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Cross-domain Latent Growth Modeling of Sexuality, Social Support, and Quality of Life in Men After Treatment for Prostate Cancer

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CROSS-DOMAIN LATENT GROWTH MODELING OF SEXUALITY, SOCIAL
SUPPORT, AND QUALITY OF LIFE IN MEN AFTER TREATMENT FOR
PROSTATE CANCER

By

Catherine Benedict

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Treatment for prostate cancer (PC) often leads to sexual side effects that impact patients,

partners, and relationship functioning. Research has focused on the direct effects of

sexual dysfunction (i.e., physiologic impairment) on quality of life (QOL); empirical

evaluation of psychological and relational domains of sexuality is limited. Psychosocial

adjustment to sexual dysfunction (i.e., sexual adjustment) may be one mechanism by

which post-treatment sexual side effects impact QOL. Furthermore, the extent to which

men perceive their partners as being (un)supportive may affect sexual adjustment

processes and QOL. It is unknown how changes in sexual adjustment, partner-specific

social support, and QOL are related. The current study used latent growth modeling

(LGM) to explore the effects of a cognitive behavioral stress management (CBSM)

intervention on sexual adjustment, perceptions of partner-specific social support, and

general QOL. After testing main effects, cross-domain LGMs were used to explore

whether trajectories of sexual adjustment, social support, and QOL were related over

time. The CBSM intervention was associated with significant improvements in QOL over

a 12-month follow-up period. Among men treated with radical prostatectomy,

intervention-related improvements in psychological adjustment to sexual dysfunction

were observed at the trend level. There were no intervention effects on partner-specific

social support. Evaluation of cross-domain relationships indicated that domains of psychological and relationship adjustment to sexual dysfunction, positive aspects of partner-specific social support, and QOL were related at baseline and improvements in psychological adjustment to sexual dysfunction and QOL were also related over time. This study contributes to a limited amount of empirical research that has evaluated the effects of PC treatment on psychosocial domains of sexuality and suggests that the degree to which men are able to psychologically adjust to sexual side effects may be related to long-term changed in QOL. Psychosocial interventions should be designed to target psychosocial adjustment processes in patients who may be at increased risk for experiencing difficulties related to their sexual side effects.

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Chapter 1: Introduction

Prostate cancer (PC) is the most common non-skin cancer diagnosed in men in the United States with over 240,000 new diagnoses in 2011 and over 2.2 million current survivors (American Cancer Society [ACS], 2011). Although 5- and 10-year survival rates for localized PC are estimated to be nearly 100% and 95%, respectively (ACS, 2011), standard treatment options are associated with significant declines in disease-specific and general quality of life (QOL). Sexual side effects following radical prostatectomy (RP) and radiation therapy (RT) are often particularly distressing and challenge intimate relationships and QOL.

Prostate cancer has been termed a "couple's disease" (Soloway, Soloway, Kim, & Kava, 2005). Disease- and treatment-related sexual dysfunction impacts patients and partners, as well as intimate relationship functioning. However, the direct effect of sexual dysfunction on QOL is unclear; sexual side effects appear to affect a range of QOL domains though PC patients often report levels of general QOL above age-matched norms (e.g., Clark, Inui, Silliman, Bokhour, Krosnow, & Robinson, 2003; Hoffman, Gilliland, Penson, Stone, Hunt, & Potosky, 2004; Korfage, et al., 2005). The majority of the literature has defined sexual dysfunction in terms of physiologic impairment and has focused almost exclusively on the impact physiologic declines in functioning has on QOL (e.g., Wittmann et al., 2009). Yet, sexual dysfunction (i.e., physiologic impairment) and psychological reactions to sexual dysfunction (i.e., distress or bother related to physiologic impairment) have been shown to be independent constructs with distinct long-term trajectories (Gacci, Simonato, Masieri, & Gore, 2009; Litwin, Nied, & Dhanani, 1998; Potosky et al., 2000; 2004; Reeve, Potosky, & Willis, 2006), suggesting

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that psychosocial adjustment to sexual dysfunction may be independently related to QOL. The degree to which psychosocial adjustment explains the relationship between post-treatment sexual dysfunction and QOL among PC patients is largely unknown.

There is a growing body of literature evaluating the psychological implications of sexual dysfunction among PC patients (e.g., distress, depression and anxiety, loss of manhood and self-esteem). Evidence also suggests that the extent to which patients perceive their sexual side effects as having an impact on their partners and relationships, as well as their perceptions of how (un)supportive their partners are and the degree to which they are satisfied with their relationship, has significant implications for their own adjustment and well-being (Banthia, Malcarne, Varni, Ko, Salder, & Greenbergs, 2003). Although research has mostly focused on the direct effects of sexual dysfunction on QOL, the true impact of PC treatment may have less to do with physiologic impairment and more with the psychosocial implications for patients. Evaluation of these relationships, however, has largely been qualitative and empirical evidence is scarce.

The current study evaluated long-term changes in psychosocial adjustment to sexual dysfunction, perceptions of partner-specific social support and general QOL among men recently treated for localized PC within the context of a psychosocial intervention. For the purposes of this study, psychosocial adjustment to sexual dysfunction will be referred to as "sexual adjustment." It was conceptualized that processes of sexual adjustment mediate the effects of sexual dysfunction on QOL. Analyses sought to determine whether participation in a psychosocial intervention promotes adaptive changes in both sexual adjustment and QOL and whether improvements in QOL were explained, in part, by improvements in sexual adjustment,

above and beyond the effects of sexual dysfunction on QOL. It was also conceptualized that perceptions of partner-specific social support are related to sexual adjustment and QOL. Similarly, analyses sought to determine whether participation in a psychosocial intervention leads to increased perceptions of support and whether changes in support were related to corresponding changes in sexual adjustment and QOL.

Sexuality: A Multidimensional Construct

Sexuality is a multidimensional construct encompassing both physical and psychosocial components. Definitions of male sexual functioning include physical and functional ability, as well as psychological factors such as sexual interest, desire, pleasure, and satisfaction (Laumann, Das, & Waite, 2008; Litwin, Nied, & Dhanani, 1998). It is expressed in attitudes and behaviors that impact and are impacted by many aspects of social roles and intimate relationships (e.g., patterns of communication, overall relationship satisfaction; Badr & Taylor, 2009; Bauer, McAuliffe, & Nay, 2007). Sexuality may be understood through a biopsychosocial model in which the contribution of and interaction between biological, psychological, and social factors determine overall sexual health (Beck, Robinson, & Carlson, 2007). Sexual health is defined as "a state of physical, emotional, mental and social well-being in relation to sexuality" by the World Health Organization (WHO; cited in Beck et al., 2007).

Despite the multiple facets of sexuality, the literature regarding the impact of PC on sexuality has been largely limited to physiologic measures of sexual dysfunction (e.g., frequency and quality of erections, ability to orgasm; e.g., Wittmann et al., 2009). Indices of psychosocial adjustment to changes in sexuality (i.e., those that consider emotional,

relationship, and sexual satisfaction domains), which are consistent with more global definitions of sexual health, have rarely been considered. Factors that are related to psychosocial adjustment to sexual dysfunction within PC are not well understood and it is unknown how trajectories of sexual adjustment and QOL are interrelated and how perceptions of partner-specific social support and relationship satisfaction affect long-term changes.

Sexuality in Later Life

Sexuality is an important component of well-being and QOL across the lifespan. The sexual health of older adults, however, is often minimized and misunderstood particularly within the context of medical illness. Despite stereotypes that older men (i.e., > 65 years) are not capable of or lack interest in sex, research consistently shows that men maintain sexual interest and remain sexually capable throughout their lives (Bauer et al., 2007; Hyde et al., 2010; Lindau, Schumm, Laumann, Levinson, O'Muircheartaigh, & Waite, 2007). Results of the National Social Life, Health, and Aging Project (NSHAP) indicated that 91% of partnered men aged 57 – 64, 75% of men aged 65 – 74, and 47% of men aged 75 – 85 are sexually active (Laumann, Das, & Waite, 2008). While sexual activity declined with age, those who remained sexually active reported a fairly high frequency (i.e., once or twice a week) though temporal trends indicated significant variability in sexual behaviors across age groups. Among the youngest age group (aged 57 – 64), 91% of men reported that vaginal intercourse was usually or always a part of sexual activity, whereas 84% of the oldest age group (aged 75 – 85) reported the same. Among older men, sexual activity was more likely to consist of kissing, hugging, and

sexual touching than it was at younger ages. These findings demonstrate that although sexual activity and satisfaction become more diverse with age (i.e., may not include sexual intercourse or require erectile functioning), sexuality in general remains an important domain of functioning for older adults. (Laumann et al., 2008).

Rather than an inevitable decline in sexual functioning with age, evidence suggests that sexual problems among older adults are more of a response to stressors in other domains of life, including declines in physical and mental health and factors associated with intimate relationships (Laumann et al., 2008). Results of the NSHAP indicated that the most common reasons for not having sex among older adults includes poor physical health (personal or partner-related) and lack of opportunity (e.g., being unpartnered or partners' lack of interest). Findings also suggested that the mechanism linking poor physical health to sexual inactivity may be poor mental health (i.e., stress, depression, and anxiety), though these associations were more variable among men than among women. Finally, overall satisfaction in the intimate relationship was negatively associated with sexual problems, providing further evidence that sexual health is the product of both individual and relational factors. (Laumann et al., 2008)

Even with declines in physical and functional ability, older men are still interested in sex. Ninety-four percent of men aged 57 – 64, 86% aged 65 – 74, and 74% aged 75 – 85 report that sex is at least somewhat important (Waite et al., 2009). In fact, in a population-based cohort study of men up to 95 years old (age range 75 – 95; 74% living with a partner), almost 50% considered sex to be at least somewhat important; 56% were satisfied and 43% wanted to have sex more often (Hyde et al., 2010). Notably, the proportion of men who considered sex to be at least somewhat important was greater than

the proportion of men who were sexually active (Hyde et al., 2010), suggesting that older men continue to desire sex despite physical and/or psychosocial barriers to being sexually active. For example, NSHAP results indicated that lack of an intimate partner did not lower men's sexual interest, as it did for women (Waite et al., 2009). This is consistent with other reported findings (Laumann et al., 2008), suggesting that interest and desire to engage in sexual activity do not diminish with age or declining physical health. In fact, findings suggest that sexuality remains an important aspect of well-being and QOL among older adults even in the face of medical illness and disability (e.g., cancer, cardiovascular disease, and diabetes; Bauer et al., 2007; Gott & Hinchliff, 2003). However, the literature regarding sexuality in medically ill populations is limited and the extent to which older men are able to adjust and adapt to sexual side effects following PC treatment is not well understood.

It is clear that older men maintain sexual interest and desire even in the face of physical decline and/or medical illness and that sexual satisfaction may be acquired through sexual activity that enhances feelings of intimacy but does not necessarily require erectile functioning or intercourse. PC patients who adjust to treatment-related sexual side effects by redefining sexual activity within their relationship in order to maintain intimacy and satisfaction may better preserve pre-treatment levels of sexual health and avoid decrements in QOL compared to those who have difficulty adjusting to sexual declines. The degree to which men perceive their partners as being (un)supportive during their cancer experience may either facilitate sexual adjustment processes or exacerbate distress associated with side effects. Although prevalence rates of post-treatment sexual side effects are well known, empirical evaluation of other indices of sexual health (e.g.,

satisfaction, relationship intimacy) are limited and processes of adjustment to sexual dysfunction have rarely been considered.

Sexuality in Prostate Cancer

Many men have active sex lives that are adversely affected by PC disease and treatment. Between 25 – 85% of RP patients and 32 – 67% of RT patients report impotence after treatment (Wittmann et al., 2009) that may persist for years; 82% of RP and 50% of RT patients report impotence 2-years post-diagnosis, and 79% of RP and 64% of RT patients report impotence 5-years post-diagnosis (Potowsky et al., 2000; 2004). PC patients also experience significant declines in other domains of sexuality, such as loss of sexual desire (60 – 80%), problems with orgasms (64 – 87%; including 31% who no longer try to reach orgasm, 17% who try but are unable to reach orgasm, and 28% with orgasms that are disappointingly weak), and overall sexual dissatisfaction (61 – 91%; Chambers, 2008; Schover et al., 2002). Compared to age-matched norms, PC patients have reported significantly worse sexual functioning (combined measures of physical symptoms and bother/distress) up to one year post-treatment (Wei et al., 2002), as well as lower levels of post-treatment sexual intimacy and sexual confidence (Clark et al., 2003). Age and pre-treatment functioning have been shown to be among the most important determinants of long-term changes in sexuality (Potosky et al., 2004), with RP patients more likely to be younger and otherwise healthier than RT patients (Katz, 2007).

As mentioned above, the majority of the literature has focused exclusively on sexual dysfunction (i.e., degree of physiological impairment), often using erectile dysfunction as a proxy (Wittmann et al., 2009). The inherent assumption is that sexual

satisfaction and well-being are primarily determined by measures of physiologic functioning alone. Findings suggest, however, that there is variability in the extent to which men are bothered or distressed by side effects (e.g., Cooperberg et al., 2003), suggesting that for some men overall adjustment and well-being may be independent of recovery of function. For example, in a qualitative study of localized PC patients 12 – 24 months post-treatment, all men reported erectile problems (Bokhour et al., 2004). However, results indicated that they spoke primarily in terms of their sexual self-concept and relationships and made a distinction between the quality of their erections and the quality of their sex lives (Bokhour et al., 2004). This is supported by empirical evidence suggesting that sexual dysfunction and bother may be relatively independent with distinct long-term trajectories (e.g., Gacci et al., 2009; Litwin et al., 1998; Potosky et al., 2000; 2004; Reeve et al., 2006). For example, in a large community-based sample, among RP and RT patients who reported significant sexual dysfunction, levels of functioning were not related to sexual distress or bother (Potosky et al., 2000; 2004). Similarly, Gacci et al. (2009) demonstrated that older age and greater time since treatment predicted worse sexual functioning but less sexual bother up to 5- and 10-years post-treatment; sexual dysfunction and bother were not significantly correlated at 3 of the 4 follow-up time points. Therefore, it appears that measures that focus primarily on assessment of physiologic dysfunction fail to capture the effects of psychological and relationship components of sexual adjustment and well-being. It may be that psychosocial adjustment to sexual dysfunction is one mechanism by which sexual side effects impact general QOL.

Psychosocial Adjustment to Sexual Dysfunction

Although PC disease and treatment often lead to substantial sexual side effects, the significance of these side effects lies less in the disruption to physiologic functioning and more in the psychosocial implications for patients, their partners, and the quality of their relationships (Beck et al., 2007). Some men adapt well to the physical and psychosocial sequelae of sexual dysfunction, whereas many have difficulty. The effect of sexual dysfunction on overall well-being and QOL may depend on psychological and relational factors that either buffer the impact of side effects and facilitate adjustment or exacerbate difficulties and impede adjustment.

The presence and severity of sexual side effects following PC treatment are generally considered to be distressing to patients and detrimental to their QOL. Sexual dysfunction has been associated with increased distress (Helgason, Adolfsson, Dickman, Fredrikson, Arver, & Steineck, 1996), depression and anxiety, and lowered QOL (Clark et al., 1999; Howlett et al., 2010; Nelson, Choi, Mulhali, & Roth, 2007; Penson et al., 2003). It has also been shown to impact body image and masculinity (Boehmer & Babayan, 2004; Bokhour et al., 2001; Perez, Skinner, & Meyerowitz, 2002), self-esteem, and quality of marital/partner relationships (Beck et al., 2007; Chambers, 2008; Gray, Wassersug, Sinding, Barbara, Trosztmer, & Fleshner, 2005). Additionally, negative psychosocial factors may exacerbate treatment-related dysfunction; depression and anxiety as well as poor marital adjustment have been related to worsened sexual desire, arousal, erectile function, and orgasm following PC treatment (Althof et al., 2005; Beck et al., 2007).

Research has also shown that many PC patients are unprepared for the experience of post-treatment sexual dysfunction and may be at increased risk for poor psychosocial adjustment. Men often do not have adequate information regarding potential treatment-related side effects, believe the side effects will not be experienced despite having information otherwise, and/or underestimate the impact of side effects and are surprised by the degree to which they are bothered by them (Beck et al., 2007; Boehmer & Clark, 2001). In a qualitative study of pre-treatment couples, both patients and partners "insisted" that they would maintain their sexual activity after treatment (Boehmer & Babayan, 2004). Though they anticipated sexual side effects, couples indicated confidence in using assistive aids (e.g., Viagra) as a solution and expected to be able to sustain pre-treatment sexual activity (i.e., did not anticipate having to change their sexual practices; Boehmer & Babayan, 2004). Furthermore, although many PC patients attempt to treat erectile dysfunction with assistive aids, evidence suggests that the majority is unsatisfied with the results and discontinue use within a year (Nelson et al., 2007). Ultimately, complete recovery of functioning is rare and the majority of men must adjust to their changed sexual circumstances. Adjusting to sexual dysfunction may be difficult, however, depending on internal expectations and values related to sexuality (e.g., definitions of manhood and sexual self-concept) as well as on partner and relationship factors (e.g., perceptions of partner expectations regarding sexual ability and level of intimacy in the relationship). Sexual health is inherently linked to the quality of intimate relationship functioning and relationship dynamics: both partners are impacted by the changes that sexual side effects have on their relationship and must cope with and adjust to those changes individually and as a couple. Therefore, partner and relationship factors

are important considerations in determining the degree to which men are able to adjust to sexual dysfunction and the impact sexual dysfunction has on their QOL.

<div align="center">The Impact of Partner and Relationship Factors on Sexual Adjustment</div>

Although sexual dysfunction is a profoundly personal experience, it also has implications for the psychosocial well-being of partners and intimate relationships (Chambers, 2008). Regret and feelings of loss are reported by both PC patients and partners regarding treatment-related sexual dysfunction (Resendes & McCorkle, 2006). Up to 38% of partners report being at least slightly dissatisfied with their sexual relationship after patients undergo RP or RT (Neese, Schover, Klein, Zippe, & Kupelian, 2003) and changes in sexual activity are associated with increased stress in both patients and partners (Ptacek, Pierce, Ptacek, & Nogel, 1999). Furthermore, treatment-related sexual dysfunction in patients has been related to sexual dysfunction in partners (Badr & Taylor, 2009; Shindel, Quayle, Yan, Husain, & Naughton, 2005). In a study of post-RP couples, the prevalence of female sexual dysfunction was high and significantly correlated with male sexual dysfunction (Shindel et al., 2005). Similarly, in a study of sexually active couples, partners of men who indicated erectile dysfunction were significantly more likely to report lower arousal, lubrication, orgasm, and satisfaction than partners of men who did not have erectile dysfunction, though sexual desire was not significantly different (Çayan, Bozlu, Canpolat, & Akbay, 2004). These findings highlight how interrelated sexuality is within a couple and the social context within which sexual dysfunction occurs.

Furthermore, the degree to which patients perceive their sexual side effects as having an impact on their partners and their relationships has significant implications for their own adjustment and well-being (Kershaw, 2008; Resendes & McCorkle, 2006). For example, partners' sexual satisfaction has been related to patients' sexual satisfaction and patient-reported marital adjustment (Badr & Taylor, 2009; Chambers, 2008; Schover, 2002). Levels of general depression and depression concerning their sex lives within partners have also been shown to be significant predictors of patients' sexual satisfaction, perceived quality of communication about sexual relationship, and relationship satisfaction, controlling for their own general and sexual depression (Garos, Kluck, & Aronoff, 2007). Even when partners feel that sexual changes related to PC are not distressing or difficult to adjust to, patients may nevertheless worry about their sexual dissatisfaction and be negatively affected, particularly if there is a lack of communication regarding sexual side effects (Beck et al., 2007; Manne, 2009). These studies suggest that PC disease and treatment not only impacts patients directly through physiologic changes in sexual functioning but also indirectly through perceived changes in relationship functioning. Adjustment to sexual dysfunction, therefore, must be viewed within a psychosocial framework.

Theories of Psychosocial Adjustment to Cancer

Theory and research suggests that psychosocial adjustment to cancer depends in large part on relationship processes. Several theories have been put forth that emphasize the relationship – or dyad – as the unit of study in understanding processes of adjustment to stressful life events. Dyadic-level theories examine the ongoing contributions of both

individuals in the relationship in their efforts to preserve or improve the quality of their relationship as they attempt to cope with stressful life events together (Manne, 2011). Relationship resilience models, for example, identify cancer as a stressor that affects both patients and partners and the strategies they employ to maintain or strengthen their relationship either facilitates or impedes adjustment to cancer-related changes (e.g., Manne, 2011; Manne, Badr, Zaider, Nelson, & Kissane, 2010; Manne, Taylor, Dougherty, & Kemeny, 1997). For example, Badr & Carmack-Taylor (2008) reported that the ways in which couples engaged in relationship maintenance strategies (e.g., positivity, openness, assurance) after a diagnosis of lung cancer impacted their psychological and relational adjustment over time.

Manne & Badr (2008) extended this line of research and proposed the relationship intimacy model of couples' psychosocial adaptation to cancer, in which patients' and partners' adjustment to cancer is primarily achieved through relationship processes that promote intimacy. Relationship processes that contribute to intimacy may either be "relationship-enhancing" or "relationship-compromising" (Manne & Badr, 2008). Relationship-enhancing behaviors improve intimacy and include reciprocal cancer-related discussion and constructive communication (e.g., mutual disclosure of concerns and feelings regarding the cancer experience). Partner responsiveness promotes feelings of being understood, cared for, and accepted. Relationship-compromising behaviors reduce intimacy and include intentional efforts to hide worries or deny concerns, conveying discomfort or avoiding partner attempts to discuss cancer-related topics or concerns, and demand-withdrawal communication patterns (also called pressure-withdrawal; occurs when one partner pressures the other to discuss cancer-related topics

or concerns and the other withdraws from such conversations). Relationship intimacy is conceptualized as the mechanism by which these behaviors impact psychosocial adjustment to cancer within patients, partners, and the relationship. As sexual dysfunction following PC treatment not only impacts the psychological well-being of patients but also partner and relationship well-being in bidirectional ways, using this model to guide understanding of psychosocial adjustment to sexual dysfunction is appropriate. (Manne & Badr, 2008)

Application to Sexual Dysfunction

Although the overall impact of PC on relationship functioning is unclear with research suggesting both positive and negative effects (e.g., Boehmer & Clark, 2000; Crowe & Costello, 2003), there is evidence that couples have a particularly difficult time adjusting to sexual changes (e.g., Garos et al., 2007; Lavery & Clarke, 1999). This may be because couples often avoid discussing how sexual side effects have affected their emotional well-being and relationship quality (Badr & Carmack-Taylor, 2009; Boehmer & Clark, 2000; Gray et al., 2000; Garos et al., 2007). For example, a qualitative study of PC couples indicated that most communication about sexuality was limited to discussions regarding treatment options, which was largely discontinued after the treatment decision was made and did not resume with the onset of sexual side effects following treatment (Boehmer & Clark, 2000). Men reported that they were uncomfortable sharing their feelings about erectile dysfunction with their partners and often held back fears and concerns related to their disease and treatment (Boehmer & Clark, 2001). Partners have also indicated a tendency to hold back or avoid discussions regarding sexual changes to

"protect" patients from increased distress (i.e., protective buffering; Boehmer & Clark, 2001; Lavery & Clarke, 1999).

Aligned with theoretical models of psychosocial adjustment to cancer, evidence suggests that couples that avoid discussing sexual side effects are at increased risk for experiencing sexual adjustment difficulties as well as more general relationship problems. For example, greater erectile dysfunction is associated with poorer intercourse satisfaction and marital adjustment within couples who report a low degree of mutual constructive communication, whereas a high degree of mutual constructive communication is associated with better intercourse satisfaction and marital adjustment (Badr & Taylor, 2009). Non-communication regarding sexual changes in the relationship has also been associated with increased distress in both patients and partners, emotional distancing and marital tension, reduced likelihood of initiating sexual interactions, lowered relationship intimacy, and worse adjustment to cancer-related changes and general QOL (Badr & Taylor, 2009; Boehmer & Clark, 2001; Kershaw et al., 2008; Manne et al., 2010; Northouse et al., 2007; Ofman, 1995). Couples that avoid discussions regarding sexual dysfunction may not have the opportunity to establish problem-solving strategies with which they could adapt to their changed sexual circumstances and increase sexual satisfaction.

Furthermore, non-communication and lowered relationship quality may make it difficult for couples to maintain congruence in their adjustment to disease- and treatment-related changes. Congruence or agreement between partners in their ability to adjust to stressful events is an indicator of relationship quality and satisfaction, whereas incongruence or discrepancy between partners can result in interpersonal dysfunction

(Deal, Wampler, & Halverson Jr., 1992; Ezer, Chachamovich, & Chachamovich, 2011; Lewis, McBride, Pollak, Puleo, Butterfield, & Emmons, 2006). In a longitudinal study of couple congruence in several domains of psychosocial adjustment to PC, patients and partners were incongruent in their adjustment to sexual dysfunction at all of the time points assessed (time of diagnosis and 3- and 12-months post-diagnosis), with patients generally more distressed about sexual side effects than partners (Ezer et al., 2011). It was demonstrated that couple incongruence in sexual adjustment increased the risk of psychological distress in patients and partners, as well as interpersonal and family dysfunction (Ezer et al., 2011).

