Research report

Personality and seasonal affective disorder: Results from the CAN-SAD study

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Abstract

Background: Personality factors have been implicated in seasonal affective disorder (SAD). The present study investigated the relationship between the five-factor model of personality (neuroticism, extraversion, openness, agreeableness, conscientiousness) and SAD.

Methods: Ninety-five patients with SAD completed personality measures before and after treatment in a clinical trial and during the summer months. The personality scores of the SAD patients were compared with a matched group of non-seasonal depressed patients and published normative data. Stability and change in personality scores with changes in mood state were assessed. Personality dimensions were evaluated as possible predictors of treatment outcome.

Results: SAD patients showed elevated openness scores relative to both non-seasonal depressed patients and norms. Their neuroticism scores were lower than non-seasonal depressed patients, but higher than norms. All personality dimensions showed large and highly significant test–retest correlations but several personality dimensions, particularly neuroticism and extraversion, also showed considerable change with changing mood state. None of the personality dimensions were significantly associated with treatment outcome.

Limitations: Personality assessment relied on self-report.

Conclusions: The personality profile of SAD patients differs from both non-seasonal depressed patients and norms. Elevated openness scores appear to be a unique feature of patients with SAD. Since mood state has a significant impact on personality scores, assessment of personality in SAD patients should ideally be conducted when they are in remission. Further investigation of the relationship between personality and SAD, especially the potential significance of elevated openness scores, is warranted.
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Keywords: Depression; Seasonal affective disorder; Personality

1. Introduction

Seasonal affective disorder (SAD) is a mood disorder in which patients experience recurrent episodes of major depression in a seasonal pattern, most commonly winter

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depression (Rosenthal et al., 1984). There has been a tendency to view SAD as a biological sub-type of depression as light appears to play a central role in both the etiology of SAD and its treatment (Lam and Levitan, 2000). Early studies of personality factors in SAD suggested that patients with SAD were characterized by relatively normal personality structure (e.g. Schulz et al., 1988; Schuller et al., 1993). However, over the last ten years preliminary evidence has accumulated to suggest that personality factors play an important role in the onset, expression and/or treatment of SAD (Enns and Cox, 2001).

A number of different personality models have been used to evaluate the relationship between personality and SAD. Some of the most promising results in this area of investigation have arisen in studies using the five-factor model of personality (FFM; Costa and McCrae, 1992). The traits of the FFM do not directly correspond to the categorical personality disorder diagnoses used in DSM-IV, but instead describe continuous dimensions of personality functioning. The empirically derived FFM has been extensively supported as a valid and useful model for describing personality functioning in both normal and clinical populations (Paunonen, 2003; Quirk et al., 2003). The personality dimensions of the FFM include neuroticism, extraversion, openness, agreeableness, and conscientiousness. Neuroticism is a broad personality dimension that involves proneness to a wide range of negative affects, emotional instability and vulnerability to stress. Extraversion is a personality dimension reflecting sociability, positive emotionality, and assertiveness. Openness involves an appreciation of experiences for their own sake, intellectual curiosity, and willingness to entertain unconventional ideas. The traits that constitute agreeableness include trust, altruism, sympathy and compliance. Orderliness, persistence, achievement striving and self-discipline are reflected in the conscientiousness dimension of the FFM (Costa and McCrae, 1992). Each of the five higher order traits in the FFM is composed of six different lower order facets (e.g. the facets of openness include six aspects of experience to which the individual is open: fantasy, aesthetics, feelings, actions, ideas and values).

Bagby et al. (1996) compared the personality characteristics of 43 patients with SAD and 57 patients with recurrent non-seasonal major depression. After controlling for depression severity (patients were currently depressed), SAD patients were found to have significantly higher openness scores than the non-seasonal depressed patients. The facets of openness contributing to this effect included openness to aesthetics, feelings, and ideas. The authors speculated that SAD patients may have a heightened sensitivity to changes in light (openness to

aesthetics), experience normal mood fluctuations more intensely than most (openness to feelings), and may search for external and relatively unconventional explanations, such as lack of sunlight, for their depression (openness to ideas). Limitations of this study included measurement of personality during a depressive episode (not when patients were in remission) and the use of SAD and non-seasonal depressed patients that were unmatched for depression severity.

