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Evaluation of the Sexual Consequences of Surgery: Retrospective and Prospective Strategies

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To assess the impact of a stressor, it is desirable to evaluate affected individuals' status both prior to and following a stressful event. Because of the difficulties inherent in prospective designs, investigators often ask people who have experienced an aversive event to evaluate their prestressor adjustment retrospectively. Do such retrospective evaluations provide a reasonable alternative to prospective assessment? To answer this question we compared retrospective and prospective data gathering procedures in the evaluation of sexual adjustment after prostate surgery. One hundred fifty-two married males who had undergone prostatectomy for benign prostatic enlargement completed a battery of measures which evaluated pre- and postsurgical sexual adjustment either prospectively (i.e., before and after surgery) or retrospectively (i.e., ratings made after surgery of both pre- and postsurgical adjustment). Retrospective assessment indicated considerable sexual deterioration pre- to postsurgery. In subjects tested prospectively, however, the results showed that surgery had little impact on sexual adjustment. Moreover, direct comparisons of retrospective and prospective methodologies reveal that discrepancies are due to differences in evaluations of presurgery status, with retrospective evaluation yielding more favorable

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ratings than prospective assessment. The results highlight a variety of biases which may affect self-ratings of pre- and post-stressor adaptation and show that discrepancies associated with the two methodologies have important implications for understanding the impact of a stressor on adjustment.

KEY WORDS: prospective and retrospective designs; methodology; prostatectomy; sexuality.

INTRODUCTION

In many "real-life" situations it is difficult to examine subjects prior to an aversive event (e.g., car accident, surgery, rape, assault). The luxury of tight, well-controlled experimental designs is, in many contexts, simply not possible. As noted by a former colleague many years ago, "Methodological rigor multiplied by applied relevance is a constant," (Scott Gardner, personal communication, 1969). It was only when we started to work with medical patients in a hospital setting that the cause of his frustration became evident.

Researchers attempting to assess the impact of a particular stressor usually have access to subjects only after the occurrence of such an event. In this situation they generally have to rely on three more or less adequate data collection designs: (1) conduct a "wholly between-groups" study by testing subjects who have undergone the stressor and a "matched" group of subjects who have not [cf. static group comparison (Campbell and Stanley, 1966)]; (2) ask subjects to rate perceived changes caused by the stressor after experiencing the aversive event (e.g., better now–worse now); or (3) ask subjects who have undergone the stressor to respond to two sets of questions, one concerning their current level of functioning and another regarding recollections of pre-stressor status. There are serious difficulties with all three options.

A major problem with the wholly between-groups design is identification and sampling of a matched control or comparison group. For example, in the case of a surgical procedure, what is the appropriate non-stressed control group — people who are equally sick but have elected not to undergo surgery or people who are not sick? The control/comparison group problem is particularly difficult in the case of prostatectomy. This procedure is performed primarily on older males for whom other surgeries, illnesses, and frequent medication use are common. In this case, not only may location of a totally healthy control group be very difficult, but such atypical individuals may be inappropriate for comparison purposes.

There are also major difficulties with using subjects' ratings of pre- to poststressor changes (e.g., better now–worse now); these include expectancy effects and the lack of appropriate standardized instruments which

use such "relativistic" ratings. Perhaps most important, comparative ratings do not provide an index of the absolute level of functioning either prior to or following the stressor.

Such difficulties have prompted some investigators to choose the third option — asking subjects to estimate, retrospectively, their prestressor status. Not only does this strategy avoid all of the difficulties associated with comparative ratings, but also it requires fewer subjects than the matched control group alternative described above. Although it is well known that pre–post evaluations have major limitations (cf. Campbell and Stanley, 1966), the realities of many real-life contexts, especially in behavioral medicine and in the study of posttraumatic stress, have forced investigators to use such designs.

