas had higher mean sexual desire scales, however, unlike previous studies; this study did not see significant links from positive schema to arousal or other sexual function outcomes. This is likely due to several factors. The current study did not have a large number of participants which resulted in small groups for each of the four schema categories, thus a type II error may exist. Additionally, Cyranowski and Andersen (1998) used different measures for sexual desire, arousal, and experience, thus different results may have emerged. Another difference that emerged comparing this study to Cyranowski and Andersen's work is that the aschematic and coschematic groups did not show the same pattern with sexual desire. Again, the smaller number of women in each group may be the culprit.

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Previous sexual self-schema studies have not used word counts to examine the role of positive emotion to positive schema. As expected, positive sexual self schemas were significantly related to the number of positive words used. This suggests that as the model intends, women with positive sexual self-schemas were more likely to consult a positively valenced mental representation about the sexual self when asked to describe sexual desire resulting in the use of more positive emotion words. Moreover, positive schema women also used more total words when asked to describe desire, suggesting that a broader array of thoughts came to mind. This may be an example of experiencing a broadened thought repertoire when positive emotions are induced when women were asked to write about desire. As such, it is supportive of Fredrickson's Broaden and Build model.

Finally, researchers from previous sexual self-schema studies used a model to focus predominately on finding links between sexual vulnerabilities for women with negative sexual self views (Andersen & Cyranowski, 1994; Cyranowski, Aarestad, & Andersen, 1999; Cyranowski & Andersen, 1998). While explaining vulnerabilities is important, a more complete picture of predictors of sexual behavior emerges when positive cognitive representations are also examined and reported. In this study, using schema in the multivariate model helped explain additional variation above and beyond examining positive emotion alone. This is likely due to the way emotions were assessed. Since women were asked to think about their emotions (and thoughts) and write about them, it is more likely that the emotions measured were not spontaneous, but those aroused by cognitions.

Unexpected Findings

In the regression models that emerged from the bivariate examination of variables, though having a partner accounted for the largest amount of variance among all sexual outcomes, it accounted for relatively less (38%) in the desire model as compared to the other sexual outcome variables (68-79%). Why might this have occurred? Is love involved in some way? Though researchers have assumed that the function of sexual desire is to motivate individuals to seek a partner and subsequently develop a committed relationship (Gonzaga et al., 2006), the motivation link from desire to sexual behavior is somewhat more complicated for women, with women engaging in sexual behavior for a variety of reasons, not always relating initially to sexual desire (Basson, 2000). Recent work suggests that functional distinctions can be seen between love and sexual desire for example. Diamond (2004) argues that romantic love promotes pair bonding while desire promotes sexual behavior with differing physiologic mechanisms (oxytocin for love and steroid hormones for desire). In a recent study, researchers examined experiences, behavioral displays and physiologic differences when brief occurrences of love and desire were elicited in the laboratory. While researchers found distinct behavioral displays, the independence of desire from love was supported(Gonzaga et al., 2006). Converging evidence seems to show that desire may serve a different function than romantic love.

But why are other sexual function outcomes more related to having a partner than desire? In part the answer may lie in the way desire was measured. The two questions that contribute to the desire score in the BISF-W are focused on the individual. See Appendix 6. How often the individual thinks about sexual matters (thoughts, fantasies or

erotic dreams) and how frequently the individual feels a desire to engage in a variety of activities such as kissing, masturbation, mutual masturbation, petting and foreplay, oral sex, vaginal penetration or intercourse, and anal sex (rated 0= not at all to 6 =more than once a day). However, the remaining questions that make up the other 6 scales (arousal, frequency, receptivity, orgasm, satisfaction and problems) ask about how often the participant has engaged in, been responsive to, or had problems with sexual activities with another person. Consequently, the desire measure is designed to examine individual activities or at least individual desires for activities. This may also be why other word categories (such as use of friend and religion words) correlate differentially with all other scales except the desire scale (see Appendix 15).

Other unexpected findings include the lack of using biologic words to explain feelings of desire despite the explicit nature of the text-writing question, particularly body or sexual words. This may likely reflect both the directness of the writing question, and the ability of the LIWC dictionary to recognize body and sex word types. Women were specifically asked to "Explore the thoughts and feelings you have before, during and after sexual activities that you believe contribute to your wish or willingness to engage in sex." Perhaps fewer body and sexual words were written due to instructions to write about thoughts and feelings rather than specific activities (see the specific wording of the writing question in Appendix 5). While designed to prevent women from focusing on doing rather than feeling, this may have constrained answers to the question. The lack of correlations seen between sexual and body words and any of the sexual scales suggests that participants may have tried to tap into psychological rather than physical feelings which reflected positively on the purpose of the study.

Another possibility is that the default LIWC dictionary which was used in the analysis may have failed to recognize sexual words. However, recognition does not seem to be entirely the case, as mean body (M=.99, SD=1.65) and sexual words (M=3.45, SD=2.44) were much higher in this study than grand means found across writing samples in validation of the most recent LIWC program. Body (M=.73,SD=.85) and sexual (M=.23,SD=.39) words in LIWC summary studies (Pennebaker, Booth et al., 2007) were lower than means for the same words in the current study. In a recent study designed to examine processing of sexual information in groups of women with and without a history of childhood sexual abuse (CSA) mean sexual word scores (using LIWC to count words) were higher than Pennebaker's grand means also. See Figure 5.1.

Figure 5.1 Mean Sexual and Body Word Scores across Studies
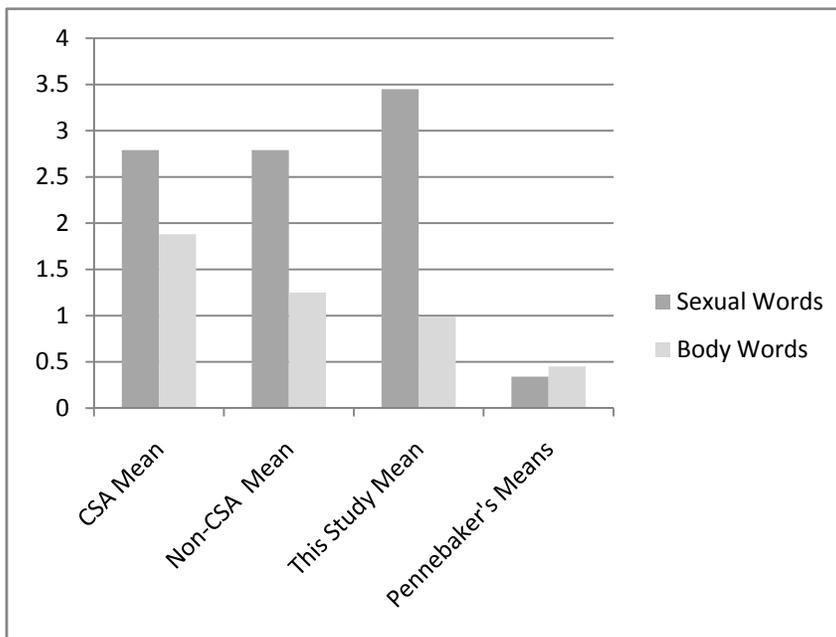
Consequently, it appears that the LIWC program has captured sexual and body words in higher levels when women are asked to write about sexual matters. What remains to be seen is whether the word counts might be much higher if additional sexually related

words were added to the LIWC dictionary and women were sampled with both an explicitly sexual and non-sexual writing task. This design would have allowed for within participant measurement of the same word counts across writing tasks. The LIWC dictionary is capable of searching for additional words and it may be possible to add words that may more closely match words that women use when writing about sexual desire.