Adjustment to treatment-related sexual dysfunction is often difficult for couples and may lead to interpersonal and relational dysfunction. Even for couples that enter the survivorship phase, negotiating the transition back to "normal life" can be challenging and findings suggest that resuming a sexual relationship and/or adjusting to changed sexual circumstances is often particularly distressing (Alfano & Rowland, 2006; Boehmer & Clark, 2001; Hodgkinson, Butow, Hunt, Wyse, Hobbs, & Wain, 2007; Manne, 2011). Further exacerbation of individual levels of distress within the couple may add to the burden of PC disease and treatment on overall QOL. Patients who perceive their sexual side effects as negatively affecting their partners and/or relationships report greater difficulties adjusting to sexual dysfunction after treatment and may also be at increased risk for experiencing decrements in more general domains of QOL. For example, even patients who are able to adapt to sexual changes and adjust their expectations regarding sexual performance on an individual level may still experience distress if they perceive that their partners are unsupportive or unsatisfied. Conversely,

those who experience distress related to sexual dysfunction but who perceive their partners as being supportive may be comforted and more open to making adjustments in sexual activity in order to maintain a satisfying intimate relationship, thus more likely to perceive side effects as having a minimal impact on QOL. Partner and relationship factors, including perceptions of partner-specific support, are important considerations in determining the impact of sexual side effects on psychological well-being and QOL. As such, psychosocial adjustment to sexual dysfunction and perceptions of support may be important indicators of QOL, above and beyond disease- or treatment-related factors and more physical measures of sexuality.

Social Support

The beneficial effects of social support on health and well-being are well documented. Social support predicts various indicators of physical and mental health and QOL, as well as disease-specific and all-cause mortality (e.g., Cohen, Underwood, & Gottlieb, 2000; Cohen, 2004; House, Landis, & Umberson, 1988; Uchino, 2004). The term social support is often used to refer to any process through which psychological or material resources are provided or perceived through social relationships (e.g., emotional, informational, or instrumental support). The structure of social networks, type of support received, quality, and quantity of social interactions and feelings of social isolation and loneliness have all been related to health and well-being (reviewed in Cohen, 2004). Different models have been specified to explain the mechanisms by which social support promotes physical and mental health (e.g., main effect, stress-buffering) but in general it

is believed that the benefit of social support is derived through its influence on emotions, cognitions, and behaviors (Cohen, 2004; Cohen & Wills, 1985).

Theory and research postulate that social support helps to mitigate or preclude the impact of stress on health and well-being. The stress-buffering hypothesis stipulates that social support protects individuals from the negative psychological consequences of stress by promoting less threatening interpretations of negative events and effective coping strategies (Cohen, 2004; Cohen et al., 2000). More specifically, it is the perceived availability of social resources that "match" the needs elicited by a given stressor (Cohen et al., 2000). Whether or not an individual receives support is less important than the perception that it will be available when needed. For example, evidence suggests that the perception of support is a more significant predictor of QOL than the amount or size of supportive networks (Queenan, Feldman-Steqart, Brundage, & Groome, 2010).

Additionally, the interactional context within which support is provided and received is also important. Research suggests that negative mood states and interpersonal dysfunction are associated with avoidant behaviors (e.g., withdrawal) and lowered perception and provision of support (cited in Cohen, Underwood, & Gottlieb, 2000). There are also distinctions made between types of stressors and provision of support (e.g., solicited versus spontaneously provided support; Cohen, Underwood, & Gottlieb, 2000). For example, some stressors are visible to support providers and signal the need for support, whereas others are either invisible or actively concealed by support recipients due to embarrassment or stigma. This is particularly relevant to the present study with respect to the sensitive nature of sexual dysfunction (e.g., threat to manhood and self-esteem) and supported by patient and partner reported avoidance of discussions regarding

sexual dysfunction which may lead to lowered patient perceptions of social support and/or social isolation.

Among post-treatment PC patients, higher levels of social support are associated with better disease-specific and general QOL (e.g., Queenan et al., 2010). In a study of mixed cancer patients, greater perceived social support was related to less depression and anxiety and better overall QOL, independent of the effects of age, marital status, education, and stage of disease (Parker, Baile, de Moor, & Cohen, 2003). PC patients who report less social support report greater incidence and severity of disease-related symptoms and worse general QOL than patients who report more social support (Courtens, Stevens, Crebolder, & Philipsen, 1996; Parker et al., 2003) and limited evidence suggests that social support interventions may improve QOL (Ross, Boesen, Dalton & Johansen, 2002; Graves, 2003).

Partner-Specific Social Support

Partner-specific social support appears to be particularly important. Studies have indicated that the spouse is typically the first person from whom an individual seeks support in times of stress and crisis (Cutrona & Surh, 1994) and cancer patients often identify their partners as the most important support provider (Kiss & Meryn, 2001). This may be particularly true for men, as evidence suggests that women tend to receive support from multiple sources, whereas husbands tend to rely only on their wives (Hann et al., 2002; Harrison, Maguire & Pitceathly, 1995), particularly at older ages (Antonucci & Akiyama, 1987). Indeed, partners are often the primary sources of emotional support to PC patients (Garos et al., 2007). In a study of well-adjusted PC patients up to 2 years

post-treatment (i.e., higher well-being and relationship satisfaction and lower distress scores than normative populations), men reported that they had primarily relied on support seeking and problem-solving strategies to cope with cancer-related stress at the time of diagnosis and treatment (Ptacek et al., 1999). The authors speculated that their high levels of adjustment and well-being may have been due in large part to the support they had received from their partners; all men indicated that they received at least some support from their partners, with 88% endorsing the highest level of support (Ptacek et al., 1999). Other studies that have focused on the role of partner-specific support within the context of coping with cancer have reported that higher levels of support are associated with lower levels of distress, depression and anxiety, and higher levels of QOL reported by patients (e.g., Helgason, Dickman, Adolfsson, & Steineck, 2001; Mehnert, Lehmann, Graefen, Huland, & Koch, 2010; Zhou et al., 2010). Findings suggest that partner-specific social support and support-seeking behaviors are adaptive and promote long-term psychosocial adjustment and well-being.

Types of Partner-Specific Social Support

As referred to above, social support can come from a variety of sources and there are several different types of support (e.g., emotional, instrumental, informational) that have been associated with health and adjustment in patients with cancer and other chronic illnesses. For example, emotional support includes implicit or explicit communication of caring and concern, including listening, reassuring, consoling, and empathizing (Helgesen and Cohen, 1996; Kinsinger, Laurenceau, Carver & Antoni, 2011). Informational support involves the offering and delivery of information with the intent to

advise or guide (Helgesen & Cohen, 1996; Kinsinger, Laurenceau, Carver & Antoni, 2011) and instrumental support refers to the provision of tangible aid such as transportation, money, assistance with day-to-day tasks, and other material goods (Helgesen & Cohen, 1996).

Different types of support have been shown to be differentially related to patient outcomes. Findings have consistently shown a positive association between emotional support from a partner and adjustment to cancer (Alferi et al., 2001; Helgeson, 2003; Helgeson & Cohen, 1996). Emotional support has been related to better psychological adjustment, lower levels of distress, and survival time and some evidence suggests benefits may be derived through enhanced self-esteem and reduced feelings of helplessness or inadequacy (Cohen & Wills, 1985; Helgeson & Cohen, 1996). However, even when emotional support is available, some men may have difficulty deriving its benefits. For example, men who adhere to traditional masculine norms (e.g., avoid showing vulnerability) may have more difficulty accessing emotional support (Gray, Fitch, Phillips, Labrecque, & Fergus, 2000). The impact of other types of support among cancer patients has been less studied. Informational support is generally considered to be beneficial but has largely been studied within the context of healthcare (i.e., from healthcare providers) and psychosocial interventions. For example, support groups that focus on delivery of information have been shown to lead to improvement in psychological functioning (Thaxton, Emshoff, & Guessous, 2005).

The social support literature has also noted that many aspects of social interactions and relationships are not beneficial or health protective (Cohen, 2004; Cohen et al., 2000; Cohen & Wills, 1985) and that negative social interactions (e.g.,

minimization of problems, forced cheerfulness, avoidance, withdrawal or criticism) may be stronger predictors of distress and well-being and more influential on cancer-related adjustment than positive ones (Manne et al., 1997; Taylor, 1991). Potentially negative aspects of social networks can act as psychological stressors affecting cognitive, emotional, and biological responses that increase risk for poor health, regardless of the intent of the support provider (Cohen, 2004). Negative support has been shown to be related to increased distress among cancer patients (Manne, Ostroff, Winkel, Grana, & Fox, 2005) and unsupportive interactions may have a greater impact on well-being than supportive ones (Lepore & Helgeson, 1998). When considering the role of partner-specific social support on PC patients' adjustment and well-being it is important to consider all interactions within the couple. Not all behaviors that are intended to be supportive or helpful by partners are perceived as such by patients.

Furthermore, as patients and partners are often incongruent in their psychosocial adjustment to sexual dysfunction, which is associated with interpersonal dysfunction and lowered quality the relationship, the provision and perception of support within the couple may be impacted (Ezer et al., 2010). Partners sometimes avoid cancer-related discussions, particularly those related to sexual dysfunction, in an attempt to avoid increasing patient distress (Boehmer & Clark, 2001). While some patients may welcome non-communication, others may feel alone in their attempts to cope and assume the worst regarding partners' feelings and reactions to PC-related changes in their relationship. Perceived social constraints in discussing cancer-related concerns from partners has been related to worse mental health among PC patients (Lepore & Helgeson, 1998). Conversely, some partners pressure patients to engage in cancer-related discussions

despite their desire to avoid such discussions (e.g., demand- or pressure-withdraw; Manne, 2010). Qualitative studies have suggested that patients and partners often feel uncomfortable discussing sexual dysfunction, in particular, even when they feel comfortable discussing other cancer-related topics and concerns (e.g., Boehmer & Clark, 2000). Maladaptive communication patterns have been associated with poor adjustment to PC and may also exacerbate couple incongruence and lead to interpersonal and relationship dysfunction (Boehmer & Clark, 2001; Ezer et al., 2010; Manne, 2010). Poor interpersonal functioning is associated with less support seeking behaviors and problem-focused coping (Ptacek, Pierce, & Ptacek, 2002), greater distress when seeking support (Zakowski et al., 2003), more negative reactions to PC-related intrusive thoughts (Lepore & Helgeson, 1998), as well as lower levels of partner-to-patient support reported by both patients and partners (Song et al., 2010). As such, patients who perceive their partners as being unsupportive with regard to their sexual dysfunction may engage in maladaptive behaviors that further limit their support with regard to other areas of functioning, placing them at greater risk for experiencing subsequent decrements in more general domains of QOL. Therefore, partner-specific social support may impact general QOL directly and/or indirectly through its impact on psychosocial adjustment to sexual dysfunction.

Quality of Life

The impact of PC treatment-related sexual dysfunction on QOL is unclear. On the one hand, many studies have indicated that sexual side effects impact a range of QOL domains. As reviewed above, patients who experience sexual dysfunction have reported diminished sexual interest/desire and quality of sexual intimacy, as well as changes in

body image and masculinity, anxiety about sexual interaction, and lowered self-confidence regarding sexual feelings and capability (Clark et al, 2003; Schover et al., 2002). Erectile dysfunction, specifically, has been related to self-esteem, depression, and marital satisfaction, general health perceptions, role limitations due to physical problems, and role limitations due to emotional problems (Weber & Sherwill-Navarro, 2005). On the other hand, PC patients often report overall levels of QOL that are comparable to age-matched norms despite continued side effects (Korfage et al., 2005; Hoffman et al., 2004; Clark et al., 2003; Miller et al., 2007; Wei et al., 2002). It appears that although men report that sexual side effects are bothersome and distressing when asked directly, many have learned how to adjust to side effects and perceive their general QOL as being largely unaffected. Those who have had difficulty adjusting to sexual side effects, however, may continue to experience decrements in general QOL, particularly if they perceive their partners as being unsupportive and/or are unsatisfied with the quality of their relationship.

Clark et al. (2003) compared localized PC patients who had previously been treated with either RP or RT with a reference group of men with no history of PC and a normal prostate-specific antigen (PSA) on a number of physical, psychosocial, and QOL outcomes. Results indicated that PC patients reported worse urinary, bowel, and sexual dysfunction than the reference group but comparable levels of general QOL (i.e., SF-12 physical and mental health summary scales). Notably, greater sexual dysfunction was associated with worse QOL. Patients with diminished sexual function also indicated diminished quality of sexual intimacy, sexual confidence, and masculinity, as well as less confidence about cancer control, less positive appraisal of the effect surviving cancer has

had on one's outlook (i.e., perception that coping with cancer has made one stronger or resulted in a better outlook on life), and greater likelihood of expressing regret regarding their treatment decision. Empirical analysis did not explain the incongruity in disease-specific versus general QOL (i.e., significantly lower disease-specific function but similar general QOL compared to reference group norms), though focus group discussions offered some insight. Discussions suggested that patients may adjust to side effects by minimizing disease-related changes and emphasizing "what has not been lost." For example, despite greater levels of sexual dysfunction and lower levels of sexual intimacy and sexual confidence, patients reported comparable marital affection as men without cancer. Patients also compartmentalized the effects of disease and treatment. For example, although patients reported much greater PSA concern compared to the reference group, they did not indicate greater levels of worry or concern for general health. Finally, the researchers suggested that although side effects may be problematic or bothersome they do not signal tumor progression or advancing disease and patients may have mentally resigned to the experience of side effects, choosing to appreciate survival and focus on domains of health and well-being that have been maintained. In essence, patients were engaged in a number of psychological strategies with which they had adjusted to the effects of disease and treatment. Although mean levels of disease-specific functioning were below age-matched norms, participant discussions suggested successful psychological adjustment, such as cognitive reframing, which may have explained their ability to maintain average levels of QOL. (Clark et al., 2003)

The majority of research regarding the impact of PC on QOL has emphasized the direct effects of physiologic impairment; empirical analysis of the role of psychosocial

adjustment has not been extensive (Clark et al., 2003). Although sexual dysfunction (i.e., physiologic impairment) may be distressing, research suggests that psychosocial factors that promote adjustment may buffer the impact of sexual dysfunction on QOL. For example, although sexual dysfunction would conceptually lead to decrements in QOL given the importance men place on their sexuality and their desire to maintain sexually satisfying intimate relationships, sexual dysfunction is often unrelated to measures of general QOL when other domains of sexuality are considered. In a model that simultaneously evaluated the effects of sexual dysfunction, desire, and bother on general QOL, sexual desire and bother were associated with QOL but not sexual dysfunction, controlling for the effects of demographic and medical variables (Benedict et al., unpublished). Similarly, Dahn et al. (2004) demonstrated that for men with lower levels of functioning following treatment, greater sexual desire was associated with lower QOL whereas less sexual desire was related to higher QOL; and the opposite was true for men with high levels of functioning, such that more sexual desire was associated with higher QOL and less sexual desire was associated with lower QOL. These findings suggest that the impact of sexual dysfunction on general QOL depends, in part, on psychological variables (e.g., sexual bother, desire). Psychosocial factors that promote adjustment, such as cognitive reframing or support from one's partner, may buffer the effects of sexual dysfunction and promote adaptive long-term changes in QOL.

Psychosocial Interventions in Prostate Cancer

Psychosocial and behavioral interventions among cancer patients generally aim to reduce emotional distress and improve adjustment and QoL (e.g., Anderson, 1992; Meyer

& Mark, 1995). Interventions have demonstrated positive effects across a range of psychosocial and physical outcomes (e.g., emotional adjustment [e.g., depression, anxiety, fear, denial or repression, distress]; functional adjustment [e.g., socializing, return to work]; disease- and treatment-related symptoms [e.g., fatigue, nausea, pain]) as well as immunological outcomes and some evidence suggests significant effects on recurrence and survival time (Meyer & Mark, 1995). Although findings have been mixed with reports of non-significant effects as well, several reviews of the literature have concluded that the majority of psychotherapeutic interventions among cancer patients demonstrate some improvement in psychosocial adjustment (Anderson, 1992; Meyer & Mark, 1995). Interventions have been shown to improve adjustment and well-being at all stages of diagnosis and treatment (Anderson, 1992).

Several approaches to conducting interventions among adult cancer patients have been employed, including supportive-expressive group therapy, psycho-educational interventions, and multimodal intervention methods. Therapy components often involve an emotionally supportive context to address fears and anxieties, information about the disease and treatment, teaching cognitive and behavioral coping strategies, and relaxation training (Anderson, 1992; Cockle-Hearne & Faithfull, 2010). Supportive interventions primarily aim to provide patients with the opportunity to acknowledge their experiences and express their emotions and concerns to other cancer patients. Therapeutic processes by which participants benefit from the intervention and adjust to their cancer experience include sharing experiences, giving and receiving information and reducing social isolation (Bottomly, 1997). Psycho-educational interventions build on this but tend to be more structured in nature, often focusing on cognitive and behavioral techniques to

facilitate adjustment and adaptive coping with which participants gain a greater sense of control over their cancer experience (Bottomly, 1997; Cockle-Hearne & Faithfull, 2010). Some evidence suggests that cancer patients may benefit more from structured interventions than purely supportive ones; this may be due to learning skills to more effectively cope with cancer and cancer-related changes after the intervention has ended (e.g., stress management; Bottomly, 1997).

Psychosocial interventions tailored specifically for post-treatment PC patients have demonstrated positive results on a range of outcomes. Following participation in interventions, men have reported reduced stress and mood disturbance (e.g., depression, anxiety, distress, anger; Carlson, Speca, Patel, & Goodey, 2004; Parker et al., 2009; Stiegelis et al., 2004; Weber et al., 2004), less uncertainty and better communication with spouses (Northouse et al., 2007), better understanding of their illness and more active involvement in treatment (Gregoire, Kalogeropoulos, & Corcos, 1997), and improved disease-specific and general QOL (Parker et al., 2009; Penedo et al., 2004; 2006). Mechanisms that explain intervention-related improvements include enhanced stress management skills (Penedo et al., 2004; 2006), cognitive reframing and problem solving skills (Mishel, 2002; Northouse et al., 2007), and increased self-efficacy (Weber & Sherwill-Navarro, 2005).

Several studies have evaluated the effect of psychosocial interventions on sexual outcomes specifically. Lepore et al. (2003) reported on the effects of two types of interventions: group education (6-weekly 1 hour lecture sessions) and group education-plus-discussion (same lecture sessions plus 45 minutes of peer discussion). Results indicated that peer group discussion was associated with improved sexual bother at 12-

months post-intervention but neither intervention condition significantly improved sexual function. Weber et al. (2004) also reported significant improvements in sexual bother but not sexual function 4-weeks post-intervention. Geisler (2005) reported significant long-term improvements in sexual function and sexual limitations and a trend in sexual bother at 12-months post-intervention. Similarly, Canada, Neese, Sui & Schover (2005) reported significant improvements in sexual function and satisfaction at 3-months post-intervention but only sexual satisfaction showed continued improvement at 6-months post-intervention (i.e., sexual function declined). Finally, prior work in the cognitive behavioral stress management (CBSM) in PC study has reported significant improvements on a measure that assessed both sexual function and bother from pre- to immediately post-intervention (Molton et al., 2008; Penedo et al., 2007; Seigel et al., 2007). These findings are reviewed below.

Cognitive Behavioral Stress Management Group Intervention in Prostate Cancer

Penedo et al. (2004; 2006) assessed the effects of a 10-week group-based CBSM intervention designed to improve stress management skills through relaxation training and cognitive-behavioral techniques, versus an half-day informational seminar, in a sample of localized PC patients treated with RP or RT. Men in the intervention condition reported significant increases in stress management skills and subsequent improvements in QOL (including physical, social/family, emotional and functional domains), and RP patients, specifically, reported improved coping skills and reduced psychological distress post-intervention.

Siegel et al. (2007) evaluated the effects of the CBSM intervention on sexual functioning among the same sample of PC patients. The study sought to determine whether social inhibition, a personality trait characterized by a tendency to constrain expressions of emotions and behaviors in social situations to avoid disapproval (Denollet, 2005), influenced intervention effects. Preliminary analyses evaluated cross-sectional relationships between perceived social support (i.e., general support, partner-specific support, and family/social well-being), social inhibition, and sexual functioning. Results indicated that partner-specific social support was the only type of social support that was significantly related to sexual function, controlling for relevant indicators of social inhibition. Primary analyses indicated significant intervention effects on sexual functioning in RP but not RT patients from pre- to post-intervention (3-months post-baseline) time points. Intervention effects were moderated by levels of social inhibition, such that those who were high in social inhibition demonstrated significantly larger pre- to post-intervention treatment gains in sexual functioning. Furthermore, although the relationship between social support and sexual function was not the focus of the study, Siegel et al. (2007) reported that RP patients who indicated low levels of social support (one standard deviation below the mean) were at the 15th percentile of sexual functioning at baseline compared to age-matched healthy controls, whereas those who indicated high levels of social support (one standard deviation above the mean) were at the 23rd percentile. Results support prior findings suggesting that partner-specific social support is an important consideration in determining disease-specific outcomes, particularly sexual dysfunction.

Molton et al. (2008) reported similar findings regarding the same CBSM intervention. Significant improvements in sexual function immediately following participation in the intervention were observed; effects were particularly pronounced among participants characterized by higher levels of interpersonal sensitivity. The authors speculated that the intervention might have normalized feelings of anxiety and perceived loss of manhood associated with sexual dysfunction and taught appropriate partner communication strategies with which men could improve their ability to express their needs and feelings, thereby decreasing anxiety related to sexual performance and promoting sexual intimacy (Molton et al., 2008). In essence, the authors argued that the intervention served to promote psychosocial adjustment to sexual dysfunction. Although conceptually plausible, these mechanisms of change were not analyzed. Sexual function in these studies was evaluated using a measure that was primarily designed to assess physiologic dysfunction (e.g., quality and frequency of erections) following PC treatment. Other domains of sexuality such as sexual satisfaction and quality of intimate relationship functioning were not captured empirically. It may be that the effects of the intervention would be better captured by a measure of psychosocial adjustment to sexual dysfunction than a measure of physiologic dysfunction. Furthermore, empirical analysis of the relationships between sexual adjustment, partner-specific social support, and QOL is limited and it is unknown changes in these domains are related over time.

The CBSM intervention in PC has been shown to have significant effects on stress management and coping skills, psychological distress, and overall QOL, and improvements in sexual functioning from pre- to immediately post-intervention have also been reported. The current study sought to build on these findings by directly assessing

the effects of a CBSM intervention on psychosocial adjustment to sexual dysfunction, partner-specific social support, and QOL. Analyses also sought to evaluate whether improvements in sexual adjustment, partner-specific social support, and QOL were interrelated, above and beyond relevant socio-demographic and medical factors, sexual dysfunction, and relationship satisfaction.

Current Study

PC disease and treatment often lead to sexual side effects that impact multiple domains of adjustment and well-being. The majority of the literature has focused on the direct effects of sexual dysfunction (i.e., physiologic impairment) on QOL. However, sexual dysfunction and psychosocial indices of adjustment to sexual dysfunction (e.g., distress or bother) have been shown to be relatively unrelated over time (Gacci et al., 2009). For example, many men experience significant distress due to their perceptions of the impact sexual side effects have had on their partners and intimate relationships, independent of their level of sexual functioning. The degree to which men are able to adjust within psychological and relational domains of sexuality (i.e., psychosocial adjustment to sexual dysfunction) may be one mechanism by which post-treatment sexual dysfunction is related to general QOL. Within this context, interpersonal functioning and the quality of the relationship are important. Patients who are highly distressed have been shown to reduce support-seeking behaviors and have lowered perceptions of support, which may exacerbate sexual adjustment difficulties and lead to further decrements in QOL. The extent to which men perceive their partners as being (un)supportive during their cancer experience may significantly impact sexual adjustment processes and

changes in QOL. That is, patients' perceptions of partner-specific social support may impact general QOL directly and/or indirectly through its impact on sexual adjustment.

Psychosocial interventions tailored specifically for post-treatment PC patients have demonstrated positive results on a range of outcomes, including improved disease-specific and general QOL. Intervention effects on domains of sexuality, specifically, suggest greater improvements in psychological domains related to post-treatment sexual dysfunction (e.g., sexual bother and satisfaction) than in physiologic recovery. Interventions that have reported significant effects on measures of physiologic functioning almost always indicate contiguous effects on psychological domains of sexuality as well. Despite this, comprehensive assessments of the psychosocial sequelae related to post-treatment sexuality are mostly qualitative. Empirical evaluation of long-term trajectories of psychosocial adjustment to sexual dysfunction is almost non-existent and it is unknown how changes in sexual adjustment, perceptions of partner-specific social support, and QOL are related over time.

The current study proposed that the impact of treatment-related sexual dysfunction on QOL is explained in part by processes of sexual adjustment; that perceptions of partner-specific social support impacts general QOL directly and indirectly through its impact on sexual adjustment; and that participation in a psychosocial intervention leads to improvements in sexual adjustment, perceptions of partner-specific social support, and QOL. It was conceptualized that higher levels of sexual adjustment are related to higher levels of QOL, controlling for the effects of sexual dysfunction on QOL; that higher levels of partner-specific social support are related to higher levels of

sexual adjustment and QOL; and that improvements in sexual adjustment, partner-specific social support, and QOL are related. See Figure 1 for conceptual model.

Latent growth modeling (LGM) was used to explore the effects of a CBSM intervention on psychosocial adjustment to sexual dysfunction ("sexual adjustment"), partner-specific social support ("social support"), and general QOL among men recently treated for localized PC. Cross-domain LGMs were used to evaluate whether trajectories of sexual adjustment, social support, and QOL were interrelated (i.e., at baseline and change over time), independent of intervention participation (i.e., no test of intervention group differences). In sum, analyses aimed to determine whether men randomized to an intervention condition reported significant improvements in sexual adjustment, social support, and general QOL compared to men randomized to a control condition (see Figures 2 – 4) and, among all men randomized to both intervention conditions, whether improvements in sexual adjustment led to improvements in general QOL and whether improvements in social support led to improvements in both sexual adjustment and QOL (see Figure 5).

For the current study, the following hypotheses were tested:

Specific Aim 1: To examine whether participants randomized to a 10-week CBSM group intervention condition reported significant improvements in psychosocial adjustment to sexual dysfunction (i.e., "sexual adjustment") compared to participants randomized to a half-day psychoeducational control condition. See Figure 2.

