Published in final edited form as:

Health Psychol. 2006 May ; 25(3): 348–354. doi:10.1037/0278-6133.25.3.348.

Moderators of the Benefits of Psychoeducational Interventions for Men With Prostate Cancer

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Abstract

The authors examined whether 3 individual difference variables—self-esteem, self-efficacy, and depressive symptoms—interacted with psychoeducational group interventions for men with prostate cancer ($n = 250$) to predict general and prostate-specific quality of life. Men with nonmetastatic prostate cancer were randomly assigned to an education intervention, an education plus group discussion intervention, or usual care and followed for 12 months. Eight groups of 10 to 12 men were convened in each condition. Men who began the study with lower self-esteem, lower prostate-specific self-efficacy, and higher depressive symptoms benefited the most from the interventions. Of these 3 moderator variables, the most consistent results emerged for self-esteem. That is, the benefits of the intervention were strongest for men with low self-esteem.

Keywords

prostate cancer; psychoeducational intervention; quality of life; self-esteem; self-efficacy

Psychosocial and educational interventions in the area of cancer are no longer uncommon. In the last decade, the evidence on the effectiveness of these interventions for improving quality of life has been mixed (Fawzy, Fawzy, Arndt, & Pasnau, 1995; Helgeson & Cohen, 1996; Meyer & Mark, 1995; Newell, Sanson-Fisher, & Savolainen, 2002; Rehse & Pukrop, 2002; Sheard & Maguire, 1999). One contributing factor to the mixed evidence is that many of the studies in this field are preventive, assuming that all patients are in need of intervention (Sheard & Maguire, 1999). However, there is emerging evidence that some people are more likely than others to reap the benefits of an intervention (Antoni et al., 2001; Edgar, Rosberger, & Nowlis, 1992; Goodwin et al., 2001; Helgeson, Cohen, Schulz, & Yasko, 2000; Lepore & Helgeson, 1999; Mishel et al., 2003; Stanton et al., 2002). Our study builds on this small but growing literature by further examining characteristics that distinguish those people with cancer who are most and least likely to benefit from psychosocial and educational interventions.

The present analysis addresses the question of who benefits from psychosocial interventions by further examining data from our previously published randomized controlled trial on the effects of education and support groups on men's adjustment to prostate cancer (Lepore, Helgeson, Eton, & Schulz, 2003). In this study, 250 men treated for localized prostate cancer were randomly assigned to one of three conditions: group education, group education plus

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Portions of these data were presented at the 112th Annual Meeting of the American Psychological Association, Honolulu, Hawaii, July–August 2004.

facilitated peer discussion, or usual care. The education intervention provided men with information to enhance their understanding of and control over the illness experience. The facilitated peer discussion component of the education plus discussion intervention focused on discussing how the educational topic was personally relevant to men. In a previous report, we showed that both interventions had significant positive effects on prostate cancer knowledge, health behaviors, and physical functioning (Lepore et al., 2003). However, some of these effects were limited to men with less formal education. That is, the less educated men benefited the most from an information-based intervention. We found no effects of the interventions on depressive symptoms or mental functioning, even among men with less education.

Previous research guided the current analysis of individual differences in men's responses to the education and support group interventions for prostate cancer. One guiding principle was that individuals who have a higher level of baseline distress may benefit the most from a psychological intervention (Goodwin et al., 2001). Thus, we examined how baseline distress interacted with the interventions to influence subsequent distress, with the expectation that more distressed men would show the greatest benefits from the interventions.