Limitations and Future Directions

There are five major limitations that may likely have affected the results of this study in the areas of theory, design, methodology, analysis, and interpretation of results. Applying a positive psychology framework to sexual desire research has not been done before. One challenge to this approach comes from a recent study in which researchers concluded that rather than broadening one's thought/action repertoire, sexual desire narrows one's attention to focus on a desired object of sexual interest (Gonzaga et al., 2006 1008). However, this conclusion ignores other positive emotions which also emerged in the desire group; including amusement, happiness and pride. One problem with reaching this narrowed attention conclusion may be that when looking for positive emotions using traditional methods designed to study negative emotions, positive emotion results may be missed. Fredrickson (1998) suggests that fundamental differences between positive and negative emotion may require attention to different characteristics and a shift in how positive emotions are studied. Broadened thinking and feeling necessarily are likely to result in reports of other positive emotions which may not be expected. In a study with women with childhood sexual abuse (CSA), researchers (Rellini & Meston, 2007) were not expecting to see that women in the CSA group would

have positive emotions that explained 30% of desire in a fantasy essay. These unexpected findings linked with expectations of focused versus broadened emotions reports may result in missing other positive emotions, relationships among emotions, and different characteristics of positive emotions when they do exist.

The current study attempted to apply Fredrickson's Broaden and Build model to explore whether positive emotions exist when women write about desire. However, examining the valence of emotions in the words used to write about desire is only a first step and may likely not be sufficient to capture the broad range of emotions that women feel with desire. A variety of self report and non self report measures could be used which would allow participants to choose from a list of emotions experienced, or perhaps a measure of facial expressions could be used when women write about desire. For a review of positive emotion measurement, see Lucas, Diener and Larsen (2003). Furthermore, asking women to recall their thoughts and feelings about desire may likely result in recall bias, since the emotion experienced is not proximal to the experience of desire or the sex act itself, but linked to the memory of a desire experience.

The design of the study was limited since it was an online survey of predominately undergraduate women. An online survey was used to ensure anonymity for participants, and to offer the ability to write about feelings without fear of exposure in a more public situation. Unfortunately, since women were not warned that they would be answering questions about sex when they started the survey, those women who used a public computer may have found themselves in an uncomfortable situation. One participant reported this occurred for her. Not identifying this as a sex study at

recruitment may have avoided response bias, but may have resulted in additional respondent demand for women answering on a public computer.

The sample included a large number of young women which is not generalizable to the larger population of women. Also having approximately 40% of the sample not currently engaged with a partner or in sexual activity likely reduced the amount of variance that was able to be accounted for in many of the outcome variables, especially those related to sexual function. For example, in a previous study with a similar population of young women Cyranowski and Andersen (1998) warn that the sexual self-schemas of women with less sexual experience may be less well differentiated. The same limitation applies to the current sample. However, I believe it may be important to understand the emergence of thoughts and feelings related to desire, even before activity occurs. Perhaps a more useful approach would be a longitudinal design to compare women over time and examine whether and how changes in sexual outcomes may emerge.

This study was also limited by the method used to ask women to write about desire. Since no standard question designed to elicit an open-ended description of sexual desire was available, original directions were created. Problems that are likely to threaten the results include that the question was long (Pennebaker, 2008) and may have included terms which participants did not feel comfortable with (See Appendix 5). In the future, perhaps separating the questions into more than one task may improve both the amount of time women take when writing and perhaps allow a fuller expression of emotions.

Moreover, some women may have difficulty recognizing sexual thoughts and feelings as research suggests that many women do not experience spontaneous desire

(Basson, 2005; Regan & Berscheid, 1996). Some women struggled to write about desire, using fewer words than seen in typical emotions writing samples and sometimes even directly reporting how difficult it was to write about desire. One woman wrote, "My experience with desire is that it is hard to describe in words". In the future using a sexual cues scale which has recently been developed (McCall & Meston, 2006) may be useful as a check for whether women who struggle to identify sexual cues perform differently on a writing task of this type.

Analysis and interpretation of results may have been limited by the correlational nature of the study and the analysis needed to answer specific research questions. A structured approach was used to examine bivariate associations and only after these associations emerged were they used in multivariate models. While this is a realistic approach, many more questions arose in the course of examining and analyzing the data. Future investigation needs to include an examination of other words which were correlated with desire, but not a focus of the present study (such as motion and exclusion words). Similarly, the LIWC program is capable of extracting more words if the specific words are added to the program. In this study, the LIWC program was used with the default dictionary. In the future, more sexually related words, perhaps including word cues from other sexuality studies could be added to the LIWC dictionary. Similarly specific positive emotion words might be added including those used in previous studies such as amusement, joy awe, compassion, contentment, gratitude, hope, joy, love, pride, interest and sexual desire (Fredrickson & Losada, 2005).

An exciting possibility for future work is to examine the ratio of positive to negative words used in the context of writing about desire. Fredrickson and Losada

(2005) found that the positivity to negativity ratio could be examined and that flourishing individuals had an approximately 3 to 1 positivity to negativity ratio. Understanding positivity ratios has also been observed in marriage studies. Gottman and colleagues observed 73 coupled discussing an area of conflict in their relationships and found that among marriages where both partners were most satisfied, a 4.7 to one ratio of positive observed emotions and 5 to one positivity ratio in speech acts existed. Those marriages with much lower ratios (0.7 observed emotions and 0.9 speech acts) resulted in much more negative outcomes (Gottman & Levenson, 1999). If this same ratio could be examined with sexual desire, perhaps further distinguishing characteristics of positive emotions could be discovered.

Conclusion

The overall aim of this study was to use a positive emotions model to guide an examination of the role of positive emotion in fueling sexual desire among women. Exploratory in nature, this study began to discover whether sexual desire could be examined using a positive psychology approach and if so, what associations between positive emotion and desire may exist. While results were modest, they are encouraging and suggest that using a positive emotions approach deserves closer inspection and may be useful in future studies.

Appendices

Appendix 1
Study Consent Forms

UNIVERSITY OF MICHIGAN

CONSENT TO BE PART OF A RESEARCH STUDY

NAME OF STUDY AND RESEARCHERS

Title of Project: Emotions among Healthy Women

Principal Investigator: Elizabeth Brough, RN, MSN, PhD Candidate,

University of Michigan School of Nursing

Co-Investigators: Bonnie Hagerty, RN, PhD. Chair person of Dissertation Committee

University of Michigan School of Nursing

GENERAL INFORMATION

We are conducting research about thoughts and emotions among healthy women during individual and interpersonal situations. To gather information, we are asking 125 adult women between the ages of 18-30 years old to answer a one-time survey online in UM.Lessons. During the survey, you will answer questions and write about thoughts and feelings during specific situations. The survey is voluntary. You may skip or refuse to answer any survey question without affecting your survey compensation or academic standing/record. Your responses will help us understand and treat women with health concerns better.

There are two parts to this study. After you have completed the first part you will

be given more information about the study and offered the opportunity to participate in a

second part. You may choose to participate in just one or in both parts of the study. It will

take a total of 30 minutes to complete both parts of the study [part 1 takes about 10

minutes and part 2 takes about 20 minutes].

You will be asked to complete the questions online in a secure site UM.Lessons. Some questions may cause you to feel embarrassed. This survey is a blinded survey, thus your answers are anonymous to the researchers. Names and identifying information are not present in questionnaire results. While you may see your name at the top of the last page,

researchers will not see the top of the last page. This is a default of the UM.Lessons system. Your name is not connected to any data that the researchers will see.

