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Interpersonal Sensitivity and Sexual Functioning in Young Men with Testicular Cancer: the Moderating Role of Coping

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Abstract

Background Interpersonal sensitivity is characterized by the predisposition to perceive and elicit criticism, rejection, and negative social evaluation. It may be linked to poorer physical or functional health outcomes, particularly in the interpersonal context (cancer-related sexual dysfunction).

Purpose This study tested the association of interpersonal sensitivity with sexual functioning following testicular cancer

in young men and whether this association is moderated by coping processes.

Method Men ages 18 to 29 ($N=171$; M age=25.2, $SD=3.32$) with a history of testicular cancer were recruited via the California State Cancer Registry and completed questionnaire measures including assessments of interpersonal sensitivity, sexual functioning, and approach and avoidance coping.

Results Regression analysis controlling for education, age, partner status, ethnic status, and time since diagnosis revealed that higher interpersonal sensitivity was significantly related to lower sexual functioning ($\beta=-0.18$, $p<0.05$). Cancer-related approach-oriented coping was associated with better sexual functioning ($\beta=0.19$, $p<0.05$). No significant association was observed for avoidance coping ($\beta=-0.08$, ns). Approach-oriented coping, but not avoidance, moderated the relationship with sexual functioning ($\beta=0.19$, $p<0.05$), such that higher interpersonal sensitivity was more strongly associated with lower functioning among men with relatively low use of approach coping.

Conclusion Interpersonal sensitivity may be an important individual difference in vulnerability to sexual dysfunction after testicular cancer. Enhancement of coping skills may be a useful direction for intervention development for interpersonally sensitive young men with cancer.

Keywords Interpersonal sensitivity · Approach coping · Avoidance · Sexual function · Testicular cancer

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Introduction

Individual difference characteristics can affect adjustment to chronic illness (see [1]), including aspects of physical functioning following cancer treatment. One pathway for their influence is by way of disruption or enhancement of interpersonal ties during the experience of significant stressors. For instance, Hoyt and Stanton [2] found that men with cancer

who had relatively high levels of unmitigated agency, or the tendency to focus on oneself to the exclusion of others, were less likely to benefit from available social support in adjusting to cancer. Difficulties within the social context or deficits in social support are reliable predictors of physical health and functional outcomes during chronic illness [3–6]. From this interpersonal perspective, patterned responses to others set the stage for chronic disruption of the social context, with enduring negative consequences for physical and psychological health [7, 8]. This study examines interpersonal sensitivity in young men with testicular cancer to determine associations with a relevant functional health outcome (i.e., sexual functioning) and the potential moderating role of approach and avoidance coping.

Interpersonal sensitivity is an individual difference factor that might leave men particularly vulnerable to poorer physical and emotional health outcomes after cancer. It refers to the predisposition to perceive and elicit criticism, rejection, and negative social evaluation from others. It is characterized by a tendency to center on feelings of inadequacy and inferiority, to remain vigilant to evaluation, and respond with inhibition and withdrawal [9]. Early work tied interpersonal sensitivity to pronounced empathy [10] and a tendency to process criticism [11]. More recently, Marin and Miller [9] tied interpersonal sensitivity to the related constructs of introversion [12], rejection sensitivity [13], behavioral inhibition [14], and type D personality [15].

Interpersonal sensitivity is linked to functional and adjustment outcomes in cancer patients (e.g., [16]) as well as adults with other chronic illnesses (e.g., [17]). One outcome that has received some attention is sexual functioning (e.g., [18, 19]). Siegel and colleagues [18] documented a relationship of interpersonal sensitivity with worse sexual functioning in men who underwent radical prostatectomy for prostate cancer. Interpersonal sensitivity also was related to poorer patient–physician communication and lower levels of partner support.