Does the retrospective pre–post strategy provide a reasonable alternative to a prospective pre–post design? Recent work suggests that recall is an active process wherein people search their memories selectively, reinterpret past events, and fill in gaps in memory in a systematic manner. A variety of factors influences evaluations about one's past, including the mere passage of time (Frank and Gilovich, 1989). Current mood (e.g., Bower, 1981; Clark and Teasdale, 1982) and facial and gestural expressions (Riskind, 1983) have also been shown to influence memory for pleasant versus unpleasant events. One's present status on an attribute and one's implicit theories about the conditions which are likely to promote stability or change are also likely to bias recall (McFarland, *et al.*, 1989; Ross, 1989). For example, McFarland and Ross (1987) showed that after self-evaluations had changed in either a positive or a negative direction, those individuals who believed the particular personality characteristic in question to be stable over time recalled their previous self-evaluations as more positive or negative; these corresponded to their present status rather than to their original evaluations. On the other hand, when people believe that they have improved on an attribute after an intervention, they are likely to recall their preintervention ratings as having been more negative than was the case (Conway and Ross, 1984).

Another possible source of retrospective recall bias (Widom, 1989) involves the shift of meaning phenomenon, whereby past events are remembered in the context of one's present situation. A number of studies have shown that after a face-valid intervention (e.g., skills training), people are likely to recall their preintervention responses as substantially worse than they had initially reported (Conway and Ross, 1984; Perry *et al.*, 1988). These changes could be due to shift of meaning effects (Perry *et al.*, 1988), the operation of implicit theories about stability and change (McFarland *et al.*, 1989), or merely to expectancy effects, demand characteristics, or the

reduction of cognitive dissonance after having voluntarily undergone a stressful intervention.

Self-schemata predispose individuals to recall information which confirms their self-concepts (Swann and Read, 1981a, b). For most, the bias is in a self-enhancing direction (Greenwald, 1980). Information processing and motivationally based self-enhancing biases are likely to affect self-ratings, both about current levels of functioning and about past behaviors.

It is not clear, however, how such biases are likely to operate in evaluations of adjustment before and after a stressful event such as surgery. For example, in her theory of cognitive adaptation to threatening events, Taylor (1983) demonstrated that when faced with a threat, such as receiving a diagnosis of breast cancer, women formulated illusory beliefs about the causes of their cancer and about how they could prevent a recurrence. They also made self-enhancing comparisons about both their current and their prestressor situations. The women saw themselves as better adjusted currently than before they had any signs of cancer (possibly a retrospective recall bias), as coping better or at least as well as other women faced with the same crisis, and as having experienced no changes or only positive changes in their lives since their diagnosis of cancer. Here, self-evaluations were shown to be biased assessments of *current* status.

A few investigators believe that the shift of meaning phenomenon sometimes causes retrospective evaluations to be more meaningful than self-ratings collected prospectively (Howard, 1982; Perry *et al.*, 1988). The majority of researchers, however, argue that retrospective evaluations are likely to be confounded in some way, although they do not necessarily agree on the direction in which such ratings will be biased.

Few investigators seem to have considered the possibility of bias in prospective evaluations. Yet if biases are induced by shifts in meaning, expectancy effects, self-enhancing tendencies, current status on an attribute, and implicit theories about stability and change, then ratings of *post*-surgery adaptation could be biased, as could *prospective* ratings of *pre*-stressor adjustment.

Self-handicapping strategies which involve making an anticipatory excuse to justify the possibility of negative outcomes later (cf. Snyder and Higgins, 1988) could, for example, bias presurgery evaluations. In the case of sexual adjustment after surgery, if a man believes before surgery that he will be healthier afterward, he may allow himself to paint a gloomy picture prior to the procedure in the expectation that things will improve, especially if he needs to justify the decision to undergo elective surgery. On the other hand, he may evaluate his presurgery status as poorer than is actually the case even if he believes that the surgery will have a negative impact on sexual adjustment; this could serve an ego-defensive function

because after surgery, things could only turn out better than expected. Indeed, Orne (1962) argued long ago that investigators should control for the demand characteristics of interventions by including a control group who simulate having undergone all experimental procedures.

While there is reason to believe that prospective and retrospective evaluation of adjustment before and after a stressor may not yield comparable information, the literature does not permit us to specify in what way such evaluations are likely to differ. To explore this question we compared sexual adjustment pre and post prostate surgery when using both prospective and retrospective data collection procedures.

