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PAPER

Understanding the distressed prostate cancer patient: Role of personality

Laura M. Perry[1] | Michael Hoerger[1,2] | Jonathan Silberstein[1,2] | Oliver Sartor[1,2] | Paul Duberstein[3]

[1] Tulane University, New Orleans, LA, USA

[2] Tulane Cancer Center, New Orleans, LA, USA

[3] University of Rochester Medical Center, Rochester, NY, USA

Correspondence
Laura M. Perry, 3073 Percival Stern Hall, Tulane University, New Orleans, LA 70118, USA.
Email: lperry5@tulane.edu

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Abstract

Objective: To evaluate the relationship between personality and emotional distress in prostate cancer. Neuroticism and introversion were hypothesized to be associated with clinically significant symptoms of emotional distress, including depression, anxiety, and suicidal ideation.

Methods: Men with a history of prostate cancer (n = 212) completed an NIH-funded cross-sectional study using well-validated measures of personality, depression, anxiety, and suicidal ideation. Covariates were age, education, time since diagnosis, comorbidity, and presence of metastases.

Results: Emotional distress was reported by 37% of participants, including depression (23%), anxiety (15%), and suicidal ideation (10%). As hypothesized, men who were more neurotic were more likely to report emotional distress (44.5% vs 26.9%; OR = 2.78, P = .004), depression (31.9% vs 11.8%; OR = 4.23, P = .001), and suicidal ideation (29.4% vs 9.7%; OR = 4.15, P = .001). Introverts were more likely to report emotional distress (45.2% vs 28.7%; OR = 2.32, P = .012) and depression (30.8% vs 15.7%; OR = 2.57, P = .014). Men with metastases were more likely to report emotional distress (51.7% vs 31.2%; OR = 4.56, P < .001).

Conclusions: Neuroticism and introversion were associated with clinically significant emotional distress in men with prostate cancer. Findings suggest that, in the context of treatment for prostate cancer, patient distress reflects disease characteristics (eg, metastases presence) as well as stable personality traits. Implications for clinical care are discussed.

KEYWORDS

cancer, depression, distress, introversion, mental health, neuroticism, oncology, personality, prostatic neoplasms, suicidal ideation

1 | INTRODUCTION

Three million men in the United States are living with prostate cancer, the most common cancer diagnosis among men,[1] and their emotional distress warrants more attention. Approximately 10-25% report clinically significant symptoms of depression or anxiety, and 10-15% report thoughts of suicide[2,3]; these rates are comparable to those reported in other common cancer diagnoses.[4] Accordingly, men with prostate cancer are 2 to 5 times more likely to experience symptoms of emotional distress, such as depression or anxiety, than demographically matched men in the general population.[5] Recently diagnosed patients, those with more symptoms and side effects, and those with metastases commonly experience more emotional distress in cross-sectional studies.[6-8] Emotional distress is also an important prognostic indicator in cancer, relating to decreased treatment adherence and earlier mortality.[9] The National Comprehensive Cancer Network recommends routine distress screening during oncology visits, especially attending to patients with greater disease burden.[10] However, in addition to disease characteristics, enduring patterns of thinking, feeling, and interacting with the world (ie, stable personality characteristics) may also contribute to the experience of emotional distress in prostate cancer. In the present investigation, we examined the extent to which emotional distress—symptoms of depression, anxiety, and suicidal ideation—was accounted for by core personality characteristics.

The Five-Factor Model (FFM) of personality[11] is a widely accepted and well-validated taxonomy that succinctly organizes personality into 5 core domains. Commonly referred to as the "Big Five," these domains of personality can be summarized as neuroticism (a tendency to be emotionally unstable and experience negative emotions), introversion (a tendency to be withdrawn, reserved, and inhibited; the opposite of extraversion), openness to experience (a tendency to be curious and creative), agreeableness (a tendency to be warm and altruistic), and conscientiousness (a tendency to be organized and responsible). These 5 domains are thought to provide a reasonably comprehensive and non-arbitrary summary of individual differences in personality[12] and have been studied in many different diseases.[13]