Hypothesis 1: It was hypothesized that participants randomized to an intervention condition would report significant improvements in sexual adjustment, whereas

participants randomized to a control condition would report no change or decreases in sexual adjustment.

Specific Aim 2: To examine whether participants randomized to a 10-week CBSM group intervention condition report significant improvements in partner-specific social support (i.e., "social support") compared to participants randomized to a half-day psychoeducational control condition. See Figure 3.

Hypothesis 2: It was hypothesized that participants randomized to an intervention condition would report significant improvements in social support, whereas participants randomized to a control condition would report no change or decreases in social support.

Specific Aim 3: To examine whether participants randomized to a 10-week CBSM group intervention condition report significant improvements in QOL compared to participants randomized to a half-day psychoeducational control condition. See Figure 4.

Hypothesis 3: It was hypothesized that participants randomized to an intervention condition would report significant improvements in QOL, whereas participants randomized to a control condition would report no change or decreases in QOL.

Specific Aim 4: To examine whether trajectories of sexual adjustment, social support, and QOL were significantly related among all participants, controlling for intervention group membership. See Figure 5.

Hypothesis 4a: It was hypothesized that baseline levels of sexual adjustment, social support, and QOL would be significantly related such that worse sexual adjustment would be related to lower levels of social support and QOL among participants randomized to both intervention conditions (control and CBSM; i.e., pre-intervention, cross-domain correlation of intercepts).

Hypothesis 4b: It was hypothesized that changes in sexual adjustment, social support, and QOL would be significantly related such that improvements in sexual adjustment would be related to improvements in social support and QOL among participants randomized to both intervention conditions (control and CBSM; i.e., cross-domain correlation of slopes).

Exploratory Aim 1: To examine different types of partner-specific social support and confirm the reported factor structure of the Sources of Social Support Scale (SSSS; Carver, 2006) identified in a sample of post-treatment breast cancer patients (i.e., 4 factor structure representing informational, instrumental, emotional, and negative support; Kinsinger, Laurenceau, Carver & Antoni, 2011).

Exploratory Hypothesis 1: It was hypothesized that analyses would support a 4 factor structure of the SSSS representing informational, instrumental, emotional, and negative support and confirm prior findings in the literature (Kinsinger, Laurenceau, Carver & Antoni, 2011).

Exploratory Aim 2: To examine whether CBSM attendance was significantly related to intervention-related changes in sexual adjustment, social support, and QOL.

Exploratory Hypothesis 2: It was hypothesized that attendance would be significantly related to intervention-related changes across domains such that participants who attended more CBSM intervention sessions would demonstrate greater improvements in sexual adjustment, social support, and QOL (i.e., group-specific covariate; negative correlation with sexual adjustment slope 1 factor and positive correlation with partner-specific social support and QOL slope 1 factors).

Chapter 2: Methods

Participants

Participants were part of a NIH funded study (Cognitive-Behavioral Stress Management in Prostate Cancer [CBSM in PC]; NCI grant 1P50CA84944) that evaluated the effects of a CBSM intervention on QOL and disease progression in men who had been treated for localized (Stage I or II) PC. The current study utilized data collected from participants who were currently partnered (i.e., married or in an equivalent relationship).

Inclusion/Exclusion Criteria

Participants were required to be at least 50 years old and to have undergone RP or RT treatment for localized PC within the past 18 months. Men were excluded if they were currently receiving hormone therapy (e.g., Lupron, Zoladex, Eligard or Viadur, per self-report) or other adjuvant treatment (e.g., chemotherapy) for PC, or if they had a history of other non-skin cancer(s). In addition, participants were required to have a 9th grade reading level and be free of significant cognitive impairment or active psychiatric symptoms (i.e. panic attacks, posttraumatic stress disorder, psychosis, or alcohol/drug dependence) to ensure comprehension of assessment materials and content of the intervention.

Measures

Socio-demographic and Medical Variables

Standard questionnaires were used to assess socio-demographic and medical variables via interview. Socio-demographic variables included age, ethnicity, and years

of formal education, total combined household income, and relationship status. Medical variables included type of treatment, time since diagnosis, and time since treatment. Comorbid medical conditions were measured using the Charlson Comorbidities Index, a weighted index of 19 medical conditions that yield a total score ranging from $0 - 37$ (CCI; Charlson et al., 1987).

Pre-treatment Sexual Satisfaction

A standard questionnaire was developed for this study to assess the degree to which sexual relations had been modified following PC diagnosis and treatment. Questions included assessment of pre- to post-treatment changes in sexual activity (e.g., frequency of sexual activity, partner initiation of sexual activity) and satisfaction. A single item that measured pre-treatment sexual satisfaction will be used as a predictor of baseline sexual adjustment and QOL.

Relationship Satisfaction

Marital/partner relationship satisfaction was measured using a single item that asks participants to rate their current degree of happiness in their relationship on a scale from "1 – extreme unhappiness" to "7 – extreme joy."

Sexual Dysfunction

Sexual dysfunction was measured using the UCLA-Prostate Cancer Index (UCLA-PCI; Litwin et al., 1998) for post-RP participants and the Expanded Prostate Cancer Index Composite (EPIC; Wei et al., 2000) for post-RT participants. Both

measures share a core subset of items and a composite score of 7 items will be used to assess sexual dysfunction (i.e., degree of physiologic impairment; e.g., "How would you rate the usual quality of your erections?"). Items that assess sexual desire and bother that are typically included in the UCLA-PCI and EPIC sexual dysfunction composite will be removed to have a more discrete measure of physiologic impairment and avoid collinearity with the sexual adjustment outcome variable. Previous studies have demonstrated that desire and bother are distinct domains and may significantly affect the relationship between sexual dysfunction and QOL in men with PC (e.g., Dahn et al., 2004). Higher scores indicated less sexual dysfunction. The modified sexual dysfunction scale has been used in prior work with the CBSM in PC study and yielded adequate psychometric properties and good internal reliability. Cronbach's alphas for the current sample across timepoints ranged from .90 – .91.

Psychosocial Adjustment to Sexual Dysfunction

The Psychosocial Adjustment to Illness Scale – Sexual Relationships subscale (PAIS; Derogatis, 1986) was used to assess psychological and social adjustment to illness related changes in quality of sexual functioning or relationship. The PAIS is a widely used measure that assesses the quality of psychosocial adjustment to a current medical illness or the sequelae of a previous illness within the past 30 days. The Sexual Relationships subscale includes 6 items that ask participants to rate how they feel PC has affected their sexual functioning (e.g., interest, frequency, quality of performance, pleasure/satisfaction) and quality of interpersonal relationship (e.g. arguments related to sexual inactivity) on a 4-point scale (0 – 3). Higher scores indicate *worse* psychosocial

adjustment (i.e., more difficulty adjusting to sexual dysfunction). Use of the Sexual Relationships subscale is limited within PC research. Select items from the Sexual Relationships subscale have been used in post-treatment PC populations to assess "sexual life" (Lilleby, Fosså, Waehre, & Olsen, 1999) but evaluation of psychometric properties was not applicable as the complete scale was not used. Cronbach's alphas for the current sample across time points ranged from .73 – .81.

Evaluation of the PAIS in other medical populations has demonstrated adequate reliability and validity (Derogatis, 1986). The internal consistency of the Sexual Relationships subscale has been demonstrated in breast and lung cancer, as well as renal dialysis, cardiac and Hodgkins' disease (all coefficients ≥ .80) and interrater reliability has been demonstrated in breast cancer (observers included a clinical psychologist and nurse) and Hodgkins' disease (observers included physicians, psychologists and social workers; coefficients ≥ .81; Derogatis & Fleming, 1996; Derogatis & Lopez, 1983). Several researchers have reported good convergent relationships between the PAIS subscales and measures of depression and anxiety (among cardiac transplant patients), disability, pain and global assessment of health (among ambulatory patients with systemic lupus erythematosus), and global scores of symptom severity (among polio survivors; reviewed in Derogatis & Fleming, 1996). Its predictive validity has been demonstrated for a range of external criteria among many clinical populations, including cancer patients, and has been shown to discriminate between levels of depression, psychological distress, family cohesion, perceived social support, symptom severity and stage of disease (reviewed in Derogatis & Fleming, 1996). Use of the PAIS in colorectal cancer has also demonstrated that greater improvements in psychosocial adjustment from

pre- to post-chemotherapy treatment predicted greater improvements in general QOL

(measured using the Functional Assessment of Cancer Therapy – General version;

Galica, 2008) and in breast cancer a significant prognostic relationship between the PAIS

and overall survival was reported such that women who experienced a greater impact of

illness and disease had an increased risk of death (Goodwin et al., 2004). Finally,

published norms for the PAIS are available for lung cancer, renal dialysis, essential

hypertension and burn patients (Derogatis & Fleming, 1996).

Social Support

The Sources of Social Support Scale (SSSS; Carver, 2006), a 10-item self-report

measure, was used to assess the kinds of PC-related help and support participants

received from their partner (i.e., partner-specific social support). Participants were asked

to answer questions regarding the amount of different types of support they received on a

"1 – Not at all" to "5 – A lot" scale (could also answer "0 – Not applicable"). Higher

scores indicate more social support from one's partner. The SSSS was originally

developed to assess perceptions of support in breast cancer and was modified to be

applicable to PC-related partner support. Prior work in breast cancer has identified a 4

factor structure of the SSSS representing informational (1 item), instrumental (1 item),

emotional (4 items that assess positive support and 2 items that assess the absence of

emotional support [reverse coded]), and negative support (2 items; arguing and criticizing

[reverse coded]) using confirmatory factor analysis (Kinsinger, Laurenceau, Carver &

Antoni, 2011). The SSSS has been used in prior work with the CBSM in PC study and

yielded adequate psychometric properties and internal reliability (e.g., Cronbach's alpha

= 0.74; Siegel, et al., 2007). Cronbach's alphas for the current sample across time points ranged from .78 – .91.

Quality of Life

The Functional Assessment of Cancer – General Module (FACT) was used to assess general QOL (Cella et al., 1993). The FACT – G includes 27 items that measure physical, social/family, emotional, and functional domains of QOL. A single item from the social/family well-being subscale that measures current sexual satisfaction was removed to avoid collinearity with other variables in the model and a total score will be calculated from the remaining 26 items. Participants were asked to indicate to what degree each statement was "true" in the last 7 days on a 5-point scale that ranged from "1 – Not at all" to "5 – Very much." Items are recoded on a 0 – 4 scale and the total scores of the 26 items may range from 0 – 104, with higher scores indicating better QOL. The FACT – G has been used extensively in cancer populations as well as in prior work with the CBSM in PC study and demonstrated adequate psychometric properties and internal reliability. Cronbach's alphas for the current sample across time points ranged from .89 – .91.

Procedure

Recruitment

Participants were recruited by referrals from urology clinics, study flyers, community organization presentations, and through the Florida Cancer Data System (FCDS), a registry of Florida cancer patients maintained by the Florida Department of

Health (DOH) that provided contact information for all men in the tri-county area (Miami-Dade, Broward, and Palm Beach). Packets that included a research study flyer, a signed letter by the Principal Investigator, and a letter from the Florida DOH that was endorsed by the Secretary of Health were mailed to PC patients who met general eligibility criteria. Patients were asked to contact the research team using the telephone number or self-addressed stamped envelope included in the packet if they were interested in participating. These recruitment efforts were developed in previous studies and are in full accordance with the Health Information Portability and Accountability Act (HIPAA) regulations of the Florida DOH and the University of Miami/Sylvester Comprehensive Cancer Center (UM/SCCC).

Screening

Initial screening to determine preliminary eligibility was conducted via phone interview. The Mini Mental State Examination (MMSE) was used to screen for cognitive impairment (Folstein, Folstein, & McHugh, 1975) and screener items from the Structured Clinical Interview for DSM-IV/Non-Patient edition (SCID-IV/NP; First, Spitzer, Gibbon, & Williams, 2002) were used to identify possible active psychiatric symptoms. The MMSE is an 11-item test that assesses orientation, registration, attention, calculation, recall, and language (Folstein et al., 1975) and men who scored below 26 out of a maximum score of 30 were excluded from the study. If a screener item on the SCID-IV/NP was endorsed, the full SCID-IV/NP module was administered and men who met full criteria for panic attacks, posttraumatic stress disorder, psychosis, and/or alcohol/drug dependence within the past three months were excluded from the study and

referred to appropriate mental health resources. If eligibility criteria were met, men were provided with a more detailed explanation of the study's purpose and procedures, including monetary compensation. Those who expressed interest in participation were scheduled for an in-person interview at the Behavioral Medicine Research Center (BMRC) at the University of Miami, at which time they signed a University of Miami IRB-approved consent form and were enrolled in the study.

Randomization

Participants were randomized to either the CBSM or control condition using methods that maintained group sizes at about 6 – 8 participants for each cohort. Cohorts of approximately 18 men were randomized using a 1:1 CBSM to control condition ratio; cohorts of approximately 12-17 men were randomized using a 2:1 CBSM to control condition ratio; and for cohorts with less than 12 men participants were assigned to a single group, which was then randomly assigned to a condition (Penedo et al., 2006).

CBSM Condition

The CBSM condition consisted of a 10-week manualized group intervention that was modified from the original protocol developed by Antoni et al. (1991; 2003) for CBSM in PC (Penedo et al., 2004; 2006). Prior investigations have used the intervention in several medical populations, including human immunodeficiency virus, chronic fatigue syndrome and breast carcinoma (Antoni, 2003; Lechner et al., 2003; Lopez et al., 2011). Groups met once per week for 2 hours in which 90-minutes were devoted to didactic discussion and exercises and 30-minutes to relaxation training. Groups were co-led by a

licensed clinical psychologist and/or master's level clinical health psychology student who was trained in the CBSM protocol.

The CBSM intervention focused on stress management and relaxation training. During the didactic portion of each session, participants provided information regarding stress awareness, physical responses to stress and the appraisal process and were taught a variety of cognitive-behavioral stress-management techniques, including identifying cognitive distortions and cognitive restructuring processes (e.g., rational thought replacement), effective coping strategies (e.g., emotional-focused vs. problem-focused coping), anger management and assertiveness training (e.g., effective communication), and social support development. Information specific to PC physiology, diagnosis, treatment and side effects was also provided and health maintenance strategies were reviewed. During the relaxation portion, participants were taught a variety of relaxation techniques through group relaxation exercises, including progressive muscle relaxation (PMR), guided imagery, meditation, and diaphragmatic breathing, and were encouraged to practice the techniques on a daily basis. The concepts and techniques introduced in each session built upon information covered in prior sessions and were reinforced through group discussions, exercises (e.g., role-plays) and weekly homework assignments.

Control Condition

The control condition consisted of a single psychoeducational group seminar. The seminar was approximately 4 hours and consisted of a condensed version of the topics that comprised the 10-week CBSM intervention. Participants were encouraged to practice

stress-management skills and relaxation training on a daily basis. The seminar was co-led

by a master's level clinical health psychology student and/or a licensed clinical

psychologist who was trained in the CBSM protocol.

Assessments

The current study used data collected from all time points of the CBSM in PC

study. Participants were assessed 4 times over a 15-month period, including baseline (T1;

2 to 3 weeks prior to randomization and the start of the intervention) and follow-up

assessments (T2 [3-month post-baseline; 2 to 3 weeks post-intervention]; T3 [6-month

follow-up; 9 months post-baseline]; and T4 [12-month follow-up; 15 months post-

baseline]). Psychology graduate students and research associates that were blind to group

assignment conducted all psychosocial assessments. Immune and endocrine data were

also collected but will not be used in the current study. Monetary compensation of $50.00

was given to participants at each assessment visit for their time and effort.

Chapter 3: Analyses

Preliminary Analyses

All variables were tested for internal consistency and normality. Variables with absolute values of the skew index greater than 3.0 and kurtosis index greater than 10.0 were considered to have non-normal distributions and were further evaluated to determine whether transformation would be appropriate (Kline, 2005). Data were also screened for outliers and any participant with a score greater than 3.0 standard deviations beyond the mean at any time point were further evaluated to determine inclusion or exclusion from analyses based on data from other relevant variables regarding that participant (Kline, 2005).

Descriptive statistics for baseline socio-demographic and medical variables (age, ethnicity, years of formal education, total combined family income, relationship status, type of treatment [i.e., RP verse RT], time since diagnosis and time since treatment), pre-treatment sexual satisfaction, relationship satisfaction and sexual dysfunction were evaluated for the entire sample, as well as the control and intervention groups separately. The intervention condition variable was dummy coded (0 for the control group and 1 for the CBSM group) and significant between-group differences ($p<.10$) on any of the variables were determined based on independent samples t-tests for continuous variables and chi-square tests for categorical variables. Covariates were included in primary analyses based on theoretically plausible relationships to sexual adjustment, partner-specific social support, and QOL.

Primary Analyses

<u>Missing Data</u>

Analyses used the full information maximum likelihood (FIML) approach to generate parameter estimates for the models that were tested. Parameter estimates and standard errors were estimated directly from the observed data by calculating a log-likelihood function and computing iterative algorithms that converge to a solution that minimizes discrepancy between observed and predicted covariances (i.e., missing data are not imputed; Enders, 2006; Kline, 2005). This approach assumes that the variables are normally distributed and that missing data are missing at random (MAR; the missing data pattern is not systematic) or missing completely at random (MCAR; the missing data pattern is not systematic and is unrelated to any other variable). Under conditions in which missing data assumptions have been met, FIML estimates are unbiased and more efficient than other procedures of handling missing data (e.g., mean imputation, listwise and pairwise deletion; Enders & Bandalos, 2001). All variables with missing data were evaluated to determine significant differences between participants with complete versus missing data (t-tests, $p<.05$).

<u>Structural Equation Modeling</u>

Analyses were conducted in Mplus, a structural equation modeling (SEM) software (version 5; Muthén & Muthén, 2007). SEM includes a range of statistical techniques that involve analysis of mean and covariance structures of both observed and latent variables. The main goal of analyses is to identify patterns of correlations among variables by specifying a model with which to maximize the amount of explained

variance of each variable and minimize the amount of unexplained variance or error and explain the mean structure of the data.

Model fit was determined using several statistical indices: chi-square goodness-of-fit statistic (χ^2; tests whether the predicted covariance matrix specified by the model is significantly different from the data), comparative fit index (CFI; tests the relative improvement in model fit of the specified model over a null model that assumes zero covariances among the observed variables), standardized root mean square residual (SRMR; measures the mean absolute correlation residual, or the overall difference between the predicted correlations and observed correlations in the data), and root mean square error of approximation (RMSEA; measures the error of approximation, or the lack of fit of the predicted covariance matrix to the data, and is adjusted to favor parsimony). Good model fit was indicated by the following three criteria: χ^2 p-value >.05, CFI >.95, SRMR <.08, and RMSEA <.06 (Kline, 2005). Chi-square difference tests were used to determine the relative improvement in model fit between nested models. (Kline, 2005)

Latent Growth Modeling

Latent growth modeling (LGM) refers to a class of structural equation models for longitudinal data with repeated measures. Latent variables are used to estimate growth parameters (i.e., intercept and slope factors) and to estimate the amount of measurement error included in the model. Level 1 growth models are used to model and predict intra-individual change over time. LGMs assume that all individuals have growth trajectories with the same functional form and covariates are assumed to have uniform influence on observed and latent variables. (Kline, 2005; Willett & Sayer, 1996)

The current study used multiple-group LGMs to analyze trajectories of sexual adjustment, partner-specific social support, and QOL and determine significant intervention effects within each domain (i.e., control versus CBSM; see Figures 2 – 4). It was hypothesized that the greatest amount of intervention-related change in the outcome variables would occur during and immediately following participation (i.e., change from T1 [baseline; pre-intervention] to T2 [3-month post-baseline; post-intervention]); after which, participants would maintain intervention-related benefits (i.e., better sexual adjustment, greater social support, and higher levels of QOL) but would not continue to improve at the same linear rate over time. In order to test the expected trajectory, piecewise growth curves were specified such that observed indicators (i.e., T1 – T4) loaded on to an intercept factor (i.e., path loadings all set to 1) and two latent slope factors to account for different rates of growth across time points within the CBSM group. That is, within the CBSM group, slope 1 was specified to represent the rate of growth from T1 to T2 (i.e., path loadings set to 0, 1, 1, 1) and slope 2 was specified to represent the rate of growth from T2 to T4 (i.e., path loadings set to 0, 0, 3, 5). The slopes within the control group were constrained equal to specify a linear trajectory over time; as this group did not participate in the intervention, it was not expected that they would report significant change over time and, if they did, that it would be gradual across the four time points (i.e., T1 – T4; change from T1 – T2 would not be different from T2 – T4). A model with cross-group equality constraints of the slope estimates was compared to an unconstrained model in which the CBSM slope 1 estimate (i.e., change from T1 to T2) was free to vary and a chi-square difference test performed. Intervention effects were defined by a significant improvement in model fit when a unique slope 1 estimate was

specified for the CBSM group, compared to a model that constrained control and CBSM slopes equal (i.e., linear slope for both groups). The residual variances of the indicators were constrained equal to assist in parameter estimation, unless otherwise noted. Due to randomization, intercept means and variances were also constrained equal in models that included covariates to save degrees of freedom and facilitate parameter estimation.

Covariates were selected according to theory and prior research and included in the models based on hypothesized relationships with sexual adjustment, partner-specific social support, and QOL. Selected covariates were included in the models as predictors of the slope 1 factor to account for the degree to which they explained variance in change from T1 to T2 in each outcome variable and to facilitate the detection of significant intervention effects (i.e., intervention group differences in change from T1 to T2; slope 1 estimate).

Cross-Domain Latent Growth Modeling

Cross-domain LGMs were used to analyze the interrelationships among trajectories of sexual adjustment, partner-specific social support, and QOL. Level 2 growth models are used to estimate how initial status and growth in separate domains relate to one another over time; when growth in one domain is related to growth in another, the individual growth parameters will covary across domains. Analyses sought to determine whether growth parameters in separate domains were interrelated, irrespective of participation in the intervention (i.e., no test of intervention effects; combined analyses of control and CBSM groups). Due to concerns regarding power, a piecewise approach to modeling growth was not used. Instead, LGMs for each outcome

variable of interest were conducted in which a linear growth curve was specified that allowed the T3 and T4 factor loadings to be estimated. That is, the factor loadings of the 4 time points were fixed to 1 for the intercept; for the slope, factor loadings were fixed to 0 and 1 for time points T1 and T2, respectively, and were estimated for time points T3 and T4 (see Figure 6). As in the piecewise approach, it was hypothesized that the greatest amount of intervention-related change in the outcome variables would occur during and immediately following participation; after which, participants would maintain intervention-related benefits (i.e., better sexual adjustment, greater social support, and higher levels of QOL) but would not continue to improve at the same linear rate over time. As these analyses were not conducted to determine intervention effects in the outcome variables, models constrained estimates of T3 and T4 factor loadings to be equal across groups (i.e., both control and CBSM groups would be characterized by the same growth factor loadings). However, specifying T1 and T2 factor loadings while allowing T3 and T4 factor loadings to be estimated allowed the linear growth curve to capture the greatest amount of change from pre- to immediately post-intervention time points.

Analyses combined separate LGMs into a composite cross-domain LGM in a stepwise fashion in which the intercept and slope parameters were permitted to covary across domains according to theory and hypothesized relationships. The final cross-domain LGM was hypothesized to include sexual adjustment, partner-specific social support, and QOL (see Figure 5). It was conceptualized that initial status and change in sexual adjustment, partner-specific social support, and QOL would be related. Therefore, parameter estimates in the final model were hypothesized to be: mean values of the latent factors within each domain (6 population means), the variance and covariance of the

latent factors within each domain (6 variances and 3 covariances), and specified

covariances of the latent factors across domains (6 covariances).

Chapter 4: Results

Preliminary Analyses

Sample Description

Analyses were limited to participants who reported to be "currently in a relationship" (i.e., partnered) at the time of enrollment and initial assessment visit (n=225; 86% of the sample; N=261). Of those that were excluded from analyses, 10 (4%) reported to be single/never married, 20 (8%) were separated or divorced, and 6 (2%) were widowed. Partnered men, compared to unpartnered men, were younger (F[1, 259]=2.88, $p<.10$) and reported a higher income (F[1, 258]=9.12, $p<.01$) and longer time since treatment (F[1, 253]=5.59, $p<.05$). See Table 2 for full comparison between partnered versus unpartnered participants. All subsequent results refer to partnered participants.

Participants were 65 years of age (SD=7.7) on average, had completed approximately 14 years of education (SD=3.4), and reported an average household income of $57,600 (SD=$52,300). The sample was ethnically diverse (40% Non-Hispanic White, 17% African American/Black, 41% Hispanic, 2% other) and consisted primarily of English speakers, although 35% reported Spanish as their primary language. Almost half of the sample was employed (38% full-time; 8% part-time); 44% was retired and 10% was on disability or otherwise not employed.

All participants had been diagnosed with Stage I or II PC and had been treated with surgery (50%) or radiation therapy (50%) within the past 18 months. The average time since PC diagnosis was 16 months (SD=6.5) and the average time since treatment was 11 months (SD=4.4). Approximately 66% of participants reported at least one comorbid medical illness and 44% reported two or more (e.g., 16% indicated diabetes,

31% indicated connective tissue disease, lupus, or arthritis, 18% indicated peripheral vascular disease).

Difference between Intervention and Control Groups

Participants randomized to the CBSM condition (n=124) were slightly older (M=65.8, SD=7.7) than participants randomized to the control condition (n=101; M=64.1, SD=7.7; t[223]=-1.71, $p<.09$). All other group differences on baseline demographic, medical, or psychosocial variables between participants randomized to the CBSM or control conditions were not significant (see Table 3).