A second guiding principle was that individuals who were low in specific internal resources that are relevant to quality of life would benefit from interventions that accentuated those resources (Antoni et al., 2001; Helgeson et al., 2000; Lepore & Helgeson, 1999). Thus, we examined whether two personal resource variables—self-esteem and self-efficacy—interacted with the interventions to influence both general and prostate-specific quality of life. Self-esteem and self-efficacy were both strong cross-sectional predictors of quality of life among these men at baseline (Eton, Lepore, & Helgeson, 2001). We predicted that men who had lower general self-esteem and lower self-efficacy with respect to controlling the side effects of prostate cancer at baseline would benefit the most from the interventions, because the interventions emphasized normalizing and enhancing men's sense of control over the illness experience. The educational sessions provided men with information on how to make healthy lifestyle changes; how to communicate with family, friends, and health care professionals; and how to cope with negative side effects of treatments. Thus, men who had a poorer self-concept or less confidence in themselves more generally (i.e., low self-esteem), and who felt less capable of controlling the specific side effects of the illness (i.e., low self-efficacy), should have benefited the most from these interventions. Because the education only and the combined interventions showed similar effects on quality of life and had education as their common core, we did not have any expectations about whether our moderator variables would differentially interact with the two interventions.

Method

Participants

Physicians from 11 radiation and oncology groups referred patients to the study who had been recently treated for localized prostate cancer. Of 576 referred patients, 362 agreed to be contacted about the study and met all eligibility criteria: (a) They had no history of cancer except skin cancer, (b) lived within 1 hr of Pittsburgh, and (c) had nonmetastatic disease. Of these, 279 (77%) completed the baseline interview and agreed to randomization, 250 (90%) completed the study, and 29 (10%) were lost to follow-up. Attrition was unrelated to experimental condition. Participant demographic and medical variables are shown in Table 1.

Procedure

Following enrollment, a male interviewer conducted an in-home baseline interview. The average time between treatment and the baseline interview was approximately 2 months ($Mdn = 47$ days, range = 7–141 days, $SD = 21.91$). Follow-up assessment occurred at

approximately 2 weeks, 6 months, and 12 months after the interventions. The baseline and 2-week assessment occurred in person, whereas the 6-month and 12-month assessments were conducted by phone. At each wave, self-report questionnaires were used to assess more sensitive issues (i.e., prostate-specific quality of life). To test our hypothesis that individual difference variables interact with the intervention to predict quality of life, we chose the earliest follow-up assessment, 2 weeks after the intervention, and the latest follow-up, 12 months after the intervention. Following the baseline interview, patients were randomly assigned to one of three conditions: an education only group intervention, an education plus facilitated peer discussion group intervention, or usual care (control group). Eight different groups of men (10–12 men per group) were created for each condition (93 men per condition).

The education intervention consisted of six weekly, 1-hr lectures delivered by experts in the areas of prostate cancer biology and epidemiology, side effects of treatment, nutrition, stress and coping, relationships and sexuality, and follow-up care. Patients were encouraged to attend the lectures with a family member or friend. The education plus discussion intervention consisted of the same lecture series with 45 additional minutes of group discussion following each lecture. A male clinical psychologist facilitated these discussions and was responsible for maintaining a safe, nonjudgmental atmosphere. The discussions focused on how the lecture topic was relevant to group members. Female family members convened in a separate room for their own discussion, which was facilitated by a female oncology nurse. Patients in the control condition received nothing beyond their standard medical care.

Instruments

Quality control variables—As part of data quality control, at the end of each interview, the interviewers rated the extent to which the patients had difficulty understanding the questions and difficulty concentrating on 5-point scales (1 = *never*; 5 = *very often*). We created a composite variable by averaging the ratings of these two items at each interview wave and then averaging across interview waves. Higher scores indicate poorer comprehension and concentration. Because there was a significant condition effect on this variable (see Lepore et al., 2003), we statistically controlled for it in all analyses.

General quality of life—We used the Short-Form General Health Survey (SF-36; Ware, Snow, Kosinski, & Gandek, 1993) to measure general quality of life. We followed the scoring procedures used by the authors to create the global physical health component score (PCS) and a global mental health component score (MCS). Higher numbers indicate better functioning (range = 0–100).

Depressive symptoms—We measured depressive symptoms using a 15-item modified version of Radloff's (1977) Center for Epidemiological Studies—Depression Scale (CES-D). The 15-item CES-D has been validated with people with cancer and captures almost all of the information of the original 20-item CES-D but is free of gender bias (Stommel et al., 1993). Higher numbers indicate greater depressive symptoms (range = 0–3). Internal consistencies were good at all waves (alpha ranged from .83 to .89).