The data for this comparison are based on information gathered as part of two studies of sexual adjustment in men who underwent surgery for benign prostatic enlargement. Prostatic enlargement occurs almost universally in men as a correlate of aging (Basso, 1977); surgery, most commonly transurethral prostatectomy, is the treatment of choice when symptoms such as urinary frequency and urgency become severe. This procedure is unlikely to disturb the innervation of the erectile system; indeed, the only likely sexual side effect of the procedure is retrograde ejaculation of semen into the bladder. Nevertheless, the reported adverse consequences have been shown to range from no change to substantial deterioration in sexual functioning and adjustment (cf. Libman and Fichten, 1987). The goal of our two studies was to evaluate the sexual consequences of surgery for benign prostatic enlargement, determine the risk factors for sexual dysfunction postprostatectomy, and evaluate an intervention designed to prevent sexual difficulties after surgery. Interpretation of the results of these two studies necessitated a better understanding of the methodological issue explored in the present investigation. Thus, this paper constitutes a *process analysis* of the data and does not focus on changes in sexual adjustment postprostatectomy.

METHODS

Subjects

Subjects were 152 men who were generally in good health except for the problem of benign prostatic hypertrophy. Subjects were referred by eight Montreal-area urologists and had undergone transurethral prostatectomy for benign prostatic enlargement. All subjects were participating in one of two larger investigations (Libman *et al.*, 1987b, 1989). Those who had already had their surgery were tested in the Retrospective condition (both pre- and postsurgery ratings made postsurgery); individuals who had

not yet had their surgery were tested in the Prospective condition (presurgery ratings made prior to surgery and postsurgery ratings made after). Eighty-three of the subjects were tested in the Retrospective condition and 69 were tested in the Prospective condition.

Subject selection criteria were as follows: age between 50 and 79, currently married, good command of English, and minimum grade 9 educational level (or equivalent) to ensure adequate comprehension and ability to fill out questionnaire measures. Subjects were excluded on the basis of severe physical illness, diagnosis of prostatic cancer, diabetes mellitus, another recent surgery in either spouse, conditions associated with organically based erectile dysfunction [cf. Kaplan's (1974) tables on the effects of illness and drugs on sexuality], and psychological disturbance (defined as having sought or contemplated psychotherapy during the past 2 years).

The average age of men in the Retrospective condition was 65; these subjects had been married for an average of 32 years and their relationships were generally satisfactory [mean Locke–Wallace Marital Adjustment Scale (Kimmel and Van der Veen, 1974) score was 112]. Subjects were in good physical and psychological health. Average income and educational levels indicate that subjects were, generally, from the "middle class."

All of the men in the Prospective condition were recommended for transurethral prostatectomy by their urologist. The mean age of the men in this sample was 64; they had also been married for an average of 32 years and they, too, were, generally, in satisfactory marital relationships (mean Locke–Wallace Marital Adjustment Scale Score was 110). Again, the sample's socioeconomic status could best be described as middle-class and these subjects, too, were in good physical and psychological health, except for the prostatic symptoms.

Some subjects who completed the Presurgery battery failed to complete the Postsurgery measures. Attrition was greater in the Prospective than in the Retrospective sample. In the Retrospective sample, 72 of the 83 men completed measures concerning both pre- and postsurgery adjustment; in the Prospective sample, only 49 of the 69 men completed both batteries. Reasons cited by dropouts included boredom with the questionnaires, discomfort with the explicit sexual information requested, and time requirements. Attrition in the Prospective sample also occurred because of delays and indefinite postponements of surgery, postsurgical complications, and illness diagnosed after completion of the presurgery battery.

Comparisons in the Prospective sample show that completers did not differ significantly from dropouts on age, education, duration of marriage, or psychological or marital adjustment; however, completers experienced more physical symptoms ($M = 5.9$) than did noncompleters ($M = 4.5$),

[$t(67) = 2.61, p < .05$]. In the Retrospective sample, completers and noncompleters differed significantly only on education, with completers having had more years of schooling, ($M = 13$) than noncompleters, ($M = 10$) [$t(81) = 2.86, p < .01$].

