Arch Sex Behav (2008) 37:652–661
DOI 10.1007/s10508-007-9258-0

ORIGINAL PAPER

Cognitions, Emotions, and Sexual Response: Analysis of the Relationship among Automatic Thoughts, Emotional Responses, and Sexual Arousal

Pedro J. Nobre · José Pinto-Gouveia

Received: 8 September 2005 / Revised: 19 March 2007 / Accepted: 27 August 2007 / Published online: 25 October 2007

Abstract The relationship between automatic thoughts and emotions presented during sexual activity and their correlation with sexual arousal was investigated. A total of 491 individuals (163 women and 232 men without sexual problems and 47 women and 49 men with a *DSM-IV* diagnosis of sexual dysfunction) completed the Sexual Modes Questionnaire (SMQ; Nobre and Pinto-Gouveia, *Journal of Sex Research, 40*, 368–382, 2003). Results indicated several significant correlations among automatic thoughts, emotions, and sexual arousal. Erection concern thoughts in the men and failure/disengagement thoughts and lack of erotic thoughts in the women presented the most significant negative correlations with sexual arousal. Additionally, sadness and disillusion were positively related to these negative cognitions and negatively associated with sexual arousal in both sexes. On the other hand, pleasure and satisfaction were negatively associated with the above-mentioned negative cognitions and positively associated with subjective sexual arousal in both men and women. Overall, findings support the hypothesis that cognitive, emotional, and behavioral dimensions are closely linked and suggest a mode typical of sexual dysfunction composed of negative automatic thoughts, depressive affect, and low subjective sexual arousal.

P. J. Nobre
Departamento de Educação e Psicologia, Universidade de Trás-os-Montes e Alto Douro, Vila Real, Portugal

P. J. Nobre (✉)
Rua Amorim de Carvalho, 97, Senhora da Hora 4460, Portugal
e-mails: pedro.j.nobre@clix.pt; pnobre5@gmail.com

J. Pinto-Gouveia
Faculdade de Psicologia e Ciências da Educação da Universidade de Coimbra, Coimbra, Portugal

Keywords Cognitions · Emotions · Sexual response · Sexual dysfunction · Sexual mode

Introduction

Several studies have indicated that cognitive factors, such as cognitive distraction (Beck, Barlow, Sakheim, & Abrahamson, 1987; Dove & Wiederman, 2000; Elliot & O'Donohue, 1997; Farkas, Sine, & Evans, 1979; Geer & Fuhr, 1976; Przybyla & Byrne, 1984), efficacy expectancies (Bach, Brown, & Barlow, 1999; Creti & Libman, 1989; Palace, 1995), causal attributions (Fichten, Spector, & Libman, 1988; Weisberg, Brown, Wincze, & Barlow, 2001), cognitive schemas (Nobre & Pinto-Gouveia, 2006a), sexual beliefs (Nobre & Pinto-Gouveia, 2006b; Nobre, Pinto-Gouveia, & Gomes, 2003), and automatic thoughts (Nobre & Pinto-Gouveia, 2003, in press), play an important role in determining sexual response.

Recent studies have indicated that men and women with sexual dysfunction present with a set of dysfunctional sexual beliefs (Adams, Dubbert, Chupurdia, Jones, Lofland, & Leermakers, 1996; Baker & De Silva, 1988; Byrne & Schulte, 1990; Nobre & Pinto-Gouveia, 2006b; Nobre et al., 2003), tend to activate more negative cognitive schemas when exposed to unsuccessful sexual events (Nobre & Pinto-Gouveia, 2006a), and report having significantly more negative thoughts during sexual activity, compared to sexually healthy individuals (Dove & Wiederman, 2000; Nobre and Pinto-Gouveia, 2003, in press).

Regarding the role of emotions, studies have indicated different patterns for individuals with and without sexual dysfunction. Findings showed that anxiety exerts no significant effect (Beck et al., 1987) or even facilitates sexual arousal in sexually healthy men and women (Barlow, Sakheim,

& Beck, 1983; Elliot & O'Donohue, 1997; Laan, Everaerd, Van-Aanhold, & Rebel, 1993; Palace & Gorzalka, 1990), whereas it decreases sexual response in men with sexual problems (Beck et al., 1987). Regarding the impact of mood, research consistently suggests that depressive affect is negatively related to sexual arousal (Beck & Barlow, 1986; Heiman, 1980; Heiman & Rowland, 1983; Koukounas & McCabe, 2001; Meisler & Carey, 1991; Mitchell, DiBartolo, Brown, & Barlow, 1998; Nobre et al., 2004; Rowland, Cooper, & Heiman, 1995; Rowland, Cooper, & Slob, 1996).

Despite this accumulated data, little is known about the relationship among cognitions, emotions, and sexual response. This study aimed at exploring that relationship, using cognitive theory as the core framework. Beck (1996) proposed the new concept of *mode* as an integrated network composed of cognitive, affective, and behavioral systems. These systems interact and influence each other, producing synchronous responses to external demands. In this model, the traditional central role of cognitive processing (mediating emotional and behavioral reactions) was substituted by a network of interdependent cognitive, emotional, and behavioral dimensions. Beck suggested that various psychopathological disorders could be conceptualized in terms of modes. For example, specific phobia could be characterized by specific dangerous thoughts, emotional responses of anxiety, and a behavioral impulse to escape, whereas depression could be characterized by thoughts of loss accompanied by sadness and lack of motivation.

With the goal of assessing the relationship among cognitions, emotions, and sexual response, the Sexual Modes Questionnaire (SMQ) was developed containing three components: Automatic thoughts, emotional response, and sexual response (Nobre & Pinto-Gouveia, 2003). Using the terminology proposed by Beck (1996), our intention was to characterize the mode underlying sexual dysfunction in men and women. As a second goal, it was our intention to compare the emotional and sexual responses from participants with and without sexual dysfunction when presenting the same types of automatic thoughts.