Health behavior—We developed five questions related to positive health behaviors that were recommended to patients in the intervention groups. Men indicated whether or how frequently in the prior week they exercised, did Kegel exercises, took time to relax, took vitamins, and got adequate sleep. We calculated a health behavior index score by summing responses to these questions. Because none of the moderator variables interacted with the interventions to predict health behavior, they are not further discussed in the article.

Prostate-specific quality of life—We used the UCLA Prostate Cancer Index (PCI; Litwin et al., 1998) to measure sexual, urinary, and bowel functioning. Higher scores on the scales indicate better functioning (range = 0–100). In the present study, these scales had adequate to good reliability at all waves (alphas ranged from .68 to .92).

Self-esteem—Self-esteem was measured with the 10-item Rosenberg Global Self-Esteem Scale at baseline (Rosenberg, 1965), in which responses to each statement are made on 5-point scales (1 = *strongly disagree*; 5 = *strongly agree*). The internal consistency was .84 at baseline.

Self-efficacy—Self-efficacy is defined as the belief that one is able to control outcomes (Bandura, 1992). In a previous study of men with prostate cancer, we developed a measure of self-efficacy that reflected how certain men were that they were able to control side effects (e.g., urine leakage), manage stress, understand their illness, and communicate effectively with physicians and family (Lepore & Helgeson, 1999). Here, the nine-item instrument had good reliability, $\alpha = .78$. Because self-esteem and self-efficacy were only modestly related ($r = .25$, $p < .01$) at baseline, we examined the two variables separately.

Statistical Plan

We examined the extent to which self-esteem, self-efficacy, and depressive symptoms moderated the effects of the education and combined education plus discussion intervention on general and prostate-specific quality of life outcomes. We tested moderation at two waves of data collection—the first and last follow-ups, which took place 2 weeks and 12 months after the intervention—to help control for experiment error.

We used multiple regression analyses to test these hypotheses.¹ We computed two contrast terms, one that compared the education group with the control group and one that compared the combination group with the control group. We entered the respective baseline measure of the dependent variable on the first step, the comprehension variable on the second step, the main effects for the baseline moderator variable and the two contrast terms on the third step, and two interaction terms on the last step (Education to control contrast $\times$ Moderator; Combined to control contrast $\times$ Moderator). We centered the variables before computing interaction terms, and we interpreted and plotted the interactions using Aiken and West's (1991) procedures. Results from regression analyses that revealed significant interactions between self-esteem and intervention are shown in Table 2, between self-efficacy and intervention in Table 3, and between depressive symptoms and intervention in Table 4. In our previous report (Lepore et al., 2003), we found interactions between the interventions and the educational background of the men. Because educational background was not correlated with either of the moderator variables or either intervention (all $ps > .10$), we did not include it in our analyses.

Results

Self-Esteem

Physical functioning—At 2-week follow-up, the education and combined interventions each interacted with self-esteem to predict PCS (see Table 2). As shown in Figure 1, lower self-esteem was related to poorer physical functioning for control but not for education intervention participants. Low self-esteem men were buffered from poor physical functioning when they were assigned to the intervention. At the later follow-up, there was a significant

¹Because we used a group-level intervention, each individual group could exert a random effect that should be statistically controlled. To test whether this was necessary, we used SAS Proc-Mixed (Littell, Milliken, Stroup, & Wolfinger, 1996) to conduct a random effects mixed models regression analysis. The intervention was treated as a fixed effect, and the individual group was a random effect in the model. For each outcome, the effect of group in the model was not significant and accounted for less than 1% of the residual variation among men. Thus, we returned to an ordinary least squares regression approach.

interaction of self-esteem with the combined intervention. The pattern of the interaction is the same as at the earlier assessment shown in Figure 1. Lower self-esteem was related to poorer physical functioning for controls but not for combined intervention participants. Low self-esteem individuals who were assigned to the combined intervention had a relatively high level of physical functioning compared with those who were assigned to the control group.