Jain et al. (1999) compared the personality profiles of a small group of patients with SAD ($N=24$) and a group of depressed bipolar patients ($N=13$) and evaluated pre- to post-treatment changes in FFM personality dimensions in twenty of the SAD patients. This study replicated the finding of Bagby et al. (1996) of elevated openness in SAD patients. The SAD patients also showed higher extraversion scores and lower neuroticism scores than the bipolar depressed patients, indicating a less disturbed personality profile. Neuroticism and extraversion scores were found to vary from pre- to post-treatment; neuroticism showed a significant decline (effect size $d=.62$) and extraversion showed a trend toward increasing scores (effect size $d=.26$). Methodological limitations of this study included the small sample size, the choice of comparison group, and the use of subjects that were not matched for depression severity.

Lingjaerde et al. (2001) studied FFM personality structure in a group of 82 Norwegian patients with winter SAD who were assessed in a depression free state during the summer using a Norwegian language instrument (5-PF; Engvik, 1994). In comparison to norms, patients with SAD showed lower emotional stability (higher neuroticism), lower surgency (lower extraversion), lower agreeableness and higher conscientiousness. In contrast to earlier studies by Bagby et al. (1996) and Jain et al. (1999) this study did not demonstrate elevated openness scores in SAD patients. It is not clear whether the negative finding with regard to openness was due to cultural differences in the study sample, differences in the measurement of personality dimensions or other factors.

Studies to date have yielded preliminary evidence for a potentially important relationship between SAD and several of the personality dimensions of the FFM. In keeping with studies of non-seasonal depression, higher neuroticism scores and lower extraversion scores appear to be associated with SAD (Lingjaerde et al., 2001). However, it is unclear whether the neuroticism and extraversion scores of SAD patients are similar to non-seasonal depression patients (Bagby et al., 1996) or less pathological than non-seasonal depression patients (Jain et al., 1999). Two studies showed significantly higher

openness scores in SAD patients in comparison to psychiatric control groups (Bagby et al., 1996; Jain et al., 1999) but no study to date has confirmed that openness scores in SAD patients differ from population norms. The effect of FFM personality dimensions on treatment outcome in SAD has not been investigated.

The following research questions were addressed in the present study:

1. Do patients with SAD have a different personality profile than matched patients with non-seasonal depression? We hypothesized that patients with SAD would show higher levels of openness and extraversion and lower levels of neuroticism.
2. Does the personality profile of patients with SAD differ from general population norms? We hypothesized that patients with seasonal depression would show higher levels of neuroticism and openness and lower levels of extraversion.
3. Are measures of personality stable over time and with changes in mood state in patients with SAD? We hypothesized that in SAD patients, personality variables would show relative stability (reflected in large, highly significant test–retest correlations), but that some personality variables (especially neuroticism and extraversion) would show significant change from pre-treatment to post-treatment and the summer months.
4. Do personality factors predict outcome in patients with SAD? We predicted that lower neuroticism scores, and higher extraversion and openness scores would be associated with better response to acute treatment and lower depression scores in the summer.

For research questions 2, 3, and 4 supplementary analyses for the six lower-order facets of openness (fantasy, aesthetics, feelings, actions, ideas, values) were undertaken whenever significant findings for the higher order openness factor were obtained.

2. Methods

2.1. Participants

The present study was conducted with the participants in the CAN-SAD study (Lam et al., 2006). The CAN-SAD study was an eight-week multi-centre trial comparing the antidepressant effectiveness of light treatment and fluoxetine in SAD. Ninety-six patients meeting DSM-IV criteria for major depressive disorder with a seasonal pattern based on the Structured Clinical Interview for DSM-IV (SCID; First et al., 1996) were randomized to

receive either light therapy (10,000 lux for 30 min in the morning) plus placebo capsules OR fluoxetine capsules (20 mg) plus morning dim light exposure (200 lux). Patients were required to have a baseline 17-item Hamilton Rating Scale for Depression (HRSD; Hamilton, 1967) score of at least 20, or a 24-item HRSD (including 7 items measuring reversed vegetative symptoms) score of at least 23. Patients with bipolar I disorder were excluded, but 5 patients (5.3%) had bipolar II disorder. Thirty-two (33.3%) of participants had atypical depressive features. A family history of mood disorders was noted in 41 patients (42.8%). Forty-eight eligible patients were randomized to each treatment condition. Overall, there were no significant differences in treatment outcome between the treatment conditions, though light treatment showed a small advantage in speed of response. The mean age of the 95 participants (32 men, 63 women) who provided complete pre-treatment personality data was 43.8 ± 10.8 years.