Over the past 2 decades, numerous prospective studies have shown that neuroticism and introversion confer risk for depression and anxiety in community samples.[14,15] Neuroticism has also been prospectively identified as a risk factor for depression and anxiety in mixed-cancer[16] and breast cancer samples.[17,18] Introversion has been linked to depression and anxiety in cross-sectional breast cancer[19] and other illness-defined samples.[20]

To our knowledge, no study of emotional distress in prostate cancer has included a complete assessment of the Big Five personality domains, instead examining only selected aspects of personality. One cross-sectional study[21] found that neuroticism was related to increased depression and anxiety, but personality domains beyond neuroticism were not assessed. Another study found that having an optimistic outlook was associated with lower general emotional distress, but specific mental health symptoms and personality domains of the FFM were not assessed.[8] If the Big Five personality domains are associated with emotional distress, the assessment of personality by oncology care teams could facilitate the delivery of tailored psychosocial interventions.[22]

The present study was the first to investigate whether the Big Five personality domains were associated with clinically significant emotional distress in prostate cancer, including the presence of depression, anxiety, and suicidal ideation. Analyses controlled for key demographic and clinical covariates of age, education level, cancer stage, time since diagnosis, and comorbidities. Based on prior literature,[19,21] we hypothesized that neuroticism and introversion would be associated with increased emotional distress.

2 | METHODS

2.1 | Participants and procedures

Participants were men self-identified with prostate cancer who completed a cross-sectional online survey conducted at the University of Rochester, James P. Wilmot Cancer Institute. Participants were included if they were ≥18 years old, had a diagnosis of prostate cancer, were receiving oncologic care, and able to read English. They were recruited using the NIH Clinical and Translational Science ResearchMatch participant recruitment tool,[23] which provides researchers at over 100 institutions with access to an international sample of over 90 000 patient volunteers, and through links posted at the Prostate Cancer InfoLink Social Network, educational and discussion websites, and social media. All participants completed a consent document where they were informed that they would be completing a survey on psychosocial constructs and health. They were not required to have received treatment in a particular country. The study was approved by the local Institutional Review Board (ethical approval #RSRB00037941).

2.2 | Measures

2.2.1 | Demographic and health characteristics

Participants self-reported their age, gender, race/ethnicity, geographic location, education, and marital status. Participants also responded to questions about their health status, including time since diagnosis, cancer stage (assessed by presence/absence of distant metastases), types of common cancer treatments, and comorbidities (angina, arthritis, blindness or trouble seeing, chronic back pain or sciatica, chronic heart burn or ulcers, congestive heart failure, deafness or ear trouble, diabetes, heart attack, hypertension or high blood pressure, limitation in arm or leg, liver trouble, and stroke or mini stroke or TIA). Health-related quality of life was assessed by the first 6 items of the Functional Assessment of Cancer Therapy-General Physical Subscale[24] and the McGill Quality of Life Questionnaire global quality-of-life rating.[25]

2.2.2 | Personality

Personality was assessed using a well-validated 20-item personality scale (Mini-IPIP).[26] Each domain (neuroticism, introversion, openness, agreeableness, and conscientiousness) was assessed using a 4-item subscale. Participants reported the extent to which items, such as "Get upset easily" (neuroticism) and "Don't talk a lot" (introversion) described their typical behavior, using a scale from 1 (*very inaccurate*) to 5 (*very accurate*). Responses were summed to yield overall scores for each of the 5 personality domains: neuroticism (α = .77), introversion (α = .79), openness (α = .65), agreeableness (α = .70), and conscientiousness (α = .65). These estimates of internal consistency were similar to those observed elsewhere, and the IPIP has shown validity in illness-defined samples.[27] Personality was dichotomized to ease clinical interpretation,[28] with participants classified as high (≥median) or low (<median) for each personality domain.

2.2.3 | Emotional distress

Emotional distress was evaluated using measures of depression, anxiety, and suicidal ideation. Depression and anxiety were assessed using 7-item subscales from the Depression Anxiety Stress Scale (DASS-21),[29] which is valid in illness-defined populations[30] including prostate cancer.[7] Sample items included "I felt down-hearted and blue" (depression) and "I felt scared without any good reason" (anxiety). Participants rated the extent to which they experienced each symptom during the past week, with response options of 0 (*not at all*), 1 (*some of the time*), 2 (*a good part of the time*), or 3 (*most of the time*). Internal consistency (depression: α = .91; anxiety: α = .68) was similar to that observed elsewhere. Using established cutoffs,[29] participants were classified as having clinically significant symptoms of depression or anxiety if they scored ≥7 on the depression subscale and ≥5 on the anxiety subscale. Participants also responded to the PHQ suicide item[31]: "I had thoughts that I would be better off dead, or of hurting myself in some way."