According to Beck's (1996) mode model, we expect to find consistent relationship patterns among the cognitive, emotional, and sexual components. According to recent findings, strong associations are expected between automatic thoughts and emotions that typically characterize individuals with sexual dysfunction (Nobre & Pinto-Gouveia, 2006c, in press). Nobre & Pinto-Gouveia (in press) found that men with sexual dysfunction presented significantly more erection concerns, failure anticipation thoughts, and lack of erotic thoughts during sexual activity compared to sexually healthy men. Additionally, women with sexual dysfunction tend to present significantly more sexual abuse thoughts, failure/disengagement thoughts, and lack of erotic thoughts relative to their functional counterparts. Regarding emotional response during sex, Nobre and Pinto-Gouveia (2006c) have corroborated most studies on the role of emotions during sexual activity, indicating that affective states closely related to depressive mood (sadness, disillusion, guilt, lack of pleasure, and satisfaction) were strongly associated with sexual dysfunction in men and women, whereas emotions typical of anxiety states (worry, fear) appeared to be relatively independent from sexual functioning.

In men, we expected to find high correlations between the automatic thought dimensions of erection concerns, failure anticipation, and lack of erotic thoughts (as measured by the Automatic Thought sub-scale of the SMQ) and the emotional responses of sadness, disillusion, pleasure, and satisfaction (as measured by the Emotional Response component of the SMQ) and low correlations between those cognitions and the emotional responses of worry and fear. Significant negative correlations between this group of cognitive-emotional variables and sexual responses were also expected. Regarding the women, significant correlations were expected between the automatic thought dimensions of sexual abuse, failure/disengagement and lack of erotic thoughts (as measured by the Automatic Thought sub-scale of the SMQ), and the emotional responses of sadness, guilt, anger, pleasure, and satisfaction (as measured by the Emotional Response component of the SMQ) and low correlations between those cognitions and the emotional responses of worry and fear. High negative correlations between this set of variables and sexual response were also expected.

Method

Participants

A total of 210 women and 281 men participated in the study. Two groups were constituted: A clinical group of 47 women and 49 men with sexual dysfunction, and a comparison group of 163 women and 232 men without sexual dysfunction.

Participants from the clinical sample were patients at the sexology clinic of Coimbra's University Hospital (an outpatient clinic of a central hospital serving the population of Coimbra and its region). Participants diagnosed with primarily psychogenic sexual dysfunction, using the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV; American Psychiatric Association, 1994) criteria, constituted this group. The principal diagnoses assigned were the following: For the men, erectile disorder (69.4%), premature ejaculation (22.4%), orgasmic disorder (4.1%), hypoactive sexual desire (2%), and sexual dysfunction not otherwise specified (2%); for the women, hypoactive sexual desire (40.4%), vaginismus (25.5%), orgasmic disorders (21.3%), dyspareunia (6.4%), sexual arousal (4.3%), and sexual aversion (2.1%). A total of 21 (43%) women and 9

(18%) men had an additional sexual dysfunction (co-morbid diagnosis). After completing a clinical assessment (conducted by a group of trained sex therapists from the clinic using an unpublished structured interview for sexual dysfunctions), consecutive patients who were given a DSM-IV diagnosis of sexual dysfunction were approached about the study by a member of the research team and given the option to decline. An explanation of the purpose of the study was provided and a consent form was signed. Participants then completed the questionnaire in a private space and returned it directly to the member of the team present. The clinical sample was obtained between September 2000 and December 2001 and the participation rate was 94.8%. The demographic characteristics of the clinical sample are shown in Table 1.

Participants from the control sample were recruited in different regions of Portugal by a group of volunteer students from the Universidade de Trás-os-Montes e Alto Douro. This group of students collected the sample in their hometowns throughout the country using non-random methods (convenience sample). Participants were contacted directly by the volunteers who explained the purpose of the study and gave them the questionnaire with the instructions. These participants were instructed to answer the questionnaires when alone and in the privacy of their homes and then to return them by mail using pre-stamped envelopes. Participants were not paid.

In order to control for the presence of sexual dysfunction, participants who presented scores lower than the cutoffs on the different dimensions assessed by the International Index of Erectile Function (IIEF, Rosen et al., 1997) and the Female Sexual Function Index (FSFI, Rosen et al., 2000) were excluded. The cutoff scores used were the following: For the men, sexual desire = 5.2, erectile function = 22.0, orgasmic function = 5.9, intercourse satisfaction = 7.7, and overall satisfaction = 6.9; for the women, sexual desire = 3.0, sexual arousal = 4.1, lubrication = 4.6, orgasm = 3.8, pain = 4.4, and sexual satisfaction = 3.9. With the exception of erectile function, where the optimal cutoff scores were calculated and published (Cappelleri, Rosen, Smith, Mishra, & Osterloh, 1999), the remaining cutoff scores were based on average values on the different domains of the IIEF (Rosen et al., 1997) and FSFI (Rosen et al., 2000) from samples of individuals without any history of sexual dysfunction. The cutoff scores were calculated by subtracting one SD from the average on the different domains of sexual function. Using this criterion, 71 men and 103 women from the original control sample were excluded from the study (in order to rule out any individual that may have sexual dysfunction). The control sample was collected between September 2000 and April 2002 and the response rate was 30.6%.