While you will use your UM uniquename to login to UM.Lessons, your name, or uniquename can not be connected to your answers by the researchers. UM.Lessons will provide the researchers an alphabetical list of respondents who have taken the survey so they may be compensated for participation. All survey responses are kept separately from identifying information and stored only in UM.Lessons servers in a secure location. Only in special situations (a medical emergency) can the UM.Lessons developer access the uniqname identity of a respondent.

During the study, the data reports will be kept in the School of Nursing in a secure office within a locked file cabinet and only accessible to the study team. It will remain accessible to the PI and co-PI until the completion of doctoral work. All names and identifiers will be removed by UM.Lessons prior to being sent to the researchers, thus privacy is ensured for each participant.

You may have your data from part one or part two rescinded (removed) after completing either part. Please contact the PI at ebrough@umich.edu if you wish to have your data deleted. Since your name is not connected to the survey results, the data will be removed by UM.Lessons before being released to the researchers, thus none of your answers will be available to anyone connected with the study.

You will not be identified in any reports on this study. Records will be kept confidential to the extent provided by federal, state, and local law. However the Institutional Review Board, or university and government officials responsible for monitoring this study may inspect these records. Since study results are separated from all identifying information prior to being released from UM.Lessons, the IRB will not be able to link individuals with their responses to survey questions.

While we there are minimal risks to women who take this survey, in the unlikely event that emotional discomfort is experienced, you should contact your health care provider or the Counseling and Psychological Services (CAPS) 3100 Michigan Union 530 S State Street Ann Arbor, MI 48109 http://www.umich.edu/~caps/ 734-764-8312 for a referral.

There are no direct benefits to you for completing this survey. Future women may benefit by the information we learn. Your participation in this project is voluntary. Even after you consent and start the survey, you may leave the study at any time without penalty or loss of benefits to which you may otherwise be entitled. Payment for participation will be in the form of a gift card (valued at $10.00). No cash payments will be made in lieu of gift cards.

Contact Elizabeth Brough, RN, MSN, Room 2348, telephone 734-647-7326 or Bonnie Hagerty, RN, PhD. room 1305, 734-764-9454 at the School of Nursing, 400 North Ingalls, Ann Arbor, Michigan 48109-0482 if you have questions or concerns about this study or feel that the study has caused you any harm. If you have any questions or

concerns about your rights as a research subject, or any grievance, you may also contact the Institutional Review Board, University of Michigan, 540 E. Liberty Street, Suite 202, Ann Arbor, MI 48104-2210; telephone 734-936-0933, email: irbhsbs@umich.edu.

<div align="center">

CONSENT

Research Subject:

</div>

I have read the information given above. Elizabeth Brough has offered to answer any questions I may have concerning the study. I understand that if I have more questions or concerns about the study or my participation as a research subject, I may contact one of the people listed above. I understand that I may receive a copy of this form upon request. I understand that by entering the UM.Lessons associated with this study, I give my consent to participate in the study.

Yes: I hereby consent to participate in this study. Click the continue button in UM.Lessons to begin.

No: If you do not wish to participate in this study, click the log out button in UM.Lessons to stop.

<div align="center">

UNIVERSITY OF MICHIGAN

CONSENT TO BE PART OF A RESEARCH STUDY- PART 2

NAME OF STUDY AND RESEARCHERS

Title of Project: Emotions among Healthy Women

Principal Investigator: Elizabeth Brough, RN, MSN, PhD Candidate,

University of Michigan School of Nursing

Co-Investigators: Bonnie Hagerty, RN, PhD. Chair person of Dissertation Committee

University of Michigan School of Nursing

INFORMATION ABOUT THE NEXT SECTION

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The next section asks questions about sexually explicit situations. To gather information, we are asking 125 adult women between the ages of 18-30 years old to answer a 10 minute free text question about sexual desire and another 10 minute clinical survey with explicit sexually related questions. During the survey, you will answer questions and write about thoughts and feelings during sexual desire situations.

The survey is voluntary. You may skip or refuse to answer any survey question without affecting your survey compensation. Your responses will help us understand and treat women with sexual health concerns better.

It will take about 20 minutes to complete the questions online in a secure site UM.Lessons. Some questions may cause you to feel embarrassed. This survey is a blinded survey, thus your answers are anonymous to the researchers. Names and identifying information are not present in questionnaire results. UM.Lessons will provide the researchers an alphabetical list of respondents who have taken the survey so they may be compensated for participation. While you may see your name at the top of the last page, researchers will not see the top of the last page. This is a default of the UM.Lessons system. Your name is not connected to any data that the researchers will see.

You will not be identified in any reports on this study. Records will be kept confidential to the extent provided by federal, state, and local law. However the Institutional Review Board, or university and government officials responsible for monitoring this study may inspect these records. Since study results are separated from all identifying information prior to being released from UM.Lessons, the IRB will not be able to link individuals with their responses to survey questions.

During the study, the data reports will be kept in the School of Nursing in a secure office within a locked file cabinet and only accessible to the study team. It will remain accessible to the PI and co-PI until the completion of doctoral work. All names and identifiers will be removed by UM.Lessons prior to being sent to the researchers, thus privacy is ensured for each participant. You may have your data from part one or part two rescinded (removed) after completing either part. Please contact the PI at ebrough@umich.edu if you wish to have your data deleted. Since your name is not connected to the survey results, the data will be removed by UM.Lessons before being released to the researchers, thus none of your answers will be available to anyone connected with the study.

While we expect there are minimal risks to women who take this survey, in the unlikely event that emotional discomfort is experienced, you should contact your health care provider or the referral agencies listed below.

Counseling and Psychological Services
3100 Michigan Union
530 S State Street
Ann Arbor, MI 48109
http://www.umich.edu/~caps/
(734) 764-8312

Sexual Assault Prevention and Awareness Center
715 N. University, Suite 202

Ann Arbor, MI 48104
http://umich.edu/~sapac
Sexual Assault Prevention & Awareness Center 24 hr. crisis line: (734) 936-9333

U of M Psychiatric Emergency Services
http://www2.med.umich.edu/healthcenters/clinic_detail.cfm?service_id=30
U of M Psychiatric Emergency Services 24 hour crisis line (734) 996-4747
University Hospital
1500 East Medical Center Drive
Floor B1, Room B1C204, Reception: Emergency Medicine
Ann Arbor, MI 48109-5020

CONSENT

Research Subject: I have read the information given above. I understand that the next part of the survey asks about sexual situations. Elizabeth Brough has offered to answer any questions I may have concerning the study. I understand that if I have more questions or concerns about the study or my participation as a research subject, I may contact one of the people listed above. I understand that I may receive a copy of this form upon request. I understand that by entering the next part of the UM.Lessons associated with this study, I give my consent to participate in the study.

Yes: I hereby consent to participate in the rest of this study. Click the continue button in UM. Lessons to begin.

No: If you do not wish to participate in this study, click the log out button in UM.Lessons to stop.

If you decide to stop at any time, your responses cannot be linked to your name.

In order to receive your gift card your name and email will be given to the principle investigator in a report from UM.Lessons.

After 15 people have taken the survey, a list of names will be sent to the principle investigator (Elizabeth Brough) who will send you a $10.00 gift card from Target.

Please be sure your correct address is available in the UM directory so your gift card is not delayed.
If you prefer to receive your gift card online or at another address not in the UM directory, please email me directly at ebrough@umich.edu with instructions.