Response options were adapted to conform to the same 4-point rating scale as the DASS-21, with suicidal ideation classified as present (responses 1–3) or absent (response 0). The PHQ suicide item is valid in cancer samples.[32] Participants were classified as having general emotional distress if they reported clinically significant symptoms on any of the 3 measures (ie, depression, anxiety, or suicidal ideation). All participants received a list of mental health resources in case they experienced distress during the study.

2.3 | Statistical methods

Basic descriptive statistics and zero-order correlations were examined among all study variables. For our primary analyses, we used odds ratios (*OR*) from binary logistic regression to evaluate the relationship between each personality variable (predictor) and likelihood of experiencing emotional distress (categorical dependent variable). Personality variables were entered simultaneously. In the primary model, the dependent variable was general emotional distress, with secondary models separately examining depression, anxiety, and suicidal ideation. Covariates in all models included age, education level (presence/absence of a bachelor's degree), time since diagnosis, presence of comorbidities, and presence of metastases. All models checked for assumptions involving normality and multicollinearity. Sensitivity analyses used continuous indicators of the predictors and/or outcome variables.

3 | RESULTS

3.1 | Sample characteristics

Participants were 212 men self-identified with prostate cancer (see Table 1). They were ages 42 to 84 (M = 62.43). The majority were white, married, and college educated. They were geographically distributed across the United States (31.6% from the South, 20.8% from the Midwest, 18.4% from the West, and 11.8% from the North) and internationally (17.5%). Participants scored a mean of 7.10 on the McGill quality-of-life item. On the Functional Assessment of Cancer Therapy-General, 84.4% reported a lack of energy, 50.5% reported pain, and 68.4% reported being bothered by treatment side effects. Many (71.7%) reported having a comorbidity, most commonly hypertension (49.1%), chronic back pain (21.7%), and impaired hearing (20.8%). The median time since diagnosis was 1.5 years and 27.4% had metastatic disease. Treatments included radiation (29.7%), chemotherapy (9.4%), surgery (22.2%), biologic/targeted therapy (9%), unknown (9%), and other treatments (24.1%), or none of these (22.2%). The most common treatment combination was radiation and surgery (6.6%). Emotional distress was reported by 36.8% of participants: depression (23.1%), anxiety (15.1%), and suicidal ideation (9.9%).

3.2 | Univariate associations

3.2.1 | Demographic and clinical characteristics

Correlations among all study variables are shown in Table 2. College graduates had a lower likelihood of general emotional distress (P = .029), including anxiety (P = .031) and suicidal ideation (P = .006). Younger participants were more likely to have anxiety (P = .045). Participants with metastases had an increased likelihood of experiencing general emotional distress (P = .006).

TABLE 1 Descriptive statistics

Variables	*N*	%
Demographic and Health Characteristics		
Age		
≥65	80	37.7%
<65	132	62.3%
White	193	96.2%
Married	179	84.4%
Educated, Bachelor's or higher	147	69.2%
Time since diagnosis, years		
0–0.50	44	20.8%
0.51–1.00	45	21.2%
1.01–3.00	66	31.1%
3.01 or greater	57	26.8%
Metastases present	58	27.4%
Comorbidity present	152	71.7%
Personality		
Neuroticism, high (neurotic)	119	56.1%
Introversion, high (introverted)	104	49.1%
Openness, high (open)	110	51.9%
Agreeableness, high (agreeable)	121	57.1%
Conscientiousness, high (conscientious)	120	56.6%
Emotional distress present		
General distress	78	36.8%
Depression	49	23.1%
Anxiety	32	15.1%
Suicidal ideation	44	9.9%

Note: N = 212. Personality was measured using the IPIP, depression and anxiety with the DASS-21, and suicidal ideation with the PHQ. Personality was dichotomized using median splits. Emotional distress was categorized using clinically defined cutoffs (see Method). General emotional distress refers to any clinically significant depression, anxiety, or suicidal ideation; this percentage is lower than the sum of the constituent components due to overlap.