The extent to which findings observed in men with prostate cancer extend to other relevant patient groups remains to be determined. It may be that interpersonal sensitivity is particularly relevant in cancers for which patients' sexual and reproductive health is directly threatened. One such cancer is testicular cancer, which is the most prevalent cancer among men in late adolescence and early adulthood [20]. This developmental period is marked by unique psychological and social experiences of negotiating the transition from adolescence to adulthood, including significant relational and interpersonal exploration [21]. Progress in medical treatments has afforded young men with testicular cancer survival rates exceeding 90 % [22, 23]. However, testicular cancer and its treatment can produce changes in orgasmic functioning, loss of fertility, lowered sexual confidence, and self-image and declines in sexual satisfaction and overall functioning [24–30]. Unlike radical prostatectomy, however, where there are definitive

physiological mechanisms (e.g., severing the cavernous nerves) that subtend the psychological distress of sexual dysfunction, a similar nerve mechanism is not known to exist with radical orchiectomy. Thus, sexual functioning and/or sexual satisfaction may have a primarily psychological basis. As such, individual vulnerabilities and coping behaviors may be even more critical in this context.

Few factors that distinguish patients' risk for poorer sexual functioning have been established, providing little guidance for identifying vulnerable patients and targeting intervention development. Interpersonal sensitivity holds promise in this regard. Molton et al. [19] found that men with prostate cancer who had higher interpersonal sensitivity made larger improvements in sexual functioning following a cognitive behavioral stress management intervention compared to men with lower interpersonal sensitivity. Such findings suggest that modifiable behavioral resources, such as strategies for coping with cancer-related limitations, have potential to buffer or exacerbate the influence of interpersonal sensitivity.

Research to date has not examined the potential role that coping processes have in modulating the influence of interpersonal sensitivity on outcomes. A widely used classification of coping processes is to consider the extent to which strategies involve approaching stressors versus avoiding them [31]. For instance, active strategies such as planning for sexual communication, information-seeking regarding treatment options, expressing emotions to partners, or social support-seeking can be construed as approach-oriented coping, whereas strategies that involve disengagement from partners, denial of changes in functioning, or behavioral distraction can be viewed as avoidance-oriented efforts.

Approach- and avoidance-oriented coping behaviors are inherently neither adaptive nor maladaptive. Rather, coping effectiveness is better determined by the characteristics of the individual and the situation [32]. In the case of the experience of chronic disease, a meta-analysis [33] suggested a salutary effect of approach-oriented coping and negative impact of avoidance coping on physical and emotional health (e.g., pain, depression, fatigue) in men with cancer (see also [34]). Use of avoidance coping by men high in interpersonal sensitivity could exacerbate social inhibition, reduce opportunities for intimacy, and impair effective processing of emotion, with resulting decreased sexual confidence and function. Alternatively, approach strategies might enhance effective management of symptoms, mitigate strains in relational dynamics, and improve regulation of emotions.

This study examines interpersonal sensitivity in young men with testicular cancer. The aim is to determine whether interpersonal sensitivity is associated with sexual functioning, as has been observed in men with prostate cancer. Furthermore, the potential moderating role of cancer-related coping processes (i.e., approach vs. avoidance) is examined. It is hypothesized that interpersonal sensitivity will be related to worse

sexual functioning. We expect this relationship to be more pronounced in the context of higher avoidance coping and buffered by relatively high use of approach-oriented coping.

Methods

Participants and Procedures

Potential participants were identified by the California Cancer Care Registry and invited to participate. Eligibility criteria included men between 18 and 29 years of age at study enrollment with history of diagnosed testicular cancer and ability to read and understand English. Men with severe psychiatric disorder or cognitive impairment were excluded. Following signed informed consent, participants completed questionnaires by mail or in person and were compensated \$50. Procedures were approved by the human subjects' protection boards at the University of California and the California Committee for Protection of Human Subjects.