To evaluate research question 1, a matched comparison group was selected from a database of patients with non-seasonal depression at the Winnipeg study site. These patients had been clinically referred or recruited by newspaper advertisement for a series of antidepressant medication clinical trials for non-seasonal depression (similar recruitment method to the CAN-SAD trial). They all met DSM-IV criteria for major depressive disorder and were experiencing a major depressive episode at the time of completing study measures. Participants in the comparison group were matched with CAN-SAD trial participants on the basis of gender, age (within 2 years), and Beck Depression Inventory (BDI-II; Beck et al., 1996) scores (within 2 points). The mean age of the matched sample was 43.8 ± 10.8 years.

All participants provided informed written consent to participate in the study.

2.2. Measures

NEO-Five Factor Inventory (NEO-FFI; Costa and McCrae, 1992). The NEO-FFI is a reliable and valid 60-item measure that assesses the FFM personality traits: neuroticism, extraversion, openness, agreeableness and conscientiousness. Each item of the NEO-FFI consists of a self-report statement to which respondents record their level of agreement or disagreement on a five-point likert scale.

NEO-Personality Inventory Revised (NEO-PI-R; Costa and McCrae, 1992). The NEO-PI-R assesses the same higher-order personality traits using the same format as the NEO-FFI but has a larger number of items (240) and assesses six lower-order facets of each personality

trait. Participants completed the 48 items of the NEO-PI-R required to evaluate the six facets of openness: fantasy, aesthetics, feelings, actions, ideas and values.

Beck Depression Inventory (BDI-II; Beck et al., 1996). The BDI-II is a commonly used 21-item self-report measure of depression severity over the past two weeks. The BDI-II incorporates items measuring hypersomnia, increased appetite and weight gain and in comparison to the original BDI, its item content more closely reflects DSM-IV criteria for major depressive disorder. Hamilton Rating Scale for Depression (HDRS; Hamilton, 1967). A 24-item version of the HDRS (HDRS-24) incorporating the original 17 scored items plus 7 additional items reflecting reversed vegetative symptoms that are common in SAD was used for the present analyses. The HDRS ratings were conducted by board-certified psychiatrists blind to treatment assignment using the Structured Interview Guide for the Hamilton Depression Rating Scale, SAD Version (SIGH-SAD; Williams et al, 1988).

2.3. Procedure

Participants in the CAN-SAD trial completed personality measures prior to the start of study treatment ($N=95$), after 8 weeks of randomized study treatment ($N=82$), and during the summer (July or August) following their study participation ($N=68$). A total of 62 SAD patients provided complete personality data for all three time points.

To address research question 1, pre-treatment NEO-FFI scores of the 95 CAN-SAD participants were compared with the 95 non-seasonal depressed patients using t-tests. Openness facet scores were not available for the non-seasonal depressed patients.

To address research question 2, NEO-FFI and openness facet scores of the CAN-SAD participants who completed personality measures during the summer months were compared with the adult normative sample ($N=1000$) described in the NEO-PI-R manual (Costa and McCrae, 1992) using t-tests. In keeping with Michalak et al. (2005) patients were required to have a BDI-II score <18; four patients were eliminated for the analyses, leaving a SAD patient sample of 64 patients with a mean BDI-II score of 5.4 ± 4.6.

Research question 3 considered the relative stability and degree of change of personality scores over time and with changes in mood state in SAD patients. To assess stability of the NEO-FFI and openness facet scores over time and with changes in affective state, two test–retest correlation coefficients were calculated for each personality variable; between pre-treatment and post-

treatment ($N=82$) and between post-treatment and the summer months ($N=62$). To evaluate changes in personality scores with changes in mood state in SAD patients, the 62 patients with complete personality data (pre-treatment, post-treatment, and summer) were evaluated using repeated measures analysis of variance (ANOVA), with one within-subjects factor (time) and one between subjects factor (treatment condition). A Greenhouse–Geisser correction was conducted to adjust for degrees of freedom if the Mauchly Test of Sphericity was significant.

The fourth research question was addressed using multiple regression analyses. Separate regression models were evaluated for each personality dimension for each of four dependent variables: BDI-II score post-treatment and during the summer months and HDRS-24 score post-treatment and during the summer months. In the first block of each regression model, pre-treatment symptoms (BDI-II or HDRS-24) were controlled. In the second block of each regression model, treatment condition (1 = light, 2 = fluoxetine) and pre-treatment NEO-FFI personality dimensions were entered. In the third block, interaction terms (personality dimension × treatment condition) were entered. The interaction term in block 3 was utilized in consideration of the possibility that personality variables may differentially predict response to light or fluoxetine treatment.