1. **What is your current age?**
2. **What is your current education level?**
    a. Freshman year of college
    b. Sophomore year of college
    c. Junior year of college
    d. Senior year of college
    e. Graduate school- Masters program
    f. Graduate school- Doctoral program
    g. Completed Doctorate
3. **My current relationship status is:**
    a. Not currently in any relationship with another person
    b. In a relationship with another person for less than one year
    c. Married or in a committed relationship for less than one year
    d. Married or in a relationship for more than one year but less than 5 years
    e. Married or in a committed relationship for more than 5 years
    f. Divorced or ended a long term relationship recently, within the last year
    g. Divorced or separated from a long term relationship partner greater than one year ago.
4. **I have the following number of children currently living in the household with me:**
    a. None
    b. 1
    c. 2-3
    d. 4 or more
5. **Please select the household income that most closely matches your own.**
    a. 0-$25,000/ year
    b. $25,001 to $50,000 per year
    c. $50,001-$75,000 per year
    d. $75,001,00-$100,000
    e. More than $100,000 per year
    f.   I do not wish to respond
6. **Please select the approximate number of hours you work per week outside of school work.**
    a. I am not working while in school.
    b. 1-8 hours per week
    c. 9-20 hours per week
    d. 20-40 hours per week
    e. More than 40 hours per week
7. **If you have major medical problems that have interfered with your ability to function physically please describe them briefly.**
8. **I am taking the following medications regularly (for longer than one week)** *Please check all that apply*
    a. Antidepressants of any type (for example, Prozac, Paxil, Zoloft, or Lexapro)
    b. Birth control pills (whether taken for birth control or menstrual cycle problems)
    c. Medications for high blood pressure or heart disease
    d. Medications for nausea or other intestinal problems
    e. Prescription pain relievers for more than one week's duration
    f. Prescription medication for anxiety or other mental health problems of any type
    g. None

h. Other

Choose a number for each adjective to show how accurately the adjective describes you as you are GENERALLY OR TYPICALLY.

To what extent does the term_____describe me?

	Not at all Descriptive (0)	1	2	3	4	5	Very Much Descriptive (6)
1. generous	O	O	O	O	O	O	O
2. *unihibited*	O	O	O	O	O	O	O
3. *cautious*	O	O	O	O	O	O	O
4. helpful	O	O	O	O	O	O	O
5. *loving*	O	O	O	O	O	O	O
6. *open-minded*	O	O	O	O	O	O	O
7. *shallow*	O	O	O	O	O	O	O
8. *timid*	O	O	O	O	O	O	O
9. *frank*	O	O	O	O	O	O	O
10. *clean*-cut	O	O	O	O	O	O	O
11. *stimulating*	O	O	O	O	O	O	O
12. *unpleasant*	O	O	O	O	O	O	O
13. *experienced*	O	O	O	O	O	O	O
14. *short-tempered*	O	O	O	O	O	O	O
irresponsible	O	O	O	O	O	O	O
direct	O	O	O	O	O	O	O
logical	O	O	O	O	O	O	O
broad-minded	O	O	O	O	O	O	O
kind	O	O	O	O	O	O	O
arousable	O	O	O	O	O	O	O
practical	O	O	O	O	O	O	O
self-conscious	O	O	O	O	O	O	O
dull	O	O	O	O	O	O	O
straightforward	O	O	O	O	O	O	O
casual	O	O	O	O	O	O	O
disagreeable	O	O	O	O	O	O	O
serious	O	O	O	O	O	O	O
prudent	O	O	O	O	O	O	O
humorous	O	O	O	O	O	O	O
sensible	O	O	O	O	O	O	O
embarrassed	O	O	O	O	O	O	O
outspoken	O	O	O	O	O	O	O

level-headed	O	O	O	O	O	O	O
responsible	O	O	O	O	O	O	O
romantic	O	O	O	O	O	O	O
polite	O	O	O	O	O	O	O
sympathetic	O	O	O	O	O	O	O
conservative	O	O	O	O	O	O	O
passionate	O	O	O	O	O	O	O
wise	O	O	O	O	O	O	O
inexperienced	O	O	O	O	O	O	O
stingy	O	O	O	O	O	O	O
superficial	O	O	O	O	O	O	O
warm	O	O	O	O	O	O	O
unromantic	O	O	O	O	O	O	O
good-natured	O	O	O	O	O	O	O
rude	O	O	O	O	O	O	O
revealing	O	O	O	O	O	O	O
bossy	O	O	O	O	O	O	O
feeling	O	O	O	O	O	O	O

The 26 Sexual Self-Schema Scale items are in italics.
The positive schema dimension is the sum of items:
2,5,6,9,11,13,16,18,20,24,25,32,35,37,39,44,45,48,and 50 (45 is reverse-scored)
The negative dimension is the sum of Items: 3,8,22,28,31,38,41.

Appendix 4
Patient Health Questionnaire-2 (PHQ-2)

Over the past two weeks, how often have you been bothered by any of the following problems?

1. Little interest or pleasure in doing things.
   0 = Not at all
   1 = Several days
   2 = More than half the days
   3 = Nearly every day

2. Feeling down, depressed, or hopeless.
   0 = Not at all
   1 = Several days
   2 = More than half the days
   3 = Nearly every day

Score interpretation:

Total point score:	Probability of major depressive disorder (%)	Probability of any depressive disorder (%)
1	15.4	36.9
2	21.1	48.3
3	38.4	75.0
4	45.5	81.2
5	56.4	84.6
6	78.6	92.9

This questionnaire is used as an initial screening test for major depressive episode.
(from Kroenke K, Spitzer RL, Williams JB. The Patient Health Questionnaire-2: validity of a two-item depression screener. Med Care 2003;41:1284-92).

Appendix 5
Writing Sample: Writing About You

Please write about your thoughts and feelings about your personal experience of sexual desire. Sexual desire is defined as your interest in, willingness, and /or wish to engage in any sexual activity that you find meaningful.

Explore the thoughts and feelings you have before, during and after sexual activities that you believe contribute to your wish or willingness to engage in sex. The specific sexual activity is not as important as your own thoughts and feelings that may have led to you recognize that you became interested in engaging in the sexual activity. Some questions that may help you include:

What feelings and thoughts lead you to desire sexual activities? What feelings make you want to get "turned on"?

During a sexual experience, what feelings and thoughts keep you interested in continuing to experience sexual activity? What keeps you "turned on"?

After you have had sex, are there thoughts and feelings that you wish to savor or think about later which may lead to desire in the future? What makes you want to get "turned on "in the future?

It is important for you to write continuously and don't worry about grammar, sentence structure or spelling. Please write without stopping for 20 minutes expressing your deepest thoughts and feelings.

Appendix 6
Brief Inventory of Sexual Function for Women (BISF-W)

Please answer the following questions by choosing the most accurate response for the past month.

