Cognitive-Affective Processes in Sexual Arousal and Sexual Dysfunction

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In 1986 Barlow published his model of sexual dysfunction. Cranston-Cuebas and Barlow (1990) summarized the early empirical work supporting this model. The present paper briefly reviews the original model and details the empirical and theoretical work since 1990. Lastly, an updated version of the model is presented based on the reviewed studies as well as advances in anxiety research (see Barlow, 2002 for a detailed review of anxiety research). Barlow’s model can be conceptualized as concerning itself with three broad areas of cognitive and emotional processes in which individuals with and without sexual dysfunction differ: 1) Cognitive schemata and affective associations with which an individual enters a sexual situation, 2) differences in cognitive processing of sexual stimuli including the person’s own arousal, and 3) cognitive, affective and behavioral responses to their sexual performance and the experience of sexual arousal.

Review of the Original Model of Sexual Dysfunction

Barlow (1986) conceptualized early efforts aimed at understanding and treating sexual dysfunction in his model of cognitive and affective contributions to sexual functioning (Figure 1.). In this model dysfunctional sexual performance is seen as being maintained by means of a negative feedback loop (Barlow, 1986; Cranston-Cuebas & Barlow, 1990; van den Hout & Barlow, 2000). Individuals with and without sexual dysfunction approach sexual situations differently. In response to implicit or explicit demands for sexual performance, men and women without sexual dysfunction experience positive affect, success expectancies, and perceptions of control. In contrast, in individuals with sexual dysfunction implicit or explicit demands for sexual performance evoke a state of anxious apprehension that is characterized by heightened tension and arousal, negative affective valence and failure expectancies. In essence, from experience
of prior sexual difficulties, sexual stimuli elicit anxiety and expectancies of poor performance in the individual with sexual dysfunction.

In all individuals, heightened arousal is associated with a narrowing of the attentional focus (for a discussion of this process in anxiety disorders see Barlow, 2002). However, differences in the emotional and cognitive aspects of how individuals with and without sexual dysfunction enter the sexual situation result in the two groups responding differently. Since individuals with sexual dysfunction expect failure and negative consequences, their focus of attention narrows to sources of threat or danger, setting the stage for additional distortions in the processing of information, either through attentional or interpretive biases (reflecting preexisting hypervalent cognitive schemata).

A variety of cues or propositions, to use the terms of Lang (1985, 1994a, 1994b), would be sufficient to evoke anxious apprehension. These cues may be broad based or very narrow, such as a highly responsive partner (Abrahamson, Barlow, Sakheim, Beck, & Kelly, 1985). Importantly, this process could occur without the necessity of a conscious, rational appraisal. For example, one might experience anxiety without awareness of the specific trigger or cue, such as an object or situation that “represents” a past “sexual failure experience,” or an internal somatic sensation, as is seen in patients with panic disorder. Janssen, Everaerd, Spiering, and Janssen (2000), using a preattentive priming paradigm, demonstrated that such automatic (preattentive) processing of sexual stimuli influenced both genital (erectile tumescence) and behavioral (decision time) measures.

At sufficient intensity, the shift to non-erotic cues in conjunction with the narrowing of the attentional focus results in disruption of performance. Thus, at low
levels of autonomic arousal an individual may still be able to attend to sexual cues while attention is focused on sexual performance concerns; however, as autonomic arousal increases, whether resulting from sexual arousal or anxious arousal, the focus of attention narrows increasing the salience of the attended to stimuli. In individuals with sexual dysfunction this process increases the salience of non-erotic cues and results in further decreases in sexual arousal (e.g., erectile tumescence). In contrast, for individuals without sexual dysfunction increased arousal amplifies the salience of erotic cues and results in greater sexual arousal.

The repeated experiencing of an inhibited sexual response and the associated negative affect may result in several cognitive, affective, and behavioral consequences. First, the individual becomes hypervigilant for cues or stimuli associated with sources of anxious apprehension (e.g., implicit or explicit demands for sexual performance). Secondly, sexual situations and stimuli are associated with increased negative affect and further confirmation of failure expectancies. Thirdly, in an attempt to cope the individual may subsequently avoid sexual activity and stimuli. As a result, individuals with repeated experiences of sexual dysfunction approach (or in the extreme, avoid) sexual situations differently then individuals without sexual dysfunction.