Table 1 shows the demographic characteristics of the two groups. Regarding age, the men in the clinical group were significantly older than the men in the control group, $t(277) = 3.15$, $p < .01$, but there was no significant age difference between the two groups of women, $t(208) = -1.01$. Additionally, men and women from the clinical sample presented significantly lower educational levels compared to the control group [men: $\chi^2(6, N = 280) = 117.56$, $p < .001$; women: $\chi^2(6, N = 206) = 14.11$, $p < .05$]. Marital status was also significantly different in participants from the clinical and control groups [men: $\chi^2(5, N = 281) = 12.44$, $p < .05$; women: $\chi^2(5, N = 207) = 18.10$, $p < .01$].

Table 1 Demographic characteristics of the clinical and control groups

	Clinical group		Control group	
	Women ($n = 47$)	Men ($n = 49$)	Women ($n = 163$)	Men ($n = 232$)
Age (in years)				
M	28.7	43.0	30.41	35.78
SD	6.7	14.4	11.38	14.27
Range	19–50	18–67	18–75	18–79
	%		%	
Marital status				
Single	23.4	26.5	57.5	40.9
Married/living together	70.2	71.5	36.9	54.9
Divorced/widowed	6.4	2.0	5.6	4.2
Educational level				
0–9 years	27.6	75.6	11.6	12.1
10–15 years	42.6	22.4	36.4	26.0
16 or more years	29.8	2.0	52.0	61.9

Measures

Sexual Modes Questionnaire (SMQ)

The SMQ (Nobre & Pinto-Gouveia, 2003) is a measure aimed at assessing automatic thoughts, emotions, and sexual response during sexual activity. The questionnaire is composed of an automatic thought sub-scale (AT), and also assesses emotional response (ER), and sexual response ratings (SR) to the automatic thought items.

The AT has a male and a female version. The male version consists of 30 items and the female version consists of 33 items that evaluate automatic thoughts and images presented during sexual activity. The participants rated the frequency in which they experienced the automatic thoughts during sexual activity on a response scale ranging from 1 (never) to 5 (always).

Psychometric studies supported the reliability and validity of the sub-scales (Nobre & Pinto-Gouveia, 2003). Test-retest data indicated a statistically significant correlation

($r = 0.95$, $p < .01$) for the total scale between two consecutive administrations (with a 2-week-interval) of the female version ($n = 23$), and a moderate correlation ($r = 0.65$, $p < .05$) for the male version (possibly due to the low-sample size, $n = 9$). Cronbach's $\alpha = 0.88$ for the male and 0.87 for the female version supported the internal consistency of both scales. Convergent validity indicated that the AT sub-scales were strongly associated with measures of sexual functioning. The female version was significantly correlated with the FSFI ($r = 0.49$, $p < .01$) and the male version with the IIEF ($r = 0.60$, $p < .05$).

Both versions of the automatic thought sub-scale were submitted to factor analysis (Nobre & Pinto-Gouveia, 2003). A principal component analysis with varimax rotation of the female version identified six factors, accounting for 53.1% of the total variance: Sexual abuse thoughts, Failure and disengagement thoughts, Partner's lack of affection, Sexual passivity and control, Erotic thoughts, and Low self-body-image thoughts. In the male version, the principal component analysis identified five factors that accounted for 54.7% of the total variance: Failure anticipation and catastrophizing thoughts, Erection concern thoughts, Age and body function related thoughts, Negative thoughts toward sex, and Erotic thoughts. In both male and female versions, specific dimensional scores for each factor and a total score were calculated, with higher scores representing negative automatic thoughts during sexual activity (see Appendix A for sample items associated to each factor).

The emotional response component (ER) is composed of 30 items in the male version and 33 items in the female version that evaluate emotions reported by the participants during sexual activity. The items are directly connected to the items of the automatic thought scale. So, for each automatic thought, participants indicated their emotional response. A list of ten emotions was presented (worry, sadness, disillusion, fear, guilt, shame, anger, hurt, pleasure, and satisfaction) and participants were asked to check which of them were usually experienced whenever they endorsed each automatic thought. An index for each emotional response was calculated based on the formula total number of each emotion endorsed/total number of emotions endorsed. The index based on this formula represents the proportion in which participants usually experienced each emotion during sexual activity. The emotional response indexes range from 0.0 to 1.0. Convergent validity studies (Nobre & Pinto-Gouveia, 2003) indicated that some emotions of the ER were strongly associated with measures of sexual functioning.

The sexual response component (SR) has 30 items in the male version and 33 items in the female version and was aimed at assessing the subjective sexual response presented during sexual activity (subjective sexual arousal). The items were directly connected to the items of the automatic thought scale. So, for each automatic thought presented, the participants were asked to rate the intensity of their subjective sexual arousal on a 5-point scale ranging from 1 (very low) to 5 (very high). An index of sexual response was calculated based on the formula: Sum of the sexual response for each item/total number of sexual response items endorsed. The index based on this formula provides an indication of the average sexual response (subjective sexual arousal) presented by the participants during sexual activity. The sexual response index ranged from 1 to 5. Discriminant validity studies (Nobre & Pinto-Gouveia, 2003) showed that scores on both men and women sexual response indexes were significantly higher in sexually healthy participants compared to individuals with sexual dysfunction.

The International Index of Erectile Function

The IIEF (Rosen et al., 1997) is a 15-item, self-administered measure assessing different areas of sexual functioning in men. A principal component analysis identified five factors: Erectile function, orgasmic function, sexual desire, intercourse satisfaction, and overall satisfaction. Psychometric studies supported the reliability (Cronbach's $\alpha = 0.73$ and higher and test-retest reliability from $r = 0.64$ to 0.84) and the discriminant validity of the measure. Studies with clinical samples demonstrated its sensitivity and specificity for detecting treatment related changes (Rosen et al., 1997). The measure allows the calculation of specific indexes for each dimension as well as a sexual function total index (calculated through the sum of the specific dimensional indexes), with higher scores indicating greater levels of sexual functioning (sexual desire: 2–10, erectile function: 1–30, orgasmic function: 0–10, intercourse satisfaction: 0–15, overall satisfaction: 2–10, total: 5–75).