1. Do you currently have a sex partner?
   a. Yes
   b. No
2. Have you been sexually active during the past month?
   a. Yes
   b. No
3. During the past month how frequently have you had sexual thoughts, fantasies, or erotic dreams?
   a. Not at allOnce2 or 3 timesOnce a week2 or 3 times per weekOnce a dayMore than once a dayUsing the scale, indicate how frequently you

have felt a desire to engage in the following activities during the past month? *(An answer is required for each, even if it may not apply to you.)* **(0) Not at all, (1) Once, (2) 2 or 3 times, (3) Once a week , (4) 2 or 3 times per week, (5) Once a day, (6) More than once a day**

   a. KissinDreams or fantasyMasturbation aloneMutual masturbationPetting and foreplayOral sexVaginal penetration or intercourseAnal sexUsing the

scale, indicate how frequently you have become aroused by the following sexual experiences during the past month. *(An answer is required for each, even if it may not apply to you).* **(0) Have not engaged in this activity, (1) Not at all, (2) Seldom, less than 25% of the time, (3) Sometimes, about 50% of the time, (4) Usually, about 75% of the time, (5) Always become aroused**

   a. KissinDreams or fantasyMasturbation aloneMutual masturbationPetting and foreplayOral sexVaginal penetration or intercourseAnal sexOverall,

during the past month, how frequently have you become anxious or inhibited during sexual activity with a partner?

   a. I have not had a partnerNot at all anxious or inhibitedSeldom, less than 25% of the timeSometimes, about 50% of the timeUsually, about 75% of the timeAlways become anxious or inhibitedUsing the scale, indicate how

frequently you have engaged in the following sexual experiences in the last month? *(An answer is required for each, even if it may not apply to you.)* **(0) Not at all, (1) Once, (2) 2 or 3 times, (3) Once a week, (4) 2 or 3 times per week, (5) Once a day, (6) More than once a day** KissinSexual fantasyMasturbation aloneMutual masturbationPetting and foreplayOral sexVaginal penetration or intercourseAnal sexDuring the past month, who has initiated sexual

activity? *(Please choose the most appropriate response.)*

   a. I have not had a partnerI have not had sex with a partner during the past monthI usually have initiated activityMy partner and I have equally initiated activityMy partner has usually initiated activityDuring the past

month, how have you usually responded to your partner's sexual advances? *(Please choose the most appropriate response)*

a. I have not had a partnerHas not happened during the past monthUsually refusedSometimes refusedAccepted reluctantlyAccepted, but not necessarily with pleasureUsually accepted with pleasureAlways accepted with pleasureDuring the past month, have you felt pleasure from any forms of sexual experience? *(Please choose the most appropriate response.)*

a. I have not had a partnerHave had no sexual experience during the past monthHave not felt any pleasureSeldom, less than 25% of the timeSometimes, about 50% of the timeUsually, about 75% of the timeAlways felt pleasureUsing the scale, indicate how often you have reached orgasm during the past month with the following activities. *(An answer is required for each, even if it may not apply to you.)* **(0) I have not had a partner, (1) Have not engaged in this activity, (2) Not at all , (3) Seldom, less than 25% of the time, (4) Sometimes, about 50% of the time, (5) Usually, about 75% of the time, (6) Always reached orgasm**

a. In dreams or fantasKissingMasturbation aloneMutual masturbationPetting and foreplayOral sexVaginal penetration or intercourseAnal sexDuring the past month, has the frequency of your sexual activity with a partner been: *(Please choose the most appropriate response.)*

a. I have not had a partnerLess than you desiredAs much as you desiredMore than you desiredUsing the scale, indicate the level of change, if any, in the following areas during the last month? (An answer is required for each, even if it may not apply to you.) **(0)Not applicable, (1) Much lower level, (2) Somewhat lower level , (3) No change, (4) Somewhat higher level , (5) Much higher level**

a. sexual interessexual arousalsexual activitysexual satisfactionsexual anxietyDuring the past month, how frequently have you experienced the following? *(An answer is required for each, even if it may not apply to you.)* **(0)Not at all, (1) Seldom, less than 25% of the time, (2) Sometimes, about 50% of the time, (3) Usually, about 75% of the time, (4) Always**

   a. Bleeding or irritation after vaginal penetration or intercourse
   b. lack of vaginal lubrication
   c. Painful penetration or intercourse
   d. Difficulty reaching orgasm
   e. Vaginal tightness
   f. Involuntary urination
   g. Headaches after sexual activity
   h. Vaginal infection

15. Using the scale, indicate the frequency with which the following factors have influenced your level of activity during the past month. *(An answer is required for each, even if it may not apply to you.)* **(0) I have not had a partner, (1) Not at all, (2)Seldom, less than 25% of the time,(3) Sometimes, about 50% of the time,(4) Usually, about 75% of the time,(5) Always**
   a. My own health problems (for example infection, illness)
   b. My partner's health problems
   c. Conflict in the relationship
   d. Lack of privacy
   e. Other (please specify)

16. How satisfied are you with the overall appearance of your body? *(Please choose the most appropriate response.)*
    a. Very satisfied
    b. Somewhat satisfied
    c. Neither satisfied nor dissatisfied
    d. Somewhat dissatisfiedVery dissatisfiedDuring the past month, how frequently have you been able to communicate your sexual desires or preferences to your partner? *(Please choose the most appropriate response.)*

    a. I have not had a partnerI have been unable to communicate my desires or preferencesSeldom, about 25% of the timeSometimes, about 50% of the timeUsually, about 75% of the timeI was always able to communicate my desire or preferencesOverall, how satisfied have you been with your sexual relationship with your partner? *(Please choose the most appropriate response.)*

    a. I have not had a partner
    b. Very satisfied
    c. Somewhat satisfied
    d. Neither satisfied nor dissatisfied
    e. Somewhat dissatisfied
    f. Very dissatisfied
19. Overall, how satisfied do you think your partner has been with your sexual relationship? *(Please choose the most appropriate response.)*
    a. I have not had a partner
    b. Very satisfied
    c. Somewhat satisfied
    d. Neither satisfied nor dissatisfied
    e. Somewhat dissatisfied
    f. Very dissatisfied
20. Overall, how important a part of your life is your sexual activity? *(Please choose the most appropriate response.)*
    a. Not at all important
    b. Somewhat unimportant
    c. Neither important nor unimportant
    d. Somewhat important
    e. Very important
21. Choose the number that corresponds to the statement that best describes your sexual experience.
    a. Entirely heterosexual
    b. Largely heterosexual, but some homosexual desire
    c. Largely heterosexual, but considerable homosexual desire
    d. Equally heterosexual and homosexual
    e. Largely homosexual, but considerable heterosexual desire
    f. Largely homosexual, but some heterosexual desire
    g. Entirely homosexual
22. Choose the number that corresponds to the statement that best describes your sexual desires.

a.   Entirely heterosexual
b. Largely heterosexual, but some homosexual desire
c. Largely heterosexual, but considerable homosexual desire
d. Equally heterosexual and homosexual
e. Largely homosexual, but considerable heterosexual desire
f. Largely homosexual, but some heterosexual desire
g. Entirely homosexual

Appendix 7
Brief Inventory of Sexual Function Scale Scoring

Question Type /Scale	Question # (Range)	Content
Demographic Questions	BISF-1 (yes/no)	Current Sex Partner
Demographic Questions	BISF-2 (yes/no)	Sexually active past month
Demographic Questions	BISF-13 (-10 to +10)	Change during last month
Demographic Questions	BISF-21 (0-6)	Described sexual experience (sexual orientation)
Demographic Questions	BISF-22 (0-6)	Described sexual desire (sexual orientation)
D1 (Thoughts/Desire)	BISF-3 (0-6)	Sexual thoughts
D1 (Thoughts/Desire)	BISF-4 (0-6) [score/7]	Desire for activity
D2 (Arousal)	BISF-5 (0-8) [score/8]	Arousal during activities
D2 (Arousal)	BISF-6 (0-4) [score/4]	Anxiety with partner
D3 (Frequency of Sexual Activity)	BISF-7 (0-12) [score/4]	Frequency of engaging in activities
D4 (Receptivity/Initiation)	BISF-8 (0-6)	Who initiated activity
D4 (Receptivity/Initiation)	BISF-9 (0-5)	Response to advances
D4 (Receptivity/Initiation)	BISF-12 (0-4)	Satisfaction frequency of activity
D5 (Pleasure/Orgasm)	BISF-10 (0-4)	Felt pleasure from experience
D5 (Pleasure/Orgasm)	BISF-11 (0-8) [score/4]	Frequency of orgasm
D6 (Relationship Satisfaction)	BISF-18 (0-4)	Satisfaction sexual relationship
D6 (Relationship Satisfaction)	BISF-19 (0-4)	Satisfaction partner w/sexual relationship
D6 (Relationship Satisfaction)	BISF-20 (0-4)	Overall importance of sex to your life
D7 (Problems affecting sexual function)	BISF-14 (0-4) [score/8]	Frequency of problems
D7 (Problems affecting sexual function)	BISF-15 (0-4) [score/8]	Influence of health factors
D7 (Problems affecting sexual function)	BISF-16 (0-4)	Satisfaction with body appearance
D7 (Problems affecting sexual function)	BISF-17 (0-4)	Ability to communicate desires

Mazer, N. A., Leiblum, S. R., & Rosen, R. C. (2000). The brief index of sexual functioning for women (BISF-W): a new scoring algorithm and comparison of normative and surgically menopausal populations. *Menopause, 7*(5), 350-363.