Prior to further interpreting past work and reviewing more recent empirical findings, several important distinctions need to be clarified. First, anxiety is frequently (and mistakenly) used as a general term loosely referring to a number of affective states that include fear, panic, and worry. However, these various “anxiety” states have unique characteristics. Anxiety defined more specifically refers to a state of “anxious
apprehension” that incorporates a sense of uncontrollability focused largely on future negative events, a strong physiological or somatic component (sympathetic nervous system), a vigilance (or hypervigilance) for threat cues, and a shift in attention to a self-focus (self-preoccupation) in which the evaluation of one’s (inadequate) capabilities to cope with the threat is prominent (Barlow, 2002).

Secondly, sexual arousal is likewise composed of a complex triad involving physiological, cognitive, affective, and behavioral components. These components frequently correspond, but are also discordant. Janssen, et al. (2000) note that there seems to be a strong link between sexual stimuli and the activation of genital responses, while subjective sexual arousal seems to be more variable and more strongly influenced by situational factors. Janssen et al. and Bancroft (1989) conclude that, at least to some degree, the components of sexual arousal and response are under the control of different mechanisms.

Thirdly, different components of “anxious apprehension” as well as various related states of negative affect (worry or fear) influence the various components of sexual arousal differentially, and not always in the same direction (i.e. facilitate or inhibit sexual arousal). For example, research by Meston and her colleagues (Meston & Gorzalka, 1995, 1996a, 1996b; Meston, Gorzalka, & Wright, 1997; Meston & Heiman, 1998) have attempted to separate the effects of increased sympathetic nervous system (SNS) arousal on sexual response from the effect of cognitive and affective components of anxiety on sexual response. In general, these studies found that in women without sexual dysfunction and women with hypoactive sexual desire disorder, increased SNS activation prior to watching an erotic film increases genital sexual response, as measured
by vaginal photoplethysmography. Subjective reports of sexual arousal, on the other hand, do not seem to be influenced by SNS activation. The implication of this line of research is that the somatic component of anxious apprehension may facilitate genital response, while the negative affective component may concurrently decrease physiological and/or subjective arousal. The cognitive component (selective attentional focus) may facilitate or interfere with physiological sexual arousal depending on whether or not the individual has a sexual dysfunction. Furthermore all of these processes interact with one another and themselves through feedback loops creating a truly complex web of influences that determines sexual arousal. We will now review the influence of some of these variables in more detail.

Cognitive Schemata

Men with sexual dysfunction evidence a “sexually dysfunctional mentality” that includes perceived lack of control over sexual arousal, sexual failure expectancies, maladaptive sexual causal attributions, and cognitive bias (hypervigilance). For example, an earlier study indicated that men with erectile disorder in the laboratory reported feeling that they have less control over their arousal (Mitchell, Marten, Williams, & Barlow, 1990). In contrast, sexually functional men, much like individuals without anxiety disorders, engage in cognitive and attentional processes that allow them to maintain an “illusion of control,” which serves as a protection against developing a “dysfunctional mentality.” In studies of sexual arousal in the laboratory, it has been shown that sexually functional participants overlooked small changes in their performance, and failed to report decreases in their physiological arousal (Abrahamson et al., 1985; Abrahamson, Barlow, Sakheim, Beck, & Athanasiou, 1985). This finding was
recently replicated (Mitchell, DiBartolo, Brown, & Barlow, 1998). A growing body of research by Barlow and his colleagues provides evidence (reviewed below) for the different mentalities of men with and without sexual dysfunction. However, it is important to note that it is not possible to determine whether this “sexually dysfunctional mentality” is a cause of sexual dysfunction or the result of experiencing sexual difficulties based on the research studies conducted to-date, since these have been cross-sectional in design. Longitudinal studies are required in order to determine whether individuals evidence a dysfunctional mentality prior to or as a result of experiencing sexual difficulties.

One aspect of the sexual cognitive schema evidenced by men with erectile disorder is feelings of lack of control over their erectile response. Studies have found that the use of fantasy, or the ability to form vivid mental representations, is important for the voluntary control of sexual arousal (e.g., Stock & Geer, 1982). Since sexually dysfunctional patients report less use of fantasy in sexual situations (Marten & Barlow, 1991), the relationship between imagery ability, fantasy content, and voluntary arousal was explored (Weisberg, Sbrocco, & Barlow, 1994). Sexually functional participants were asked to engage in either a fantasy in which they would not be able to attain and maintain an erection, or a fantasy in which their performance was satisfactory. Contrary to expectations, differences in arousal between fantasy groups were not found. Fantasies in which participants imagined sexual scenarios during which they either did or did not experience sexual difficulties facilitated equivalent levels of penile tumescence and subjective arousal. Upon examination of the fantasies written by participants in the “negative” fantasy condition, it was found that while participants included accounts of
sexual problems as instructed, these problems were not the focus of the fantasies. In other words, these participants created arousing fantasies in which problems occurred (such as detumescence), but were not specifically focused on, or the participants fantasized the problems as being only temporary. These findings support the notion that sexually functional men may demonstrate a “resistance to a sexually dysfunctional mentality” (Abrahamson, Barlow, Beck et al., 1985; Abrahamson, Barlow, Sakheim et al., 1985).