Analysis of Covariates

Analyses were conducted to determine preliminary relationships between outcome variables of interest and socio-demographic and medical variables, pre-treatment sexual satisfaction, relationship satisfaction, and sexual dysfunction. Specified covariates and pre- and post-intervention sexual adjustment, social support, and QOL (i.e., PAIS, SSSS, and FACT at time points T1 and T4) were evaluated using bivariate correlation (see Table 4) and one-way analysis of variance to test continuous and categorical variables, respectively. Significant relationships are reported below ($p<.10$).

Sexual Adjustment. Better (i.e., lower scores) pre- and post-intervention sexual adjustment was significantly related to fewer medical comorbidities ($r=.14$, $p<.05$ and $r=.18$, $p<.05$) and higher levels of pre-treatment sexual satisfaction at baseline ($r=-.16$, $p<.05$ and $r=-.18$, $p<.05$, respectively) and better sexual functioning (all p's <.01; see

Table 4). Retired participants also reported significantly better post-intervention sexual adjustment (M=13.5, SD=3.9) than participants who were employed part-time (M=10.4, SD=4.2; $F[4,155]=3.20$, $p<.05$; Tukey post-hoc test, $p<.05$).

Social Support. Perceptions of greater support from one's partner at pre- and post-intervention were positively related to time since diagnosis ($r=-.11$, $p<.10$, and $r=-.18$, $p<.05$, respectively), pre-treatment sexual satisfaction ($r=.29$ and $r=.32$, respectively, all p's<.001), and relationship satisfaction ($r=.50$ and $r=.52$, respectively, all p's<.001). Pre-intervention social support was also significantly related to age and sexual functioning ($r=-.14$ and $r=.14$, respectively, all p's<.001). A significant difference in post-intervention social support across ethnic groups was indicated ($F[2,167]=3.74$, $p<.05$; Tukey post-hoc test, $p<.05$), such that Black participants reported more social support (M=39.1, SD=6.9) than Non-Hispanic White participants (M=34.6, SD=8.1).

Quality of Life. Higher levels of pre- and post-intervention QOL was related to more education ($r=.26$, $p<.001$ and $r=.15$, $p<.05$, respectively), higher household income ($r=.24$, $p<.001$ and $r=.23$, $p<.01$, respectively), fewer medical comorbidities ($r=-.22$, $p<.01$ and $r=-.18$, $p<.05$, respectively), and higher levels of sexual functioning (all p's <.10; see Table 4), pre-treatment sexual satisfaction ($r=.21$, $p<.01$ and $r=.24$, $p<.01$, respectively), and relationship satisfaction ($r=.27$, $p<.001$ and $r=.35$, $p<.001$, respectively). Ethnic group differences in pre- and post-intervention QOL were indicated ($F[2,221]=10.41$, $p<.001$ and $F[2,168]=7.14$, $p<.01$, respectively), such that Hispanic participants reported significantly lower levels of QOL (T1 M=75.7, SD=12.8; T4

M=82.7, SD=13.9) than Non-Hispanic White participants (T1 M=84.1, SD=12.1; T4

M=90.9, SD=11.6) and Black participants (T1 M=81.7, SD=14.4; T4 M=88.4, SD=13.1;

Tukey post-hoc tests, all p's<.05). Participants who were on disability also reported

significantly lower levels of pre-intervention QOL (M=13.5, SD=3.9) than all other

participants (F[4,220]=3.54, p<.01; all Tukey post-hoc tests, p<.10).

Primary Analyses

Latent Growth Models

Multiple-group analyses were conducted in which piecewise LGMs were used to

test intervention effects in each outcome variable of interest (i.e., sexual adjustment

[PAIS], social support [SSSS], and QOL [FACT]). Covariates were specified as

predictors of the slope 1 factor to determine the degree to which individual differences in

change from T1 to T2 (i.e., baseline to 3-month follow-up; pre- to immediately post-

intervention) were accounted for by selected socio-demographic, medical, and

psychosocial variables. Results of initial (i.e., without covariates) and final (i.e., with full

set of covariates) LGMs for each outcome variable are reported below.

Sexual Adjustment

Contrary to hypotheses, there was not a significant intervention effect on sexual

adjustment detected. The initial LGMs indicated that the constrained model did not fit the

data (χ^2[12, N=225]=27.35, p=.01; CFI=.96; SRMR=.07; RMSEA=.11) and model fit

was not improved by the unconstrained model (χ^2[11, N=225]=25.87, p=.01; CFI=.96;

SRMR=.07; RMSEA=.11; $\chi^2\Delta$[1, N=225]=1.48, p>.05). However, further analyses were

conducted to determine whether the two processes of sexual adjustment measured by the

PAIS – psychological adjustment and relationship adjustment to sexual dysfunction –

were independent factors and, if so, whether intervention effects varied across the

different types of sexual adjustment assessed by the PAIS measure.

Confirmatory Factory Analysis of the PAIS. Confirmatory factor analysis

(CFA) demonstrated that a single factor solution in which all items were specified to load

onto a single latent factor did not fit the data (χ^2[14, N=225]=170.03, *p*<.05; CFI=.59;

SRMR=.23; RMSEA=.22; residual variances of items were constrained equal), indicating

that the items were not congeneric. A two-factor solution in which items related to

psychological sexual adjustment (i.e., PAIS items 2 – 5) and items related to relationship

sexual adjustment (i.e., PAIS items 1 and 6; see Appendix: Measures) were specified to

load onto separate latent factors, termed "Psychological Adjustment" and "Relationship

Adjustment," respectively, was tested[1]. Model fit indices indicated that this model fit the

data relatively well (χ^2[11, N=225]=20.73, *p*=.05; CFI=.97; SRMR=.04; RMSEA=.06)

and significantly improved model fit over the single factor solution (see Table 5; $\chi^2\Delta$[3,

N=225]=149.31, *p*<.001). The two factors were significantly correlated (unstandardized

r=.07, SE=.02, *p*<.01; standardized r=.29, *p*<.05) and all factor loadings were significant

(i.e., standardized loadings ranged from .42 – .81; see Table 5).

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[1] Residual variances of the indicators were constrained to be equal within factors, except item 2, which was free to vary as it had a much larger residual variance than the other items of the same factor (i.e., residual variances of items 3 – 5 constrained equal and items 1 and 6 constrained equal; thereby adding 2 degrees of freedom difference to the chi-square difference test).

Psychological and Relationship Adjustment. In order to evaluate whether there were significant intervention effects on either of these factors, two subscales were created by summing PAIS items 2 through 5 to make up the Psychological Adjustment subscale and PAIS items 1 and 6 to make up the Relationship Adjustment subscale at each time point (following the same procedures as the overall measure, items 2, 4, and 6 were reverse coded; higher scores still indicated *worse* adjustment). Again, multiple-group LGMs were conducted for each of the two subscales and chi-square difference tests were used to determine significant group differences in model fit. Initial (i.e., without covariates) and final (i.e. with covariates) models were tested. Covariates included age, medical comorbidities, type of treatment [i.e., RP vs. RT], time since treatment, relationship satisfaction, and pre-treatment sexual satisfaction. Finally, sexual dysfunction was considered as an additional covariate to determine whether there were intervention effects in either of these domains of sexual adjustment, above and beyond physiologic dysfunction.

Psychological Adjustment. Results indicated that there was not a significant intervention effect on the Psychological Adjustment subscale; the constrained model fit the data (χ^2[12, N=225]=20.92, *p*>.05; CFI=.98; SRMR=.06; RMSEA=.07) but the unconstrained model did not improve model fit ($\chi^2\Delta$[1, N=225]=1.80, *p*>.05). Parameter estimates of the constrained model indicated that participants reported significant improvements in psychological adjustment over time (i.e., both control and CBSM groups; unstandardized mean slope estimate=-.12, *p*<.001).

Constrained and unconstrained models that included covariates[2] (i.e., age,

medical comorbidities, type of treatment, time since treatment, and relationship

satisfaction) were analyzed and the findings were similar (i.e., constrained model, χ^2[30,

N=225]=38.26, p>.05; CFI=.98; SRMR=.04; RMSEA=.05; non-significant chi-square

difference test with unconstrained model, $\chi^2\Delta$[1, N=225]=.78, p>.05; variance of slopes

were fixed to 0 in these models). Results confirmed prior findings and indicated a

significant improvement in psychological adjustment (unstandardized mean slope

estimate=-.09, SE=.04, p=.05). None of the covariates contributed to change in

psychological adjustment in either the CBSM or control groups; there was a trend in the

CBSM group that indicated more medical comorbidities was related to greater

improvements in psychological adjustment from T1 to T2 (i.e., regression of the slope 1

factor on the covariate; unstandardized β=.23, SE=.13, p=.08).

Finally, sexual dysfunction was considered as an additional covariate. Proposed

analyses had intended to add sexual dysfunction to the model to determine whether

psychosocial adjustment processes related to sexual dysfunction were independent of

physiologic levels of functioning and whether intervention effects would be observed,

above and beyond levels of sexual dysfunction. However, evaluation of the data indicated

that the sexual dysfunction and psychological adjustment variables were highly correlated

in both the control and CBSM groups (i.e., correlations ranged from -.59 to -.83). These

correlations were higher than the correlations indicated in preliminary analyses between

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[2] Pre-treatment sexual satisfaction was not included due to multi-collinearity with other variables in the
model; models that included pre-treatment sexual satisfaction as an additional covariate had worse model
fit across all indices (i.e., constrained model, χ^2[37, N=225]=55.19, p=.03; CFI=.96; SRMR=.06;
RMSEA=.07).

the PAIS and the sexual dysfunction subscale, indicating that the removal of items from the PAIS that refer to relationship adjustment increased confounding between these constructs. Therefore, sexual dysfunction was not included as a covariate in the psychological adjustment models.

Relationship Adjustment. Similar to the Psychological Adjustment subscale, there was not an intervention effect observed on the Relationship Adjustment subscale; the constrained model fit the data (χ^2[12, N=225]=13.84, *p*>.05; CFI=.99; SRMR=.08; RMSEA=.04), while the unconstrained model did not improve model fit ($\chi^2\Delta$[1, N=225]=.30, *p*>.05). However, parameter estimates indicated that participants did not report significant changes in relationship adjustment over time (unstandardized mean slope estimate=-.003, SE=.01, *p*>.05).

Covariates were included in the model (i.e., age, medical comorbidities, type of treatment, time since treatment, relationship satisfaction, and pre-treatment sexual satisfaction) and results were similar (constrained model fit the data, χ^2[30, N=225]=26.58, *p*>.05; CFI=.98; SRMR=.04; RMSEA=.03; non-significant chi-square difference test with unconstrained model, $\chi^2\Delta$[1, N=225]=.08, *p*>.05). Again, no significant changes in relationship adjustment were observed. Relationship satisfaction and pre-treatment sexual satisfaction were related to baseline levels of relationship adjustment (i.e., intercept) in both the control (standardized r=-.49, SE=.13 and r=-.47, SE=.13, *p*'s<.01, respectively) and CBSM groups (unstandardized r=-.41, SE=.11 and r=-.35, SE=.12, *p*'s<.01, respectively). Among CBSM participants, although improvements in relationship adjustment were not significant, those who indicated higher levels of relationship satisfaction also reported greater improvements in relationship adjustment

from T1 to T2 (i.e., regression of the slope 1 factor on the covariate; unstandardized

β=.17, SE=.06, *p*<.01; standardized β=3.08). Models that included sexual dysfunction as

a covariate[3] did not fit the data (i.e., constrained model; χ²[107, N=225]=288.01, *p*<.001;

CFI=.11; SRMR=.15; RMSEA=.12; unconstrained model; χ²[106, N=225]=282.51,

p<.001; CFI=.13; SRMR=.14; RMSEA=.12; see Figure 8).

      Treatment Types (RP vs. RT). Due to prior findings published on this dataset in

which intervention effects on sexual dysfunction were found to vary across treatment

type (i.e., significant intervention effect in RP, but not RT, participants; Siegel, 2007),

further analyses were conducted to explore whether there were intervention effects on

psychological and relationship adjustment (i.e., Psychological Adjustment and

Relationship Adjustment subscales of the PAIS) within RP and RT participants

separately (i.e., LGM analyses by treatment group). Covariates were not included in these

models due to small sample sizes across groups. Preliminary analyses of group

differences in socio-demographic and medical factors by treatment type indicated that RP

participants, compared to RT participants, were significantly younger (RP, Mean=60.39,

SD=5.16; RT, Mean=69.58, SD=7.12) and reported fewer comorbid medical conditions

(RP, Mean=1.22, SD=1.66; RT, Mean=2.33, SD=2.19) and less time since diagnosis (RP,

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[3] Sexual dysfunction was included in the model using the sexual dysfunction observed variables collected at each time point (i.e., 4 variables). Prior findings in this sample have reported significant intervention effects on sexual dysfunction among RP, but not RT, participants (Siegel, 2007). Although there were several differences in the populations and measures across prior and present analyses (i.e., full sample vs. partnered sample; EPIC/UCLA sexual dysfunction subscale vs. modified version of this subscale), the sexual dysfunction observed variable at each time point was specified to be a predictor of the corresponding observed indicator of the latent growth factors, rather than as predictors of the slope 1 factor, to account for known differences among RP and RT participants (see Figure 8).

Mean=13.80, SD=6.52; RT, Mean=17.43, SD=6.09; independent samples *t* tests, all *p*'s

<.05).

Radical Prostatectomy Participants. Among RP participants (control n=56;

CBSM n=55), results indicated that there was a trend toward an intervention effect on

psychological adjustment (constrained model fit the data, χ^2[14, n=111]=22.07, *p*>.05;

CFI=.97; SRMR=.12; RMSEA=.10; unconstrained model indicated improvement in

model fit at the trend level, $\chi^2\Delta$[1, n=111]=2.78, *p*<.10) but not relationship adjustment

(constrained model did not fit the data, χ^2[14, n=111]=19.03, *p*>.05; CFI=.93;

SRMR=.12; RMSEA=.08; unconstrained model did not improve model fit, $\chi^2\Delta$[1,

n=111]=.87, *p*>.05). Similar to the overall models that included both surgery and

radiation participants, the constrained model within this subgroup of RP participants

indicated that psychological adjustment improved over time (unstandardized mean slope

estimate=-.21, SE=.04, *p*<.05); whereas relationship adjustment did not (unstandardized

mean slope estimate=-.01, SE=.02, *p*>.05).

Although the chi-square difference test comparing psychological adjustment

models was only significant at the trend level (*p*<.10), further evaluation of the

unconstrained model indicated that CBSM participants made significant improvements in

adjustment from T1 to T2 (unstandardized mean slope 1 estimate=-.72, SE=.31, *p*<.05)

that appeared to be greater than improvements made by control participants

(unstandardized mean slope estimate=-.18, SE=.04, *p*<.01; Figure 7). This is consistent

with Siegel's (2007) findings in which RP participants in both intervention groups

reported improvements in sexual functioning, but CBSM participants demonstrated

greater improvements from T1 to T2, compared to control participants (i.e., piecewise

LGMs; significant chi-square difference test comparing constrained and unconstrained models). Several factors may have contributed to the non-significant chi-square difference test between the constrained and unconstrained models in these analyses, including a smaller sample size (i.e., compared to Siegel's [2007] analyses, the CBSM group had 15 fewer participants, whereas control group was comparable) as well as the large standard error of the CBSM group slope 1 estimate (CBSM unstandardized mean slope 1 estimate=-.85, SE=.32; compared to control unstandardized mean slope estimate=-.22, SE=.05).

Radiation Participants. Among RT participants (control n=45; CBSM n=69), results indicated that there were no significant intervention effects on either psychological adjustment (constrained model fit the data, χ^2[14, n=114]=22.44, p>.05; CFI=.96; SRMR=.10; RMSEA=.10; non-significant chi-square difference test with the unconstrained model, $\chi^2\Delta$[1, N=225]=.28, p>.05) or relationship adjustment (neither of the models fit the data; constrained model, χ^2[14, n=114]= 40.35, p<.001; CFI=.68; SRMR=.39; RMSEA=.18; unconstrained model, χ^2[13, n=114]=39.19, p<.001; CFI=.68; SRMR=.38; RMSEA=.19). First, with respect to psychological adjustment, the constrained model indicated that there was no significant change over time (i.e., both control and CBSM groups; unstandardized mean slope estimate=-.05, SE=.06, p>.05). This is inconsistent with Siegel's (2007) prior findings in which RT participants reported improvements in sexual dysfunction, though there was not an intervention effect detected (i.e., significant slope in constrained model, characterizing both intervention groups). Of note, those analyses were conducted in a larger sample size of RT participants (control=54; CBSM=82; Siegel, 2007). With respect to relationship adjustment, both

intervention groups were characterized by mean levels of relationship adjustment across

time points that were not linear (see Figure 9); correlations among indicators were also

relatively low in both groups, particularly within the control group (i.e., control group,

ranged from .05 – .53; CBSM group, ranged from .52 – .69).

Social Support

Again, contrary to hypotheses, there was not a significant intervention effect

found on partner-specific social support[4] (constrained model fit the data, χ^2[11,

N=225]=14.37, p>.05; CFI=.99; SRMR=.05; RMSEA=.05; non-significant chi-square

difference test with the unconstrained model, $\chi^2\Delta$[1, N=225]=.46, p>.05) and parameter

estimates indicated a decline in social support over time (unstandardized mean slope

estimate=-.27, SE=.07, p<.001).

Covariates (i.e., age, medical comorbidities, time since treatment, and relationship

satisfaction) were added to the model and results confirmed prior findings. The

constrained model fit the data (χ^2[23, N=225]=25.39, p>.05; CFI=.99; SRMR=.05;

RMSEA=.03) and the unconstrained model did not improve model fit ($\chi^2\Delta$[1,

N=225]=.51, p>.05); the constrained model indicated that there was a significant decline

in social support (unstandardized mean slope estimate=-.21, SE=.09, p<.05). None of the

covariates were significantly related to the slope in either of the intervention groups (all

p's>.10); social support at baseline (i.e., intercept) was significantly correlated with

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[4] Initial models (i.e., without covariates) in which residual variances of the indicators were constrained equal across groups did not fit the data. Parameter estimates in models that relaxed cross-group equality constraints indicated that the residual variances of the CBSM group were much larger those of the control group. Additional models that constrained residual variances of the indicators within groups (i.e., unique estimate for each intervention group) fit the data; results refer to models with these specifications.

relationship satisfaction in both the control and CBSM groups (standardized r=.56, SE=.09 and r=.62, SE=.07, *p*'s<.01, respectively).

Confirmatory Factor Analysis of the SSSS. Confirmatory factor analyses were conducted to determine the appropriate factor structure of the SSSS as the measure includes items that refer to multiple domains of partner-specific social support (i.e., informational, instrumental, emotional, and negative support; see Appendix: Measures). First, a single factor model was tested. Results indicated that the single factor solution did not fit the data (χ^2[35, N=225]=329.40, *p*<.05; CFI=.72; SRMR=.14; RMSEA=.19; constraining residual variances of the indicators did not improve model fit). Parameter estimates indicated that all factor loadings were significant (all *p*'s<.001), except items 8 and 10 (standardized factor loadings=-.12 and -.07, *p*'s >.10, respectively). Of note, the weakest factor loadings among the other items, though significant, were items 7 and 9 (standardized factor loadings=.20 and -.34, *p*'s<.05, respectively). Combined, these items are the 4 items on the scale that refer to lack of emotional support and negative support (Kinsinger, Laurenceau, Carver & Antoni, 2011), suggesting that these items may be underlying a unique latent construct. Furthermore, the model explained a significant amount of variance in all indicators, except for items 7, 8, and 10 (r^2 of these items ranged from .01 – .04). Finally, modification indices suggested that items 8 – 10 should be correlated to improve model fit, which was aligned with the possibility that those items assessing negative support reflect a unique construct from positive support.

Based on these findings, further analyses were conducted to determine whether a 2-factor solution, representing "Positive Support" (6 items) and "Negative Support" (4

items), fit the data. Preliminary item level analysis indicated that the Negative Support

items (i.e., items 7 – 10; see Appendix: Measures) were not normally distributed,

particularly item 7 (i.e., "How often does your wife/partner argue with you relating to

your cancer?"; skew=3.31, SE=2.6; kurtosis=7.29, SE=.32); 72% of participants

responded "1 – not at all" and only 10% indicated a score of 3 or above. Therefore, a

two-factor model was run in which item 7 was not included in analyses; "Positive

Support" was made up of 6 items, whereas "Negative Support" was made up of 3, rather

than 4, items. The final model estimated all residual variances of the indicators and

correlated items 1 and 2 (i.e., items that referred to informational and instrumental

support, respectively; see Figure 10). Despite a significant chi-square value, this model

was determined to best fit the data as all other model fit indices suggested good fit and

indicated improvement over previous models (χ^2[25, N=225]=68.09, p<.01; CFI=.96;

SRMR=.06; RMSEA=.09). All factor loadings were significant (see Table 6) and the

model explained a significant amount of variance of each indicator (r^2 ranged from .32 –

.77, all p's<.001). The positive and negative latent factors were significantly correlated

(standardized r=-.25, SE=.08, p<.01), as were items 1 and 2 (standardized r=.26, SE=.07,

p<.001).

Of note, analyses that evaluated a 2-factor solution with all items (i.e., 1 – 10, 7

included) did not fit the data and indicated worse model fit compared to models that

excluded item 7 (χ^2[34, N=225]=102.95, p<.01; CFI=.93; SRMR=.08; RMSEA=1.0). As

expected, all items loaded significantly onto their respective factors, except item 7

(standardized factor loading=.11, p>.10). Furthermore, item 7 was the only indicator that

did not have a significant amount of variance explained by the model (r^2=.01, p>.05).

These findings supported the exclusion of item 7 in previous analyses.

Positive and Negative Support. Further consideration was given to determine

whether two SSSS subscales, referring to positive and negative social support, could be

created, as there was concern regarding the distribution of the negative support items.

Across time points, between 75 – 84% of participants responded "1 – Not at all" to item

number 8 (i.e., "How often does your wife/partner criticize you relating to your

cancer?"); 70 – 81% indicated the same response to item number 9 (i.e., "How often does

your wife/partner lets you down when you are counting on them?"); and 70 – 83% to

item 10 (i.e., "How often does your wife/partner withdraw from discussions about your

illness or try to change the topic away from your illness?"). As the majority of

participants responded to these items with the lowest possible response rating,

intervention effects were not evaluated within the negative support domain due to

concerns regarding floor effects and the inability to detect significant group differences in

change over time. Therefore, a single "Positive Social Support" subscale was created by

summing SSSS items 1 through 6 to make up a "Positive Social Support" subscale.

Positive Support. The same procedure was conducted to evaluate whether there

was an intervention effect on positive support (i.e., multiple-group LGMs; chi-square

difference tests to compare constrained and unconstrained models). Initial (i.e., without

covariates) and final (i.e. with covariates) models[5] were tested. Results indicated that

there was not an intervention effect on positive support (constrained model fit the data

(χ^2[10, N=225]=18.26, p>.05; CFI=.98; SRMR=.06; RMSEA=.09); the unconstrained

model did not improve model fit ($\chi^2\Delta$[1, N=225]=.12, p>.05). The constrained model

estimated a decline in positive support over time (unstandardized slope estimate=-.31,

SE=.07, p<.05). Models that included covariates (i.e., age, medical comorbidities, time

since treatment, and relationship satisfaction) did not fit the data (constrained model,

χ^2[22, N=225]=49.21, p<.001; CFI=.95; SRMR=.05; RMSEA=.11; unconstrained model,

χ^2[21, N=225]=48.88, p<.001; CFI=.95; SRMR=.05; RMSEA=.11).

Quality of Life

A significant intervention effect on QOL was observed. Results of initial LGMs[6]

indicated that the constrained model did not fit the data (χ^2[9, N=225]=39.54, p<.05;

CFI=.94; SRMR=.14; RMSEA=.17); the unconstrained model improved model fit ($\chi^2\Delta$[1,

N=225]=8.91, p<.05) but fit indices were not optimal (χ^2[8, N=225]=23.62, p=.003;

CFI=.97; SRMR=.12; RMSEA=.13). Additional analyses were conducted in which a

model that allowed both slopes for the CBSM group to vary (i.e., unique slope 1 and 2

estimates) was specified and compared to the previous model (i.e., chi-square difference

test with unconstrained model that only allowed slope 1 estimate to vary). This model

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[5] Models that constrained the residual variances equal did not fit the data. In line with suggested modification indices, the residual variance of the T4 indicator was estimated and significantly improved model fit. Results refer to models with these specifications.
[6] Prior models constrained residual variances equal across groups, as was done with other outcome variables, but results indicated problems with model specification. Model changes were made based on evaluation of parameter estimates and modification indices. The final model constrained T1, T3, and T4 residual variances equal within groups and allowed the T2 variances to vary.

best fit the data (χ^2[7, N=225]=11.95, *p*>.05; CFI=.99; SRMR=.12; RMSEA=.08) and

significantly improved model fit over the previous model ($\chi^2\Delta$[1, N=225]=11.67,

p<.001). Intervention participants reported significant improvements in QOL from T1 to

T2 (unstandardized mean slope 1 estimate=5.22, SE=.89, *p*<.001) and trended toward

continued improvements from T2 to T4 (unstandardized mean slope 2 estimate=.32,

SE=.19, *p*=.08). Control participants reported smaller, though significant, improvements

over time (unstandardized mean slope estimate=1.18, SE=.16, *p*<.001).