Sexual Function BISF-W Scales	Mean (SD)	Cronbach's Alpha	Inter-item Correlations
D1-Thoughts /Desire	20.75(8.31)	.837	.385
D2-Arousal	15.71(8.73)	.840	.334
D3-Frequency of Activity	14.20(8.69)	.802	.316
D4-Reptivity/Initiation	6.56(5.07)	.854	.675
D5-Pleasure/Orgasm	8.15(6.08)	.685	.195

Sexual Self-Schema Scales	Mean (SD)	Cronbach's Alpha	Inter-item Correlations
Romantic-Passionate Scale	42.52(6.75)	.775	.274
Open-Direct Scale	31.86(7.1)	.790	.285
Positive Schema Scale (1+2)	74.40(11.32)	.817	.197
Conservative-Embarrassed Scale	20.50(5.80)	.676	.232
D6 Relationship Satisfaction	6.93 (4.01)	.817	.579
D7-Problems Affecting Sexual Function	11.62(7.86)	.796	.230
Composite Score	65.35(32.84)	.813	.628

Previous Cronbach's α from Mazur et al. were D1(desire)=.72, D2(arousal)=.39, D4(receptivity)=.45, D5(orgasm) .72, D6(satisfaction)=.61 and D7(problems)= -.08. This group included clinical populations thus were lower than the healthy sample reporting in this study.

Appendix 9
Sample Characteristics

	Completed All (n=125)	Dropped Out (n-39)	t-test/ X^2
Age (Mean, SD)	21.5 (2.45)	20.36(1.84)	t (162) =2.69, p=.008**
Education ,*College level*			
Freshman=1	.8	.0	X^2(4) =12.05,
Sophomore=2	12.0	35.0	p=.017*
Junior=3	19.2	17.5	
Senior=4	61.6	40.0	
Grad school=5,6	6.4	7.5	
Relationship Status (%)			ns
1=No current relationship	39.2	59.0	
2= Relationship<1yr,	20.8	15.4	
3=Married/relationship <1yr	4.0	2.6	
4=Married/rel >1 but<5yrs	25.6	17.9	
5=Married/rel >5yrs	9.6	5.1	
6=Divorced/ended rel <1yr)	.8	0.0	
Children (%)			ns
Zero	96.8	97.5	
One	3.2	0.0	
4 or more	0.0	2.5	
Income (%)			ns
Zero-$50,000/yr	64.8	72.5	
$50-100,000/yr	14.4	15.0	
>$100,000/yr	13.6	0.0	
Employment *(%)*			ns
Not working	32.8	22.5	
<20 hrs/wk,	43.2	55.0	
>20 hrs/wk	24.0	22.5	
Medication Use (%)			ns
BCP's	53.6	50.0	
Antidepressants	7.2	10.0	
GI Meds	4.0	2.5	
Anxiety Meds	4.0	2.5	
No Regular Meds	27.2	37.5	
Other	20.0	27.5	
Depression Score *(%)*			ns
0 score=none	52.0	57.5	
1-3 score=no sign sx	43.2	35.0	
>3 score=depression sx	4.8	7.5	

*p-value <.05 ; ** p-value < .010

Appendix 10
Sample Sexuality Background Characteristics

*Note the drop outs were those who completed most or all of the BISF-W scale, but did not attempt the written text question.	*Completed n=125*	*Dropped out (n=16)*	*X²*
Current Sex Partner *(%)* *Yes*	58.4	50.0	ns
No	41.6	50.0	
Sexually Active *(%)* *Yes*	60.0	43.8	ns
No	40.0	56.2	
Sexual changes past month			
Interest – *(%)* Much Lower	6.4	0	ns
Somewhat Lower	11.2	14.3	
N/A/No Chg	52.0	71.4	
Somewhat Higher	24.8	7.1	
Much Higher	5.6	7.1	
Arousal-*(%)* Much Lower	4.8	0	ns
Somewhat Lower	8.0	7.1	
N/A/No Chg	60.8	78.6	
Somewhat Higher	21.6	14.3	
Much Higher	4.8	0	
Activity- *(%)* Much Lower	12.8	0	$\chi^2(4)=$ 11.23, p=.024*
Somewhat Lower	16.0	21.4	
N/A/No Chg	55.2	50.0	
Somewhat Higher	16.0	21.4	
Much Higher	0	7.1	
Satisfaction – *Much Lower*	8.8	0	ns
Somewhat Lower	13.6	14.3	
N/A/No Chg	60.8	64.3	
Somewhat Higher	15.2	21.4	
Much Higher	1.6	0	
Anxiety –*(%)* Much Lower	6.4	7.1	ns
Somewhat Lower	8.0	7.1	
N/A/No Chg	68.8	57.1	
Somewhat Higher	13.6	28.6	
Much Higher	3.2	0	
Sexual Experience *(%)* Entirely heterosexual experience	84.8	87.5	ns
Largely hetero but some homosexual experience	13.6	12.5	
Largely homosexual but some heterosexual experience	1.6	0	
Sexual Desires *(%)*			ns
Entirely heterosexual	67.2	81.2	
Largely heterosexual but some homosexual desire	24.0	18.8	
Largely homosexual but considerable heterosexual desire	5.6	0	
Equally homosexual and heterosexual desire	.8	0	
Largely homosexual but some heterosexual desire	1.6	0	
Entirely homosexual desire	.8	0	

Relationship Characteristics Compared to Sexuality Scores

	No current relationship	*Relationship <1yr*	*Married / committed relationship <1 yr*	*Married/ committed relationship 1-5yr*	*Married/ committed relationship >5yr*	*Divorced/ end of committed relationship <1yr*	**ANOVA**
Desire							**F(5,132)=.62, p=.686**
M(SD)	6.07(2.44)	6.87(2.67)	6.95(.97)	6.67(2.23)	6.64(2.06)	7.29(.00)	
n	55	30	6	33	33	1	
Arousal							**F (5,132) =11.40, p=.000****
M(SD)	3.34(3.03)	6.62(2.13)	6.21(2.86)	6.96(2.50)	7.12(2.30)	4.25(.00)	
n	55	30	6	33	13	1	
Frequency							**F (5,134) = 20.26, p=.000****
M(SD)	1.86(1.44)	4.73(1.85)	4.65(2.42)	4.99(1.71)	4.19(1.75)	3.25(.00)	
n	56	30	6	34	13	1	
Receptivity							**F (5,134) =16.31, p=.000****
M(SD)	2.86(4.76)	9.47(3.72)	7.67(4.27)	9.24(3.14)	8.92(3.50)	5.00(.00)	
n	56	30	6	34	13	1	
Orgasm							**F (5,133) =13.23, p=.000****
M(SD)	1.97(2.21)	4.43(1.66)	5.71(3.21)	4.95(1.88)	5.13(2.34)	2.00(.00)	
n	56	30	6	33	13	1	
Satisfaction							**F (5,132) =28.88, p=.000****
M(SD)	3.68(3.22)	9.76(2.03)	9.67(2.33)	9.76(2.62)	6.85(2.97)	5.00(.00)	
n	56	29	6	33	13	1	
Problems							**F (5,132) =5.86, p=.000****
M(SD)	3.23(2.25)	4.91(1.86)	3.84(1.71)	4.89(2.27)	5.48(2.17)	9.88(.00)	
n	56	30	6	33	12	1	
BISF-Com							**F (5,127) = 18.24, p=.000****
M(SD)	16.61(13.09)	37.00(10.96)	37.01(10.87)	37.27(11.68)	34.41(9.99)	6.90(.00)	
n	54	29	6	31	12	1	