3.2.2 | Personality

As hypothesized, neuroticism was associated with an increased likelihood of general emotional distress (P = .008), including both depression (P = .001) and suicidal ideation (P < .001). Introversion was also associated with an increased likelihood of general emotional distress (P = .013), especially depression (P = .009). Although not anticipated, conscientiousness was associated with a lower likelihood of anxiety (P = .018).

3.3 | Multivariate regression analyses

3.3.1 | Primary model

As hypothesized, personality was associated with emotional distress in logistic regression analyses (see Table 3). Specifically, patients with high neuroticism (31.9%) were more likely than those with low neuroticism (11.8%) to report depression (P = .001). Neuroticism was also associated with greater likelihood of suicidal ideation (29.4% vs 9.7%, P = .001). Additionally, introverts (30.8%) were more likely than extraverts (15.7%) to report depression (P = .014). None of

TABLE 2 Correlations among study variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Demographics and Health																
1	Age (≥65)															
2	White	−.05														
3	Married	−.10	−.02													
4	Education, Bachelor's degree or higher	.01	−.13	.05												
5	Time since diagnosis	.23**	.00	−.16*	−.03											
6	Comorbidity present	.23**	−.07	.02	−.05	.14*										
7	Metastases present	.20**	.01	−.15*	−.01	−.26***	−.04									
Personality																
8	Neurotic	−.18*	−.03	.01	−.05	−.09	.16*	−.20**								
9	Introverted	.03	−.05	.16*	.06	−.12	.03	−.01	.01							
10	Open	−.07	.01	.00	.02	−.01	−.17*	.17*	−.19**	−.02						
11	Agreeable	.01	.03	−.14*	.09	.00	−.08	.11	−.15*	−.18**	.12					
12	Conscientious	.07	−.07	−.01	.04	−.01	−.06	.08	−.14*	−.21**	.03	.22**				
Emotional distress																
13	General emotional distress	−.13	.00	−.05	−.15*	−.11	.00	.19**	.18**	.17*	.05	−.05	−.08			
14	Depression	−.08	−.07	.02	−.10	−.08	−.05	.04	.24**	.18**	−.05	−.09	−.13	.72***		
15	Anxiety	−.14*	.08	.04	−.15*	−.04	.12	.01	.11	.11	.04	−.01	−.16*	.55***	33***	
16	Suicidal ideation	−.11	.04	−.07	−.19**	−.09	.04	.03	.24***	.03	.05	−.10	−.05	.67***	.46***	.24***

Note. All variables are dichotomous, except for time since diagnosis.

*$P < .05$.

**$P < .01$.

***$P < .001$.

TABLE 3 Logistic regression analyses of neuroticism and introversion predicting general emotional distress, depression, and suicidal ideation