The Female Sexual Function Index

The FSFI (Rosen et al., 2000) is a 19-item instrument, providing information on the major dimensions of sexual function. A principal component analysis identified six factors: Sexual interest/desire, sexual arousal, lubrication, orgasm, sexual satisfaction, and sexual pain. The measure has acceptable test-retest reliability ($r = 0.79$–0.86), internal consistency (Cronbach's $\alpha = 0.82$ and higher), and discriminant validity. The measure allows the calculation of specific indexes for each dimension as well a sexual function index (calculated through the sum of the specific dimensional indexes), with higher scores indicating greater levels of sexual functioning (desire: 1.2–6, arousal: 0–6, lubrication: 0–6, orgasm: 0–6, global satisfaction: 0.8–6, pain: 0–6, total, 2–36).

Results

Automatic Thoughts and Emotions During Sexual Activity

Table 2 shows the correlations between the automatic thought sub-scale dimensions and the emotional response indexes presented by men during sexual activity. Results indicated consistent patterns of correlations between some dimensions of the automatic thoughts and the emotional response components. In a more specific analysis of the inter-correlations, we may emphasize the statistically significant correlations between the emotional responses of sadness, guilt, shame, pleasure, and satisfaction and most automatic thought dimensions. On the other hand, emotions such as worry, fear, disillusion, anger, and hurt showed almost none significant correlations with the automatic thought dimensions. Dysfunctional thoughts in sexual contexts seem to be intimately related to an emotional pattern constituted by emotions typically involved in depressed mood (low pleasure and satisfaction, sadness, guilt, and shame).

Table 2 Correlations between the automatic thought dimensions and the emotional response indexes in men (n = 232)

Emotional response	Automatic thoughts				
	Failure anticipation thoughts	Erection concern thoughts	Age and body related thoughts	Negative thoughts toward sex	Lack of erotic thoughts
Worry	0.11	0.26*	0.21	0.09	−0.07
Sadness	0.25*	0.26*	0.30**	0.23	0.09
Disillusion	0.12	0.10	0.04	0.04	0.10
Fear	0.21	0.21	0.16	0.14	0.15
Guilt	0.24	0.35**	0.21	0.26*	0.13
Shame	0.43**	0.37**	0.31**	0.30**	−0.09
Anger	0.10	0.05	0.03	0.14	0.03
Hurt	0.11	0.04	0.12	0.17	0.07
Pleasure	−0.44**	−0.43**	−0.36**	−0.36**	−0.04
Satisfaction	−0.29**	−0.41**	−0.36**	−0.30**	−0.11

* $p < .05$

** $p < .01$

Regarding the women, we found a similar pattern (see Table 3). The emotional responses of disillusion, guilt, pleasure, and satisfaction correlated significantly with most of the automatic thought dimensions, whereas hurt did not correlate with any of the automatic thought dimensions.

The remaining emotions presented specific correlational patterns. Sadness correlated significantly ($p < .01$) with low body image thoughts, whereas worry, fear, and shame presented significant correlations with sexual passivity and control thoughts. We should note, however, that the negative cognitive content typical of women with sexual dysfunction (sexual abuse thoughts, failure, and disengagement thoughts) correlated significantly with the majority of the emotional responses usually associated with depressive mood (disillusion, anger, and lack of pleasure and satisfaction). Overall, it is interesting to note the fact that pleasure and satisfaction presented the stronger correlations with all automatic thought dimensions in both men and women.

Automatic Thoughts and Sexual Response

Regarding the relationship between automatic thoughts and sexual response, results supported the hypothesis that the

Table 3 Correlations between the automatic thought dimensions and the emotional response indexes in women (n = 163)

Emotional Response	Automatic thoughts					
	Sexual abuse thoughts	Failure disengagement thoughts	Partner's lack of affection	Sexual passivity and control	Lack of erotic thoughts	Low self-body-image thoughts
Worry	0.11	0.09	0.09	0.22*	0.09	0.05
Sadness	0.07	0.10	0.08	−0.00	0.14	0.24**
Disillusion	0.21*	0.35**	0.27**	−0.10	0.12	0.18
Fear	0.16	0.04	0.18	0.39**	0.03	0.13
Guilt	0.15	0.21*	0.21*	0.19	0.07	0.27**
Shame	0.19	0.07	0.25**	0.35**	0.08	0.19
Anger	0.23**	0.21*	0.08	0.02	0.18	0.00
Hurt	0.13	0.14	0.16	−0.01	0.10	0.07
Pleasure	−0.38**	−0.35**	−0.42**	−0.37**	−0.23**	−0.25**
Satisfaction	−0.31**	−0.36**	−0.26**	−0.31**	−0.26**	−0.37**

* $p < .05$

** $p < .01$

negative cognitive contents were strongly related to low sexual response levels. All automatic thought dimensions presented significant negative correlations with the sexual response index in both the male and female groups. In the men sample, strong correlations were observed for erection concerns ($r = -0.45$) and failure anticipation thoughts ($r = -0.40$), while in the women group, failure and disengagement thoughts ($r = -0.45$), and sexual abuse thoughts ($r = -0.49$), were strongly correlated to the sexual response index (see Table 4).