Mental functioning—At 2 weeks, self-esteem interacted with the education intervention to predict MCS. This interaction is shown in Figure 2. The relation of self-esteem to mental functioning was stronger for controls than education participants. Again, this finding suggests that the intervention is providing a buffer against low levels of mental functioning for men with lower self-esteem. Self-esteem did not interact with the combined intervention to predict mental functioning. At 12-month follow-up, self-esteem interacted with both interventions to predict MCS. Consistent with the interaction at the earlier assessment shown in Figure 2, the positive relation between self-esteem and mental functioning was stronger for controls than for education and combined participants.

Depressive symptoms—Self-esteem interacted with both interventions to predict depressive symptoms at 2 weeks. The interactions mirrored the one shown in Figure 2. Lower self-esteem was associated with greater depressive symptoms in the control group but not the intervention groups. Again, low self-esteem individuals seem to be buffered from higher levels of depressive symptoms when they are in an intervention. At 12-month follow-up, self-esteem interacted with both interventions. Lower self-esteem was associated with greater depressive symptoms among controls but not among combined or education intervention participants.

Prostate-specific functioning—Self-esteem did not interact with either intervention to predict prostate-specific functioning measures (urine, sex, bowel) at 2-week follow-up. At 12-month follow-up, self-esteem significantly interacted with the combined intervention to predict urine function. Lower self-esteem was related to worse urinary function among controls but was unrelated to urinary function for combined intervention participants. Self-esteem also interacted with both the education and combined intervention to predict bowel function at 12-month follow-up. Lower self-esteem was related to worse bowel function among controls but not among intervention participants.

Self-Efficacy

Physical functioning—At 2-week follow-up, self-efficacy interacted with both interventions to predict PCS. As shown in Figure 3, lower self-efficacy was related to worse physical functioning for controls but not for education participants. Low self-efficacy individuals assigned to either intervention were buffered from poor physical functioning. At 12-month follow-up, self-efficacy interacted only with the education intervention. Similar to the interaction shown in Figure 3, lower self-efficacy was related to worse physical functioning for controls but was unrelated to physical functioning for education participants.

Mental functioning—Self-efficacy did not interact with either intervention to predict MCS at 2-week or 12-month follow-up.

Depressive symptoms—Self-efficacy did not interact with either intervention to predict depressive symptoms at 2-week or 12-month follow-up.

Prostate-specific functioning—Self-efficacy did not interact with either intervention to predict urinary or sexual functioning at 2-week or 12-month follow-up. However, self-efficacy did interact with the education intervention to predict bowel functioning at both the 2-week and 12-month follow-up. Lower self-efficacy was related to poorer bowel functioning among

the control group at 2-week follow-up and 12-month follow-up but not among the education group. At 12-month follow-up, self-efficacy also interacted with the combined intervention to predict bowel function. Again, self-efficacy was related to better bowel function among controls but not among the combined intervention participants.

Depressive Symptoms

Physical functioning—Baseline depressive symptoms interacted with the education intervention to predict PCS at 2-week follow-up. Depressive symptoms were associated with worse physical functioning among controls but not among education intervention participants. At 12-month follow-up, depressive symptoms interacted with the combined intervention. Again, depressive symptoms were related to worse physical functioning among controls but not among combined intervention participants.

Mental functioning—Baseline depressive symptoms did not interact with either intervention to predict MCS at 2-week or 12-month follow-up.

Depressive symptoms—Baseline depressive symptoms did not interact with either intervention to predict depressive symptoms at 2-week follow-up but did interact with the combined intervention at 12-month follow-up. Baseline depressive symptoms were related to greater depressive symptoms among controls but were unrelated to depressive symptoms in the combined group.

Prostate-specific functioning—Depressive symptoms did not interact with either intervention to predict urine function or sexual function at either follow-up. Depressive symptoms interacted with both interventions to predict bowel functioning, but only at the 12-month follow-up. Depressive symptoms were related to worse bowel function among controls but not among education or combined participants.