Measures

Previous studies have emphasized the importance of multiple measures of sex therapy outcome as well as both narrow and broad outcome criteria (Libman *et al.*, 1984; Takefman and Brender, 1984). These factors were taken into account in the selection of measures.

Measures were adapted, where needed, to allow subjects to answer with respect to both their current level of functioning and their status during the year prior to the prostatectomy. Included in the test battery were a variety of measures required for the larger studies in which subjects were participating. Of interest to the present investigation are the following.

Sexual History Form (SHF). The SHF is a 28-item self-report sexual history measure. It is typically scored on an item-by-item basis, resulting in 28 variables. Normative data for items are available (LoPiccolo *et al.*, 1985; Nowinski and LoPiccolo, 1979). In order to obtain a global score of male sexual functioning, 12 SHF items measuring male sexual desire, frequency of sexual activity and ability (e.g., erections, ejaculatory control) were transformed to proportions of their maximum possible rating, summed, and divided by 12 to provide a derived score: Global Male Sexual Functioning. Maximum score is 1.0; lower scores indicate better functioning. Data indicate that this derived score is a good measure of overall sexual adjustment (Creti *et al.*, 1987).

Goals for Sex Therapy Scale (GSTS). This 15-item measure (Lobitz and Baker, 1979) uses a 7-point rating scale to evaluate men's satisfaction with their ability to engage in various sexual activities. It yields one score which reflects satisfaction with one's sexual performance. The instrument has been shown to be sensitive to pre–post sex therapy changes (Cohen *et al.*, 1980).

Sexual Self-Efficacy Scale — Erectile Functioning (SSES-E). The SSES-E measures confidence in one's ability to perform a variety of sexual behaviors. The scale lists 25 desirable male sexual performance tasks. Subjects indicate those tasks they can perform and rate their confidence on a 10-point scale ranging from 10 ("quite uncertain") to 100 ("certain"). The scale has demonstrated reasonable reliability and validity (Fichten *et al.*, 1988; Libman *et al.*, 1985).

Additional Sexual Measures (SHF-A). Two additional questions were prepared for the present study. These use the same response format as the SHF and inquire about the frequency of retrograde ejaculation and morning erections, aspects of male sexual capacity not tapped by the SHF. Because these questions were added to the test battery halfway through testing in the Retrospective sample, only 50% of men tested retrospectively responded to these questions.

Procedure

The research protocol was approved by the McGill University teaching hospitals' Ethics Committee. Urologists at several large metropolitan hospitals contacted potential subjects (men who had recently undergone transurethral prostatectomy for benign prostatic enlargement and men who had been recommended for this procedure and were on the waiting list for surgery) by letter, requesting their permission to be telephoned by the researchers. The study was described to all potential subjects who agreed to be contacted.

Testing was conducted in two stages. Subjects who already had their surgery were tested retrospectively. Once testing was completed for the Retrospective sample, prospective testing of individuals who had not yet undergone surgery was begun in the Prospective condition.

After verifying that subjects fit the experimental criteria, an appointment was made to administer the test battery. Each subject provided written consent prior to participating in the study. All measures were completed in the presence of one of the experimental personnel.

In the Retrospective condition subjects were tested between 3 and 18 months after their surgery. Half of these subjects first completed the battery of measures concerning their current level of adjustment and, at a testing session 1–2 weeks later, completed the same measures concerning their adjustment during the year prior to their surgery. The remaining half of the subjects completed the pre- and postsurgery batteries in the reverse sequence.

In the Prospective condition subjects completed the test battery concerning their presurgery level of adjustment (past year) shortly after the surgery date was set (between 2 days and 2 months prior to the procedure). Because we were interested in evaluating the effects of a brief psychological intervention on sexual adjustment postsurgery in the larger investigation, subjects were randomly assigned to two groups after their surgery: an Experimental group to whom we administered a psychological intervention

and a Control (no intervention) group. Four to 6 months after the surgery subjects again completed the test battery.

RESULTS

The literature shows that younger and older individuals' responses must be considered separately when evaluating pre- to postprostatectomy changes in sexual adjustment (Libman and Fichten, 1987). Not only do younger and older aging males experience differences in sexual functioning and expression (Libman, 1989) but it appears that younger and older individuals may be differentially affected by prostatectomy (Libman and Fichten, 1987; Libman *et al.*, 1989). Therefore, in the present investigation we grouped male subjects into Younger (age less than 65) and Older (age equal to or greater than 65) categories.