Participant characteristics are reported in Table 1. As described elsewhere [25], participants included 171 men between 18 and 29 years of age at time of enrollment with a history of testis cancer. The final sample of 171 men reflects a response rate of 59 % of possible cases. Responders did not differ significantly from non-responders on clinical or demographic variables. In addition to characteristics reported in Table 1, participants were, on average, 32.4 months (SD=19.3) from diagnosis and 30.1 months (SD=14.4) from primary treatment. Approximately 53 % received chemotherapy and 15 % radiation therapy, and all participants underwent at least one surgical procedure (i.e., radical inguinal orchiectomy, bilateral orchiectomy, retroperitoneal lymph node dissection). Nearly 13 % reported having no medical insurance, and 26 % reported Medicaid or public plan coverage.¹

Measures

Interpersonal Sensitivity Interpersonal sensitivity was measured by the four-item Interpersonal Sensitivity subscale of the 53-item Brief Symptom Inventory (BSI) [35]. Participants are asked the degree to which they were bothered by each experience in the past 7 days, rated on five-point scale ranging from *not at all* to *extremely*. Items reflect core characteristics of interpersonal sensitivity (e.g., “Your feelings being easily hurt”). The BSI is widely used for clinical and research purposes and has established psychometric properties [36]. In this study, Cronbach's alpha for the Interpersonal Sensitivity subscale was 0.88.

¹ Lack of medical insurance or qualification for Medicaid/public plan coverage likely indicates lower socioeconomic status or might denote limited resources or access to care.

Sexual Function Sexual function was measured with the five-item sexual function subscale of the Cancer Assessment for Young Adults (CAYA) [25]. The CAYA was developed to assess multiple dimensions of health-related quality of life in young men with cancer. Items include a list of symptoms and behaviors rated on the degree to which they apply in the prior 7 days on a four-point scale ranging from *0=none of the time* to *3=much or most of the time*. Items focus on multiple aspects of sexual functioning (e.g., “I am satisfied with my ability to achieve orgasm”), and higher scores indicate better sexual functioning. This scale has been validated by Rasch modeling and traditional psychometric criteria and exhibits strong psychometric properties [25]. In this study, Cronbach's alpha for the sexual functioning subscale was 0.76.

Approach- and Avoidance-Oriented Coping Coping was assessed by the Brief COPE [37], a 28-item self-report inventory, and the Emotional Approach Coping Scales [38], which consist of the four-item emotional processing and four-item emotional expression scales. Patients rated their coping behaviors in response to their experience of cancer on a four-point response scale ranging from *I do not do this at all* to *I do this a lot*. A composite measure of approach-oriented coping was constructed with subscale items used in previous research (e.g., [39, 40]): active coping, planning, acceptance, support seeking, emotional expression, and emotional processing. All subscales included in the approach-oriented coping score were positively and significantly correlated with each other ($r=0.40$ to 0.72 , $ps<0.001$). As in prior research [39], an avoidance-oriented coping composite also was constructed from relevant subscales: behavioral disengagement, denial, and mental disengagement. All subscales included in the avoidance-oriented coping score were positively and significantly correlated with each other ($r=0.25$ to 0.45 , $ps<0.01$). The composite scale score represents the mean of included items (approach coping $\alpha=0.82$; avoidance coping $\alpha=0.79$).

Data Analyses

Descriptive statistics and zero-order correlations were computed for key variables. Relationships between the dependent variable and potential covariates were also examined. These included participant age, education (in years), ethnicity (ethnic minority vs. non-ethnic minority), partner status (married/partnered vs. not), and time since diagnosis. All potential covariates were included in subsequent analyses.