More recent research performed by our group has examined the portion of Barlow’s (1986) model of sexual functioning that suggests that functional and dysfunctional men enter sexual situations with different expectancies for their performance. Individuals with sexual dysfunction expect to perform poorly, while individuals without sexual difficulties expect to perform well. Results from misattribution experiments (Cranston-Cuebas, Barlow, Mitchell, & Athanasiou, 1993; Cranston-Cuebas & Barlow, 1995; see Barlow, Chorpita, & Turovsky, 1996), revealed that men with erectile disorder evidenced a direct placebo effect in response to ingesting what they thought were “arousal enhancing” and “arousal detracting” pills (all pills were placebo) prior to watching an erotic film. The detraction manipulation (“This pill will interfere with erectile response”) may be viewed as creating a context in which one might predict that subjects would form negative expectancies regarding their sexual performance. Men with erectile disorder evidenced significantly decreased levels of tumescence in the detraction condition and their highest level of erectile response in the enhancement condition. In a related study, Palace (1995) was able to induce increases in positive expectancies for sexual arousal in female participants with various sexual
dysfunctions by giving them positive false feedback about their level of arousal after viewing an erotic film segment. Not only were positive expectancies found to increase after positive false feedback, but physiological sexual arousal during a subsequent film was found to increase significantly as well. This study corroborates findings regarding the relevance of expectancies in the sexual arousal for women with sexual dysfunction.

In contrast to the direct placebo effect in men erectile disorder, Cranston-Cuebas et al. (1993) found that sexually functional men evidenced a reverse placebo effect. These men evidenced significantly enhanced tumescence after the “arousal detraction” pill condition, despite the fact that pre-erotic film questionnaires revealed that participants’ expectations were in line with the manipulation (i.e., functional subjects expected to have less arousal in the detraction pill condition). These findings mirror the results of similar misattribution studies conducted with individuals suffering from insomnia (Brockner and Swap, 1983; Storms and Nisbett, 1970).

In a more recent false feedback experiment (Bach, Brown, & Barlow, 1999), the effects of low efficacy expectancies for obtaining adequate erectile responses on subsequent sexual arousal in sexually functionally men were examined. Twenty-six males were randomly assigned to either a false negative feedback group or a no feedback group. After viewing several erotic film segments, the participants in the negative false feedback group were told that their responses were less than that of the average participant in the laboratory. The control group received no such feedback. Efficacy expectancies were found to be considerably lower when the negative false feedback group viewed a subsequent erotic film, as was physiological response measured by the penile strain gauge. Despite these effects on physiological arousal, and counter to
predictions of Barlow’s (1986) model, the negative false feedback led to neither a decline in reports of subjective arousal nor an increase in negative affect. Thus, consistent with the model, a self-focus on potential inadequate responding did lower physiological sexual arousal. However, this physiological effect was not associated with changes in subjective arousal, self-estimates of arousal, or negative affect.

A follow-up study that extended the findings of Bach et al. (1999) utilizing a similar paradigm found similar results when attributions for perceived erectile failure were manipulated following a similar bogus feedback condition (Weisberg, Brown, Wincze, & Barlow, 2001). Specifically, 52 young men with normal sexual functioning viewed similar sexually explicit films while wearing a penile strain gauge and were told that they did not become as aroused as did the typical study participant. However, in this procedure, participants received an attributional manipulation in which they were then given either an external-unstable attribution (i.e., the films must have been very poor quality) or an internal-stable attribution (i.e., it seems from questionnaires you filled out that you may have a type of belief about sex that sometimes makes it difficult to get aroused here in our lab), to explain the cause of their poor erectile performance. All participants then viewed an additional film to examine responding under the different attributions.