Discussion

The goal of the present study was to determine whether self-esteem, self-efficacy, and baseline depressive symptoms moderated the effects of our psychoeducational interventions for men with prostate cancer on quality of life. We found that men who began the study with lower levels of global self-esteem, lower levels of prostate-specific self-efficacy (i.e., less certain that they could control the side effects of prostate cancer), and higher depressive symptoms benefited the most from the interventions.

The findings were most consistent across outcomes and across time for self-esteem. For measures of prostate-specific functioning, the moderating effects of self-esteem appeared only at 12 months. Thus, these findings seem to be stable over time. The fact that self-esteem appeared to be the most powerful moderator is interesting given that our measure of self-esteem was global and not tied specifically to prostate cancer. Men who reported having less confidence in themselves in general benefited from an intervention that targeted the illness and its side effects.

One reason that the findings from this article are important is that moderator effects were found on psychological outcomes. In our previous report (Lepore et al., 2003), we found no overall effects of the intervention on measures of psychological well-being, including mental functioning and depressive symptoms. However, the results in this report show that a subset of men, primarily those with low self-esteem, did benefit psychologically. These findings underscore the need to tailor interventions to subgroups of the population and to target people who are most likely to benefit from an intervention.

The findings were not unique to one particular intervention, suggesting that the educational component that was common to both interventions might have been the active ingredient. The educational intervention was focused on providing men with information about their prostate cancer, including what they could expect about side effects from treatment and how they might cope and control those side effects. Thus, men who began the study with the least confidence and self-assurance in general (and to some extent, the least confidence about controlling illness effects) benefited the most from the education intervention.

There are some limitations of this research. First, the sample was largely White and middle class, limiting our ability to generalize these findings. Second, we conducted a large number of analyses, which increases our capitalization on chance findings. In this regard, we wish to emphasize the consistency in the overall pattern of the findings rather than taking isolated findings seriously. Future replication is required, but the findings for self-esteem are consistent across measures of quality of life and across time. It is noteworthy that the moderating effects of self-esteem on prostate-specific function do not appear until 12 months later and appear for two very different measures of prostate-specific functioning.

Acknowledgements

This work was supported by National Institutes of Health Grant CA68354. We are grateful to Lyn Robertson and Robert Schwarz for facilitating all of the groups in this study. We also thank all of the physicians and office staff who assisted with this research as well as the patients who devoted their time and effort to the study. We thank our research staff for their careful execution of this research: Renee Rhodes, Michael Mattis, Rocco Mercurio, Jennifer DeFillipo, Kamara Smith, Karen Pealer, Todd Crouch, and Michelle Crouch.

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Figure 1.

The relation of self-esteem to physical health component score (PCS; 2 weeks later) for education and control group participants.

Figure 2.
The relation of self-esteem to mental health component score (MCS; 2 weeks later) for education and control group participants.

Figure 3.
The relation of self-efficacy to physical health component score (PCS; 2 weeks later) for education and control group participants.

Table 1
Demographic and Medical Characteristics of the Sample

Characteristic	%
Race	
White	90.4
African American	9.2
Asian American	0.4
Marital status	
Married	86.8
Single	13.2
Education	
Less than high school	9.6
Graduated high school	26.8
Some college	16.8
Graduated college	26.8
Postgraduate education	20.0
Employment status	
Full-time	40.8
Part-time	8.8
Retired	49.2
Other	1.2
Primary treatment	
Surgery	56.4
Brachytherapy	17.6
External beam	17.2
Beam/brachytherapy	4.8
Cryosurgery	4.0
Stage	
T1	18.0
T2	69.2
T3	12.8

Note. $N = 250$. The participants mean age was 65.04 years (range = 45–80 years, $SD = 7.45$), and their mean Gleason score was 6.14 (range = 2–10, $SD = 1.12$). T1 = 2 weeks; T2 = 6 months; T3 = 12 months.