Emotions and Sexual Response

Table 5 shows the correlations between the sexual response index and the emotional response indexes of men and women. Results showed that emotions of pleasure and satisfaction were the most strongly related to sexual response in both groups ($p < .001$). Besides these two positive emotions, we may also emphasize the significant negative correlations between the emotions of sadness, disillusion, guilt, and worry, and sexual responses in both men and women. In contrast, women's sexual response presented no significant correlations with fear, shame, and hurt, whereas men's sexual response showed a relative independence from the emotional responses of anger and hurt.

Sexual Response to Automatic Thoughts by Group

In order to examine the influence of sexual functioning on the sexual response to the different dimensions of the automatic thoughts sub-scale, multivariate analyses of covariance (MANCOVA) were conducted. For the women, a 2(Group: Sexually Dysfunctional versus Sexually Functional) × 6 (Sexual Response to the six dimensions of the female Automatic Thought Scale) multivariate analysis of covariance (MANCOVA), with age, marital status, and education co-varied, yielded a significant multivariate effect for Group, $F(6, 76) = 8.79$, $p < .001$ (Wilks' $\lambda = 0.59$).

The univariate tests indicated that women with sexual dysfunction reported significantly less subjective sexual arousal in response to the erotic thought dimension compared to women without sexual problems ($p < .001$, $\eta 2 = 0.39$). The sexual response of women with and without sexual dysfunction to the remaining automatic thoughts was not significantly different (see Table 6).

With respect to men, a 2(Group: Sexually Dysfunctional versus Sexually Functional) × 5 (Sexual Response to the five dimensions of the male Automatic Thought Scale) MANCOVA, with age marital status, and education co-varied, yielded a significant multivariate effect for Group, $F(5, 83) = 3.82$, $p < .01$ (Wilks' $\lambda = 0.81$). The univariate tests indicated that the only significant difference between men with and without sexual dysfunction was observed for the subjective sexual arousal to erotic thoughts ($p < .001$, $\eta^2 = 0.16$). Men with sexual dysfunction responded with significantly lower subjective sexual arousal to erotic thoughts during sexual activity (see Table 7).

Table 4 Correlations between the automatic thought dimensions and the sexual response index

Automatic thought domains	Sexual response index
Men ($n = 232$)	
F1: Failure anticipation thoughts	−0.40***
F2: Erection concern thoughts	−0.45***
F3: Age and body related thoughts	−0.31***
F4: Negative thoughts toward sex	−0.22*
F5: Lack of erotic thoughts	−0.25**
Women ($n = 163$)	
F1: Sexual abuse thoughts	−0.49***
F2: Failure/disengagement thoughts	−0.45***
F3: Partner's lack of affection	−0.40***
F4: Sexual passivity and control	−0.32***
F5: Lack of erotic thoughts	−0.36***
F6: Low self-body-image thoughts	−0.33***

* $p < .05$
** $p < .01$
*** $p < .001$

Table 5 Correlations between the emotional response and the sexual response indexes

Emotional response	Sexual response index	
	Men ($n = 232$)	Women ($n = 163$)
Worry	−0.39***	−0.20*
Sadness	−0.21*	−0.24**
Disillusion	−0.35***	−0.33***
Fear	−0.22*	−0.11
Guilt	−0.27**	−0.21*
Shame	−0.23**	−0.14
Anger	−0.15	−0.19*
Hurt	−0.03	−0.12
Pleasure	0.58***	0.54***
Satisfaction	0.47***	0.39***

* $p < .05$
** $p < .01$
*** $p < .001$

Emotional Response to Automatic Thoughts by Group

The study of the influence of sexual functioning on the emotional response to automatic thoughts during sexual

Table 6 Sexual response to the six dimensions of the automatic thought scale as a function of sexual functioning in women (clinical group/control group)

Thought dimensions	Group						
	Clinical (n = 26)		Control (n = 60)		F (1, 84)	p	η^2
	M	SD	M	SD			
F1: Sexual abuse thoughts	2.26	0.87	2.27	0.80	0.37	ns	0.00
F2: Failure/disengagement	2.18	0.94	2.27	0.74	0.85	ns	0.01
F3: Partner lack of affection	2.64	0.98	2.58	0.70	0.06	ns	0.00
F4: Sexual passivity/control	2.42	0.79	2.76	0.83	3.05	.084	0.04
F5: Erotic thoughts	3.16	0.84	4.32	0.61	52.3***	.001	0.39
F6: Low self-body-image	2.33	0.82	2.31	0.85	0.07	ns	0.00

* $p < .05$

** $p < .01$

*** $p < .001$

Absolute range, 0.0–5.0

Table 7 Sexual response to the five dimensions of the automatic thought scale as a function of sexual functioning in men (clinical group/control group)

Thought dimensions	Group						
	Clinical (n = 20)		Control (n = 72)		F (1, 80)	p	η^2
	M	SD	M	SD			
F1: Failure anticipation	2.14	0.76	2.61	0.63	3.43	.067	0.038
F2: Erection concern thoughts	2.37	0.84	2.45	0.67	0.20	ns	0.002
F3: Age and body thoughts	2.32	0.89	2.49	0.69	0.72	ns	0.008
F4: Negative sexual thoughts	2.42	0.79	2.56	0.70	1.57	ns	0.018
F5: Erotic thoughts	3.18	1.08	4.19	0.69	15.90***	.001	0.155

* $p < .05$

** $p < .01$

*** $p < .001$

Absolute range, 0.0–5.0

activity was based on contingency analysis with chi-square tests. The analyses used sexual functioning (1 = clinical group, 2 = control group) as the independent variable, and the frequency of the different emotional responses to automatic thought items as dependent variables. It was our intention to investigate the distinction between individuals with and without sexual dysfunction in their emotional response to the same group of automatic thoughts.