In view of the relatively large number of comparisons being conducted in the present study, a conservative α of .01 was used to evaluate the statistical significance of study findings. The criteria of Cohen (1992) were used to describe effect sizes.

3. Results

The comparison of personality scores in SAD and non-seasonal depressed patients is shown in Table 1. The

Table 1
Comparison of personality dimensions in SAD patients ($N=95$) and matched non-seasonal depressed patients ($N=95$) during a depressive episode

Personality variable	SAD patients	Non-SAD patients	t-value
	Mean (SD)	Mean (SD)	
Neuroticism	30.7 (7.3)	34.0 (7.1)	−3.24**
Extraversion	21.8 (7.0)	20.8 (7.2)	0.98
Openness	30.2 (5.6)	25.8 (6.4)	5.03***
Agreeableness	30.5 (6.6)	30.7 (7.5)	−0.16
Conscientiousness	27.5 (8.1)	28.1 (8.5)	−0.47

Notes:
**$p<.01$. ***$p<.001$.
SAD and non-seasonal depressed patients were matched with regard to age, gender and depression severity.

Table 2
Comparison of personality dimension in SAD patients during the summer months ($N=64$) with NEO adult norms ($N=1000$)

Personality variable	SAD patients	NEO adult norms	t-value
	Mean (SD)	Mean (SD)	
NEO-FFI			
Neuroticism	23.3 (8.9)	19.1 (7.7)	3.74***
Extraversion	25.2 (6.7)	27.7 (5.8)	−2.96**
Openness	30.9 (6.3)	27.0 (5.8)	4.79***
Agreeableness	32.5 (5.7)	32.8 (4.9)	−0.53
Conscientiousness	31.4 (6.8)	34.6 (5.9)	−3.63***
Openness Facets			
Fantasy	18.4 (5.5)	16.6 (4.9)	2.62*
Aesthetics	20.5 (6.1)	17.6 (5.3)	3.74***
Feelings	22.6 (4.0)	20.3 (4.0)	4.43***
Actions	17.0 (3.7)	16.4 (3.7)	1.26
Ideas	19.7 (5.1)	19.0 (5.0)	1.05
Values	22.8 (4.0)	20.7 (4.1)	4.03***

Note:
*$p<.05$. **$p<.01$. ***$p<.001$.

mean BDI-II score of the SAD patients was 23.8 ± 8.8 and the mean score of the matched non-SAD depressed patients was 23.7 ± 8.9 indicating excellent matching for self-reported depression severity. SAD patients had lower neuroticism scores and higher openness scores than matched non-seasonal depressed patients. No significant differences were observed for extraversion, agreeableness or conscientiousness.

The comparison of personality scores in SAD patients during the summer months and population norms is

Table 3
Test–retest correlations for personality dimensions in patients with SAD

Personality variable	Time 1–Time 2[a]	Time 2–Time 3[b]
NEO-FFI		
Neuroticism	.56	.70
Extraversion	.58	.87
Openness	.79	.87
Agreeableness	.75	.80
Conscientiousness	.74	.81
Openness facets		
Fantasy	.79	.79
Aesthetics	.82	.90
Feelings	.53	.77
Actions	.78	.79
Ideas	.73	.80
Values	.78	.78

Notes:
Time 1 = pre-treatment; Time 2 = post-treatment; Time 3 = summer remission.
[a]Sample size at Time 2 was 82.
[b]Sample size at Time 3 was 62.
All correlations were statistically significant $p<.001$.

shown in Table 2. SAD patients had higher neuroticism and openness scores and lower extraversion scores than the norms. In addition, the SAD patients showed lower levels of conscientiousness than the norms. At the openness facet level, SAD patients had elevated scores on aesthetics, feelings and values in comparison to norms.

Test–retest correlations for the SAD patients are shown in Table 3. Each of the personality dimensions showed evidence of considerable relative stability, with all test–retest correlations being large and highly statistically significant ($p<.001$). The lowest test–retest correlations were observed for neuroticism and extraversion. Test–retest correlations were generally higher for Time 2–Time 3 in comparison with Time 1–Time 2.