Note: Desire-Problems refers to the 7 scale scores from the Brief Inventory of Sexual Function (BISF-W). BISF-Com is the composite score (BISF scales Desire through Satisfaction added together minus Problems = BISF-Composite score) (Mazer et al., 2000).

Appendix 12
Partner, Sexually Active and Depression by BISF-W

	Current Sex Partner *t(df), p-value* *Mean(SD)(n)*	Sexually Active *t(df),p-value* *Mean(SD)(n)*	Depression Score *F(df), p-value* *Mean(SD)(n)*
Desire	t (96.56)=4.14, p=.000**	t (92.96)=4.00,p=.000**	ns
Yes	7.19(1.86)(80)	7.16(1.85)(81)	
No	5.52(2.63((58)	5.53(2.66)(57)	
Arousal	t(93.16)=13.06, p=.000**	t(90.67)=12.26, p=.000**	ns
Yes	7.38(1.70)(80)	7.35(1.70)(81)	
No	2.68(2.53)(58)	2.63(2.53)(57)	
Frequency	t(138)=15.20,p =.000**	t(138)=13.29, p=.000**	ns
Yes	5.05(1.46)(81)	4.95(1.56) (82)	
No	1.57(1.13)(59)	1.65(1.34)(58)	
Receptivity	t(96.22)=12.43, p=.000**	t(97.15)=13.06, p=.000**	ns
Yes	9.80(2.74)(81)	9.82(2.76)(82)	
No	2.18(4.12)	2.03(3.96)(59)	
Orgasm	t(110.41)=11.65, p=.000**	t(105.41)=11.49, p=.000**	F (2,136) =3.38,p=.037* (0) 3.89(2.54) (1-3) 3.17(2.36)
Yes			(>3) 5.63(2.57)
No	5.20(1.60)(80) 1.58(1.94)(59)	5.17(1.59)(81) 1.56(1.98)(58)	
Satisfaction	t(137)=13.99,p=.000**	t(137)=12.87,p=.000**	ns
Yes	9.56(2.25) (80)	9.51(2.34)(79)	
No	(59)3.36(2.98)	3.53(3.14)(60)	
Problems	t(136)=6.31,p=.000**	t(136)=6.73,p=.000**	ns
Yes	5.22(2.07)(79)	5.25(2.05)(80)	
No	2.98(2.05)(59)	2.89(2.01)(58)	
BISF Composite	t(131)=15.37,p=.000*	t(131)=15.42,p=.000*	ns
Yes	39.06(8.17) (76)	38.91(8.22)(77)	
No	14.19(10.49)(57)	13.95(10.43)(56)	

Depression Scores from PHQ-2 were collapsed into 3 categories, (0) no reported depressive
Symptoms, (1-3) minimal depression symptoms, (>3) depressive symptoms reported.

Appendix 13
Word Use This Study and LIWC2007 Base Rate Means

Note: Since the word means (SD) in this sample were compared to grand means reported from

		This Sample (n=125)	LIWC2007
	Word Count	142.09(97.75)	443 (Emotions sample)
	Six Letter Words	16.43(6.14)	16.10(3.71)
	Words/Sentence	19.22(15.77)	24.79(67.42
	Dictionary Words	82.49(6.69)	82.42(4.92)
	Number Positive Words	7.25(5.14)	n/a
	Number Negative Words	1.87(2.28)	n/a
Biologic:	Body	.99(1.65)	.73(.85)
	Health	.60(1.05)	.55(.65)
	Sexual	3.45(2.43)	.23(.39)
	Ingestion	.05(.23)	.50 (.65)
Emotion:	Affect	7.06(6.29)	4.41(1.59)
	Positive Emotions –M(SD)	5.93(6.33)	2.74(1.27)
	Negative Emotions	1.23(1.33)	1.63(.91)
	Anxiety	.58(.80)	.33(.33)
	Anger	.17(.46)	.47(.48)
	Sad	.25(.51)	.37(.37)
Function :	Function	61.33(8.38)	54.85(4.99)
	Pronoun	19.59(5.50)	15.03(3.30)
	Personal Pronoun	13.59(4.58)	10.07(2.87)
	I	11.20(4.34)	5.72(2.48)
	We	.43(.78)	.76(.83)
	You	.46(1.71)	1.18(.93)
	She/He	1.06(1.82)	1.77(1.33)
	They	.43(.99)	.65(.57)
Cognitive:	Cogmech	24.78(6.14)	15.37(2.85)
	Insight	6.95(5.18)	2.15(1.05)
	Cause	1.70(1.51)	1.55(.84)
	Discrepancy	3.45(2.16)	1.41(.79)
	Tentative	3.57(2.67)	2.29(1.05)
	Certain	.90(.96)	1.21(.64)
	Inhibition		.49(.39)
	Inclusion	5.68(3.32)	4.91(1.54)
	Exclusion	3.78(2.62)	2.40(1.06)
Other:	Religion	.18(.81)	.22(.45)

ANOVAs across many samples including spoken words, the word count grand mean cannot be compared. In this case, the mean of emotions writing samples from LIWC2007 Output Variable Information table is reported(Pennebaker, Chung et al., 2007).

Appendix 14
Correlations Linguistic Processes with Sex Scale Scores

Pearson Correlation Sig (2 tailed) N	Pronoun	Personal pronoun	I	We	She/he	You	Dictionary Words
Desire							
Arousal		.282** (.002) 123	.265** (.003) 123		.211* (.019) 123		.190* .036 123
Frequency	.186** (.038) 125	.282** (.001) 125	.272** (.002) 125				.188* .036 125
Receptivity		.293** (.001) 125	.252** (.005) 125	.207* (.020) 125	.305** (.001) 125	- .216* (.015) 125	.225* .012 125
Orgasm		.264** (.003) 124	.285** (.001) 124		.179* (.046) 124	- .198* (.028) 124	
Satisfaction	.230* (.011) 123	.333** (.000) 123	.221* (.014) 123	.250** (.005) 123	.352** (.000) 123		.220* .015 123
Problems			.200* (.026) 123				
BISF Composite	.182* (.049) 118	.306** (.001) 118	.257** (.005) 118	.230* (.012) 118	.272** (.003) 118		.211* .022 118