Multiple linear regression was used to test study hypotheses. Sexual function was regressed on interpersonal sensitivity and coping variables, controlling for identified covariates. Moderator analyses allowed for examination of the possibility that the relationship of interpersonal sensitivity and sexual function is conditioned by approach and avoidance coping as hypothesized. Regression analyses and probing of

Table 1 Participant characteristics ($N=171$)

Characteristic	Value	Characteristic	Value (%)
Age (M, SD; range)	25.2, 3.32; 18–29	Sexual orientation	
Ethnicity		Straight	93.6
White (non-Hispanic)	46.2 %	Gay	4.1
Hispanic/Latino	38.0 %	Bisexual	1.2
Asian	10.5 %	Other	1.2
Native American/Alaskan Native	2.9 %	Relationship status	
African American/Black	1.2%	Single	54.4
Other	1.2 %	Committed/partnered	29.2
Education		Married	15.8
Less than high school	4.7 %	Divorced	0.6
High school/GED	15.2 %	Have at least one child	18.7
Some college	32.2 %	Living with parents	49.1
2-Year college degree	11.1%	Employment	
4-Year college degree	27.4 %	Employed full time	40.9
Graduate degree	9.4 %	Employed part-time	22.8
income		Student	12.3
\$15,000 or less	24.0 %	Medical leave/disability	5.3
\$15,001–\$30,000	19.9 %	Unemployed	18.7
\$30,001–\$45,000	11.7 %		
\$45,001–\$60,000	15.2 %		
\$60,001–\$75,000	11.1 %		
\$75,001–\$100,000	9.4 %		
\$100,001 or more	8.8 %		

interactions were conducted in accordance with procedures outlined by Aiken and West [41].

Results

Descriptive statistics and correlation coefficients are reported in Table 2.

Notably, average levels of interpersonal sensitivity were within normal limits [35]. Also, the pattern of significant correlations is consistent with expected relationships among variables. Relationships between sexual functioning and potential covariates were examined. Only participant education (in years) was correlated with sexual function ($r=0.22$,

$p<0.05$); more education was associated with better functioning.

Primary hypotheses were tested using multiple linear regression (see Table 3). As predicted, higher levels of interpersonal sensitivity were significantly related to lower sexual functioning ($\beta=-0.18$, $p<0.05$). Likewise, approach coping was associated with better sexual functioning ($\beta=0.19$, $p<0.05$). However, contrary to expectation, no significant association was observed for avoidance coping ($\beta=-0.08$, ns).

To test the possibility that the relationship of interpersonal sensitivity and sexual functioning was conditioned by coping factors, interpersonal sensitivity by coping (approach and avoidance) interactions was examined. Although no significant interaction of avoidance and interpersonal sensitivity was

Table 2 Descriptive statistics and correlations for key variables

Variable	Descriptive statistics			Correlations			
	Mean	SD	Range	1	2	3	4
1. Interpersonal sensitivity	0.73	0.94	0.00–3.75	–	–0.39***	–0.33**	0.23**
2. Sexual function	1.21	0.31	0.60–2.00		–	0.20**	–0.30***
3. Approach coping	2.86	0.58	1.00–4.00			–	–0.02
4. Avoidance coping	1.78	0.45	1.00–3.92				–

* $p<0.05$; ** $p<0.01$; *** $p<0.001$

Table 3 Sexual function regressed on interpersonal sensitivity and coping processes

Sexual functioning				
Variable	ΔR^2	<i>B</i>	SE	β
Block 1				
Education (in years)		0.08	0.05	0.15†
Participant age		-0.05	0.02	-0.17*
Partner status		0.15	0.14	-0.08
Ethnic minority status		-0.19	0.13	-0.10
Time since diagnosis		<0.01	<0.01	0.02
Block 2				
Interpersonal sensitivity	0.14***	-0.19	0.08	-0.18*
Avoidance coping		-0.17	0.15	-0.08
Approach coping		0.29	0.12	0.19*
Block 3				
Interpersonal sensitivity		0.14	0.16	0.07
Interpersonal sensitivity × avoidance coping				
Interpersonal sensitivity × approach coping		0.26	0.12	0.19*
$F(10, 166)=5.08***; R^2=0.25$				

Regression coefficients reflect values at the end of block 3, with all variables entered into the equation. Partner status was coded 0=partnered and 1=single. Ethnic minority status was coded 0=White/Caucasian and 1=ethnic minority

† $p<0.10$; * $p<0.05$; ** $p<0.01$; *** $p<0.001$

found, approach coping moderated the relation of interpersonal sensitivity with sexual functioning ($\beta=0.19, p<0.05$).