     The final model included age, education, income, medical comorbidities, time

since treatment, and relationship satisfaction as covariates. Again, results demonstrated

that the unconstrained model in which unique CBSM slope 1 and 2 estimates were

specified best fit the data[7] (χ^2[23, N=225]=19.92, *p*>.05; CFI=.99; SRMR=.05;

RMSEA=.00), indicating an intervention effect in QOL. Intervention groups were

characterized by similar slope estimates as the previous model such that CBSM

participants reported significant improvement in QOL from T1 to T2 and continued to

improve from T2 to T4, though at the trend level of significance (unstandardized mean

slope estimates; slope 1=24.32, SE=9.44, *p*<.001; slope 2=.99, SE=.57, *p*=.08;

standardized slope 1=5.70, SE=2.33 and slope 2=.32, SE=.21); control participants also

improved over time, though gains were smaller (unstandardized mean slope

estimate=1.01, SE=.18, *p*<.001; see Figure 11). This is consistent with and extends prior

findings in a subset of the study's overall sample (n=92) in which significant intervention

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[7] The constrained model fit the data (χ^2[25, N=225]=32.90, *p*>.05; CFI=.99; SRMR=.06; RMSEA=.05); an unconstrained model in which the CBSM slope 1 estimate was free to vary significantly improved model fit ($\chi^2\Delta$[1, N=225]=8.91, *p*<.05). However, similar to analyses that did not include covariates, a model that specified unique CBSM slope 1 and 2 estimates significantly improved model fit over the previous model ($\chi^2\Delta$[1, N=225]=8.91, *p*<.01) and was retained as the final model.

effects from baseline to immediately post-intervention were reported (i.e., T1 to T2; analyses included hierarchical regression and paired-sample *t* tests; Penedo et al., 2004).

Further evaluation of the influence of covariates on change in QOL indicated that in the control group, greater improvements in QOL was significantly related to less years of education (unstandardized β=-.62, *p*<.01) and higher income (unstandardized β=.07, *p*<.02). In the CBSM group, a trend was observed such that less time since treatment was related to greater improvements in QOL (i.e., unstandardized β=-.34, SE=.19, *p*<.10).

Cross-Domain Latent Growth Models

To evaluate interrelationships among the outcome variables of interest, cross-domain LGMs were conducted and correlations among latent factors were evaluated. Based on prior analyses, these models included the Psychological Adjustment and the Relationship Adjustment subscales of the PAIS, the Positive Support subscale of the SSSS, and the FACT. This deviated from planned analyses in that (1) "psychosocial" adjustment to sexual dysfunction as a single construct was not evaluated; (2) items that reflected negative partner-specific social support were not included; and (3) the effect of socio-demographic and health-related covariates and sexual dysfunction was not evaluated.

Model Specification. Given the limited sample size, there was a concern that models that specified a piecewise approach to estimating growth parameters and cross-domain relationships among growth parameters would not converge. Therefore, LGMs were specified with linear growth curves in which slope factor loadings of time points T3

and T4 were estimated (i.e., for the intercept, the factor loadings of the 4 indicators were fixed to 1; for the slope, factor loadings were fixed to 0 and 1 for time points T1 and T2, respectively, and were estimated for time points T3 and T4; see Figure 6). Estimating T3 and T4 slope factor loadings allowed for a more sensitive estimate of linear change from pre- to immediately post-intervention (i.e., T1 to T2) while retaining data associated with longer term follow-up assessments (i.e., T3 and T4), as compared to fixing T3 and T4 factor loadings according to the study time points (i.e., corresponding to 3- and 6-month follow-up visits, respectively). This was done for the Psychological Adjustment, Positive Support, and FACT outcome variables, as piecewise analyses had indicated significant change among intervention groups in these domains. Although cross-domain analyses were not conducted to determine intervention effects, estimating T3 and T4 factor loadings best captured known T1 to T2 changes given limitations to conduct more complicated cross-domain growth models using a multiple-group piecewise approach. Models constrained estimates of T3 and T4 factor loadings to be equal across groups (i.e., both control and CBSM groups would be characterized by the same linear growth curve).

Conversely, Relationship Adjustment was included as single latent factor (i.e., not as a growth model), as previous analyses indicated that slope estimates were not significant in either intervention group (i.e., no change over time). Additionally, a variable designating intervention group membership (i.e., coded 0 for control and 1 for CBSM) was included in all models as a predictor of the slope factors to account for intervention-related differences in change between groups. Finally, covariates were not included due to the complexity of the models and limited sample size.

Cross-Domain Relationships. In a cross-domain model that included psychological and relationship adjustment, positive social support, and QOL outcomes, results indicated that the model fit the data relatively well, despite a significant chi-square (χ^2[106, N=225]=178.31, *p*<.05; CFI=.96; SRMR=.05; RMSEA=.06; see Figure 12). Consistent with prior analyses, participants reported improvements in both psychological adjustment and QOL (unstandardized mean slope estimates=-.32, SE=.16 and 3.78, SE=.70, respectively, *p*'s<.01). Cross-domain correlations indicated that, at baseline, all domains were related to one another: better psychological adjustment was related to better relationship adjustment (standardized r=.21, *p*<.05), greater positive social support (standardized r=-.20, *p*<.05), and higher levels of QOL (standardized r=-.29, *p*<.001); better relationship adjustment was related to greater support (standardized r=-.58, *p*<.001) and higher levels of QOL (standardized r=-.58, *p*<.001); and, finally, greater support was also related to higher QOL (standardized r=.46, *p*<.001). Additionally, improvements in psychological adjustment and QOL were related (i.e., cross-domain correlation of slopes; standardized r=-.57, *p*<.05) and relationship adjustment and change in social support were related (i.e., cross-domain correlation of latent factor and slope; standardized r=-.47, *p*<.001). No other cross-domain correlations of slopes and the latent factor of relationship adjustment were significant (*p*'s >.10).

Exploratory Analyses

Partner-Specific Social Support

The Sources of Social Support Scale (SSSS; Carver, 2006) was developed to assess "how different *aspects* of support differ" in the context of coping with cancer

(Carver, 2006) and prior work has reported that a 4 factor structure representing informational, instrumental, emotional, and negative support best fit the data among a sample of post-treatment breast cancer patients (Kinsinger, Laurenceau, Carver & Antoni, 2011). To examine different types of partner-specific social support within post-treatment prostate cancer patients and confirm the reported factor structure, CFA was conducted and LGMs were used to evaluate intervention effects.

Results of these analyses are reported above under "Social Support." Briefly, a 2-factor solution, representing "Positive Support" (6 items) and "Negative Support" (3 items), was found to best fit the data (χ^2[25, N=225]=68.09, p<.01; CFI=.96; SRMR=.06; RMSEA=.09). There was not an intervention effect detected in positive support (constrained model fit the data, χ^2[10, N=225]=18.26, p>.05; CFI=.98; SRMR=.06; RMSEA=.09; the unconstrained model did not improve model fit ($\chi^2\Delta$[1, N=225]=.12, p>.05) and parameter estimates indicated a decline in support over time (unstandardized slope estimate=-.31, SE=.07, p<.05). Negative support was not evaluated due to results of item level analyses.

Attendance

The CBSM intervention consisted of 10 sessions that were divided into relaxation training and didactic components. Attendance was collected for each component separately and coded on a 3-point scale; "0 – did not attend," "1 – partial attendance," and "2 – full attendance" (i.e., range of possible attendance scores was 0 – 20). However, evaluation of the data indicated that the majority of participants attended both relaxation training and didactic components jointly (i.e., if attended one, attended both; if missed

one, missed both). Therefore, an overall attendance score was calculated by summing relaxation training and didactic attendance (i.e., possible range was 0 – 40) rather than analyzing the independent effects of attendance to relaxation training versus attendance to didactic component on intervention-related changes in the outcome variables separately.

Participants' mean attendance was 23.45 (SD=15.01; range 0 – 40). This translated to attending an average of 7 intervention sessions (i.e., including partial and full attendance; relaxation training, M=6.48, SD=3.59; didactic component, M=6.65, 3.58). Preliminary analyses indicated that attendance was not associated with any of the socio-demographic or medical covariates, relationship satisfaction, pre-treatment sexual satisfaction, or sexual dysfunction (i.e., bivariate correlations for continuous variables and chi-square tests for categorical variables).

In order to determine whether attendance had a significant impact on intervention-related changes in the outcome variables within the CBSM group, further analyses were conducted that included specifying "attendance" as a group-specific covariate in piecewise LGMs for each outcome; the path from attendance to the slope 1 factor was estimated in the CBSM group and constrained to 0 in the control group. Similar to previous analyses, constrained and unconstrained models were tested and chi-square difference tests were used to determine significant improvement in model fit. The effect of attendance on the CBSM slope 1 factor was evaluated in unconstrained models. Results indicated that attendance did not affect pre- to immediately post-intervention changes (i.e., T1 to T2) in psychological or relationship adjustment to sexual dysfunction, partner-specific positive support, or QOL (see Table 7).

Chapter 5: Discussion

The current study sought to determine whether the impact of PC treatment-related sexual dysfunction on QOL is explained, in part, by processes of psychosocial adjustment to sexual dysfunction (i.e., referred to as "sexual adjustment"). Furthermore, perceptions of partner-specific social support were hypothesized to impact QOL directly and indirectly through its impact on sexual adjustment. Finally, it was proposed that participation in a psychosocial intervention designed to improve stress management and relaxation skills and promote adjustment and well-being following PC treatment would lead to improvements in sexual adjustment, perceptions of partner-specific social support, and QOL. It was conceptualized that baseline levels of sexual adjustment, social support, and QOL would be related and that changes in sexual adjustment, social support, and QOL would also be related among both control and CBSM participants. Again, for the purposes of this discussion, "sexual dysfunction" refers to physiologic impairment, whereas "sexual adjustment" refers to psychosocial adjustment processes related to sexual dysfunction.

Disease- and treatment-related sexual side effects often impact multiple domains of general QOL among PC patients. Empirical evaluation of the effects of sexual side effects on adjustment and well-being have focused on the direct effect of sexual dysfunction on QOL and have largely failed to consider additional psychosocial factors related to sexual dysfunction and sexuality (e.g., distress or bother related to side effects; relationship adjustment). A limited amount of research has suggested that sexual dysfunction and sexual adjustment are independent constructs with distinct long-term

trajectories (e.g., Gacci et al., 2009). For example, studies have shown that among post-treatment PC patients, although most men report significantly impaired sexual functioning, not all report bother or distress related to declines in functioning and overall measures of sexual dysfunction and bother are often uncorrelated (e.g., Gacci et al., 2009; Litwin et al., 1998; Potosky et al., 2000; 2004; Reeve et al., 2006). Therefore, processes of sexual adjustment – or the degree to which men are able to adjust to sexual side effects within psychological and relational domains of sexuality – may be one mechanism by which post-treatment sexual dysfunction impacts general QOL.

The current study sought to address these gaps in the literature by first determining whether participation in a cognitive behavioral stress management (CBSM) intervention led to improvements in sexual adjustment, partner-specific social support, and general QOL. After testing main effects, cross-domain relationships across both intervention groups were evaluated to determine whether improvements in sexual adjustment were related to improvements in general QOL and whether improvements in partner-specific social support were related to improvements in both sexual adjustment and QOL. Although analyses did not test for intervention group differences in cross-domain relationships, results provided insight into how these domains relate to one another over time and possible areas for further work.

CBSM Effects on Sexual Adjustment, Social Support, and QOL

The impact of a 10-week group-based CBSM intervention on sexual adjustment, partner-specific social support, and general QOL was evaluated (analyses were limited to partnered men). Results demonstrated that participation in the intervention was associated

with improvement in QOL, but not sexual adjustment or social support. Further analyses evaluated the factor structure of the sexual adjustment and social support measures and explored intervention effects in identified factors.

Findings regarding intervention-related improvement in QOL are consistent with and extend prior work published on a smaller sample of participants from this dataset that demonstrated significant intervention effects on QOL from pre- to immediately post-intervention time points (i.e., T1 to T2; Penedo et al., 2004). The current study demonstrated that participants maintained improvements up to 12-months post-intervention and a trend suggested that they continued to improve over that time period. Men reported baseline (pre-intervention) levels of QOL that were below published means of localized PC and age-matched control populations[8] (i.e, Wei et al., 2002). However, intervention participants improved to levels that were higher than both localized PC and age-matched controls by the 3-month post-intervention time point (i.e., T2) and trended toward continued improvement up to 12-months post-intervention (i.e., T3 – T4). Control participants made smaller, though significant, improvements but mean levels were lower than CBSM participants and below localized PC and age-matched control means (i.e., Wei et al., 2002). Furthermore, greater improvements among CBSM participants were related to less time since treatment (though only at a trend level), indicating that the

[8] This comparison controls for the difference in scoring between current analyses and standard scoring of the FACT (i.e., a single item that assesses sexual satisfaction was excluded from the total score to avoid collinearity with other variables). Prior work has established that a clinically meaningful difference in QOL, as measured by the FACT, is defined by a 5-point difference in scores (Brucker, Yost, Cashy, Webster, & Cella, 2005). Mean score differences were greater than 5, the highest score of the response range on a single item, indicating that participants reported below average levels of QOL, controlling for the difference in scoring. Furthermore, descriptive analysis of the FACT sexual satisfaction item at baseline indicated that 69% of participants answered "1 – Not at all satisfied" and another 16% answered "2 – A little bit," suggesting that participants were generally not satisfied with their sex life, which would have led to even lower scores of QOL had the item been included in the total score.

intervention may have been more effective among men who were closer to treatment completion. Among control participants, those with less education and lower income reported fewer gains in QOL than those with more education and higher income, suggesting that there may have been a subset of men at greater risk for experiencing post-treatment decrements in QOL, despite mean levels of the control group indicating overall improvement over time.

Contrary to expectations, participation in the CBSM intervention did not lead to improvements in sexual adjustment or social support. Sexual adjustment improved over time in both control and CBSM, whereas social support declined. However, as theory and literature suggest that both sexual adjustment and social support are multidimensional constructs (Derogatis, 1986; Helgesen and Cohen, 1996; Kinsinger, Laurenceau, Carver & Antoni, 2011; Merluzzi & Martinez Sanchez, 1997), additional analyses were conducted to evaluate the factor structure of the PAIS and SSSS and determine whether intervention effects varied across identified factors.

Both the PAIS and SSSS were best described by a two-factor solution that identified "psychological adjustment" and "relationship adjustment" and "positive social support" and "negative social support" constructs, respectively. Subscales were created and used in all subsequent analyses (i.e., Psychological Adjustment and Relationship Adjustment subscales of the PAIS and a Positive Social Support subscale off the SSSS; Negative Social Support items were positively skewed and were not included in further analyses). Results suggested that participation in the intervention provided some benefit in the degree to which men were able to engage in psychological adjustment processes related to sexual dysfunction following surgical treatment for their cancer. There was no

indication of intervention-related improvement in relationship adjustment to sexual dysfunction or positive social support.

Cross-Domain Relationships among Sexual Adjustment, Social Support, and QOL

Cross-domain relationships among psychological and relationship adjustment to sexual dysfunction, positive social support, and general QOL were evaluated. Prior to the intervention, men who reported better psychological adjustment were also more likely to report better relationship adjustment, greater positive social support (at the trend level), and higher levels of QOL (i.e., cross-domain correlation of intercepts/latent factor). Additionally, improvements in psychological adjustment and QOL were also related, though neither was related to relationship adjustment or positive social support (i.e., cross-domain correlation of slopes/latent factor). This is consistent with prior findings that have reported concurrent improvements in psychosocial adjustment to illness (i.e., full PAIS scale; 7 domains of adjustment) and general QOL among colorectal cancer patients (Galica, 2008; unpublished dissertation). However, research is limited and further work should address how specific domains of adjustment, which have been shown to be separate and distinct, relate to more general QOL over time. Adjusting to sexual side effects, in particular, has been shown to be particularly difficult for PC patients and their partners and is related to decrements in more general domains of well-being. Therefore, evaluation of sexual adjustment, independent of other domains of adjustment, is warranted.

Psychosocial Adjustment to Sexual Dysfunction: Further Considerations

As reported above and contrary to hypotheses, participation in the CBSM intervention was not associated with improvement in sexual adjustment, though a trend indicated that RP participants may have derived some benefit in the domain of psychological adjustment to sexual dysfunction. Indeed, analyses indicated that trajectories of psychological versus relationship adjustment were very different and also varied by treatment group (RP versus RT participants). Therefore, an overall test of intervention effects in sexual adjustment that combined psychological and relationship domains and both treatment groups may have been inappropriate. Results indicate that some PC patients may be more likely to experience post-treatment sexual adjustment difficulties than others and thus more likely to benefit from a psychosocial intervention. Likewise, detection of intervention effects may be enhanced by incorporating participant heterogeneity into analyses.

Both intervention groups reported improvements in psychological adjustment to sexual dysfunction suggesting that with time, PC patients on average may naturally move toward resolution of difficulties associated with sexual side effects. However, evaluation of mean levels indicated that men were still experiencing some degree of difficulty throughout the study and at all assessment time points. Levels of sexual adjustment across time points were higher (i.e., worse adjustment) than reported means in the literature of mixed cancer patients undergoing chemotherapy (Gilbrar & DeNour, 1989), breast cancer patients 1 month post-surgery (L. Northouse, personal correspondence, April 19, 2012; in reference to Northouse, Mood, Templin, Mellon & George, 2000), breast cancer patients 2 months and one year post-diagnosis (Goodwin, 2004),

hemodialysis patients (DeNour, 1982), and patients who were post-surgery for ulcerative colitis (Weinry, Gustavsson, & Barber, 2003). Notably, none of those samples included exclusively male participants and research suggests that gender-specific constructs, such as definitions of manhood and adherence to traditional masculine norms, are important considerations in determining the impact of PC sexual side effects on adjustment and well-being (Burns & Mahalik, 2006; 2007; 2008). Although the current study did not explore constructs of masculine identity, this may be an important consideration in determining which men are most likely to experience sexual adjustment difficulties.

Item level analysis indicated that, at baseline, 67% of participants reported sexual performance problems despite continued interest in sex (i.e., corresponding to "constant sexual performance problems" and "totally unable to perform sexually"); and 65% reported significant difficulties related to sexual pleasure and satisfaction (i.e., "marked loss of" and "sexual pleasure and satisfaction have stopped"). Of note, endorsement of continued sexual interest was somewhat more evenly distributed; 51% of participants reported "a marked loss" or "absolutely no sexual interest since illness," with 49% reporting a "slight loss" or "no loss" of sexual interest. Compared to published findings among post-treatment PC patients, participants in the current study indicated slightly more difficulties related to pleasure/satisfaction, though rates of sexual activity/frequency problems were comparable (Lilleby, Fosså, Waehre, & Olsen, 1999).

These findings support the literature suggesting that there is some variability in how men experience post-treatment sexual side effects across different domains of sexuality. A significant proportion of men continue to be interested in and desire sexual activity, despite continued performance problems. For these men, psychosocial

interventions may serve to normalize anxieties surrounding sexual dysfunction and teach adaptive coping skills to adjust to a lowered sexual ability. In fact, these men may benefit from more intensive efforts than was provided in the CBSM intervention, as those effects were not significant (though analysis did not account for possible latent subgroups). Conversely, other men do not continue to desire sexual activity (and would presumably be less motivated to address sexual difficulties in an intervention context) and do not report sexual adjustment difficulties. These men may be characterized by low levels of pre-treatment sexual functioning, suggesting that declines in post-treatment functioning may require less of an adjustment, or they may have effectively adjusted to their changed sexual circumstances (e.g., by focusing their attention on what has not been lost, such as being a cancer survivor and longevity; redefining their conceptions of sexuality and intimacy), thereby maintaining sexual pleasure/satisfaction and intimacy. Although an intervention targeting sexual adjustment may be less useful for men who do not report sexual adjustment difficulties, they may provide positive peer support and be a source of information in group settings. Intervention facilitators, if aware of variability within the group, may find value in asking them to share their experiences and "lessons learned" and use their input to inform group discussion and exercises. Unfortunately, analyses in the current study did not reveal any socio-demographic or health-related covariates that contributed to psychological or relationship adjustment to sexual dysfunction. Nevertheless, realizing the variability among PC patients with respect to their experiences of post-treatment sexual side effects may be important in clinical settings (e.g., different goals for treatment; targets of intervention) and research efforts (e.g., analyze intervention effects with respect to possible subgroups). Future work should explore what

factors contribute to better or worse sexual adjustment over time and how psychosocial interventions may target those men most at risk for experiencing sexual adjustment difficulties.

<u>Psychological versus Relationship Adjustment to Sexual Dysfunction</u>

As reviewed above, analyses determined that "psychological adjustment" and "relationship adjustment" to sexual dysfunction were independent constructs; a two-factor solution, made up of Psychological Adjustment (4 items) and Relationship Adjustment (2 items), best fit the data. This is consistent with prior work that evaluated the factor structure of the PAIS in a sample of lung cancer patients and found that the 2 items related to relationship adjustment were more highly correlated with a "Relationship with Partners and Family" construct than the "Sexual Adjustment" construct (Merluzzi & Sanches, 1997). Similar findings were also demonstrated in a sample of kidney, heart, liver, lung, and bone marrow transplant candidates (i.e., 2 items referring to relationship adjustment to sexual dysfunction loaded onto a separate factor; Rodrigue, Kanasky, Jackson, & Perri, 2000). These findings are contrary to the original scales of the measure and discussed in further detail below.

There was not an intervention effect on psychological adjustment; both groups reported significant improvements over time. In contrast, neither group reported significant change in relationship adjustment over time and no intervention effect was detected. However, analyses exploring whether effects varied across treatment type suggested that RP participants reported some benefit from the intervention with respect to their psychological adjustment to sexual dysfunction (i.e., group differences detected at

the trend level). Models that evaluated psychological adjustment among RT participants and relational adjustment among both RP and RT participants did not demonstrate significant intervention-related improvements.

Results of analyses by treatment type were consistent with Siegel et al.'s (2007) findings and suggest that the CBSM intervention may have been particularly effective in helping men cope with the sexual side effects of surgery. Surgery is associated with an immediate onset of side effects (i.e., days to weeks following surgery), usually followed by a gradual recovery. Alternatively, for men who undergo radiation to address their cancer, the onset of side effects and subsequent loss of functioning often continues to worsen over a longer period of time (i.e., months to years). It may be that continued and prolonged declines in sexual functioning, with no end in sight, may be more challenging to adjust to than immediate post-surgery dysfunction followed by hopeful recovery. That is, the experience of undergoing RP versus RT is qualitatively different, suggesting that patients may vary in their expectations of post-treatment side effects and recovery, which may influence their adjustment to sexual changes and response to intervention. Alternatively, patient characteristics may explain differences in post-treatment sexual adjustment trajectories. Consistent with the literature (e.g., Katz, 2007), RP participants were significantly younger and reported fewer comorbid medical conditions than RT participants, which may have been associated with greater motivation to address sexual adjustment difficulties and derive benefit from the intervention.

Regardless of the treatment patients decide to undergo, research has shown that men often do not have an adequate understanding of likely post-treatment sexual side effects when making treatment-related decisions; men are often not provided sufficient

information regarding potential side effects, often do not believe side effects will be experienced despite having information otherwise, and/or underestimate the impact side effects will have (Beck, Robinson, & Carlson, 2007; Boehmer & Clark, 2001; Crowe & Costello, 2003). As such, it may be that RT patients were unprepared for the prolonged nature of their sexual side effects and ill equipped to manage them. In comparison, undergoing surgery may be a more overt and tangible experience that naturally lends itself to considering the possibility or inevitability of side effects (e.g., physical wounds). Therefore, it may be relevant to consider patient characteristics such as expectations of post-treatment sexuality (e.g., How prepared were you for post-treatment side effects?) and goals for recovery (e.g., How motivated are you to achieve pre-treatment levels of sexual functioning?) when assessing post-treatment sexual adjustment in both clinical and research settings.

Psychological Adjustment. The majority of participants experienced significant difficulties with respect to their psychological adjustment to sexual dysfunction, particularly with regard to their loss of pleasure/satisfaction, perceived inability to perform sexually, and marked decrease in frequency of sexual activity (i.e., corresponding to item level endorsement of "moderate to severe" responses). As trajectories of psychological adjustment and general QOL were related, results suggest that the psychological sequelae related to post-treatment side effects has larger implications for more general domains of QOL. This is consistent with a limited amount of research that has related psychosocial adjustment to illness, in general, and psychosocial adjustment to sexual dysfunction, in particular, to a range of disease-

specific and general QOL measures. For example, Merluzzi & Martinez Sanchez (1997) reported that among a large sample of mixed cancer patients, psychological adjustment to sexual dysfunction (using the same 4 psychological adjustment PAIS items used in the current study) was significantly related to measures that assessed the physical and functional impact of disease, psychological distress and well-being, and self-efficacy in coping with cancer; measures of social support and coping were unrelated. Notably, the sample was highly diverse with respect to demographic and medical characteristics and only 5% were PC patients (Merluzzi & Martinez Sanchez, 1997). Nevertheless, findings suggest that the degree to which men are able to psychologically adjust to sexual side effects has important implications for long-term changes in QOL. As the majority of PC patients will never achieve pre-treatment levels of sexual functioning (Nelson et al., 2007), psychological processes related to sexual dysfunction remains an important target for intervention.

Psychosocial intervention efforts should target those PC patients who endorse psychological adjustment difficulties related to their sexual dysfunction (which does not include all patients). As a proportion of men are *not* sexually active prior to treatment and/or do not continue to desire sexual activity following treatment, resources may be utilized more efficiently by targeting those men who continue to desire sexual activity, despite physiologic dysfunction and self-reported performance problems. Although sexual dysfunction was only one target of the CBSM intervention, it was designed to teach adaptive coping skills related to sexual side effects, such as reframing maladaptive beliefs surrounding sexual side effects and performance standards (e.g., redefining and exploring new ways to be sexually active; incorporating sexual practices that enhance

intimacy but don't necessarily require erections firm enough for intercourse); and teaching communication skills to address sexual changes in the relationship. This is in line with normal changes associated with aging as research consistently indicates that older men (i.e., > 65 years) consider sexuality to be an important area of functioning, though definitions of sexual activity and satisfaction become more diverse with age (e.g., may not include sexual intercourse or require erectile functioning; Laumann et al., 2008). As sexuality and intimacy was only one target of the CBSM intervention, only one session was devoted to it specifically. It may be that among the subset of participants who endorsed significant adjustment difficulties related to sexual side effects, additional and targeted intervention efforts addressing specific problems related to sexuality would have provided benefit within both sexual as well as more general domains of QOL (e.g., extra sessions for subset of participants).