Sample Sizes and Equivalence of Groups

Table I provides information on sample sizes. These indicate the following. (1) The proportions of Younger and Older subjects in both the Prospective and the Retrospective samples were approximately equivalent Presurgery. Moreover, comparisons on age, education, duration of relationship, physical symptoms, and psychological and marital adjustment showed no significant differences between subjects in the Prospective and subjects in the Retrospective samples ($p > .2$ in all cases). (2) Postsurgery, the proportions of Younger and Older subjects continued to be equivalent in the Retrospective sample. In the Prospective sample, however, Younger males

Table I. Sample Sizes[a]

	Number of subjects who completed the presurgery battery		Number of subjects who completed *both* pre- and postsurgery batteries		
	Retrospective sample	Prospective sample	Retrospective sample	Prospective sample	
				Total	Control group
Younger	40	38	36	30	18
Older	43	31	36	19	7

[a]There was attrition in both the Prospective and the Retrospective samples. Therefore, the number of subjects for whom both pre- and postsurgery data are available is lower than the number of subjects for whom only presurgery data exist. Also, sample sizes on the multivariate tests are somewhat lower because some subjects were missing a single score.

are overrepresented at the Postsurgery testing time; this is particularly evident in the Prospective sample Control group.

Data Analysis

The ideal design for data analysis would have been a three-way multivariate analysis of variance (MANOVA) comparison [2 Samples (Retrospective/Prospective) × 2 Age (Younger/Older) × 2 Time (Pre-/Postsurgery)]. This comparison could not be carried out for a variety of reasons. First, we felt it inappropriate to group Experimental and Control group subjects' Postsurgery scores in the Prospective sample because the intervention in the Experimental group was expected to improve subjects' Postsurgery sexual adjustment. Using only Prospective condition Control group data would, however, have resulted in a sample with very few Older subjects. Moreover, using data from only those subjects who completed both the Pre- and the Postsurgery batteries would have resulted in the loss of Presurgery data for 55 subjects because of attrition.

A major concern of the present investigation was to assess the comparability of Presurgery scores using Prospective and Retrospective data gathering procedures (after all, postsurgery evaluation was collected after surgery in both samples). Separate assessment of Presurgery scores without major losses in sample size and without complications due to Postsurgery confounds introduced by the intervention in the Prospective sample seemed a priority. Therefore, we performed one-way multivariate analysis of covariance (MANCOVA) comparisons (with age as the covariate) on pre and post data separately, as well as chi-square tests. While this resulted in a loss of elegance in data analysis, we felt that it was the best possible compromise in the circumstances.

Pre- to Postsurgery Changes

In order to evaluate the consequences of prostatectomy when Retrospective and Prospective designs are used, one-way MANCOVA comparisons (Pre/Post) were performed separately on Retrospective sample scores and on Prospective sample Control group scores. This form of analysis parallels what investigators would use if they employed only one of the two designs.

The MANCOVA uses data for only those subjects for whom there are no missing data. Rather than estimating a large number of scores on the SHF-A items, separate analyses were performed on Retrospective sample subjects' scores on the two Additional Sexual Measures (those dealing

with retrograde ejaculation and morning erections) because only part of the sample completed these two questions. In addition, a few subjects had missing scores on one of the tests. Therefore, sample sizes for these analyses are as follows; Retrospective sample $n = 67$ for all variables except the Additional Sexual Measures, where $n = 35$; and Prospective Sample $n = 20$. The multivariate criterion used is Pillai–Bartlett and the equivalent F is reported.

In the Retrospective sample, both multivariate time effects were significant [$F(7,60) = 3.64$, $p < .002$; $F(2,33) = 7.40$, $p < .002$]. The time effect was also significant in the Prospective sample [$F(9,11) = 6.61$, $p < .002$]. Means for these analyses and univariate F results are presented in Table II.