Repeated measure ANOVAs for each personality dimension showed significant effects of time for neuroticism ($F=40.62$, $p<.001$), extraversion ($F=27.72$, $p<.001$), openness ($F=5.59$, $p<.01$) and conscientiousness ($F=11.67$, $p<.001$), and for the openness facets of feelings ($F=5.26$, $p<.01$), actions ($F=8.89$, $p<.001$) and ideas ($F=8.79$, $p<.001$). No significant effects were observed for treatment group, or time × treatment group interactions in any of the analyses, indicating that the two active treatments had no differential effects on personality scores. Accordingly, overall group means (combining the two treatment groups) are presented in Table 4. The change in neuroticism (declining scores) reflected a large

Table 4
Personality scores over three time points for combined light and fluoxetine treatment groups

Personality variable	Scale means (standard deviation)			Effect size (Cohen's d)
	Time 1	Time 2	Time 3	Time 1 vs Time 3
NEO-FFI				
Neuroticism	30.2 (7.6)	23.3 (7.8)[a]	23.1 (8.8)[b]	.86
Extraversion	20.3 (6.1)	24.4 (6.5)[a]	24.9 (6.8)[b]	.71
Openness	29.8 (5.7)	30.4 (6.2)	31.2 (6.3)[b]	.22
Agreeableness	31.3 (6.6)	31.9 (5.6)	32.9 (5.6)	.25
Conscientiousness	28.5 (8.5)	30.9 (7.3)[a]	31.2 (6.9)[b]	.36
Openness facets				
Fantasy	17.7 (5.7)	17.8 (5.3)	18.2 (5.5)	.10
Aesthetics	19.5 (5.9)	19.7 (5.7)	20.4 (5.9)	.16
Feelings	21.5 (4.1)	22.3 (3.8)	22.8 (4.1)[b]	.32
Actions	15.6 (3.4)	16.5 (3.5)[a]	16.8 (3.8)[b]	.36
Ideas	18.0 (4.6)	19.2 (5.1)[a]	19.9 (5.1)[b]	.40
Values	22.4 (3.3)	22.5 (3.9)	23.2 (3.9)	.24

Notes: $N=62$.
Time 1 = pre-treatment; Time 2 = post-treatment; Time 3 = summer.
Subscripts indicate significant differences ($p<.01$) in group means across the three time points: [a]Time 1 vs Time 2, [b]Time 1 vs Time 3.

effect size while the change in extraversion (increasing scores) approached a large effect size. Much of the change in these two measures occurred between the pre-treatment and post-treatment assessments. Measures of openness and conscientiousness each showed gradually increasing scores over time, but the change in these dimensions reflected small effect sizes.

Regression analyses failed to demonstrate that any of the personality dimensions considered in this study were predictive of outcome.

4. Discussion

The findings of the present study provide further evidence for an important relationship between FFM personality dimensions and seasonal affective disorder. Most of the findings were in keeping with study hypotheses.

Patients with SAD were observed to have elevated openness scores in comparison to carefully matched non-seasonal depressed patients. The use of SAD and non-SAD patients matched for BDI-II score increases our confidence that the result is not due to differences in depression severity between groups. The present study also extended the findings of earlier authors by demonstrating that SAD patients have elevated openness scores compared to norms. At the openness facet level, SAD patients were characterized by elevated scores on openness to aesthetics, feelings and values. Bagby et al. (1996) observed elevated aesthetics, feelings and ideas facets in depressed SAD patients compared to non-seasonal depressed patients. These results suggest that SAD patients are characterized by a high level of receptivity to emotions, a tendency to experience more intense emotions, and heightened sensitivity to their environment. They may also be open to the unconventional in both ideas and values. These traits may help understand how SAD patients are prone to experiencing amplified reactions to the external environment (that is, the reduced photoperiod of the winter months), and to experiencing exaggerated negative emotionality in response to seasonal change in vegetative symptoms (increased sleep and appetite) (Bagby et al., 1996; Murray et al., 2002).

The present study also found evidence that SAD patients have elevated levels of neuroticism in comparison to norms. This result parallels the observations of Lingjaerde et al. (2001). Two other studies showed that depressed SAD patients have lower neuroticism scores than other depressed patients (Bagby et al., 1996, Jain et al., 1999). The present study confirms this observation using patients with matched depression severity. It appears that

SAD patients have a level of neuroticism intermediate between norms and non-seasonal depressives.