Significant bivariate correlations *p-value <.05; ** p-value <.010

Pearson Correlation Sig (2 tailed) N	Social Processes		Cognitive Processes				Perceptual Process	Current Concerns	
	Friend	Human	Certain	Insight	Cog Mech	Cause	Feel	Achieve	Relig- ion
Desire			-.184* (.042) 123					.185* (.041) 123	
Arousal	.277** .002 123			218* (.015) 123			.202* (.025) 123		-.223* (.031) 123
Freq- uency	.321** .000 125			241** (.007) 125			.180* (.045) 125		-.209* (.020) 125
Receptiv- ity	.283** .001 125	-.186* .038 125	-.189* (.036) 124						-.186* (.038) 125
Orgasm	.264** .003 124								-.195* (.030) 124
Satisfac- tion	.327** .000 123				.186* (.039) 123				-.221* (.014) 123
Problems	.237** .008 123								
BISF Com- posite	.289** .002 118			196* (.033) 118		182* (.049) 118			-.226* (.014) .118

Note: Cog Mech =cognitive mechanisms; Achieve=achievement

Analysis of Variance Words by Sexual Self-Schema Categories

Category Word (example)	Positive Schema M(SD) N=39	Co Schematic M(SD) N=30	Negative Schema M(SD) N=36	Aschematic M(SD) N=20	F(df),p-value
Psychological Process					
Number of Positive Words *(love, nice, sweet)*	9.19(5.73)	6.71(4.62)	6.65(4.06)	7.25(5.14)	F(3,121)=3.32, p=.022
Cognitive Process					
Certain *(always, never)*	.94(.81)	1.22(1.22)	.99(.91)	.15(.38)	F(3,121)=5.86, p=.001
Exclusive *(but, without, exclude)*	4.07(2.54)	3.50(2.58)	2.95(2.43)	5.13(2.73)	F(3,121)=3.42, p=.020
Relativity					
Motion *(arrive, car, go)*	1.09(.96)	.54(.78)	.94(1.09)	1.39(1.53)	F(3,121)=2.84, p=.041
Linguistic Process					
Word Count *(total number of words)*	181.90(106.59)	137.67(81.55)	124.19(94.03)	103.35(87.93)	F(3,121)=3.87, p=.011
Numbers *(second, thousand)*	.38(.55)	.08(.24)	.28(.65)	.07(.31)	F(3,121)=2.86, p=.040

Only significant categories and words are presented here. For a complete list see Appendix 17. (Word examples and categories from Pennebaker, J. W., Booth, R. J., & Francis, M. E. (2007). Linguistic Inquiry and Word Count: LIWC2007 (2007 ed., pp. 1-10). Austin, Tx: LIWC Inc.)

Appendix 17
LIWC Word Category List

Category	Examples	Words in Category
Linguistic Process		
Word Count	Words per text sample	
Six Letter Words	Number of six letter words used	
Words/Sentence	Words per sentence	
Dictionary Words	Words captured by dictionary	
Function Words		
Function	All function words	464
Pronoun	I, them, itself	116
Personal Pronoun	I, them, her	70
1st Person Singular	I, me, mine	12
1st Person Plural	We, us, our	12
2nd Person	You, your, thou	20
3rd Person	She, her, him	17
3rd Person Plural	They, their, they'd	10
Impersonal pronoun	It, it's, those	46
Article	A, an, the	3
Verb (common)	Walk, went, see	383
Auxiliary verb	Am, will, have	144
Past tense	Went, ran, had	145
Present tense	Is, does, hear	169
Future tense	Will, gonna	48
adverb	Very, really, quickly	69
prepositions	To, with , above	60
Conjunctions	And, but, whereas	28
Negations	No, not, never	57
Quantifiers	Few, many, much	89
Numbers	Second, thousand	34
Swear word	Damn, piss, fuck	53
Spoken Categories		
Assent	Agree, OK, yes	30
Non-Fluencies	Er, hm, umm	8
Fillers	Blah, Imean, youknow	9
Cognitive Processes		
Cognitive mechanisms	Cause, know, ought	730
Insight	Think, know, consider	195
Cause	Because, effect, hence	108
Discrepancy	Should, would, could	76
Tentative	Maybe, perhaps, guess	155
Certain	Always, never	83
Inhibition	Block, constrain, stop	111
Inclusive	And, with include	18
Exclusive	But, without, exclude	17
Perceptual Processes	Observing, heard, feeling	273
See	View, saw, seen	72
Hear	Listen, hearing	51
Feel	Feels, touch	75

Affective Processes		
Affect	Happy, cried, abandon	915
Positive Emotions	Love, nice, sweet	406
Negative Emotions	Hurt, ugly, nasty	499
Anxiety	Worried, fearful, nervous	91
Anger	Hate, kill, annoyed	184
Sad	Crying, grief, sad	101
Social Processes	Mate, talk, they, child	455
Family	Daughter, husband, aunt	64
Friends	Buddy, friend, neighbor	37
Humans	Adult, baby, boy	61
Biological Processes	Eat, blood, pain	567
Body	Cheek, hands, spit	180
Health	Clinic, flu, pill	236
Sexual	Horny, love, incest	96
Ingest	Dish, eat, pizza	111
Relativity	Area, bend, exit, stop	638
Motion	Arrive, car, go	168
Space	Down, in, thin	220
Time	End, until, season	239
Personal Concerns		
Work	Jobs, majors, Xerox	327
Achieve	Earn, hero, win	186
Leisure	Cook, chat, movie	229
Home	Apartment, kitchen, family	93
Money	Audit, cash, owe	173
Religion	Altar, church, mosque	159
Death	Bury, coffin, kill	62

(Word examples and categories from Pennebaker, J. W., Booth, R. J., & Francis, M. E. (2007). Linguistic Inquiry and Word Count: LIWC2007 (2007 ed., pp. 1-10). Austin, Tx: LIWC Inc.)

Bivariate Schema Group Comparisons with Sex Scales

Sexuality Measure	Positive Schema	Co-Schematic	Negative Schema	Aschematic	F
Desire Mean (SD)	7.19(2.04)	6. 54(2.39)	5.76(2.07)	6.57(3.09)	F(3,134)=3.06, p=.043*
(n=138)	(n=42)	(n=30)	(n=45)	(n=21)	
Arousal Mean (SD)	6.17(2.56)	4.61(3.54)	4.99(2.90)	5.94(3.66)	F(3,134)=2.00, p=.116
(n=138)	(n=41)	(n=31)	(n=45)	(n=21)	
Frequency Mean (SD)	4.14(2.03)	3.30(2.30)	3.27(2.08)	3.55(2.40)	F(3,136)=1.41, p=.243
	(n=42)	(n=32)	(n=45)	(n=21)	
(n=140)					
Receptivity Mean (SD)	7.21(5.04)	6.28(5.20)	6.24(5.09)	6.38(5.15)	F(3,137)=.330, p=.803
	(n=42)	(n=32)	(n=46)	(n=21)	
(n=141)					
Orgasm Mean (SD)	4.44(2.10)	3.22(3.00)	3.14(2.37)	3.89(2.49)	F(3,135)=2.45, p=.066
(n=135)	(n=42)	(n=31)	(n=45)	(n=21)	
Satisfaction Mean (SD)	7.38(3.93)	7.10(4.26)	6.40(4.01)	6.90(3.99)	F(3,135)=.451, p=.717
	(n=42)	(n=31)	(n=45)	(n=21)	
(n=139)					
Problems Mean (SD)	4.25(2.19)	4.06(2.45)	4.63(2.54)	3.83(2.02)	F(3,134)=.671, p=.571
(n=138)	(n=41)	(n=32)	(n=44)	(n=21)	
BISF-W Composite Mean (SD)	31.97(13.87)	27.22(16.77)	25.38(15.37)	29.42(15.90)	F(3,129)=1.37, p=.256
(n=133)	(n=40)	(n=29)	(n=43)	(n=21)	

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