A manipulation check indicated that the participants in each of the two groups did in fact attribute the supposed erectile difficulty to internal or external causes according to the feedback given by the experimenter. The results indicated that participants in the external-unstable attribution group showed greater physiological and subjective sexual arousal during a third film than did participants with the internal causal attribution.
Interestingly, the attributional manipulation did not significantly affect levels of negative affect, perceived erectile control, or expected degree of erection. Thus the results of this study demonstrated that physiological responding could be influenced in sexually functional men independent of negative affect, perceived lack of control, or negative expectancies. Weisberg et al. (2001) suggest that the lack of cognitive and affective response to the negative false feedback could be related to the relative importance imparted upon a perceived sexual failure in a laboratory setting. It is possible that for participants, a poor sexual performance in the lab is not important because they may not generalize it to real-life sexual situations (where they may be judged negatively by a partner), thereby constituting resilience against developing negative cognitions and affect from the feedback. This study is currently being replicated in female participants without sexual dysfunction.

Recent work undertaken to develop a trait measure of sexual attributional style, the Sexual Attributional Style Questionnaire (SASQ; Weisberg et al., 1998; Scepkowski et al., 2003) is beginning to shed light of the differences in explanatory styles possessed by sexually functional and dysfunctional men. As indicated by this self-report measure, and as predicted by earlier research (Quadland, 1980; Loos, Bridges, & Critelli, 1987; Fichten, Spector, & Libman, 1988), men with erectile disorder made more internal, stable, and global causal attributions for negative sexual events than men without sexual dysfunction. This is consistent with results from Weisberg, et al. (1998), who found that scores on the negative sexual event subscale of the SASQ could differentiate between men with and without erectile disorder. Also as predicted by previously discussed research supporting the contention that functional men maintain positive expectancies for
their sexual performance despite experimental manipulation, sexually functional men rated the stability of negative sexual events significantly lower than men with erectile disorder. Sexually functional men rated the importance of negative sexual events lower than did men with erectile disorder. Dysfunctional men did not differ from functional men in their causal attributions for positive sexual events, and unexpectedly, both groups ascribed more external, unstable, and specific attributions to positive sexual events than positive non-sexual events. This finding indicates than even functional men approach sexual activities with less “self-serving” attributional bias than is typically shown in their attributions for non-sexual positive events.

Positive and Negative Affect

Barlow’s model (1986) also theorizes that individuals with sexual dysfunctions react to erotic stimuli with greater negative affect. The link between depression and reductions in sexual function has been well established and studied in men (e.g., Nofzinger et al., 1993) and women (Frohlich & Meston, 2002). In addition, past studies have found that individuals with sexual dysfunction report significantly less positive affect during erotic exposure (Beck & Barlow, 1986b; Heiman & Rowland, 1983). Similarly, several studies have found a strong association between positive affect and subjective sexual arousal in men with and without sexual dysfunction (Koukounas & McCabe, 2001; Rowland, Cooper, & Heiman, 1995; Rowland, Cooper, & Slob, 1996) and in women (Heiman, 1980; Laan, Everaerd, van Bellen, & Hanewald, 1994).

Several studies have manipulated affect during laboratory studies of sexual arousal. Meisler and Carey (1991) using Velton Mood Induction Procedure (Velton, 1968), found that participants had a longer latency in to maximum subjective sexual
arousal following the depression affect induction as compared to the elation affect induction. Erectile tumescence did not differ significantly as a result of the affect inductions. Laan, Everaerd, van Berlo, and Rijs (1995) used musical selections to induce a “positive sexual mood” in 51 women and examined its effects on subjective and genital measures of sexual arousal during both fantasy and in response to erotic films. Results indicated no significant effect of the mood induction on post-film/fantasy measures of subjective or genital sexual arousal. There was a marginally significant reduction in negative emotions in response to the erotic film in the mood induction group compared to the no-induction group. Although pre- versus post-induction measures of affect and subjective sexual arousal differed significantly, the post-induction (pre-film/fantasy) between groups comparison (induction group vs. no induction group) was not significant. Perhaps the research setting (e.g., participants’ expectations of watching erotic films) may have created a “positive mood for sex” that confounded the results. The Laan et al. study did not attempt to induce positive affect, per se, but rather a positive sexual mood (i.e. the authors used music to attempt to get the participants “in a mood”). Thus, conclusions regarding positive affect’s role in sexual arousal are unclear from this study.