	General Emotional Distress[a]				Depression				Suicidal Ideation			
Predictor	**%**	**OR**	**95% CI**	***P***	**%**	**OR**	**95% CI**	***P***	**%**	**OR**	**95% CI**	***P***
Age												
≥65	28.8%	0.55	[0.23–1.41]	.082	18.8%	0.88	[0.40–1.92]	.746	15.0%	0.67	[0.29–1.53]	.336
<65	41.7%	1.00			25.8%	1.00			24.2%	1.00		
Education												
College or higher	32.0%	**0.43**	**[0.22–0.85]**	**.015**	20.4%	0.53	[0.23–1.12]	.096	15.6%	**0.36**	**[0.17–0.76]**	**.007**
Less than college	47.7%	1.00			29.2%	1.00			32.3%	1.00		
Comorbidities												
At least one present	36.8%	1.05	[0.51–2.15]	.687	21.7%	0.53	[0.23–1.18]	.120	21.7%	1.13	[0.48–2.66]	.787
Absent	36.7%	1.00			26.7%	1.00			18.3%	1.00		
Metastases												
Present	48.3%	**4.56**	**[2.10–9.79]**	**<.001**	25.9%	2.23	[0.97–5.12]	.058	22.4%	1.81	[0.77–4.23]	.172
Absent	31.2%	1.00			22.1%	1.00			20.1%	1.00		
Time since diagnosis[b]	38.6%	0.88	[0.77–1.01]	.061	20.9%	0.92	[0.79–1.07]	.273	19.2%	0.90	[0.77–1.07]	.232
	35.6%				19.5%				17.6%			
Neuroticism												
High (neurotic)	44.5%	**2.78**	**[1.38–5.61]**	**.004**	31.9%	**4.23**	**[1.83–9.77]**	**.001**	29.4%	**4.15**	**[1.73–9.94]**	**.001**
Low (emotionally stable)	26.9%	1.00			11.8%	1.00			9.7%	1.00		
Introversion												
High (introverted)	45.2%	**2.32**	**[1.20, 4.48]**	**.012**	30.8%	**2.57**	**[1.21–5.45]**	**.014**	22.1%	1.24	[0.58–2.64]	.586
Low (extraverted)	28.7%	1.00			15.7%	1.00			19.4%	1.00		
Conscientiousness												
High	33.3%	0.90	[0.47–1.72]	.741	18.3%	0.72	[0.35–1.47]	.364	19.2%	1.06	[0.49–2.27]	.890
Low	41.3%	1.00			29.3%	1.00			22.8%	1.00		
Agreeableness												
High	34.7%	1.03	[0.53–1.98]	.935	19.8%	0.90	[0.43–1.83]	.763	17.4%	0.75	[0.35–1.58]	.441
Low	39.6%	1.00			27.5%	1.00			25.3%	1.00		
Openness to experience												
High	39.1%	1.19	[0.63–2.26]	.598	20.9%	0.75	[0.36–1.54]	.432	22.7%	1.62	[0.76–3.45]	.209
Low	34.3%	1.00			25.5%	1.00			18.6%	1.00		

Note: Bold values indicate significant multivariate association ($P < .05$) between a personality domain and emotional distress variable. % = proportion of participants in each group who experienced clinically significant general emotional distress, depression, and any suicidal ideation, unadjusted for covariates. *OR* = odds ratio from binary logistic regression analyses that included each of the 5 personality domains simultaneously and covariates of age, education, comorbidity, metastases, and time since diagnosis. CI = confidence interval.

[a]Any clinically significant symptoms of depression, anxiety, or suicidal ideation.

[b]Continuous covariate. % = the predicted proportion of individuals who would experience clinically significant general emotional distress, depression, and any suicidal ideation at 1 year post-diagnosis (first value) vs 2 years post-diagnosis (second value), while holding all other covariates at their mean values.

the personality domains were significant predictors of anxiety in logistic regression (not shown). After controlling for other covariates, college graduates were still less likely to report general emotional distress (*OR* = 0.44, $P = .015$), although this was confined to suicidal ideation (*OR* = 0.36, $P = .007$); education was no longer significantly related to anxiety. The presence of metastases was also associated with the presence of general emotional distress (*OR* = 4.56, $P < .001$), although non-significant when examining the 3 symptom measures separately (*ORs* = 1.45 to 2.23, *ps* > .058).

3.3.2 | Sensitivity analyses

All findings for personality persisted in sensitivity analyses using continuous indicators of personality and/or emotional distress (see Table S1). In contrast to the logistic regression analyses of the primary model, the sensitivity analyses revealed 3 additional significant associations: neuroticism was associated with higher anxiety ($P < .001$) and conscientiousness with less anxiety ($P = .035$) and depression ($P = .005$); although continuous indicators may afford more power, these results are interpreted cautiously because they diverged from the primary model. In summary, neuroticism and introversion were associated with an increased likelihood of emotional distress, including when controlling for demographic and health covariates and in sensitivity analyses.

4 | CONCLUSIONS

This study found that personality was related to emotional distress in prostate cancer. Approximately 37% of the sample reported general

emotional distress, including depression (23%), anxiety (15%), and suicidal ideation (10%). Our findings suggest that emotional distress is more common among patients with certain personality vulnerabilities, such as being neurotic (44.5% vs 26.9%) or introverted (45.2% vs 28.7%), a question prior research failed to examine comprehensively.