As the data presented in Table II indicate, one would be forced to draw very different conclusions about the sexual consequences of prostate surgery depending on whether inferences are based on data from the Prospective or from the Retrospective samples. For example, results in the Retrospective sample show significant deterioration in sexual adjustment on six of the nine variables. In contrast, Prospective sample data show deterioration in sexual adjustment on only one variable: Retrograde Ejaculation. Moreover, results in the Prospective sample show significant improvement on Satisfaction with the Couple Sexual Relationship.

Why Do the Two Techniques Yield Different Findings?

Examination of Means. To examine the reasons for the discrepancies noted above, we performed one-way MANCOVAs to compare scores in the Prospective and Retrospective samples. By performing separate analyses on Presurgery and Postsurgery scores, we were able to use all participating subjects' data at the Presurgery testing time, while using only the Prospective sample Control group subjects' data at Postsurgery; this avoided possible confounds caused by the experimental intervention.

The multivariate group effects were significant for the Presurgery testing time both on SHF-A items [$F(7,121) = 2.53$, $p < .019$; $F(2,104) = 3.99$, $p < .037$], and on all other items; this was not the case for the Postsurgery testing time ($p > .3$). Examination of the univariate F values at Presurgery show significant differences on six of the nine variables: Global Sexual Functioning [$F(1,127) = 11.61$, $p < .001$], Morning Erections [$F(1,105) = 5.99$, $p < .016$], Frequency of Couple Sexual Activity [$F(1,127) = 10.38$, $p < .002$], Sexual Self-Efficacy [$F(1,127) = 10.11$, $p < .002$], Satisfaction with Sexual

Table II. Pre- and Postsurgery Means and Test Results in the Retrospective and Prospective Condidtions[a]

Variable	Retrospective					Prospective				
	Pre	Post	F	p	Findings	Pre	Post	F	p	Findings
Sexual Adjustment: Capacity Global Sexual Functioning[b]	.43 (.08)	.48 (.11)	$F(1,66) = 17.07$	.001	Worse post	.51 (.10)	.54 (.23)	$F(1,19) = 0.33$	ns	
Sexual Adjustment: Capacity—Orgasms Retrograde Ejaculation (SHF-A)[b]	1.66 (1.33)	3.49 (2.36)	$F(1,34) = 15.25$	.001	Worse post	1.50 (1.00)	4.35 (2.18)	$F(1,19) = 23.64$	.001	Worse post
Sexual Adjustment: Capacity—Erections Morning Erections (SHF-A)[b]	3.43 (1.48)	3.43 (1.43)	$F(1,34) = 0.05$	ns		3.55 (1.23)	3.10 (1.41)	$F(1,19) = 3.08$	ns	
Sexual Adjustment: Behavior Frequency of Couple Sexual Activity (SHF)[b]	5.30 (1.55)	5.81 (1.71)	$F(1,66) = 13.44$	.001	Worse post	6.60 (1.54)	6.70 (1.59)	$F(1,19) = 0.13$	ns	

Frequency of Desired Couple Sexual Activity (SHF)[b]	4.46 (1.09)	4.67 (1.45)	$F(1,66) = 2.51$	ns		4.70 (0.92)	4.60 (1.14)	$F(1,19) = 0.16$	ns	
Sexual Adjustment: Cognitive Dimension										
Sexual Self-Efficacy (SSES-E)	64.27 (18.84)	59.25 (20.28)	$F(1,66) = 8.84$	.004	Worse post	54.04 (21.73)	56.25 (19.85)	$F(1,19) = 1.03$	ns	
Satisfaction with Sexual Ability (GSTS)	70.58 (16.40)	66.24 (17.48)	$F(1,66) = 4.08$	.048	Worse post	56.25 (19.85)	57.55 (23.00)	$F(1,19) = 0.06$	ns	
Sexual Adjustment: Affective Dimension										
Frequency of Sexual Arousal (SHF)[b]	4.03 (1.37)	4.45 (1.70)	$F(1,66) = 4.28$	.042	Worse post	4.20 (1.54)	4.70 (1.34)	$F(1,19) = 1.67$	ns	
Sexual Adjustment: Couple Relations										
Satisfaction with Couple Sexual Relationship (SHF)	5.02 (1.27)	4.61 (1.60)	$F(1,66) = 2.64$	ns		3.80 (1.85)	4.55 (1.28)	$F(1,19) = 5.38$	.032	Better post

[a]Values in parentheses are standard deviations. ns, not significant.
[b]Lower scores indicate better adjustment.