Mitchell et al. (1998) also used musical selections to induce positive (elated) and negative (depressed) affect in 24 men without sexual difficulties. The Positive and Negative Affect Schedule–State version (PANAS-state; Watson, Clark, & Tellegen, 1988) was used to measure affect pre- and post-induction, as well as post erotic film. In contrast to Laan et al. (1995), this study used a repeated measures design, thus controlling for individual differences in sexual desire, sexual arousability, and susceptibility to the mood induction. The manipulation check indicated that the positive affect induction
significantly increased positive affect compared to both the pre-induction scores and the neutral control condition. The negative affect induction resulted in significantly decreased positive affect and increased negative affect, compared to the pre-induction scores and the control condition. During an erotic film, participants evidenced greater subjective and genital (erectile) response following the positive affect induction and significantly lower genital response following the negative affect induction, as compared to a neutral control condition. Interestingly, these sexually functional participants did not report less subjective arousal following the negative affect induction, despite the successful affect manipulation and reductions in their erectile tumescence during the erotic film. These findings further support the notion of individuals without sexual dysfunction employing a cognitive bias in order to maintain an “illusion of control.” The Mitchell et al. (1998) study is currently being replicated in men with erectile disorder. The findings of Meisler and Carey (1991) and Mitchell et al. (1998) demonstrate that positive and negative affect can influence genital and subjective sexual arousal. These studies also support the notion that positive affect is especially relevant for subjective sexual arousal.

Focus of Attention, Self-focused Attention, and Interoceptive Awareness

A number of past studies have examined differences in focus of attention during exposure to erotic stimuli between men with and without erectile dysfunction (e.g. Abrahamson, Barlow, Beck et al., 1985; Abrahamson, Barlow, Sakheim et al., 1985; Beck & Barlow, 1986a and b; Beck, Barlow, & Sakheim, 1983). The findings from this body of research indicate that men with erectile disorder are focused on non-erotic cues during exposure to sexual stimuli. Research in both men (Geer & Fuhr, 1976) and
women (Elliott & O’Donohue, 1997) have demonstrated that distraction, operationalized
as a dichotomous listening task, has detrimental effects on sexual arousal in sexually
functional individuals. However, such distracting laboratory tasks do not seem to
decrease the erectile tumescence of men with erectile disorder (Abrahamson, Barlow,
Beck et al., 1985; Abrahamson, Barlow, Sakheim et al., 1985). The best explanation for
these results is that men with erectile disorder are already distracted from the erotic
stimulus by sexual performance related concerns, which are the focus of their attention.
In fact, distracting them from these performance concerns may have a disinhibiting effect
on their sexual arousal.

While a person concerned with a sexual performance failure might be thought to
be hypervigilant for signs of lack of arousal, thereby focusing intensely on his/her own
sexual response rather than on the erotic cues, a second and more impairing shift of
attention occurs. Analogous to what occurs in individuals with social phobia, when an
individual with sexual dysfunction is confronted with implicit or explicit demands for
sexual performance, a critical shift of attention occurs from an external focus (on erotic
cues) to an internal, predominantly self-evaluative, focus (Barlow, 2002). Mansell,
Clark, and Ehlers (2003) used an imaginative paradigm to simultaneously monitor
attentional focus to external and internal events. Individuals high and low in speech
anxiety were randomly assigned to a social-threat condition (anticipation of giving a
speech) or a no-threat condition and asked to perform a computer-based attention task.
The computer task involved looking at either pictures of faces or objects, while
monitoring two types of stimuli. One was an internal stimulus that consisted of a light
vibration to the fingertip, which participants were led to believe reflected changes in their
heart-rate and sweating. The other stimulus was an external one that involved detecting the letter ‘E’ superimposed on the picture on the computer screen. The researchers used the relative latency to detect the external stimulus versus the internal stimulus to determine the balance of the internal/external attentional bias. The results indicated that high speech anxious individuals selectively attended internally in the social-threat condition, but not in the no-threat condition.

Flexible self-focused attention may be part of adaptive process when it motivates behavioral change by highlighting discrepancies between one’s current state and desired internal standards of performance (Carver & Scheier, 1981, 1998). However, excessive and or rigid self-focused attention may have several dysfunctional consequences. During sexual situations, this shift to self-evaluative concerns clearly distracts an individual’s attention away from the sexually arousing cues in the situation; however, the most important consequence of this self-focus concerns its effect on emotions. Self-directed focus and the resulting sensitivity to physiological or proprioceptive sensations (interoceptive awareness) are likely to result in greater subjective intensity of the emotional experience after emotion has been elicited. Evidence suggests that this shift to a self-evaluative focused attentional state further increases arousal and negative affect, thus forming its own small negative feedback loop. Individuals with a greater disposition to self-focus were found to experience experimental provocation of various emotions as more intense than individuals with a greater disposition to external focus (Ingram, 1990; Wells & Matthews, 1994).