Relationship Adjustment. In contrast to psychological adjustment, participants did not endorse relationship difficulties related to sexual dysfunction prior to the start of the intervention and there were no significant changes observed over time. At baseline, 91% indicated little to no problems in their relationship due to illness (i.e., corresponding to item level endorsement of "no change" to "a little less close" responses) and only 17% reported having had any arguments with their partner related to changes in their sexual relationship (i.e., including "constant," "frequent," and "some arguments"). As expected, based on endorsement of item level responses, analyses of intervention effects were not significant.

However, as reviewed above, the PAIS only includes 2 items that refer to relationship adjustment to sexual dysfunction. These items ask patients to assess how

their illness has (1) caused problems in their relationship and (2) interfered with their normal sexual relations and caused arguments (items 1 and 6, respectively; see Appendix: Measures). In the case of the prior, there is no mention of sexual changes or problems, and in the case of the former, problems related to sexual changes are defined as causing arguments, which may be an invalid or incomplete definition. Couples often avoid discussing cancer-related sexual changes in their relationship, despite feeling bothered or distressed by them (Badr & Carmack-Taylor, 2009; Boehmer & Clark, 2000; Gray et al., 2000; Garos et al., 2007), which has been associated with individual distress in both partners and relationship dysfunction (Ezer et al., 2011; Germino, Mishel, Belyea, Harris, Ware, & Mohler, 1998; Ptacek, Pierce, Ptacek, & Nogel, 1999). This suggests that sexual dysfunction may still be having a significant impact on the relationship, even though couples are not having arguments over it. Therefore, these 2 PAIS items may not have adequately captured relationship adjustment difficulties among participants and limited the likelihood of detecting intervention effects. It is unknown whether this sample of PC patients (1) did not perceive to be having relationship difficulties related to sexual dysfunction, as suggested by their answers on these two items, or (2) whether these questions were not sensitive enough to capture subtle relationship difficulties that could have, nevertheless, had an impact on their adjustment and well-being.

The literature indicates that among PC couples, both partners report concerns regarding the impact of post-treatment sexual dysfunction on their relationship, though for different reasons. Notably, patients appear to be more concerned than their partners (Boehmer & Babayan, 2004; Ezer et al., 2011). That is, findings *do* suggest that patients report significant worry about how their lowered sexual functioning will impact their

partners and their relationships. However, some of their concerns may be unnecessary, particularly those related to their partner's sexual satisfaction and adjustment. For example, prior to treatment, wives report being less concerned with the possible loss of their husband's sexual function than their husbands (Boehmer & Babayan, 2004), are more willing to trade their husband's erectile functioning for survival given hypothetical situations (Volk, Cantor, Cass, Spann, Weller, & Krahn, 2004), and perceive information on sexuality as less important (Davison, Gleave, Goldenberg, Degner, Hoffart, & Berkowitz, 2002). In a qualitative study of pre-treatment PC couples, Boehmer & Babayan (2004) confirmed these findings such that both men and women voiced concerns regarding how a loss of sexual functioning might impact their relationship following treatment. However, for men, concerns were rooted in feelings of masculinity and self-identity (e.g., ability to satisfy sexual partner), whereas women were more concerned with how their husbands' adjustment would impact their relationship and were less concerned with how sexual changes would impact them personally (Boehmer & Babayan, 2004).

These findings suggest that participants in the current study may have had concerns regarding the impact their sexual side effects had on their partners and relationships that could have been assuaged with increased knowledge and understanding of their partners' thoughts and feelings. Although the CBSM intervention sought to promote adaptive communication skills and reduce anxiety surrounding discussions of sexuality and intimacy, it may be that participants' needed this to be a larger component of the intervention. Alternatively, the CBSM intervention may have affected relationship adjustment but measurement tools were unable to capture intervention-related changes.

Assuming the prior, intervention efforts may be enhanced by an added component that involves partner input regarding his/her feelings related to sexual changes in their relationship for those participants for whom it would be appropriate (e.g., partnered, those who indicate relationship adjustment difficulties [e.g., non-communication]).

Partner-Specific Social Support

There was not an intervention effect observed in partner-specific social support and both control and CBSM participants were characterized by downward trajectories of social support over time. Additionally, as referred to above, one of the aims of the study was also to explore the factor structure of the SSSS and to determine whether different types of social support varied in trajectories and response to intervention. Results were consistent between models that evaluated overall social support (i.e., all items of the SSSS) as well as in those that only included "positive social support" items (i.e., 6 items of the SSSS that measured informational, instrumental, and emotional types of support).

The SSSS measure was designed to explore "how different *aspects* of support differ" in the context of coping with cancer (Carver, 2006). In line with this, Kinsinger et al. (2011) conducted CFA to identify the appropriate factor structure for this measure among a sample of breast cancer patients and results indicated that a 4-factor solution best fit the data. These analyses specified 1-, 3-, and 4-factor solutions and chi-square difference tests were used to assess improvement in model fit. The 4-factor solution was determined to have significantly better model fit compared to the other models (Kinsinger, Laurenceau, Carver & Antoni, 2011). However, two of the "factors" that were specified in analyses of the 3- and 4-factor solutions were actually observed

variables; informational support and instrumental support were each measured using a single item. The other factors were an emotional support factor (4 items that reflected positive support and 2 items that reflected the absence of emotional support) and a negative support factor (2 items that reflected arguing and criticizing). Furthermore, none of the models fit the data (e.g., all chi-square p-values <.001); that is, chi-square difference tests were conducted among models that did not fit (Kinsinger, Laurenceau, Carver & Antoni, 2011). Finally, results indicated a significant chi-square difference test comparing the 4-factor model to the 3-factor model based on 3 degrees of freedom; it is unclear what changes were made in the model to result in 3 degrees of freedom. Therefore, these analyses were not replicated in this sample of PC patients.

Analyses conducted in this sample indicated that a 2-factor solution, made up of "positive social support" and "negative social support," best fit the data. Participants reported a normal distribution of positive support from their partner, with almost no endorsement of negative support. Greater positive support at baseline was related to better psychological and relationship adjustment and higher QOL. Although participants reported declines in positive support over time, this may have been in reaction to improvements in overall adjustment and well-being as patients moved further away from treatment. This may be particularly true for certain types of support. For example, informational support needs would likely diminish over time as patients become more educated about their disease and treatment. It is unknown why changes in positive social support were not significantly correlated to changes in sexual adjustment and/or QOL; however, as they were related at baseline, future work should explore these relationships to distinguish different types of support needs over time within the context of illness and

recovery. It would be important to determine whether declines in support were an appropriate reaction by partners given patients' decreased need or whether they were a result of miscommunication within couples and, in fact, patients continued to desire and would have benefited from increased partner support.

Although findings were somewhat limited, partner-specific social support remains an important area of research within the context of coping with disease and illness. As a large body of literature has identified different types of social support and related them to a number of physical and mental health outcomes, research should continue to evaluate these relationships among post-treatment PC patients, particularly with respect to marital/partner relationships and sexual adjustment. Although men often perceive high levels of support with respect to general issues related to their cancer experience, support surrounding specific cancer-related topics, such as sexual dysfunction and relationship satisfaction, may still be lacking. The degree to which partner-specific social support impacts long-term changes in sexual adjustment and QOL should be further evaluated.

Limitations

There were several limitations to this study. First, analysis of covariates was limited. Importantly, sexual adjustment models did not include sexual dysfunction as a covariate, rendering conclusions regarding intervention effects and interrelationships among trajectories of sexual adjustment, social support, and QOL, controlling for the effects of physiologic dysfunction, impossible. This was a primary objective of the study and future work should further evaluate different domains of sexuality separately (i.e.,

sexual dysfunction vs. psychosocial adjustment to sexual dysfunction) and independent relationships with relevant covariates and QOL outcomes.

Time-varying covariates were also not included in analyses. Therefore, it was not possible to determine whether changes in covariates, including sexual dysfunction, were related to changes in outcome variables. Furthermore, as the covariates that were included in the current study did not explain all of the variance in trajectories of the outcome variables, additional predictors (e.g., coping strategies [e.g., use of stress management skills], patterns of marital/partner communication and relationship quality, adherence to masculine norms, personal goals for post-treatment sexual recovery) should be evaluated. In doing so, a more comprehensive profile of men who may be at an increased risk for experiencing decrements in sexual adjustment following treatment may be identified. Along those lines, the present study did not include men with major psychopathology or cognitive impairment, or men with advanced (i.e., metastatic) cancer. Targeting factors related to sexual adjustment and intervention efficacy may be even more critical with PC patients who face greater psychological or physical impairment. Future work should explore additional predictors and correlates of sexual adjustment and response to intervention in more diverse patient populations.

Finally, there were several limitations due to the measures that were used to assess sexual adjustment (i.e., PAIS) and partner-specific social support (i.e., SSSS); these are discussed briefly below. With this in mind, possible limitations of the CBSM intervention are also discussed.

<u>Limits of Measurement</u>

As reviewed above, the current study identified some limitations related to the measurement of sexual adjustment and partner-specific social support, as measured by the PAIS and SSSS scales, respectively. First, with respect to the PAIS, only 2 items refer to relationship adjustment to sexual dysfunction; the first does not actually mention sexual changes or problems in the question, while the other only refers to arguments related to sexual changes. Although the full PAIS measure was developed to capture "psychosocial" adjustment to illness across 7 primary domains of adjustment (i.e., 46 items; 7 subscales), assessment of "social" adjustment within the sexual adjustment domain is limited. The reliability and validity of this measure has been demonstrated in several different studies among various medical populations, including cancer patients (reviewed in Derogatis & Fleming, 1996). However, use of the Sexual Adjustment subscale as an independent measure is limited, particularly among PC patients. A more comprehensive assessment of relationship adjustment processes is needed to adequately capture changes and/or problems in the relationship as a result of post-PC treatment sexual dysfunction. This should include but is not limited to items that assess pre-treatment sexual relations, patient and partner definitions of sexuality and intimacy, pre- and post-treatment communication patterns (e.g., likelihood of avoiding sexual topics or engaging in protective buffering), openness to redefining sexual practices and efforts taken to explore alternative ways of being intimate (and whether or not they were successful; i.e., resulted in sexual pleasure and satisfaction), motivation to resolve sexual adjustment difficulties, and goals for post-treatment sexuality both personally and within the relationship.

Additionally, a comprehensive assessment of psychosocial adjustment to sexual dysfunction should include items that reflect partner adjustment and well-being. Among PC couples, partner sexual adjustment has been shown to influence patient outcomes (Garos, 2007). Notably, it may not be partners' experiences, per se, that have an impact but rather patients' perceptions of their partners' experiences. For example, among a sample of breast cancer patients, women's perceptions of their partners' emotional involvement after surgery was related to their own sexual adjustment (i.e., self-ratings of attractiveness, sexual desirability, and femininity), emotional distress, and marital satisfaction (Wimberly, Carver, Laurenceau, Harris, & Antoni, 2005). As communication is often limited among PC couples with regard to treatment-related sexual changes, patients' may have inaccurate perceptions of their partners' adjustment, suggesting an important target for psychosocial intervention efforts.

Related to this and with respect to the SSSS, item level evaluation indicated that the vast majority of participants did not endorse "negative support" from their partners. However, only 4 items were used to assess negative support; 2 items refer to active/approach behaviors made by partners (i.e., How often does your wife/partner "argue with you relating to your cancer" and "criticize you relating to your cancer"?) and the other 2 items refer to passive/avoidant behaviors (i.e., How often does your wife/partner "let you down when you are counting on them" and "withdraw from discussions [or] change the topic away from your illness"?; see Appendix: Measures). It has been argued that PC couples are more likely to avoid discussions regarding sexual changes in their relationship, thereby increasing the likelihood that patients' would perceive more passive forms of negative support from their partners. Therefore, given

that this type of negative support was only assessed using 2 items, it may be that a more comprehensive assessment would have identified relationship interactions that patients' viewed as negative.

As support from one's partner has been shown to be the most important source of support among cancer patients (Kiss & Meryn, 2001) and analyses in the current study indicated that positive support was related to better psychological and relationship adjustment and higher QOL, the impact of partner-specific social support over time warrants further investigation. Furthermore, as a limited number of findings have suggested that negative support may be a more significant predictor of adjustment and well-being than positive types of support (Lepore & Helgeson, 1998), further evaluation of patient perceptions regarding negative interactions with their partners related to their illness may be valuable and may also be an important target of intervention.

<u>Limits of the Intervention</u>

The CBSM intervention was designed to address adaptive coping strategies related to sexual side effects, such as reframe intrusive or distorted thoughts and promote adaptive communication skills to address intimate topics in discussion with partners. However, only one session was explicitly devoted to sexuality and intimacy. Although sessions were designed to allow some flexibility regarding group discussion in which participants may have, of their own volition, initiated additional discussion of sexual difficulties or problems (e.g., during weekly check-ins/updates at the start of each session; self-generated examples used in group exercises), this would not have been a structured or manualized component of the intervention. In fact, at a certain point

discussions may have been discouraged by facilitators if concerns regarding time limits and intervention fidelity arose. As participants continued to report some degree of sexual adjustment difficulties even at post-intervention time points, findings suggest that addressing psychological adjustment processes related to sexual dysfunction may need to be a greater component of the intervention (e.g., partner involvement). Furthermore, although results of these analyses suggest that difficulties with psychological adjustment to sexual dysfunction may be a more significant concern for PC patients than relationship difficulties, it is argued that interpretations should be made with caution as the measurement of relationship adjustment was limited. A more comprehensive assessment of patients' perceptions of relationship adjustment to sexual dysfunction, within the context of an intervention, should be undertaken before conclusions can be drawn.

Previous findings that reported significant intervention effects on sexual dysfunction in this dataset among RP participants hypothesized that the mechanisms by which the intervention enacted benefit was through processes of psychosocial adjustment to sexual dysfunction (i.e., both psychological and relational processes; Molton et al., 2008; Siegel et al., 2007). It was suggested that the intervention may have served to "(a) provide the practical information these participants were avoiding, (b) normalize feelings of anxiety surrounding a perceived loss of male status, and (c) model appropriate partner communication regarding sexual dysfunction, thereby decreasing performance anxiety associated with sexual intimacy" (Molton et al., 2008). In agreement, the current study argues that intervention efforts should aim to improve psychosocial adjustment to sexual dysfunction and use appropriate measures to capture intervention outcomes. Research should continue to explore what factors predict and/or relate to sexual adjustment to

identify those patients most at risk for experiencing difficulties and distress related to continued dysfunction. As many patients continue to experience negative psychological effects related to sexual dysfunction for years following treatment, independent of their level of physiologic functioning, this is an important area for future work.

Future Directions

Based on these findings and reviews of the literature, the current study advocates for 3 main future research endeavors: (1) the development and utilization of measures that can be used to conduct a comprehensive assessment of psychosocial adjustment processes related to post-treatment sexual dysfunction among cancer patients; (2) further examination of significant predictors and/or correlates of sexual adjustment outcomes that may be used to identify those most at risk for experiencing difficulties with post-treatment side effects; and (3) the development and implementation of psychosocial intervention components that may be added on to traditional intervention designs for subsets of participants who endorse sexual adjustment difficulties (or who may be identified as being "at risk") and are likely to benefit from added support. The first was discussed above under Limits of Measurement; the other two are discussed in more detail below.

Predictors of Sexual Adjustment

A limited amount of research has evaluated predictors of sexual adjustment following PC treatment. Socio-demographic and health-related characteristics as well as physical, psychological, and relationship factors may all play a role in the degree to

which men are able to adjust to post-treatment sexual changes. Age and pre-treatment

sexual functioning have also consistently been related to trajectories of post-treatment

side effects but evaluation of psychosocial domains of sexuality has been limited. In the

current study, type of treatment appeared to make a difference in trajectories of sexual

adjustment, though RP participants were significantly younger and with fewer comorbid

medical conditions than RT participants, which may have been associated with a greater

likelihood of post-treatment physical recovery as well as greater motivation to address

sexual adjustment difficulties and achieve pre-treatment levels of sexual satisfaction.

Although levels of motivation and goals for post-treatment sexual recovery were not

evaluated in the current study, future work should consider participant heterogeneity with

respect to psychosocial factors related to sexuality.

Furthermore, participants in the current study indicated worse sexual adjustment

than other cancer and medical populations reported in the literature (i.e., comparison of

mean levels). However, this was the only sample that included exclusively male

participants and adherence to gender-specific norms may have played a role. A growing

body of literature suggests that PC patients' conceptualizations of masculinity may be an

important consideration in determining post-treatment sexual adjustment and well-being.

For example, Burns and Mahalik (2008) reported that, among post-treatment PC patients,

sexual dysfunction moderated the relationship between masculinity and illness

adjustment (i.e., social functioning, role functioning, and mental health); men with high

levels of sexual dysfunction reported worse adjustment when they more strongly adhered

to traditional masculine norms, whereas there was no difference in adjustment among

men with high versus low levels of sexual dysfunction when they reported low adherence

to traditional masculine norms. Furthermore, findings suggest that adherence to *specific* masculine norms may put men at increased risk for adjustment difficulties and poor physical and mental health outcomes, such as adherence to norms for emotional control (e.g., men should contain vulnerable emotions), self-reliance (e.g., men should handle problems independently), and definitions of manhood that rely on sexual potency (Burns & Mahalik, 2006; 2007; 2008).

Future research should identify those factors that are the strongest predictors of long-term trajectories of sexual adjustment in order to identify patients who may be at increased risk for experiencing post-treatment difficulties and to inform psychosocial interventions efforts. For example, men who express rigid adherence to problematic masculine norms would likely benefit from developing greater flexibility in their definitions of manhood (e.g., alternative means of validating masculinity and gender identity other than sexual capacity), learning to identify unrealistic expectations regarding their sexual performance, and working to enhance relationship intimacy without sexual intercourse by considering novel ways of experiencing sexual pleasure and satisfaction (Gray et al., 2002; Oliffe, 2004). Although the CBSM intervention addressed some of these, effects may have been enhanced by having sexuality and intimacy be a larger focus of the intervention and/or by providing additional support to those participants who express interest to address specific sexual adjustment problems. Profiles of individuals who may be at an increased risk for experiencing post-treatment sexual adjustment difficulties should be developed and used in both clinical and research settings to target those most in need and/or to design future interventions with greater specificity or with targeted components for patients likely to benefit from added support.

Psychosocial Interventions

Theory and research suggests that psychosocial adjustment to cancer depends in large part on relationship processes. For example, the relationship intimacy model of couples' psychosocial adaptation to cancer proposes that both patients' and partners' adjustment to cancer is achieved primarily through relationship processes that promote intimacy (Manne & Badr, 2008). Couples vary in the degree to which they engage in relationship-enhancing behaviors that improve intimacy (e.g., reciprocal cancer-related discussion and constructive communication) versus relationship-compromising behaviors that reduce intimacy (e.g., intentional efforts to hide worries or deny concerns, demand-withdrawal communication patterns). However, nowhere is this more poignant than in domains of sexuality and intimacy, which is inherently linked to the quality of relationship functioning and satisfaction and, particularly among PC couples, an area that is often avoided when problems arise. For that reason, one of the targets of the CBSM intervention was to promote psychosocial adjustment to sexual dysfunction. This involves both individual and dyadic processes of adjustment; men must first accept their lowered sexual ability and have a desire to be sexually active, even if this involves a shift in their definitions of sexual intimacy, and then address topics of sexuality and intimacy with their partner. Although the CBSM intervention attempted to address both of these areas of adjustment by normalizing feelings of anxiety surrounding sexual dysfunction, providing education regarding alternative sexual practices that don't require erections, and teaching communication skills with which to approach discussions with their partner, dyadic level changes may be more easily achieved by involving the partners.

Communication, in particular, appears to be a significant factor related to post-treatment adjustment and well-being among PC couples, specifically with respect to sexual domains (Gotcher, 1993). Non-communication regarding sexual changes in the relationship has been associated with a number of negative outcomes, including increased distress in patients and partners, emotional distancing and marital tension, and worse QOL (Badr & Taylor, 2009; Boehmer & Clark, 2001; Kershaw et al., 2008; Manne et al., 2010; Northouse et al., 2007; Ofman, 1995). Although the CBSM intervention may have helped participants reduce anxiety and feel more confident in their communication skills, partners may have still avoided such discussions and as a couple they may not have the opportunity to establish problem-solving strategies to adapt to their changed sexual circumstances and increase sexual satisfaction.

Importantly, not all PC couples experience declines in the quality of their relationship and some report growing closer through their shared cancer experience. However, findings suggest that even among couples who are able to navigate the cancer experience together, areas of sexual adjustment are still difficult to manage (Lavery & Clarke, 1999). PC patients' sexuality is inherently linked to partner and relationship factors and, for those couples interested in maintaining pre-treatment levels of sexual intimacy, intervention efforts may need to involve both patients and partners. Future work should focus on interventions that blend group support with partner involvement, targeted at those subgroups of patients – and couples – most likely to be at risk for post-treatment difficulties and derive benefit from increased communication and adaptive coping skills aimed at improving interpersonal functioning and relationship quality.

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Appendix: Tables

Table 1. CONSORT Checklist

Section and Topic	Item #	Reported on Page #
Title and Abstract	1	--
Introduction		
Background	2	1-34
Methods		
Participants	3	35
Interventions	4	42-43
Objectives	5	30-34
Outcomes	6	37-40
Sample size	7	50, 116
Randomization		
Sequence generation	8	41-42
Allocation concealment	9	41-42
Implementation	10	41-42
Blinding (masking)	11	42
Statistical methods	12	44-49
Results		
Participant flow	13	40
Recruitment	14	40-43
Baseline data	15	50-53; 115-118
Numbers analyzed	16	50, 116
Outcomes and estimation	17	53-68
Ancillary analyses	18	69-71
Adverse events	19	NA
Comment		
Interpretation	20	72-95
Generalizability	21	72-95
Overall evidence	22	72-95

Table 2. Total Sample: Baseline Demographic, Medical, Disease-Specific, and Psychosocial Variables by Partner Status

Variable	Total Sample (N=261)		Partnered (n=225; 86%)		Unpartnered (n=36; 14%)		*F*	*p-value*
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**		
Age (years)	65.3	7.6	65.0	7.7	67.4	6.7	2.88	.09
Education (years)	13.8	3.3	13.7	3.4	14.4	3.2	7.09	.30
Household income ($K)	51.0	50.2	54.7	52.3	27.9	24.0	9.12	.003
Medical comorbidity	1.8	2.1	1.8	2.0	2.2	2.3	1.45	.23
Time since diagnosis (months)	15.6	6.9	15.6	6.5	15.0	8.9	.29	.59
Time since treatment (months)	10.3	4.5	10.9	4.4	8.7	4.7	5.59	.02
Pre-treatment sexual satisfaction	3.8	1.0	3.8	1.0	3.6	1.0	.29	.59
Sexual dysfunction (T1)	6.1	6.1	6.3	6.0	5.2	6.2	1.06	.31
Sexual dysfunction (T2)	7.4	6.5	7.1	6.4	9.1	7.0	2.42	.12
Sexual dysfunction (T3)	7.7	6.5	7.6	6.6	8.3	6.4	.26	.61
Sexual dysfunction (T4)	8.2	6.5	8.0	6.4	9.1	7.3	.74	.39

Variable	Total Sample (N=261)	Partnered (n=225; 86%)	Unpartnered (n=36; 14%)	χ^2	*p-value*
	%	**%**	**%**		
Treatment type				1.36	.28
Surgery	48	49	51		
Radiation	52	39	61		
Ethnic identification				1.63	.44
Non-Hispanic White	42	17	83		
Hispanic	41	13	87		
African American	17	9	91		
Primary language				.01	.94
English	60	60	39		
Spanish	40	40	61		
Employment Status				2.11	.72
Employed, full-time	37	11	89		
Employed, part-time	8	10	90		
On disability	4	8	92		
Retired	45	16	84		
Otherwise not employed	6	20	80		

Table 3. Partnered Sample: Baseline Demographic, Medical, Disease-Specific, and
Psychosocial Variables by Group Condition

Variable	Total (Partnered) (N=225)		CBSM (n=124)		Control (n=101)			
	Mean	SD	Mean	SD	Mean	SD	F	p-value
Age (years)	65.04	7.7	65.8	7.7	64.07	7.7	2.94	.09
Education (years)	13.7	3.4	13.5	3.4	14.0	3.3	.96	.33
Household income ($K)	54.7	52.3	51.5	49.6	58.5	55.4	.98	.33
Medical comorbidity	1.8	2.0	1.7	2.0	1.9	2.1	.44	.51
Time since diagnosis (months)	15.6	6.5	15.4	6.7	16.0	6.4	.82	.37
Time since treatment (months)	10.6	4.4	10.3	4.5	10.9	4.3	.32	.57
Pre-treatment sexual satisfaction	3.8	1.0	3.8	1.1	3.7	1.0	.23	.64
Relationship satisfaction	5.3	1.5	5.2	1.6	5.5	1.4	.29	.59
Sexual dysfunction (T1)	6.3	6.0	6.1	6.0	6.5	6.1	.83	.36
Sexual dysfunction (T2)	7.1	6.4	7.3	6.6	6.8	6.3	.68	.41
Sexual dysfunction (T3)	7.6	6.6	7.2	6.8	8.1	6.3	.11	.74
Sexual dysfunction (T4)	8.0	6.4	7.6	6.6	8.5	6.1	1.81	.18
Pre-intervention sexual adjustment (PAIS T1; baseline)	13.5	3.6	13.7	3.6	13.3	3.6	.51	.48
Post-intervention sexual adjustment (PAIS T4; 12-month follow-up)	12.7	3.9	12.7	4.0	12.7	3.8	.17	.68
Pre-intervention social support (SSSS T1; baseline)	37.6	7.1	37.5	7.2	37.6	7.0	.01	.91
Post-intervention social support (SSSS T4; 12-month follow-up)	36.1	7.8	36.0	8.4	36.3	7.1	.09	.77
Pre-intervention quality of life (FACT* T1; baseline)	80.2	13.3	80.6	13.6	79.7	13.0	.25	.62
Post-intervention quality of life (FACT* T4; 12-month follow-up)	87.1	13.3	87.2	13.7	86.8	12.9	.04	.85
Variable	Total Sample %		CBSM %		Control %		χ^2	p-value
Treatment type							2.74	.11

Surgery	49	51	49		
Radiation	51	41	59		
Ethnic identification				.18	.91
Non-Hispanic White	40	46	54		
Hispanic	42	44	56		
African American	18	48	52		
Primary language				.65	.42
English	60	58	63		
Spanish	40	42	37		
Employment Status				10.68	.03
Employed, full-time	38	50	50		
Employed, part-time	8	39	61		
On disability	5	36	64		
Retired	44	38	62		
Otherwise not employed	5	83	17		

*FACT total score calculated without inclusion of a single item that referred to sexual desire.