Regarding women, results indicated significant differences in the way individuals responded emotionally to several automatic thoughts. These differences were mainly in response to the erotic thought items. Women with sexual dysfunction showed low frequency of emotional responses of pleasure and higher frequency of worry, sadness, disillusion, and fear when presenting erotic thoughts during sexual activity, compared to their functional counterparts.

Results for men also indicated significant differences in the emotional responses to erotic thoughts. Men with sexual dysfunction when presenting erotic thoughts tended to respond with less pleasure and satisfaction and more worry, sadness, disillusion, and fear compared to men without sexual dysfunction.

Discussion

The purpose of the present study was to examine the pattern of correlations between cognitions and emotions and sexual response presented by men and women during sexual activity. Findings supported the hypothesis that cognitive, emotional, and behavioral dimensions were closely linked to each other. In fact, data indicated consistent correlational patterns

among these dimensions. It is interesting to note that the emotional responses correlating significantly with negative automatic thoughts in both men and women were the same that strongly correlated with sexual response. Pleasure and satisfaction were negatively associated with negative cognitions and positively associated with sexual response. On the other hand, sadness, guilt, and disillusion were positively related to negative cognitions and negatively associated with sexual response. In the same direction, automatic thought dimensions strongly associated with the identified emotions were also the ones that showed higher correlations with sexual response (erection concern thoughts and failure anticipation thoughts in the men and failure/disengagement thoughts and sexual abuse thoughts in the women).

Using Beck's (1996) model, we may characterize the mode typical of sexual dysfunction as being composed of negative automatic thoughts (erection concern, and failure anticipation thoughts in men, and sexual abuse thoughts and failure/disengagement thoughts in women), depressive affect (sadness, disillusion, guilt, lack of pleasure, and satisfaction), and low subjective sexual arousal.

Results from the present study should, however, be interpreted with caution due to several limitations. One main limitation regards the use of a sample partially used in the validation studies of the SMQ (Nobre & Pinto-Gouveia, 2003). The clinical sample of the present study was also used to assess the discriminant validity of the SMQ. Moreover, this sample was also used in two complementary studies on the nature of automatic thoughts and emotions during sexual activity (Nobre & Pinto-Gouveia, 2006c, in press), which were based on the responses to the same measure. Additional replications of this study using different samples should be conducted in order to verify its findings. Another possible limitation was the heterogeneity of the clinical sample. In fact, men and women from the clinical sample had diverse sexual complaints, and it is possible that there is some specificity in the automatic thoughts and emotional response according to different clinical diagnoses. Also, the different context in which participants answered the questionnaires may have impacted the findings. While participants in the clinical group answered the measures after a clinical interview (potentially evoking additional negative thoughts and emotions), participants without sexual dysfunction completed the questionnaires at home. The fact that we did not control for the effect of psychopathology (e.g., depression, anxiety) is also a limitation, since clinical data suggest higher prevalence of depression and anxiety disorder in individuals with sexual dysfunction. Finally, sexual responses in men and women were not measured during sexual activity but retrospectively by asking participants to rate their level of subjective sexual response to automatic thoughts usually presented during sexual activity. This method of assessment might be susceptible to recall bias, with participants with sexual dysfunction recalling their sexual interactions as being worse than they actually were.

Regarding studies about the effect of sexual functioning on the emotional and sexual response to automatic thoughts, the data indicated a consistent pattern for both sexes. Differences between clinical and control groups were mainly observed in their emotional and sexual response to erotic thoughts. Both men and women with sexual dysfunction tend to present less positive emotions and lower sexual arousal responses to erotic thoughts compared to sexually healthy participants. Participants with sexual dysfunction presented lower frequency of emotional responses of pleasure and satisfaction and greater worry, sadness, disillusion, and fear whenever presenting erotic thoughts during sexual activity. Moreover, sexual arousal response to erotic thoughts was significantly lower in participants with sexual dysfunction. With respect to the other thought dimensions, differences between clinical and control groups were not significant. These results suggest a new distinctive factor in the sexual dysfunctional processes. Differences between individuals with and without sexual dysfunction seem not to be exclusively related to the cognitive content (negative automatic thoughts) and emotional response (lack of positive emotions) presented during sexual activity, but are extended to the way they respond emotionally and sexually to the same self-generated thoughts (mainly erotic thoughts). Erotic thoughts, besides being less frequent in individuals with sexual dysfunction, also seem to present a lower sexual value (being associated with less frequent emotional responses of pleasure and lower subjective sexual arousal). This finding seems to suggest that, despite the importance of positive cognitions (erotic thoughts) in facilitating sexual arousal, changes in sexual response would also benefit from interventions aimed at modifying emotional content.

Overall results indicate that men and women with sexual dysfunction present with a typical pattern of thoughts and emotions during sexual activity that is strongly associated with low levels of sexual arousal. Similarly to Beck (1996), we hypothesize that these thoughts, emotions, and sexual response work in a synchronous fashion and influence each other, maintaining the sexual dysfunction. We think that these findings have implications both for assessment and treatment of men and women with sexual dysfunction. The SMQ might help clinicians in assessing the automatic thoughts, emotions, and sexual arousal typically presented by individuals with sexual dysfunction during sexual activity. Moreover, findings also suggest that interventions oriented to change the cognitive and emotional content of individuals with sexual dysfunction might have an impact on sexual arousal. Additional experimental studies on the impact of cognitions and emotions on sexual response might help shed light on this subject matter.