Simple slope analyses (see Fig. 1) revealed that higher interpersonal sensitivity was more strongly associated with lower functioning among men with relatively low use of approach coping for cancer-related stress ($\beta=-0.32, p<0.001$). However, higher reported use of approach-oriented coping

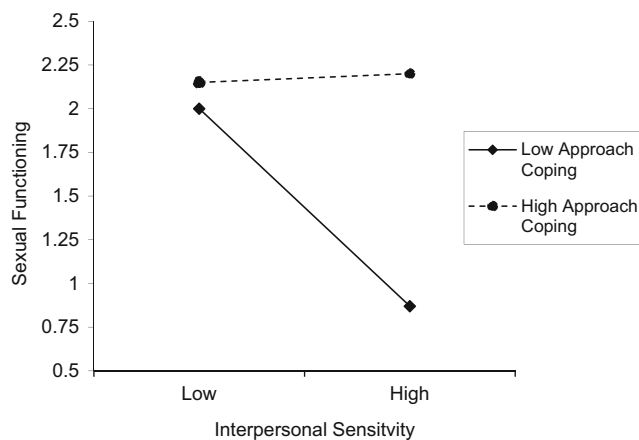


Fig. 1 Interaction of interpersonal sensitivity and sexual functioning. Figure displays interaction effect for sexual functioning. Analyses controlled for education, participant age, partner status, ethnic status, and time since diagnosis. Dashed line denotes non-significant simple slope

appeared to buffer this relationship and diminished the association of interpersonal sensitivity and sexual functioning ($\beta=0.02, p=0.895$).

Discussion

Interpersonal sensitivity may be an important individual difference variable in determining which patients are more vulnerable to sexual dysfunction after treatment for testicular cancer. Young men at high levels of interpersonal sensitivity and low use of approach-oriented coping in response to stressors related to their cancer experience may be at particularly high risk for poorer functioning and adjustment. The observed relationships of interpersonal sensitivity and sexual outcomes are consistent with observations by Siegel et al. [18] and Molton et al. [19] in men with prostate cancer. The current study significantly contributes to this literature by examining these relationships in a group of emerging adults within the clinically distinct disease context of testicular cancer. To our knowledge, this study also is the first to examine the role of coping processes in attenuating the vulnerability associated with interpersonal sensitivity. The enhancement of coping skills directed toward problem-solving, active acceptance of the diagnosis, seeking social support, and processing and expressing cancer-related emotions is a potential target of intervention for these emergent adults.

Evidence is building connecting interpersonal sensitivity and related constructs to physical health outcomes (see [9]). For instance, associations have been found with indicators of HIV progression (e.g., [42–44]), increased cardiovascular disease mortality (e.g., [45, 46]), and all-cause mortality in population and cancer samples (e.g., [47–49]). A key question remains: by what processes does interpersonal sensitivity affect physical health and functional outcomes? The potential mechanisms by which interpersonal sensitivity impacts physical symptoms and functioning remain largely theoretical. Siegel et al. [18] proposed that psychological processes, namely self-efficacy in patient–provider communication and perceived partner support, play a mechanistic role in impacting sexual functioning; however, their findings did not support mediation. Smith et al. [50] posited other psychological mediators. For instance, interpersonal sensitivity may prompt greater expression of illness behaviors and stronger symptom perceptions [51], greater exposure to stressors (particularly interpersonal stressors) [52], and poorer health behaviors.