Personality-associated differences in emotional distress were apparent for both depression and suicidal ideation, but not anxiety. As hypothesized, participants who were neurotic were more likely to report clinically significant levels of depression (31.9% vs 11.8%) and suicidal ideation (29.4% vs 9.7%). Differences in anxiety were not robust, only discernable in sensitivity analyses using continuous indicators. Also as hypothesized, introverts were more likely than extraverts to report clinically significant depressive symptoms (30.8% vs 15.7%). Neurotic and introverted individuals may have less adaptive appraisals and emotional regulation strategies in response to potentially stressful life transitions, which could help to explain these observed differences in distress. For example, a neurotic individual may appraise a diagnosis of cancer as more threatening or severe and thus experience increased emotional distress. An introvert may be less likely than an extravert to seek out social support and therefore be less equipped to fend off the stress of living with a serious illness.

Although not a primary aim of the study, our results showed that lower socioeconomic status (measured by education level) and presence of metastases were both associated with increased likelihood of emotional distress. Specifically, participants without a bachelor's degree were more likely than college-educated participants to report suicidal ideation, a finding that is especially significant to prostate cancer patients given their elevated rates of death by suicide.[33] Participants with metastatic disease were more likely to experience general distress. These findings suggest that emotional distress is shaped by enduring personality characteristics and by demographic and disease characteristics.

Consistent with prior research,[15,16] personality variables of conscientiousness, openness to experience, and agreeableness were not consistently related to emotional distress. Conscientiousness was related to lower likelihood of depression and anxiety in sensitivity analyses using continuous indicators of personality (see Table S1), perhaps suggesting that varying levels of low conscientiousness may have some association with distress. The FFM describes neuroticism and introversion as being directly related to an individual's style of emotional well-being, whereas the other personality variables are more often related to self-discipline, compliance, and receptiveness to new ideas, characteristics potentially less central to mental health.[28]

4.1 | Clinical implications

Our findings have implications for how emotional distress is managed in oncology care teams. Now that distress-screening is becoming the norm in many cancer centers,[10] oncology care teams will increasingly need to help patients receive timely, affordable, accessible, evidence-based mental health treatment. One approach could incorporate brief measures of personality into electronic health records during routine oncology care, which could be used to inform psychosocial care.[22] For example, neurotic patients may benefit from interventions, such as bias modification[34] or yoga,[35] that aim to calm and regulate emotions. Introverted patients may benefit from group treatments that could help them feel less alone.[35] Care coordinated among patients' primary care physicians and specialists (eg, oncologist, psychiatrist, urologist) has shown to effectively address emotional distress in cancer patients.[36] Integrating psychologists into this collaborative care model could strengthen care by helping physicians interpret personality screenings and offering more in-depth personality assessment. Thus, neurotic and introverted patients may benefit from closer monitoring and increased coordination by their care teams.

4.2 | Study limitations

Our findings are qualified by 3 limitations. First, our sample was more likely to be younger, white, and college-educated than some prior studies in prostate cancer,[7,8,21] and all participants could read English. There is a need for studies on more diverse samples, patients with other cancer types, and women. Second, data were unavailable on prostate-specific antigen (PSA) levels, time since treatment, and medication use. Third, our study's cross-sectional design precludes causal claims about the relationships between personality, clinical factors, and emotional distress. Although individual differences in personality emerge early in life, we recognize that the diagnosis of cancer might influence personality. For example, whereas individuals often exhibit stable or slightly decreasing levels of neuroticism as they age, those normative age-associated patterns might not be observed in patients with chronic or serious illness.[13] Longitudinal studies would be helpful for elucidating the directionality of personality-distress associations. Prospective studies have been used to identify psychosocial risk markers for developing cancer.[37] Similar studies are needed to examine whether personality accounts for variation in reactions to health events, such as disease progression or the experience of changes in PSA.

In conclusion, neuroticism and introversion were associated with an increased likelihood of experiencing general emotional distress and specific symptoms of depression and suicidal ideation in prostate cancer. Findings suggest that reports of emotional distress are shaped by patients' personalities. These enduring patterns of thinking and interacting with the world could be addressed during collaborative care-managed psychosocial intervention.

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ORCID

Laura M. Perry http://orcid.org/0000-0001-6144-6266
Paul Duberstein http://orcid.org/0000-0001-6882-0898

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

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