When individuals with sexual dysfunction are confronted with situations where they feel they should become aroused two consequences occur as a result of the shift in
attention. First, their attention becomes focused on the discrepancy between their current state of sexual performance and their internal *a priori* standards of sexual performance. This results in a negative evaluation of themselves, increases in negative affect, and predictions of not being able to cope, which further increase anxious arousal. Secondly, their increased internal focus and sensitivity to physiological sensations intensifies their experience of the negative affect. Thus, a small negative feedback loop within the larger negative loop is created by the intensification of arousal and negative affect that follows the shift of attention to a internal and self-evaluative focus. A further important consequence of self-focused attention is a failure to habituate to external stimuli while in the attentional mode. This selective internal attentional focus also functions as avoidance of the anxiety producing stimuli; in the case of sexual dysfunction this is the lack of arousal or latency to orgasm (either too short or too long). Paradoxically, individuals with sexual dysfunction may be more interoceptively aware of the somatic consequences of negative affect, while at the same time being less aware of their degree of sexual arousal. Numerous studies have found that men with erectile dysfunction under-estimate their level of arousal (see van den Hout & Barlow, 2000 for a review). A similar process is posited to occur in sexually functional individuals, except via a feedback loop that increases the experience of sexual arousal. Dekker and Everaerd (1988) found that for sexually functional males and females, subjective experiences of sexual arousal were stronger when participants attended to both sexual stimuli and the sexual feelings associated with rather than just focusing on the sexual stimuli.

Results from a recent study, (Nobre et al., 2003) exemplify the relationship between interoceptive awareness, sexual arousal, and affect. Nobre et al. assessed the
abiltiy of 60 sexually functional males to estimate their degree of erection. During the procedures, a table was placed over the participant’s lap blocking visual feedback and forcing them to rely on interoceptive awareness to estimate their level of erection. Contrary to expectations, over half of the sample (56.8%) consistently (in three out of four erotic films) under-estimated their degree of erection. Despite there being no differences in physiological erection (as measured by penile plethysmography) from the group that estimated accurately, the group that underestimated reported significantly lower levels of positive affect, and significantly lower levels of subjective sexual arousal. The participants in this study were sexually functional, undergraduate males, and therefore they may have been able to attain erections despite the lower levels of positive affect and subjective arousal. However, will these young men, as they get older, be the men that develop erectile dysfunction? To answer such questions, longitudinal studies with large sample sizes that focus on identifying the bio-psycho-social vulnerabilities for developing sexual dysfunction are required.

For men, the ability to adequately attain and maintain a rigid erection is intimately tied to their self-esteem and self-evaluation (see Zilbergeld, 1992, 1999 for a review of clinical cases). However, for women, where the signs of sexual arousal are less publicly evident (and it is much easier for a woman to fake an orgasm than for a man to fake an erection), arousal interfering concerns will have a different, but equally self-esteem relevant focus. Women’s sexual desirability is often equated with their physical attractiveness and thinness. Wiederman (2000) found that one-third of college women indicated experiencing body-image self-consciousness during physical intimacy at least some of the time. Dove and Wiederman (2000) found that in a sample of women a
measure of cognitive distraction during sexual activity (assessing performance-based and appearance-based concerns) was positively associated with lower sexual esteem, less sexual satisfaction, less consistent orgasm, and a higher incidence of pretending orgasm, even after other relevant variables such as sexual desire and sexual attitudes were statistically controlled. Interestingly, the measure of cognitive distraction remained a significant predictor of sexual outcomes (sexual esteem, sexual satisfaction, and orgasm consistency) when trait self-focus was controlled statistically. This finding is consistent with an additional finding by Nobre et al. (2003), in that individuals who under-estimated their arousal did not differ on dispositional measures of self-focused attention (private self-consciousness) or interoceptive awareness from those who accurately estimated their level of erection. Trapnell, Meston, and Gorzalka (1997) also did not find support for the role of dispositional measures of chronic self-focus in women. The lack of significant differences in dispositional measures of self-focused attention and/or interoceptive awareness may imply that deficits in self-monitoring in individuals with sexual dysfunction are characterized by situation-specific and avoidance-motivated shifts of attention away from anxiety provoking stimuli (e.g., one’s own lack of sexual arousal). In support of this hypothesis, Trapnell et al. found a significant association in women between poorer body-image, higher social anxiety, and lower trait self-focus scores.