Table 4. Correlations between Demographic, Medical, and Psychosexual Covariates, Sexual Adjustment, Social Support, and Quality of Life

Variables	1	2	3	4	5	6	7	8	9	10	11
1. Age											
2. Education	-.12										
3. Income	-.16*	.40**									
4. Medical comorbidities	.36**	-.05	-.16*								
5. Time since diagnosis	.26**	-.09	-.02	.02							
6. Time since treatment	.07	-.03	.01	-.06	.64**						
7. Pre-treatment sexual satisfaction	-.11	-.03	.02	-.22	-.16*	-.14					
8. Relationship satisfaction	.03	.04	.04	-.02	.04	.09	.18*				
9. Sexual dysfunction (T1)	-.11	.06	.14*	-.18**	.19**	.15*	.11	-.05			
10. Sexual adjustment (PAIS T1)	.07	-.04	-.07	.14	-.04	-.05	-.16*	-.08	-.72**		
11. Social support (SSSS T1)	-.14*	-.01	.04	-.09	-.11	-.09	.29**	.50**	.14*	-.21**	
12. Quality of life (FACT T1)	-.07	.26	.24**	-.22	-.04	.02	.21**	.27**	.19**	-.34**	.35**

*p<.05; **p<.01

Table 5. Confirmatory Factor Analysis of the Psychosocial Adjustment to Illness Scale – Sexual Dysfunction subscale (PAIS): Two Factor Solution

Two Factor Solution	Factor Loadings*		
PAIS Items	unstandardized	SE	standardized
"Psychological Adjustment"			
2: Sometimes when people are ill they report a loss of interest in sexual activities. Have you experienced less sexual interest since your illness?	1.0	--	.42
3: Illness sometimes causes a decrease in sexual activity. Have you experienced any decrease in the frequency of your sexual activity?	1.66	.28	.77
4: Has there been any change in the pleasure or satisfaction you normally experienced from sex?	1.87	.31	.81
5: Sometimes an illness will cause interference in a person's ability to perform sexual activities even though they are still interested in sex. Has this happened to you, and if so, to what degree?	1.83	.31	.80
"Relationship Adjustment"			
1: Sometimes having an illness can cause problems in a relationship. Has your illness led to any problems with your wife or partner?	1.0	--	.79
6: Sometimes an illness will interfere with a couple's normal sexual relationship and cause arguments or problems between them. Have you and your partner had any arguments like this and if so, to what degree?	.61	.07	.62

*All factor loadings were significant, p's<.001.

Table 6. Confirmatory Factor Analysis of the Sources of Social Support Scale (SSSS): Two Factor Solution

Two Factor Solution	Factor Loadings*		
SSSS Items	unstandardized	SE	standardized
"Positive Support"			
1: How much does your partner give you advice or information about your prostate cancer?	1.0	--	.56
2: How much does your partner give you assistance with things related to your prostate cancer?	1.35	.15	.68
3: How much does your partner give you reassurance, encouragement, and emotional support (affection) concerning your prostate cancer?	1.30	.15	.86
4: How much does your partner listen to and try to understand your worries about your prostate cancer?	1.47	.16	.88
5: How much can you relax and be yourself around your wife/partner?	.92	.12	.70
6: How much can you open up to your partner if you need to talk about your worries about your cancer?	1.35	.16	.82
"Negative Support"			
8: How often does your partner criticize you relating to your cancer?	1.0	--	.76
9: How often does your partner let you down when you are counting on them?	1.34	.14	.85
10: How often does your partner withdraw from discussions about your illness or try to change the topic away from your illness?	1.05	.10	.74

*All item loadings were significant, p's<.001.

Table 7. Exploratory Analyses: Effect of CBSM Attendance on Intervention Outcomes

Outcome	Model Fit Indices					Path Estimates*		
	χ^2	p	CFI	SRMR	RMSEA	unstandardized	SE	standardized
Psychological Adjustment Models								
Constrained	22.02	.52	1.0	.06	.01			
Unconstrained	22.02	.46	1.0	.06	.003	-.01	.02	-.22
Relationship Adjustment Models								
Constrained	19.85	.65	1.0	.07	.01			
Unconstrained	17.92	.89	1.0	.07	.00	-.001	.01	--
Positive Social Support Models								
Constrained	46.41	.001	.94	.08	.10			
Unconstrained	45.69	.001	.94	.08	.11	--	--	--
QOL								
Constrained	32.64	.04	.97	.12	.08			
Unconstrained	19.49	.36	1.0	.10	.03	.01	.06	.06

*Path estimates were not significant for any of the outcomes, indicating that CBSM participants' attendance did not have an effect on change from pre- to immediately post-intervention time points (i.e., T1 – T2).

Appendix: Figures
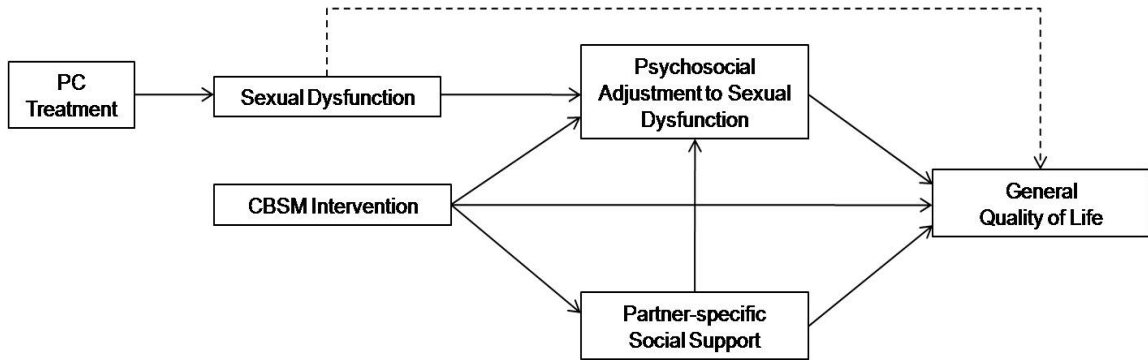
Figure 1. Conceptual Model

Figure 1. Conceptual model being tested. PC treatment leads to sexual dysfunction (i.e., physiologic impairment) that has been associated with significant decrements in general QOL. The proposed study hypothesizes that the mechanism by which sexual dysfunction leads to decreased QOL is through processes of psychosocial adjustment (or lack of adjustment) to sexual dysfunction (i.e., sexual adjustment). It is hypothesized that participants randomized to a CBSM intervention will demonstrate significant improvements in sexual adjustment and QOL compared to participants randomized to a control condition. Intervention-related improvements in QOL are hypothesized to be explained in part by improvements in sexual adjustment, controlling for the effects of sexual dysfunction on QOL. It is also hypothesized that partner-specific social support is a significant predictor of sexual adjustment and QOL and that the effects of a CBSM intervention on sexual adjustment and QOL are explained in part by intervention-related improvements in social support. QOL = quality of life; CBSM = cognitive behavioral stress management.

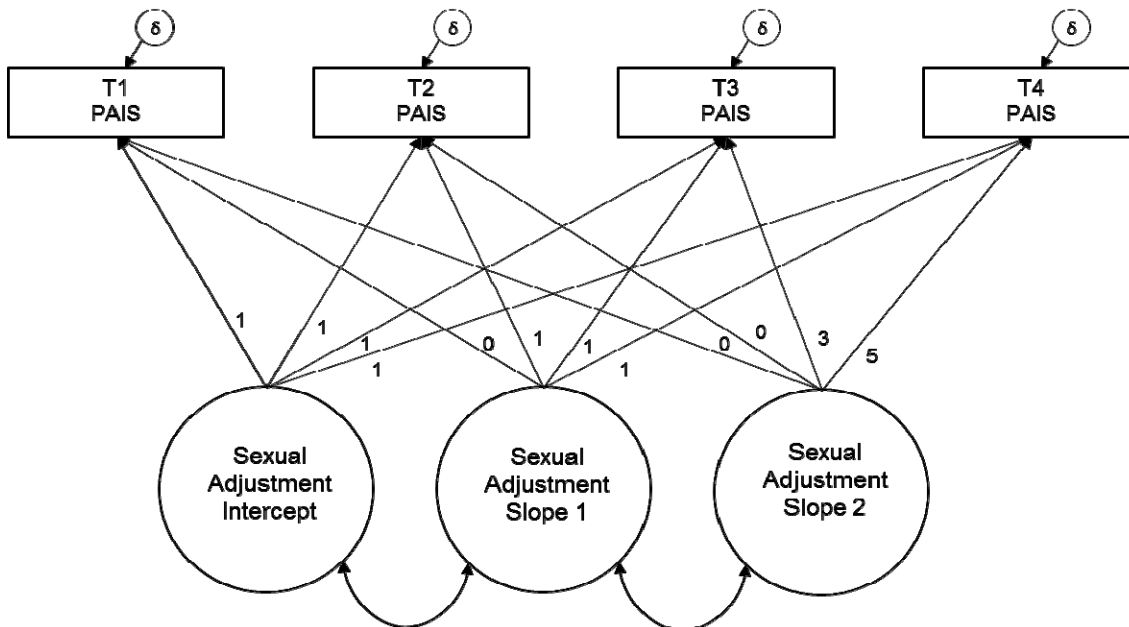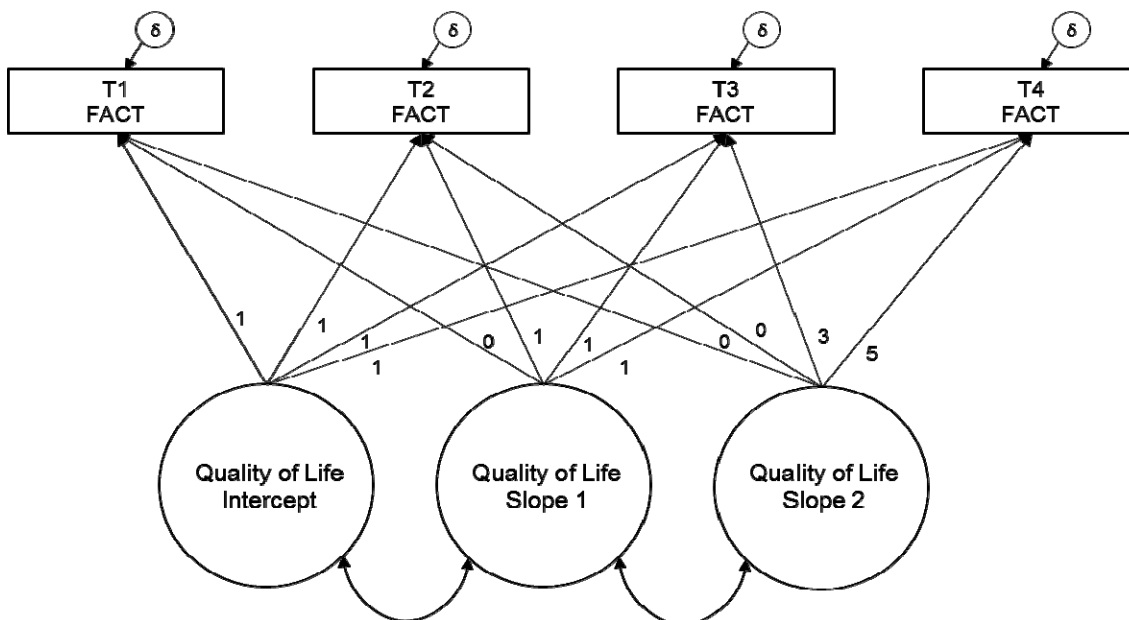Figure 2. Latent Growth Model of Sexual Adjustment

Figure 2. The proposed study will evaluate the effects of a CBSM intervention on trajectories of sexual adjustment over a 15-month period (T1; 2 to 3 weeks prior to the start of the intervention) and follow-up assessments (T2 [3-month post-baseline; 2 to 3 weeks post-intervention]; T3 [6-month follow-up]; and T4 [12-month follow-up]).

PAIS = Psychosocial Adjustment to Illness Scale – Sexual Relationships subscale (Derogatis, 1986); CBSM = cognitive behavioral stress management.

Figure 3. Latent Growth Model of Partner-Specific Social Support
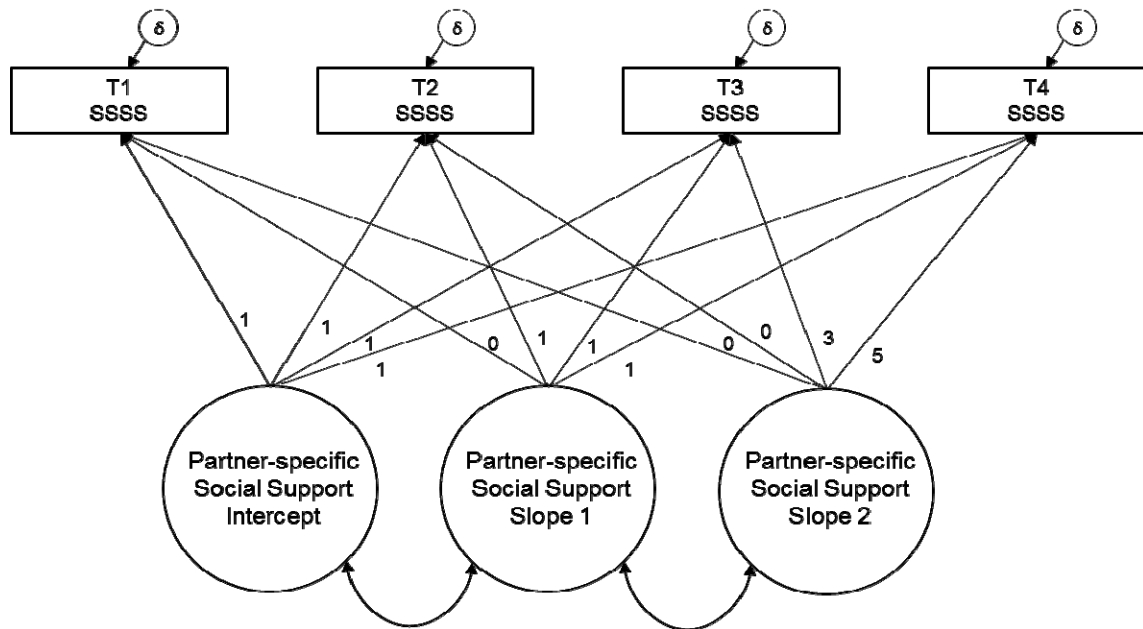
Figure 3. The effects of a CBSM intervention on trajectories of partner-specific social support over a 15-month period (T1; 2 to 3 weeks prior to the start of the intervention) and follow-up assessments (T2 [3-month post-baseline; 2 to 3 weeks post-intervention]; T3 [6-month follow-up]; and T4 [12-month follow-up]) were evaluated using multiple-group piecewise LGMs.

SSSS = Sources of Social Support Scale (Carver, 2006); CBSM = cognitive behavioral stress management.

Figure 4. Latent Growth Model of Quality of Life

Figure 4. The proposed study will evaluate the effects of a CBSM intervention on trajectories of QOL over a 15-month period (T1; 2 to 3 weeks prior to the start of the intervention) and follow-up assessments (T2 [3-month post-baseline; 2 to 3 weeks post-intervention]; T3 [6-month follow-up]; and T4 [12-month follow-up]).

FACT = Functional Assessment of Cancer Therapy – General Module (Cella et al., 1993); CBSM = cognitive behavioral stress management.

Figure 5. Cross-domain Latent Growth Model of Sexual Adjustment, Partner-specific Social Support, and Quality of Life
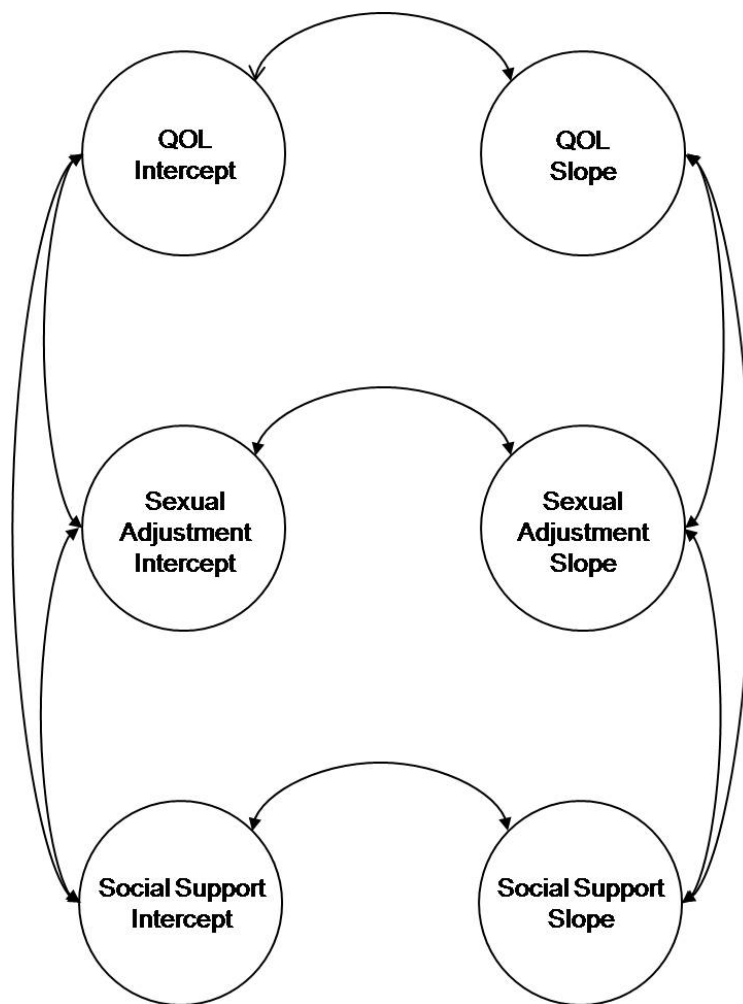

Figure 5. The proposed study will evaluate the relationships between trajectories of partner-specific social support, sexual adjustment and QOL within the context of a CBSM intervention. It is hypothesized that the relationships between baseline levels of partner-specific social support, sexual adjustment and QOL will be comparable across intervention conditions (control and CBSM; i.e., pre-intervention, cross-domain correlation of intercepts); and that intervention-related improvements in partner-specific social support will be significantly related to improvements in sexual adjustment and QOL for participants randomized to an intervention condition, whereas participants randomized to a control condition will experience decrements in social support that will be related to decreases in sexual adjustment and QOL (i.e., cross-domain correlation of slopes).

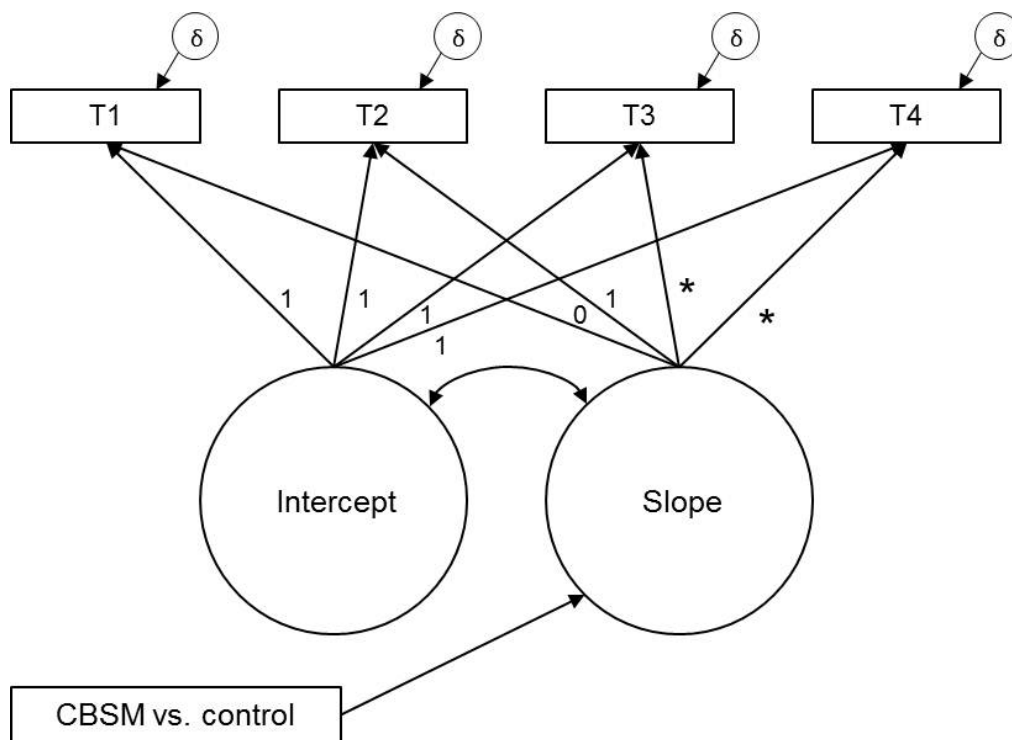Figure 6. Latent Growth Models: Estimating T3 and T4 Factor Loadings

Figure 6. Linear growth curves were specified such that the slope factor loadings of time points T3 and T4 were estimated. Estimating T3 and T4 slope factor loadings allowed for a more sensitive estimate of linear change from pre- to immediately post-intervention (i.e., T1 to T2), while retaining data associated with longer term follow-up assessments (i.e., T3 and T4); as compared to fixing T3 and T4 factor loadings according to the study time points (i.e., corresponding to 3- and 6-month follow-up visits, respectively).

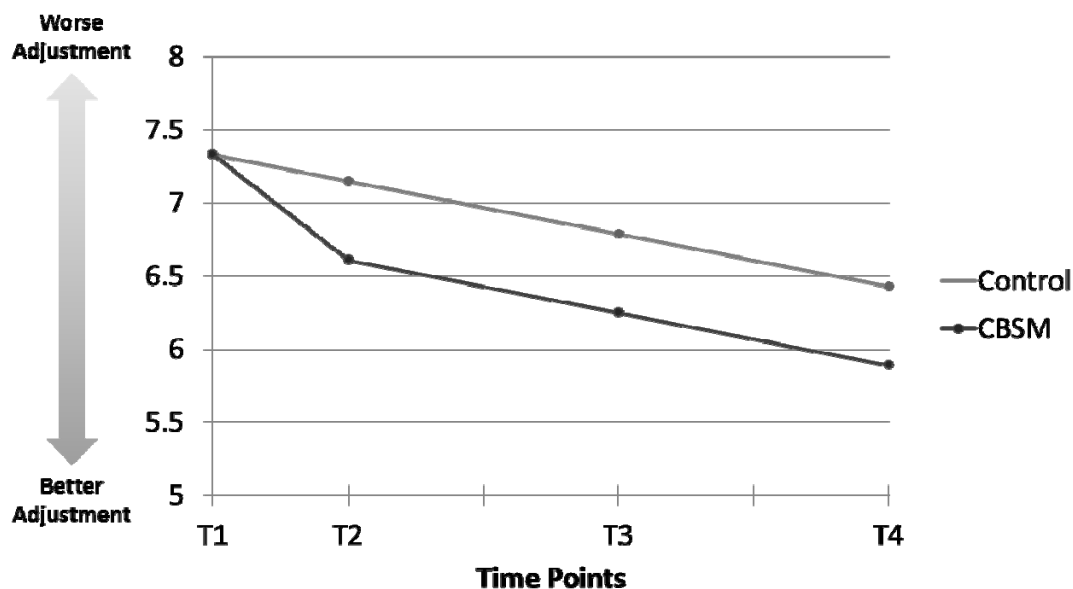Figure 7. Psychological Adjustment Trajectories by Intervention Group Condition: RP Participants Only

Figure 7. Piecewise latent growth models were conducted to determine significant intervention effects on the Psychological Adjustment subscale of the PAIS; models that constrained slopes equal across intervention groups were compared to unconstrained models using a chi-square difference test to determine significant improvement in model fit. Despite a non-significant chi-square difference, the unconstrained model suggested that CBSM participants made greater improvements from T1 to T2 (unstandardized mean slope 1 estimate=-.72, SE=.32, *p*<.05), which they maintained from T2 – T4 (unstandardized slope 2 estimate=-.18, SE=.05, *p*>.05), compared to control participants (unstandardized mean slope estimate=-.18, SE=.05, *p*<.01).

CBSM=Cognitive Behavioral Stress Management intervention; PAIS=Psychosocial Adjustment to Illness Scale (higher scores on the PAIS indicated *better* psychosocial adjustment; Derogatis, 1986).