Acknowledgments This research is part of a doctoral dissertation presented by the first author to Faculdade de Psicologia e Ciências da Educaçço da Universidade de Coimbra, Coimbra, Portugal. The study was partially supported by a grant from PRODEP. The authors would like to thank to Allen Gomes, M.D., Hospitais da Universidade de Coimbra, Portugal, for making possible the collection of the clinical sample and also for his comments and suggestions. Thanks also to D. Rijo, M.A., C. Salvador, M.A., M. Lima, Ph.D., Faculdade de Psicologia, Universidade de Coimbra, Portugal; A. Gomes, M.A., L. Fonseca, M.A., A. Carvalheira, M.A., J. Teixeira, M.D., G. Santos, M.D., J. Quartilho, M.D., Ph.D., P. Abrantes, M.D., A. Canhão, M.D., Hospitais da Universidade de Coimbra, for their suggestions and help in data collection. Thanks also to participants who volunteered to participate in the study.

References

Adams, S. G., Dubbert, P. M., Chupurdia, K. M., Jones, A., Lofland, K. R., & Leermakers, E. (1996). Assessment of sexual beliefs and information in aging couples with sexual dysfunction. *Archives of Sexual Behavior*, *25*, 249–260.

American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.

Bach, A. K., Brown, A. T., & Barlow, D. H. (1999). The effects of false negative feedback on efficacy expectancies and sexual arousal in sexually functional males. *Behavior Therapy*, *30*, 79–95.

Baker, C., & De Silva, P. (1988). The relationship between male sexual dysfunction and belief in Zilbergeld's myths: An empirical investigation. *Sexual and Marital Therapy*, 3, 229–238.

Appendix A

SEXUAL MODES QUESTIONNAIRE (SMQ; P. Nobre & Pinto-Gouveia, 2003)

The items presented below are a list of thoughts one can have during sexual activity. In the first column, please indicate the frequency of which you experience these **thoughts** by circling a number (1-never to 5-always). Next, indicate the **types of emotions** you typically experience when having these thoughts by marking an X in the columns for the appropriate emotions. Finally, in the last column, for each thought experienced indicate the intensity of your typical **sexual response** (arousal) while you are having that thought by circling a number (1-very low to 5-very high).
NOTE: For thoughts that you indicate as never experiencing, you do not need to fill out the emotion or sexual response column.

MALE ITEM EXAMPLES

THOUGHTS						EMOTIONS										SEXUAL RESPONSE				
	FREQUENCY					TYPES OF EMOTIONS										INTENSITY				
TYPE OF THOUGHTS	Never	Seldom	Sometimes	Often	Always	Worry	Sadness	Disillusioned	Fear	Guilt	Shame	Anger	Hurt	Pleasure	Satisfaction	Very low	Low	Moderate	High	Very high
FAILURE ANTICIPATION THOUGHTS	1	2	3	4	5											1	2	3	4	5
I'm condemned to failure																				
ERECTION CONCERN THOUGHTS	1	2	3	4	5											1	2	3	4	5
Why isn't this working? I must achieve an erection																				
AGE RELATED THOUGHTS	1	2	3	4	5											1	2	3	4	5
I'm getting old																				
NEGATIVE THOUGHTS	1	2	3	4	5											1	2	3	4	5
This is disgusting This way of having sex is immoral																				
EROTIC THOUGHTS	1	2	3	4	5											1	2	3	4	5
This is turning me on																				

FEMALE ITEM EXAMPLES

THOUGHTS						EMOTIONS										SEXUAL RESPONSE				
	FREQUENCY					TYPE OF EMOTIONS										INTENSITY				
TYPE OF THOUGHTS	Never	Seldom	Sometimes	Often	Always	Worry	Sadness	Disillusionment	Fear	Guilt	Shame	Anger	Hurt	Pleasure	Satisfaction	Very low	Low	Middling	High	Very high
SEXUAL ABUSE THOUGHTS	1	2	3	4	5											1	2	3	4	5
He is abusing me He only wants to satisfy himself																				
FAILURE AND DISENGAGEMENT THOUGHTS	1	2	3	4	5											1	2	3	4	5
I'm not getting turned on When will this be over?																				
PARTNER'S LACK OF AFFECTION	1	2	3	4	5											1	2	3	4	5
He is not being as affectionate as he used to be																				
SEXUAL PASSIVITY AND CONTROL	1	2	3	4	5											1	2	3	4	5
I should not take the lead in sexual activity																				
EROTIC THOUGHTS	1	2	3	4	5											1	2	3	4	5
The way he is talking turns me on																				
LOW SELF BODY-IMAGE THOUGHTS	1	2	3	4	5											1	2	3	4	5
I'm getting fat/ugly																				

Barlow, D. H., Sakheim, D. K., & Beck, J. G. (1983). Anxiety increases sexual arousal. *Journal of Abnormal Psychology*, *92*, 49–54.

Beck, A. T. (1996). Beyond belief: A theory of modes, personality and psychopathology. In P. M. Salkovskis (Ed.), *Frontiers of cognitive therapy* (pp. 1–25). New York: Guilford Press.

Beck, J. G., & Barlow, D. H. (1986). The effects of anxiety and attentional focus on sexual responding-II: Cognitive and affective patterns in erectile dysfunction. *Behaviour Research and Therapy*, *24*, 19–26.

Beck, J. G., Barlow, D. H., Sakheim, D. K., & Abrahamson, D. J. (1987). Shock threat and sexual arousal: The role of selective attention, thought content, and affective states. *Psychophysiology*, *24*, 165–172.

Byrne, D., & Schulte, L. (1990). Personality dispositions as mediators of sexual responses. *Annual Review of Sex Research, 1*, 93–117.

Cappelleri, J. C., Rosen, R. C., Smith, M. D., Mishra, A., & Osterloh, I. H. (1999). Diagnostic evaluation of the erectile function domain of the International Index of Erectile Function. *Urology*, *54*, 346–351.