Worry

According to Barlow’s (1986) model, the result of the negative feedback loop comprising the cognitive-affective process in individuals with sexual dysfunction is eventual avoidance of sexual activity. Avoidance of situations that provoke anxiety only further increases anxiety in those situations, thus potentiating the negative impact on
future sexual function in these individuals. However, it is important to realize that attempts at coping and/or avoiding can take other forms than behavioral avoidance, namely worry. Worry is distinct, but related to the phenomenon of “apprehensive anticipation.” The process of non-pathological worry is a natural and often-adaptive response to coping with and problem-solving anticipated negative events. However, in the case of sexual dysfunction, this normal coping attempt can have implications for sexual functioning. Barlow (2002) characterizes the normal process of worry as potentially successful problem-solving activity, but only if not accompanied by significant anxiety. Unfortunately, individuals with sexual dysfunction frequently do experience significant anxiety. Several of the characteristics of worry make it a prime candidate for interfering in sexual functioning. Research by Borkovec and his colleagues (e.g., Borkovec, 1994) indicates that worry is a principally verbal or semantic activity that actually serves to prevent full experience of anxiety or fear provoking stimuli. That is, the arousal driven, attention occupying, verbal/linguistic process of worry effectively suppresses the full experience of the negative state of anxiety. A related characteristic of worry is that negative worrisome cognitions result in intrusive negative thoughts that are particularly difficult to dismiss (Wells and Morrison, 1994). This effect tends to be greatest during short periods of worry. Borkovec, Robinson, Pruzinsky, and DePree (1983) found that a priming period of 15 minutes of worry, compared to 30 minutes or zero minutes, produced the greatest number of negative intrusive thoughts. Thus, worry as a coping response (in particular for sexual dysfunction) results in attentional avoidance of the anxiety producing stimuli (e.g., the sexual situation), increases in negative intrusive thoughts (distraction), and an increase in negative affect---all of which have been shown
to interfere with sexual functioning. To date, the exact role of worry in contributing to and maintaining sexual dysfunction awaits empirical elucidation and represents one of the areas of future research for the field of sexual dysfunction.

Update of the Model of Sexual Dysfunction

Barlow’s 1986 model of sexual dysfunction needs to be updated to incorporate the above detailed findings and advances in the conceptualization of anxious apprehension (Barlow, 2002). Specifically, the recent empirical work on cognitive schemata, negative and positive affect, self-focused attention, and worry warrant inclusion in the model. The updated model of sexual dysfunction has largely been based on a revised model of anxious apprehension that is detailed in Anxiety and its disorders: The nature and treatment of anxiety and panic (Barlow, 2002) and the original model of sexual dysfunction (Barlow, 1986). The updated sexual dysfunction model continues to posit a negative feedback loop in individuals with sexual dysfunction and a positive feedback-loop in individuals without sexual dysfunction (see figure 2).

A more detailed version of feedback loop that characterizes individuals with sexual dysfunctions is represented by figure 3. A bio-psycho-social perspective has been added to the model in recognition of factors that predispose individuals to develop sexual dysfunctions. These include relationship factors, physiological factors, and cognitive/emotional factors. The relationship factors and major physiological factors have not been extensively reviewed in this paper, since the focus is on the cognitive and emotional process in sexual arousal. Wince and Carey (2001) provide a review of relationship and medical factors. In addition, Janssen, Vorst, Finn, and Bancroft (2002a, 2002b) provide an excellent explanation of their Dual Control Model and the individual
differences in proclivity for sexual inhibition or sexual excitation. Within this Dual Control Model sexual inhibition is conceptualized as having essential and adaptive functions; however, individuals with maladaptive levels may be predisposed to developing sexual dysfunctions (or sexual disorders in the case of too little inhibition). The cognitive schemata theorized to predispose individuals to experiences of sexual dysfunction are based on the cognitive differences in how individuals with and without sexual dysfunction approach sexual situations, and may be the result of learning history and personality factors (Barlow, 2000). Sexually dysfunctional cognitive schemata are characterized by negative expectancies (Bach, Brown, & Barlow, 1999; Cranston-Cuebas et al., 1993) and may include predictions of erectile failure or rapid ejaculation for men, and negative evaluations by a partner of her physical attributes for women. In addition, these negative expectancies are maintained and reinforced by situation specific sexual attributional styles that attribute stable causes to negative sexual function events (Weisberg et al., 2001; Scepkowski et al., 2003).