Figure 8. Latent Growth Model of the PAIS – Relationship Adjustment Subscale with Covariates and Sexual Dysfunction
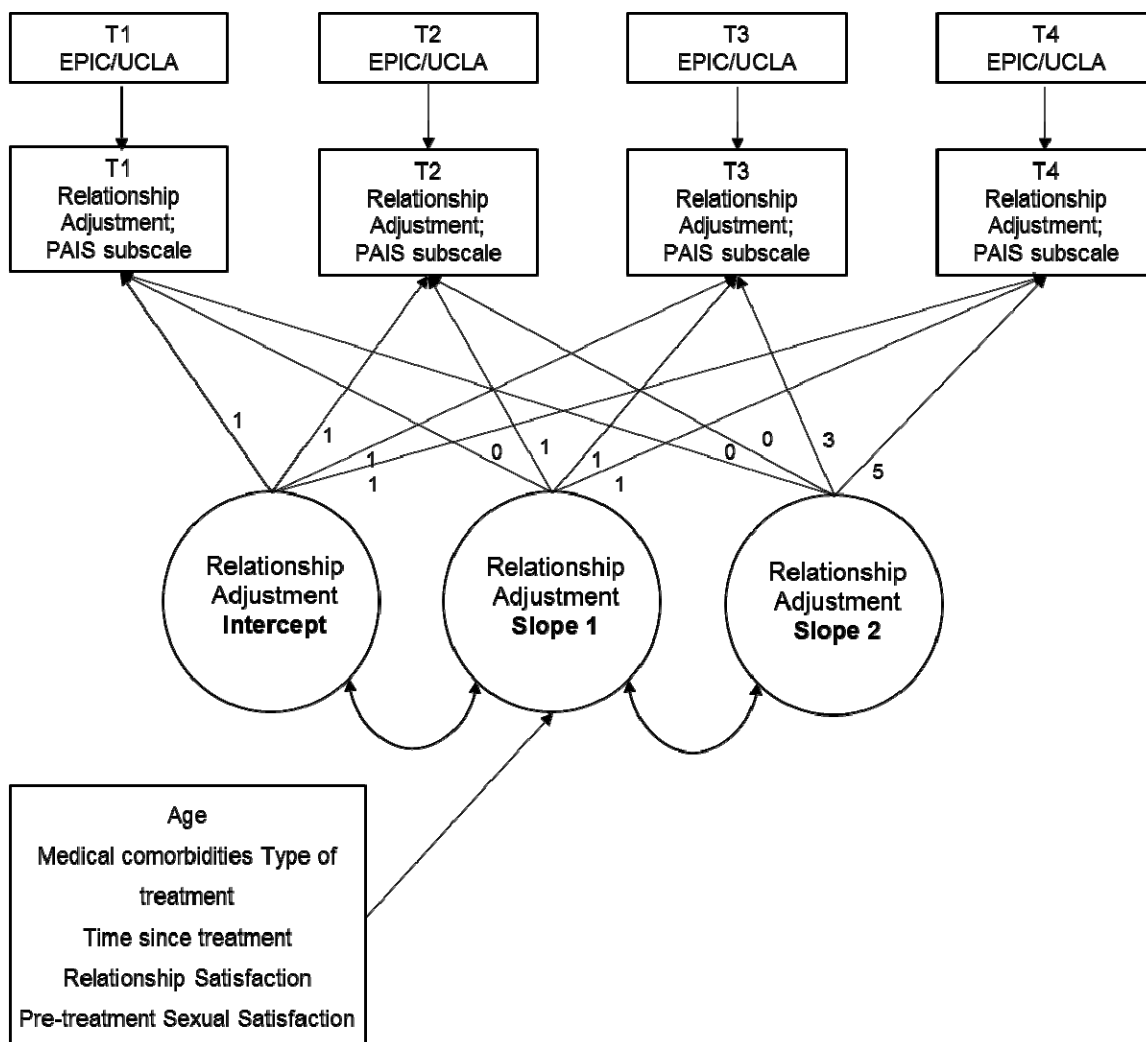

Figure 8. To control for the effects of sexual dysfunction (i.e., physiologic dysfunction), the sexual dysfunction observed variable at each time point was specified to be a predictor of the corresponding observed indicator of the latent growth factors, rather than as predictors of the slope 1 factor, to account for differences among RP and RT participants.

EPIC/UCLA=Expanded Prostate Cancer Index Composite (EPIC; Wei et al., 2000) and the UCLA-Prostate Cancer Index (UCLA; Litwin et al., 1998) – Sexual Dysfunction subscale; PAIS=Psychosocial Adjustment to Illness Scale (higher scores on the PAIS indicated *better* psychosocial adjustment; Derogatis, 1986).

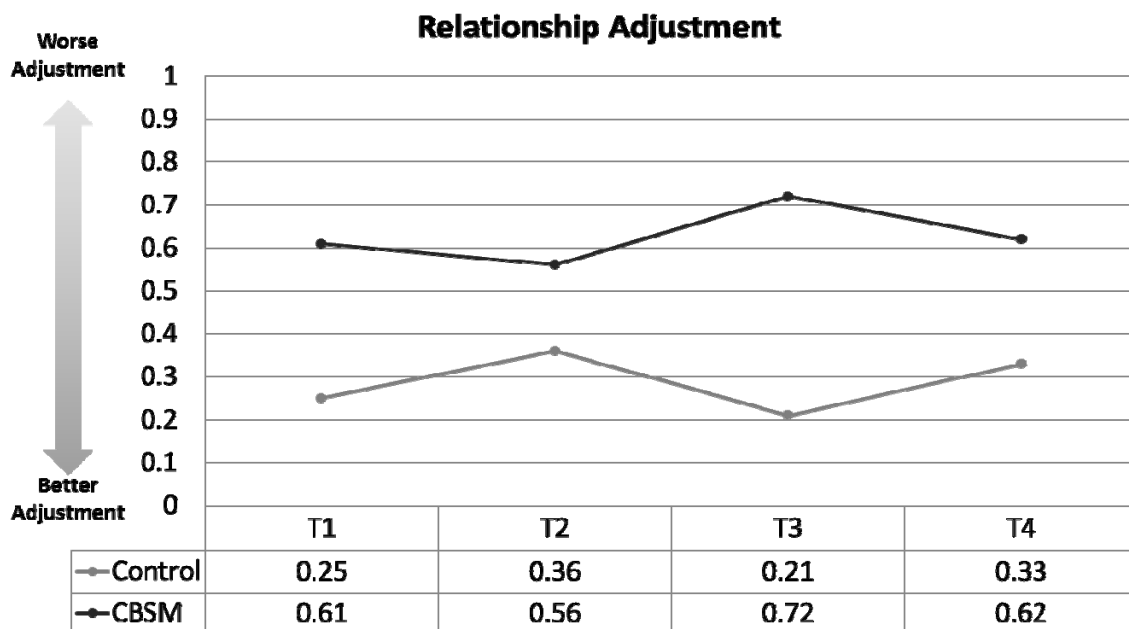Figure 9. Relationship Adjustment Mean Levels by Intervention Group Condition: Radiation Participants Only

Relationship Adjustment

Worse Adjustment → Better Adjustment

	T1	T2	T3	T4
Control	0.25	0.36	0.21	0.33
CBSM	0.61	0.56	0.72	0.62

Figure 9. The relationship adjustment models conducted using only radiation participant data did not fit the data and parameter estimates indicated that there were significant negative variances for the latent slope factors in both the control and CBSM groups. Evaluation of the data indicated that both intervention groups were characterized by mean levels of relationship adjustment across time points that could not be characterized by a piecewise slope.

CBSM=Cognitive Behavioral Stress Management intervention; PAIS=Psychosocial Adjustment to Illness Scale (higher scores on the PAIS indicated *better* psychosocial adjustment; Derogatis, 1986).

Figure 10. Confirmatory Factor Analysis of the SSSS: Two-Factor Solution
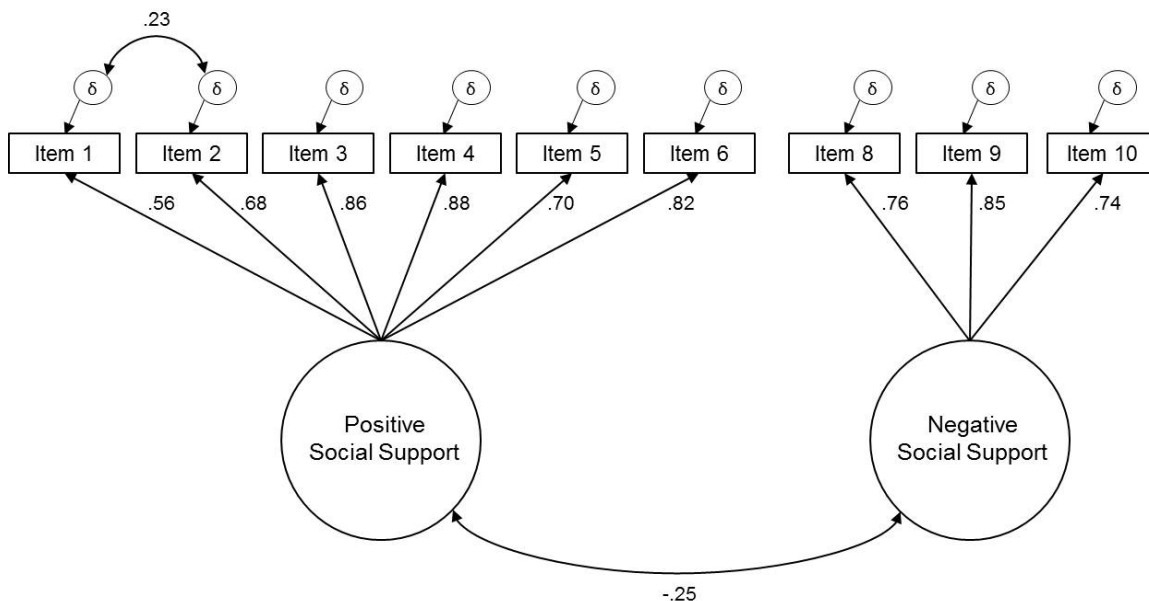
$\chi^2[25, N=225]=68.09, p<.05; CFI=.96; SRMR=.06; RMSEA=.09$

Figure 10. Confirmatory factor analysis of the SSSS confirmed a two-factor solution made up of "Positive Support" and "Negative Support" factors; item 7 was not included in the model; all residual variances of the indicators were estimated and items 1 and 2 were correlated (i.e., items that referred to informational and instrumental support, respectively). Despite a significant chi-square value, this model was determined to best fit the data as all other model fit indices suggested good fit and indicated improvement over previous models ($\chi^2[25, N=225]=68.09, p<.05; CFI=.96; SRMR=.06; RMSEA=.09$).

SSSS=Sources of Social Support Scale (Carver, 2006).

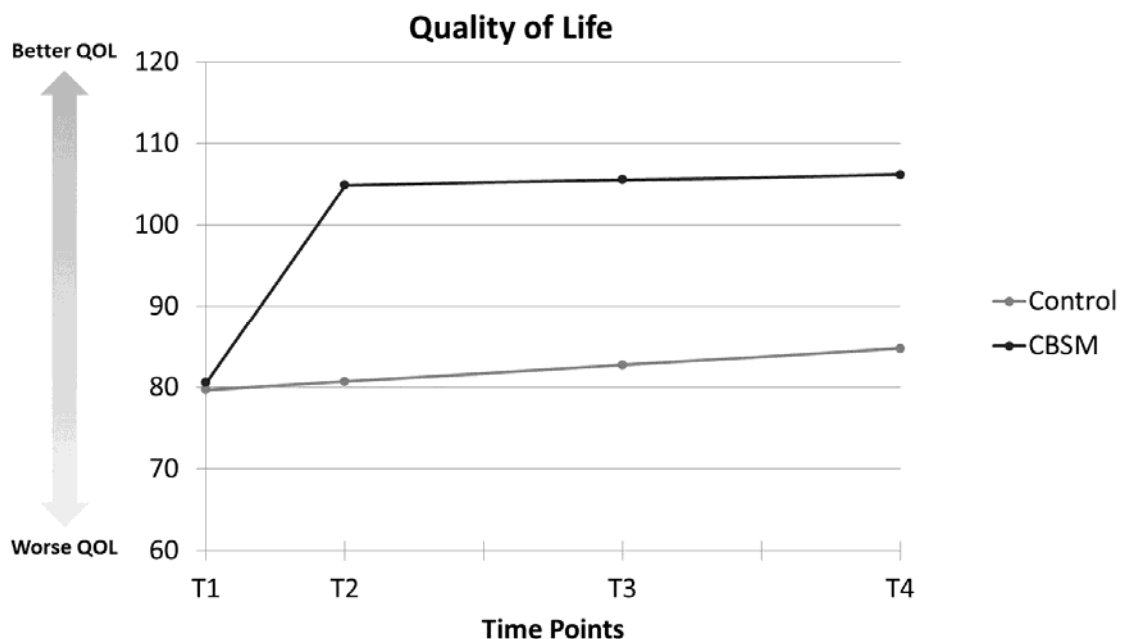Figure 11. Quality of Life Trajectories by Intervention Group Condition

Figure 11. Results indicated that there was a significant intervention effect on QOL. Covariates included age, education, income, medical comorbidities, time since treatment, and relationship satisfaction. Analyses demonstrated that the unconstrained model improved model fit over the constrained model ($\chi^2\Delta$[2, N=225]=12.98, *p*<.05). CBSM participants reported significant improvement in QOL from T1 to T2 and continued to improve from T2 to T4, though at the trend level of significance (unstandardized mean slope estimates; slope 1=24.32, SE=9.44, *p*<.001; slope 2=.99, SE=.57, *p*=.08; standardized slope 1=5.70, SE=2.33 and slope 2=.32, SE=.21); control participants also improved over time, though gains were smaller (unstandardized mean slope estimate=1.01, SE=.18, *p*<.001)

CBSM=Cognitive Behavioral Stress Management intervention; FACT=Functional Assessment of Cancer (Cella et al., 1993).

Figure 12. Cross-domain Latent Growth Model of Psychological and Relationship Adjustment, Positive Social Support, and Quality of Life
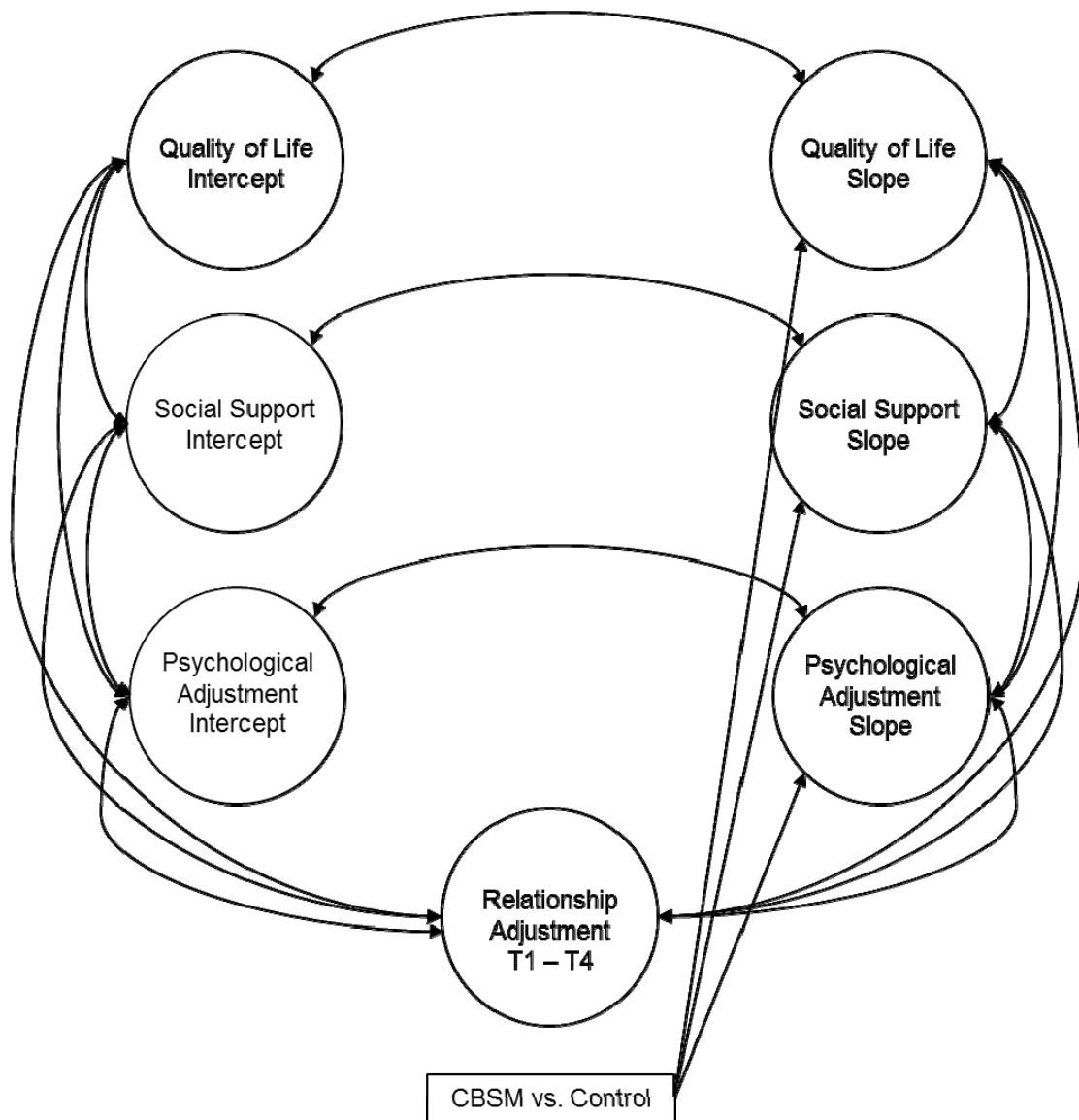

Figure 12. Fit indices indicated that the model fit the data relatively well, despite a significant chi-square test (χ^2[113, N=225]=181.47, *p*<.05; CFI=.96; SRMR=.05; RMSEA=.05). At baseline, better psychological adjustment was related to better relationship adjustment and higher levels of QOL; a trend was also observed with greater positive social support. Additionally, improvements in psychological adjustment and QOL were related, though cross-domain correlations with relationship adjustment and positive social support were not significant. Finally, better relationship adjustment was related to higher levels of positive social support.

CBSM=Cognitive Behavioral Stress Management Intervention; Quality of Life was measured using the FACT (Cella et al., 1993); Psychological Adjustment was measured using the PAIS (Derogatis, 1986); and Positive Support was measured using the SSSS (Carver, 2006).

Appendix: Measures

Psychosocial Adjustment to Sexual Dysfunction scale

<u>Psychosocial Adjustment to Illness (PAIS) – Sexual Dysfunction Subscale</u>
Higher scores indicate worse psychosocial adjustment (i.e., more difficulty adjusting to sexual dysfunction; items 2, 4, and 6 are recoded).

The following set of questions concerns the effects that your illness has had on you and how that has affected personal relationships during the past month. In answering each question, please choose the number of the option that best represents your response. If none of the answers to a question matches your experience exactly, please choose the answer that comes closest to what your experience has been.

1. Sometimes having an illness can cause problems in a relationship. Has your illness led to any problems with your wife or partner?
>   1. There has been no change in our relationship.
>   2. We are a little less close since my illness.
>   3. We are definitely less close since my illness.
>   4. We have had serious problems or a break in our relationship since my illness.

2. Sometimes when people are ill they report a loss of interest in sexual activities. Have you experienced less sexual interest since your illness?
>   1. Absolutely no sexual interest since illness
>   2. A marked loss of sexual interest
>   3. A slight loss of sexual interest
>   4. No loss of sexual interest

3. Illness sometimes causes a decrease in sexual activity. Have you experienced any decrease in the frequency of your sexual activity?
>   1. No decrease in sexual activities
>   2. Slight decrease in sexual activities
>   3. Marked decrease in sexual activities
>   4. Sexual activities have stopped

4.Has there been any change in the pleasure or satisfaction you normally experienced from sex?
>   1. Sexual pleasure and satisfaction have stopped
>   2. A marked loss of sexual pleasure and satisfaction
>   3. A slight loss of sexual pleasure and satisfaction
>   4. No change in sexual satisfaction

5. Sometimes an illness will cause interference in a person's ability to perform sexual activities even though they are still interested in sex. Has this happened to you, and if so, to what degree?

>   1. No change in my ability to have sex
>   2. Slight problems with my sexual performance
>   3. Constant sexual performance problems
>   4. Totally unable to perform sexually

 6. Sometimes an illness will interfere with a couple's normal sexual relationship and cause arguments or problems between them. Have you and your partner had any arguments like this and if so, to what degree?

>   1. Constant arguments
>   2. Frequent arguments
>   3. Some arguments
>   4. No arguments

Partner-specific Social Support Scale

Sources of Social Support Scale (SSSS)
Higher scores indicate more support (items 7 – 10 are reverse coded).

The next set of items concern the kinds of help and support you get from your wife or partner *regarding your illness*. If you do not have a wife or partner go to the next questionnaire. Please choose the number that best describes the support you have received.

0 = not applicable
1 = not at all
2 = a little amount
3 = a moderate amount
4 = a pretty large amount
5 = a lot

1. How much does your wife/partner give you advice or information about your prostate cancer (whether you want it or not)?

2. How much does your wife/partner give you assistance with things related to your prostate cancer (for example, helping you with daily chores, driving you places, dealing with bills and paperwork)?

3. How much does your wife/partner give you reassurance, encouragement, and emotional support (affection) concerning your prostate cancer?

4. How much does your wife/partner listen to and try to understand your worries about your prostate cancer?

5. How much can you relax and be yourself around your wife/partner?

6. How much can you open up to your wife/partner if you need to talk about your worries about your cancer?

7. How often does your wife/partner argue with you relating to your cancer?

8. How often does your wife/partner criticize you relating to your cancer?

9. How often does your wife/partner let you down when you are counting on them?

10. How often does your wife/partner withdraw from discussions about your illness or try to change the topic away from your illness?

Quality of Life scale

Functional Assessment of Cancer Therapy – General Module (FACT)
The original FACT – G includes 27 items that measure physical, social/family, emotional, and functional domains of QOL. Item 7 in the social/family well-being subscale will be removed to avoid collinearity with other variables in the model and a total score will be calculated from the remaining 26 items. Higher scores indicate better QOL.

Below is a list of statements that other men with prostate cancer have said are important. Please indicate how true each statement has been for you during the past 7 days.

1= not at all
2= a little bit
3= somewhat
4= quite a bit
5= very much

Physical Well-being

1. I have a lack of energy.
2. I have nausea.
3. Because of my physical condition, I have trouble meeting the needs of my family.
4. I have pain.
5. I am bothered by side effects of treatment.
6. I feel ill.
7. I am forced to spend time in bed.

Social/Family Well-being

1. I feel close to my friends.
2. I get emotional support from my family.
3. I get support from my friends.
4. My family has accepted my illness.
5. I am satisfied with family communication about my illness.
6. I feel close to my partner (or the person who is my main support).

Regardless of your current level of sexual activity, please, answer the following question. If you prefer not to answer it, please check this box [ ] and go to the next section.

7. I am satisfied with my sex life.

Emotional Well-being

1. I feel sad.
2. I am satisfied with how I am coping with my illness.
3. I am losing hope in the fight against my illness.
4. I feel nervous.
5. I worry about dying.
6. I worry that my condition will get worse.

Functional Well-being

1. I am able to work (include work at home).
2. My work (include work at home) is fulfilling.
3. I am able to enjoy life.
4. I have accepted my illness.
5. I am sleeping well.
6. I am enjoying the things I usually do for fun.
7. I am content with the quality of my life right now.

Control Variables

<u>Pre-treatment Sexual Satisfaction</u>

Prior to your diagnosis, how satisfied were you with the sexual aspect of your relationship?
1= not at all
2= slightly
3= moderately
4= quite a bit
5= extremely

<u>Relationship Satisfaction</u>

Choose the number from 1 to 7 that best describes your current degree of happiness in your relationship, using 4 to indicate "happy"—the amount of happiness that the average man has in his relationship; 7 to indicate extreme joy in your relationship; and 1 to indicate extreme unhappiness.

1	2	3	4	5	6	7
extreme unhappiness			happy			extreme joy

<u>Sexual Dysfunction</u>

The UCLA-Prostate Cancer Index (UCLA) was used for post-RP participants and the Expanded Prostate Cancer Index Composite (EPIC) was used for post-RT participants. Both measures share a core subset of items and a composite score of 7 items will be used to assess sexual dysfunction (i.e., degree of physiologic). Items that assess sexual desire and bother that are typically included in these measures will be removed to have a more discrete assessment of physiologic impairment. Higher scores indicated better sexual functioning (i.e., less sexual dysfunction).

How would you rate each of the following during the last four weeks?

1. Your ability to have an erection?
                 Very poor [0], poor [1], fair [2], good [3], very good [4]

2. Your ability to reach orgasm (climax)?
                 Very poor [0], poor [1], fair [2], good [3], very good [4]

3. How would you describe the usual QUALITY of your erections?
        None at all   [0]
        Not firm enough for any sexual activity   [1]
        Firm enough for masturbation and foreplay only   [2]
        Firm enough for intercourse   [3]

4. How would you describe the FREQUENCY of your erections?
        I NEVER had an erection when I wanted one   [0]
        I had an erection LESS THAN HALF the time I wanted one   [1]
        I had an erection ABOUT HALF the time I wanted one   [2]
        I had an erection MORE THAN HALF the time I wanted one   [3]
        I had an erection WHENEVER I wanted one   [4]

5. How often have you awakened in the morning or night with an erection?
        Never   [0]
        Seldom (less than 25% of the time or less than once a week)   [1]
        Not often (less than half the time or about once a week)   [2]
        Often (more than half the time or several times a week)   [3]
        Very often (more than 75% of the time or daily)   [4]

6. During the last four weeks did you have vaginal or anal intercourse?
        No [0]; yes, once [1]; yes, more than once [2]

7. Overall, how would you rate your ability to function sexually during the last four
    weeks?
        Very poor [0], poor [1], fair [2], good [3], very good [4]