Ability [$F(1,127) = 8.97, p < .003$], and Satisfaction with the Couple Sexual Relationship [$F(1,127) = 6.69, p < .011$]. *All* comparisons favored Retrospective condition subjects.

At the Postsurgery testing time, the multivariate F was not significant; furthermore, only one of the univariate comparisons (Frequency of Couple Sexual Activity) was significant [$F(1,88) = 4.35, p < .040$]. These results suggest that the discrepancy between conclusions based on Retrospective and those based on Prospective evaluation is due to differences favoring the Retrospective sample at the Presurgery testing time.

Examination of Frequencies. The analyses on mean differences described above do not show what percentage of subjects in the Retrospective and the Prospective samples experienced good or poor sexual adjustment either Pre- or Postsurgery. Therefore, the proportion of subjects who experienced good or poor functioning in the Prospective and in the Retrospective samples was calculated separately for Presurgery and for Postsurgery testing times and chi-square tests were performed on the frequencies. Presurgery mean splits on the scores of all subjects combined were used to determine good and poor adjustment (Older and Younger subjects were split for the Postsurgery evaluation because of large differences between the number of Younger and the number of Older subjects in the Prospective sample Control group).

Results on the chi-square tests support the findings on means; at Presurgery, significant differences ($p < .05$ or better) in favor of the Retrospective sample were found on the same six variables which distinguished groups when means were used in data analyses. Moreover, even after a Bonferroni adjustment to the alpha level, two of the tests remained significant. At Postsurgery, there were no significant differences found between the Retrospective and the Prospective samples on any of the variables.

Examination of Expectancy Effects. To evaluate the possibility that subjects' implicit theories about stability and change (i.e., expectancies about the sexual consequences of prostate surgery) may have influenced the findings, we compared the scores of 26 men who indicated that they expected no changes in sexual adjustment after surgery with the scores of 11 subjects who indicated that they expected the surgery to result in deterioration (all of these subjects were tested Retrospectively — data on this issue were not collected in the Prospective sample). Discriminant analyses on Presurgery, Postsurgery, and pre- to postsurgery change scores revealed no significant differences. Moreover, the results show that none of 36 t-test comparisons were significant, even before a Bonferroni correction to the alpha level.

DISCUSSION

Before discussing the results and their implications, it must be noted that the present investigation has a number of procedural limitations which may have influenced the findings. The intention when we conducted testing was to first assess, in a retrospective study, the nature and magnitude of changes in sexual adjustment experienced by men who had undergone prostatectomy. We used this information to determine risk predictors for sexual difficulties postsurgery and then administered a brief bibliotherapy intervention in a controlled prospective study; this was intended to minimize deterioration postsurgery. Only after both investigations were completed did we note that there were serious discrepancies between results using the retrospective design and results using the prospective design. This sequence of steps meant that the subjects were not randomly assigned to the prospective and retrospective conditions, the time frames for reporting differed in the two conditions, the treatment intervention resulted in the splitting of subjects into experimental and control groups in the prospective condition, and the order of completing the pre and post questionnaires in the retrospective condition was counterbalanced, while this was, of course, not the case in the prospective condition. Moreover, the dropout rate among subjects tested prospectively was greater than in subjects tested retrospectively. These factors could have influenced the results. Nevertheless, the equivalence of the prospective and retrospective samples on nonsexual variables and the absence of significant differences postsurgery suggest that our findings on retrospective and prospective evaluations are not wholly artifactual.

As an anonymous reviewer noted, had we intended to carry out a methodological study, we could have obtained retrospective estimates from subjects who had completed both the pre and the post test in the prospective condition. While this strategy also has some problems (e.g., test-wiseness), it could be a cost-effective means of examining the prospective vs. retrospective issue in prospective studies in areas of behavioral medicine where there is extensive use of retrospective designs.