The robust and fairly consistent association between SAD and elevated levels of openness and neuroticism can be interpreted in the context of a dual vulnerability model, as originally proposed by Young et al. (1991) and elaborated by Lam et al. (2001). In this model, SAD develops when an individual has a combination of significant seasonal physiological symptoms (e.g. energy, sleep, appetite) [seasonality factor] and a vulnerability to develop secondary depression symptoms (e.g. low mood, guilt, anxiety, rumination) [depression factor]. Exaggerated responsiveness to changing photoperiod manifests as winter pattern seasonality (Murray et al., 2002) and is associated with openness. Vulnerability to distress symptoms in response to seasonal changes in physiological symptoms is associated with neuroticism and is a component of the depression factor. Individuals with high levels of seasonality (openness) but too high of a loading on the depression factor (neuroticism) may not show a pattern of SAD because their higher level of vulnerability to distress may manifest as non-seasonal depressive episodes (and other forms of psychopathology). This would explain why neuroticism scores in SAD are at an intermediate level between norms and non-seasonal depressed patients.

The results of the present study also indicated lower levels of extraversion and conscientiousness in SAD patients in comparison to norms. Lingjaerde et al. (2001) found the same result for extraversion (surgency) but actually noted elevated levels of conscientiousness in remitted SAD patients. No clear reason for the discrepancy in the findings regarding conscientiousness is evident. Low extraversion has been hypothesized to be an important aspect of vulnerability to non-seasonal depressive disorders (Enns and Cox, 1997) and, in comparison to neuroticism, may be more specific to depression because of its important relationship to anhedonia (Clark and Watson, 1991). The combination of low extraversion and high neuroticism could potentially be important in the depression factor of the dual vulnerability model discussed above.

Mood state has an important influence on the assessment of personality in patients with SAD. Patients showed statistically significant change from pre-treatment to the summer months on four of the five dimensions of the NEO-FFI (neuroticism, extraversion, openness and conscientiousness) with most of the change occurring fairly rapidly in the eight weeks between pre- and post-treatment assessments (Table 4). Neuroticism, extraversion and conscientiousness each changed in the direction of normality but the SAD

patients' scores on these dimensions remained significantly different from norms. Interestingly, openness scores showed a small progressive increase from pre-treatment to post-treatment to the summer months, thus making the scores of the SAD patients even more elevated in comparison to norms. Elevated openness scores are thus detectable in SAD patients both during acute depressive episodes and during the summer and cannot be considered an artifact of the depressed state.

Despite the finding of significant change in several personality dimensions, the present study also noted considerable relative stability in personality scores as indicated by test–retest correlations (Table 3). The great majority of the test–retest correlations exceeded $r = .70$. The only exceptions were for neuroticism and extraversion between pre-treatment and post-treatment ($r = .56$ and $r = .58$ respectively). Thus, FFM personality traits in SAD patients show evidence of both absolute change and relative stability over time and with change in affective state (Santor et al., 1997).

Pre-treatment scores on the FFM personality dimensions were not associated with acute treatment outcome or with depression symptoms in the summer months in the present study. This negative result suggests that pre-treatment FFM personality traits may not be meaningfully related to treatment outcome in SAD, at least for these outcome measures.

The results of the present study should be considered in light of a number of limitations. Participants in the present study were treatment-seeking patients who were recruited to participate in a clinical trial and may not be representative of all SAD patients. Personality trait assessment relied on self-report measurements; the results with observer-rated personality measurement may have differed. Finally, analyses that relied on longitudinal personality trait re-assessments may have been biased by patient dropouts between the pre-treatment and summertime assessments.

The present results have some potential clinical implications. First, in carefully diagnosed patients with SAD, personality factors do not appear to exert a substantial effect on treatment outcome. As such either light therapy or antidepressant medication may be expected to yield therapeutic benefit irrespective of personality. Second, it has been noted that unconventional forms of therapy are often welcomed by patients with high levels of openness (Miller, 1991). Clinical experience suggests that SAD patients embrace the suggestion of light therapy, arguably an unconventional treatment, quite readily. The high levels of openness observed in SAD patients in the present study may help explain this observation. Third, the depressed state has a marked effect on personality assessment in SAD patients. Accordingly, definitive personality assessment may need to be deferred until summer remission of depression symptoms in SAD patients.

In summary, the personality profile of patients with SAD appears distinct from that of non-seasonal depressed patients and norms. The combination of elevated openness and moderately elevated neuroticism was relatively specific to SAD and may be important in personality-based vulnerability to SAD. FFM personality dimensions showed evidence of both absolute change and relative stability over time and with changes in mood state in SAD patients. Studies evaluating personality in SAD should ideally measure patients when they are in a remitted state because of the impact that mood state has on personality scores in SAD. Further studies investigating the relationship between personality and SAD and the potential significance of elevated openness scores in SAD patients are warranted.

Acknowledgements

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