The relation between interpersonal sensitivity and poorer outcomes could be exacerbated by not responding to health-related threats and limitations with active, approach-oriented strategies. Lack of engagement in approach-oriented strategies might provide the opportunity for the action tendencies driven by interpersonal sensitivity to prevail, especially to the degree

to which interpersonal sensitivity reflects the motivation to evade negative evaluation from others (see [9]). Submissive interpersonal behaviors, indicative of avoiding negative social evaluation, can impair relationship quality and increase the likelihood of rejection and criticism [53, 54]. Low engagement in coping through emotional expression, garnering of social support, and acceptance would likely exacerbate negative emotion and anxiety, setting men up for poorer function in the relational context of sexual activity. Current results suggest clinical relevance. As depicted in Fig. 1, at higher levels of interpersonal sensitivity, men reporting relatively low use of approach coping reported sexual functioning at approximately 2.5 standard deviations below the mean, while men reporting relatively high approach coping reported sexual functioning at approximately 3.5 standard deviations above the mean. Future studies should evaluate the clinical impact of altering approach coping in those with high interpersonal sensitivity.

No work to date has examined biological mechanisms for the effects of interpersonal sensitivity. Physiological stress processes, particularly action of the hypothalamic–pituitary–adrenal (HPA) axis, are viable mediators. There is evidence for a link between interpersonal sensitivity with blunted or suppressed cortisol reactivity in response to a dexamethasone (DEX)/corticotropin-releasing hormone (CRH) test [55] and higher rejection sensitivity with a lower cortisol awakening response [56]. The extent to which such alterations in HPA activity, or corresponding sympathetic nervous system responses, affect sexual functioning is an important area for future study. Moreover, coping responses, particularly approach-oriented strategies, might work to interrupt stress processes and buffer against any potential negative impact of dysregulated HPA axis activity.

Interpretation of findings warrants caution. This study examined relationships among self-reported variables in a cross-sectional, correlational research design. Although analyses were hypothesis-driven and grounded in theory and prior empirical work, alternate patterns of relationships are plausible. For instance, sexual dysfunction and limited coping resources might work to fuel interpersonally sensitive responses. Future work should examine the impact of interpersonal sensitivity on functioning over time and the dynamic relationship that might exist with coping processes. Although the use of a young adult sample of men with testicular cancer provides a unique opportunity to examine interpersonal sensitivity in a new context, more work is needed to understand interpersonal sensitivity and sexual functioning in other illness populations. For instance, associations of interpersonal sensitivity and impairments in sexual functioning have also been documented in women with lupus [57].

Although interpersonal sensitivity is most often considered to be dispositional, the BSI's reliance on assessment across the past week leaves open the possibility that it might be capturing

state dimensions of interpersonal sensitivity. If so, specific contextual factors (e.g., cancer-related factors, relationship dynamics, self-esteem, mood) will be particularly important to consider in future research. Studies that examine unfolding patterns of interpersonally sensitive states would help to characterize its influence on health outcomes. Further, such focus on contextual factors would better elucidate influences on the acquisition of interpersonal sensitivity. For instance, do cancer-related declines in body confidence or increases in sexual partner rejection foster learned patterns of interpersonal sensitivity?

Despite the significant bivariate negative correlation of sexual function and avoidance coping, findings did not support a direct or moderating relationship of avoidance coping. The conceptual overlap of aspects of interpersonal sensitivity and avoidance coping (e.g., social inhibition) might obscure observations. Distinguishing avoidant coping behaviors that are unique from behavioral characteristic of interpersonal sensitivity will be an important step in understanding the potential of avoidance in moderating effects. The main effect of interpersonal sensitivity suggests that targeting the reduction of some aspects of avoidance will be fruitful for the development of behavioral interventions.

Understanding the role of interpersonal dynamics on the course and consequences of disease is important, particularly when findings inform effective approaches to clinical intervention. Identification of moderators of such factors and health relationships provides the opportunity for identification of modifiable factors. For instance, skill-based approaches that enhance young cancer patients' abilities to engage in active coping processes, mobilize their social support networks, and reappraise cancer-related stressor in more positive and less threatening directions might be effective in preventing impairment in or restoring physical health and functioning.

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Conflict of Interest Authors Hoyt, McCann, Savone, Saigal, and Stanton declare that they have no conflict of interest.

Ethical Standards All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000. Informed consent was obtained from all patients for being included in the study.

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