The major revision of the model has to do with the shifts in attentional focus. In the original model (Figure 1), the negative feed-back loop characteristic of individuals with sexual dysfunctions included a shift of attention to non-erotic cues and a further increase in the salience of those non-erotic cues due to narrowing of the attentional focus. However, research on self-focused attention has demonstrated that during anxious apprehension attention rapidly shifts to a self-evaluative internal focus. This shift to self-focused attention, as well as increases in autonomic arousal, actually intensify the experience of negative affect. In addition, this shift to a self-evaluative perspective focused on lack of coping ability contributes to the maintenance of hypervigilance and
cognitive biases. This negative feedback loop nested within the overall feedback loop has been incorporated into the model (Figure 3).

The separation of affect into decreased positive and increased negative affect represents a further change in the model. The association between positive affect and subjective sexual arousal has been found in multiple studies (e.g., Meisler & Carey, 1991; Nobre et al., 2003). However, other studies (e.g., Mitchell et al., 1998) have failed to find an effect of manipulating affect on subjective sexual arousal, and therefore this portion of the model is in need of further empirical research.

Lastly, worry as an attempt at coping as well as a maintaining factor in sexual dysfunction has been added as an additional avoidance response. Worry as a coping response (in particular for sexual dysfunction) results in attentional avoidance of the anxiety producing stimuli (e.g., the sexual situation), increases in negative intrusive thoughts (distraction), and an increase in negative affect—all of which can potentially interfere with further sexual arousal. A more detailed analysis of the impact of worry on aspects of sexual arousal also awaits empirical study.

Conclusion

In summary, it may be that an affect-laden attentional process focusing on erectile function (for men), body image (for women), sexual performance and other self-evaluative concerns, combined with a tendency to avoid direct observation of one’s functioning (lack of accurate interoceptive awareness or interoceptive focus), may characterize the cognitive-affective processes in sexual dysfunction. In other words, self-focused attention, as reflected in pathological and affect-laden worry processes turned inward, may be fundamentally an avoidance technique (Borkovec, 1994; Brown, Barlow,
& Liebowitz, 1994; Roemer & Borkovec, 1993) that is orthogonal to accurate interoceptive awareness and focus. Specifically, in the case of sexual dysfunction, this process would be situationally bound, since the research discussed has shown that sexual concerns are only relevant in the context of implicit or explicit demands for performance (or in the case of women, being physically on display and judged on attractiveness by a partner).

Finally, the relationship between objective measures of arousal in a sexual context and subjective arousal seem to differ considerably among dysfunctional and functional population, with functional populations showing the well established “illusion of control” in which subjective estimates of arousal do not decrease in a correlated fashion with more objective measures of arousal. This also implies a lack of awareness of performance insufficiency, and yet the above research demonstrates that objective arousal is directly impacted by cognitive and affective manipulations. This “low road to the amygdala” (LeDoux, 1996) may provide a key to understanding vulnerabilities to anxiety driven deficits in performance when it is investigated more rigorously.

For now, it seems clear that further research on cognitive and affective aspects of sexual functioning and, by inference, other areas of performance, may further strengthen models of anxiety related deficient functioning, particularly when considered in interaction with neurobiological factors. In fact, it is unlikely that either neurobiological etiological accounts or pharmacological interventions for performance deficits such as sexual dysfunction will provide anything near a comprehensive account of the genesis or treatment of performance deficits without a full explication of the impact of cognitive and affective factors.
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Figure 1. Barlow’s 1986 Model of Sexual Dysfunction

**Functionals**  
(Positive Feedback Loop)

- Explicit or implicit demands for sexual performance (e.g., a responsive partner or other contexts) leading to public expectation of performance (e.g., erection)
- Positive affect and expectancies, accurate reporting of erection, perception of control
- Attentional focus on erotic cues
- Increased autonomic arousal
- Increasingly efficient attentional focus on erotic cues
- Functional performance

**Dysfunctionals**  
(Negative Feedback Loop)

- Negative affect and expectancies, inaccurate and underreporting of erection, perceived lack of control
- Attentional focus on public consequences of not performing or other non-erotic issues
- Increased autonomic arousal
- Increasingly efficient attentional focus on consequences of not performing (etc.)
- Dysfunctional performance