Table 2
Hierarchical Regression Analyses: Self-Esteem as a Moderator of the Relation of Interventions to Outcomes

Outcome and time									
Variable	PCS 2 weeks		PCS 12 months		MCS 2 weeks		MCS 12 months		R ²
	β	R ²	β	R ²	β	R ²	β	R ²	
Step 1									
Baseline	.51**	.27	.47**	.29	.45**	.28	.36**	.23	
Step 2									
Comprehension	.13*	.28	-.09	.30	-.12*	.29	-.09	.23	
Step 3									
EC	.12		.06		.02		.05		
CC	.11		.02		.01		.07		
Self-esteem	.21	.29	.33**	.31	.36**	.31	.52**	.29	
Step 4									
EC × Self-Esteem	-.24**		-.18		-.19*		-.18*		
CC × Self-Esteem	-.18*	.31	-.19*	.32	-.12	.32	-.26**	.31	
Variable	Depr 2 weeks		Depr 12 months		Urine 12 months		Bowel 12 months		R ²
	β	R ²	β	R ²	β	R ²	β	R ²	
Step 1									
Baseline	.69**	.51	.55**	.37	.46**	.22	.45**	.21	
Step 2									
Comprehension	.03	.51	.09	.38	-.04	.22	-.15**	.22	
Step 3									
EC	.06		-.04		.02		.06		
CC	-.02		-.09		.02		.09		
Self-esteem	-.19	.52	-.30*	.38	.25*	.22	.41	.23	
Step 4									
EC × Self-Esteem	.15*		.17*				-.29**		

	Depr 2 weeks		Depr 12 months		Urine 12 months		Bowel 12 months	
	β	R^2	β	R^2	β	R^2	β	R^2
CC $\times$ Self-Esteem	.15 [*]	.53	.22 ^{***}	.40	-.19 [*]	.23	-.29 ^{***}	.27

Note. PCS = physical health component score; R^2 = cumulative correlation squared following each step of the equation; EC = contrast of education to control group; CC = contrast of combination group to control group; MCS = mental health component score; Depr = depressive symptoms.

^{*} $p < .05$.

^{***} $p < .01$.

Table 3
Hierarchical Regression Analyses: Self-Efficacy as a Moderator of the Relation of Interventions to Outcomes

Variable	Outcome and time					
	PCS 2 weeks		PCS 12 months		Bowel 2 weeks	
	β	R^2	β	R^2	β	R^2
Step 1						
Baseline	.50**	.27	.39**	.16	.50**	.25
Step 2						
Comprehension	-.10	.28	-.19**	.20	-.03	.25
Step 3						
EC	.13*		.05		.04	.05
CC	.11		.09		-.03	.09
Self-efficacy	.24**	.29	.23*	.21	.20*	.26
Step 4						
EC $\times$ Self-Efficacy	-.15*		-.15*		-.18*	.21
CC $\times$ Self-Efficacy	-.17*	.31	-.13	.22	-.08	.27

Note. PCS = physical health component score; R^2 = cumulative correlation squared following each step of the equation; EC = contrast of education to control group; CC = contrast of combination group to control group.

* $p < .05$.

** $p < .01$.

Table 4
Hierarchical Regression Analyses: Depressive Symptoms as a Moderator of the Relation of Interventions to Outcomes

Variable	Outcome and time								
	PCS 2 weeks			PCS 12 months			Depr 12 months		
	β	R^2		β	R^2		β	R^2	
Step 1									
Baseline	.49*	.27		.39*	.16		.70*	.37	.38*
Step 2									
Comprehension	-.10	.28		-.20*	.20		.08	.37	-.12**
Step 3									
EC	.12			.05			-.03		.04
CC	.10			.09			-.08		.08
Depr	-.20**	.30		-.21**	.21			.38	-.43*
Step 4									
EC $\times$ Depr	.15**			.11			-.03		.16**
CC $\times$ Depr	.05	.31		.20**	.23		-.14**	.39	.25*

Note. PCS = physical health component score; R^2 = cumulative correlation squared following each step of the equation; EC = contrast of education to control group; CC = contrast of combination group to control group; Depr = depressive symptoms.

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