Creti, L., & Libman, E. (1989) Cognitions and sexual expression in the aging. *Journal of Sex and Marital Therapy*, *15*, 83–101.

Dove, N. L., & Weiderman, M. W. (2000). Cognitive distraction and women's sexual functioning. *Journal of Sex and Marital Therapy*, *26*, 67–78.

Elliot, A. N., & O'Donohue, W. T. (1997). The effects of anxiety and distraction on sexual arousal in a nonclinical sample of heterosexual women. *Archives of Sexual Behavior*, *26*, 607–624.

Farkas, G. M., Sine, L. F., & Evans, I. M. (1979). The effects of distraction, performance demand, stimulus explicitness, and personality on objective and subjective measures of male sexual arousal. *Behaviour Research and Therapy*, *17*, 25–32.

Fichten, C. S., Spector, I., & Libman, E. (1988). Client attributions for sexual dysfunction. *Journal of Sex and Marital Therapy*, *14*, 208–224.

Geer, J. H., & Fuhr, R. (1976). Cognitive factors in sexual arousal: The role of distraction. *Journal of Consulting and Clinical Psychology*, *44*, 238–243.

Heiman, J. R. (1980). Female sexual response patterns: Interactions of physiological, affective, and contextual cues. *Archives of General Psychiatry*, *37*, 1311–1316.

Heiman, J. R., & Rowland, D. L. (1983). Affective and physiological sexual response patterns: The effects of instructions on sexual functional and dysfunctional men. *Journal of Psychosomatic Research*, *27*, 105–116.

Koukounas, E., & McCabe, M. P. (2001). Sexual and emotional variables influencing sexual response to erotica: A psychophysiological investigation. *Archives of Sexual Behavior*, *30*, 393–408.

Laan, E., Everaerd, W., Van-Aanhold, M., & Rebel, M. (1993). Performance demand and sexual arousal in women. *Behaviour Research and Therapy*, *31*, 25–35.

Meisler, A. W., & Carey, M. P. (1991). Depressed affect and male sexual arousal. *Archives of Sexual Behavior*, *20*, 541–554.

Mitchell, W. B., DiBartolo, P. M., Brown, T. A., & Barlow, D. H. (1998). Effects of positive and negative mood on sexual arousal in sexually functional males. *Archives of Sexual Behavior*, *27*, 197–207.

Nobre, P. J., & Pinto-Gouveia, J. (2003). Sexual modes questionnaire: Measure to assess the interaction between cognitions, emotions and sexual response. *Journal of Sex Research, 40*, 368–382.

Nobre, P. J., & Pinto-Gouveia, J. (in press). Differences in automatic thoughts presented during sexual activity between sexually functional and dysfunctional males and females. *Cognitive Therapy and Research*.

Nobre, P. J., & Pinto-Gouveia, J. (2006a). *Cognitive schemas activated in negative sexual events and sexual dysfunction*. Manuscript submitted for publication.

Nobre, P. J., & Pinto-Gouveia, J. (2006b). Dysfunctional sexual beliefs as vulnerability factors to sexual dysfunction. *Journal of Sex Research, 43*, 68–75.

Nobre, P. J., & Pinto-Gouveia, J. (2006c). Emotions during sexual activity: Differences between sexually functional and dysfunctional men and women. *Archives of Sexual Behavior, 35*, 491–499.

Nobre, P. J., Pinto-Gouveia, J., & Gomes, F. A. (2003). Sexual Dysfunctional Beliefs questionnaire: An instrument to assess sexual dysfunctional beliefs as vulnerability factors to sexual problems. *Sexual and Relationship Therapy*, *18*, 171–204.

Nobre, P. J., Wiegel, M., Bach, A., Weisberg, R., Brown, T., Wincze, J., et al. (2004). Determinants of sexual arousal and the accuracy of its self-estimation in sexually functional males. *Journal of Sex Research, 41*, 363–371.

Palace, E. M. (1995). Modification of dysfunctional patterns of sexual response through autonomic arousal and false physiological feedback. *Journal of Consulting and Clinical Psychology*, *63*, 604–615.

Palace, E. M., & Gorzalka, B. B. (1990). The enhancing effects of anxiety on arousal in sexually functional and dysfunctional women. *Journal of Abnormal Psychology*, *99*, 403–411.

Przybyla, D. P. J., & Byrne, D. (1984). The mediating role of cognitive processes in self-reported sexual arousal. *Journal of Research in Personality*, *18*, 43–54.

Rosen, R. C., Brown, C., Heiman, J., Leiblum, S., Meston, C., Shabsig, R., et al. (2000). The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *Journal of Sex and Marital Therapy*, *26*, 191–208.

Rosen, R. C., Riley, A., Wagner, G., Osterloh, I. H., Kirkpatrck, J., & Mishra, A. (1997). The International Index of Erectile Function (IIEF): A multidimensional scale for assessment of erectile dysfunction. *Urology*, *49*, 822–830.

Rowland, D. L., Cooper, S. E., & Heiman, J. R. (1995). A preliminary investigation of affective and cognitive response in men before and after treatment in a sex therapy program. *Journal of Sex and Marital Therapy*, *21*, 3–20.

Rowland, D. L., Cooper, S. E., & Slob, A. K. (1996). Genital and psychoaffective response to erotic stimulation in sexually functional and dysfunctional men. *Journal of Abnormal Psychology*, *105*, 194–203.

Weisberg, R., Brown, T., Wincze, J. P., & Barlow, D. H. (2001). Causal attributions and male sexual arousal: The impact of attributions for a bogus erectile difficulty on sexual arousal, cognitions and affect. *Journal of Abnormal Psychology*, *110*, 324–334.