Based on the findings in the retrospective data gathering condition, one would have to conclude that prostatectomy results in minor but extensive pre- to postsurgery deterioration in sexual adjustment. Conclusions based on data gathered prospectively would be very different, however. Here, the results indicate that surgery has little negative impact on sexual adjustment, and may even have some beneficial effects.

Which conclusion is more accurate? The data show that retrospective and prospective methodologies do *not* yield equivalent results. Retrospective evaluation of remembered sexual adjustment prior to surgery yielded

more favorable ratings than did prospective evaluation. Moreover, the significant differences between retrospective and prospective assessment *all* indicated better sexual adjustment presurgery in subjects tested retrospectively. Postsurgery, however, subjects tested prospectively and retrospectively did not differ significantly from each other.

In general, we are inclined to trust the findings from the sample where data were gathered prospectively. In part, this is because scores after surgery were similar in the prospective and retrospective conditions; the discrepancies between the two samples are clearly caused by differences in presurgery scores.

Ratings of better adjustment presurgery, when these are based on memory, may be due to retrospective "rosy" coloration of the past — "the good old days." It is well known that people make overly favorable evaluations of themselves in many circumstances (cf. Fiske and Taylor, 1984; Taylor and Brown, 1988). Bias in memory about the self, the phenomenon of revising one's personal history, has been well documented in the social cognition literature (Greenwald, 1980). It has been suggested that revisions, such as remembering oneself to have been more successful than was really the case, are adaptive because they justify the present (Wixon and Laird, 1976). In the case of sexual adjustment prior to prostate surgery, the belief that one was functioning well presurgery may be justifying the present situation of less than optimal sexual adjustment

While we cannot pinpoint the specific mechanism which makes retrospective ratings of presurgery adjustment more favorable than prospective evaluations, our data do suggest that implicit theories about change (i.e., expectancy effects) were not the most likely cause. Even though many men believe that prostatectomy causes deterioration in sexual adjustment (Libman *et al.*, 1987a), our data show that expectancies were not related to pre- or to postsurgery ratings or to change scores in men who were tested retrospectively

Although the retrospective and prospective methods of evaluating sexual adjustment prior to prostate surgery yielded different results, it would be premature to assume that the discrepancy is necessarily due to a tendency in subjects tested retrospectively to bias their recall of sexual adjustment presurgery in a positive direction. It is also possible that subjects in the prospective condition, who were tested when they were close to their surgery, may have been functioning at a particularly low level and may have based their evaluations on the very recent past, rather than on the year prior to their surgery. That patients indicate poorer sexual functioning immediately prior to prostate surgery for cancer is an observation previously reported in the medical literature (Walsh and Donker, 1982). Thus, presurgery scores in the prospective condition may have contained a negative

bias. Furthermore, subjects in the retrospective sample, who were asked to recall their presurgery level of sexual adjustment, may have inadvertently used a time reference prior to the experience of severe prostatic symptoms rather than basing their ratings on the year prior to the surgical procedure; this could have inflated evaluations of preoperative status. Also, the design of the present investigation did not permit evaluation of self-enhancing and self-handicapping strategies which could have had an impact on presurgery scores collected prospectively.

The present results underline the importance of the timing of data collection and suggest that, if possible, subjects should be tested prospectively in a well-defined time period, preferably several months before surgery. Moreover, investigators should recognize the possibility that a variety of biases may be operating even in prospective evaluations; this suggests that using one or more comparison groups is strongly advisable.

A retrospective design can constitute a rich and useful source of experimental hypotheses. Ideally, when using retrospective methodology, data might be obtained from a comparison group, where subjects also complete measures on a retrospective basis. Comparison-group subjects may be of two types: individuals who have experienced no aversive or significant event or people who have experienced a different type of stressor. Such comparative information would be useful in formulating conclusions about the impact of a specific stressor. In the present case, a sample of married men matched on age, physical health, and psychological and marital adjustment who had undergone a surgical procedure of "equivalent" severity might have been used. Equivalence of aversive events is, of course, difficult to gauge. Nevertheless, pre- to poststressor changes in such comparison groups may be used to provide a sounder, more valid basis for evaluating the impact of a particular stressor when the more convenient retrospective methodology is used.

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