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Personality and risk for serious mental illness

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Abstract

Aim: Certain personality traits may be related to an increased risk of developing a severe mental illness (SMI). This study examined differences in personality characteristics in a sample of youth at-risk of SMI across different clinical stages compared to healthy controls (HCs).

Method: Personality characteristics were assessed with the NEO-Five-Factor Inventory-3 for 41 non-help seeking asymptomatic youth with risk factors for SMI (Stage 0), 52 youth with early mood and anxiety symptoms and distress (Stage 1a), 108 youth with an attenuated psychiatric syndrome (Stage 1b), and 42 HCs.

Results: Symptomatic participants scored significantly higher in neuroticism, and lower in extraversion, and conscientiousness compared to non-symptomatic participants. Compared to published norms, symptomatic participants had ratings of extraversion and conscientiousness in the low range and those with attenuated psychiatric syndromes scored high on neuroticism.

Conclusion: The observed personality profiles of the symptomatic stages were similar to reported profiles for discrete disorders. Early identification of this profile could aid identification of those at risk of SMI.

KEYWORDS

clinical staging, personality traits, psychiatric syndromes, serious mental illness, transdiagnostic, youth mental health

1 | INTRODUCTION

Serious mental illnesses (SMIs) such as schizophrenia, bipolar disorder, or recurrent major depression generally begin in adolescence or young adulthood (de Girolamo, Dagani, Purcell, Cocchi, & McGorry, 2012). However, youth commonly experience undifferentiated, brief, or subclinical symptoms (Hartmann, Nelson, Ratheesh, Treen, & Mcgorry, 2018) and functional impairment (Iorfino et al., 2018) before a disorder reaches threshold for diagnosis. An emerging field in the literature is the work on identification of youth who may be at risk of developing a SMI using a transdiagnostic clinical staging model (Hickie et al., 2013; McGorry, 2013). In this model, using specific criteria, youth can be identified as being at-risk individuals but asymptomatic, being distressed with mild symptoms, or presenting with attenuated syndromes. The clinical features of each stage might represent vulnerabilities to develop a SMI (Cross, Hermens, Scott, Ottavio, & Hickie, 2014; Purcell et al., 2015).

However, little is known about the role of premorbid personality traits in the development of a SMI. Personality characteristics develop in early childhood and remain relatively stable throughout life (Roberts, Walton, & Viechtbauer, 2006). Premorbid personality characteristics may represent a vulnerability marker for mental illness (Cuesta, Gil, Artamendi, Serrano, & Peralta, 2002) and it has been demonstrated that certain personality traits predict differential treatment outcome (Canuto et al., 2009; Canuto, Meiler-Mititelu, Giannakopoulos, & Weber, 2008). Identifying personality traits that may increase vulnerability to a SMI could be relevant in predicting treatment outcome and illness course (Lahey, 2009).

Most of the empirical studies of personality have been based on the Five-Factor Model of personality (FFM, McCrae & John, 1992). Although it has been suggested that specific pattern of FFM personality traits might relate to the onset, severity, and progression of psychiatric disorders (Klein, Kotov, & Bufferd, 2011), meta-analyses demonstrate little diagnostic specificity, with a general personality profile high on neuroticism and low on conscientiousness, extraversion, and openness for schizophrenia, mood, and anxiety disorders compared to healthy controls (Kotov, Gamez, Schmidt, & Watson, 2010; Malouff, Thorsteinsson, & Schutte, 2005; Ohi et al., 2016). It has been reported that in those who experience a depressive episode both in major depression and bipolar disorder there is evidence of an increase in neuroticism and a decrease in extraversion and conscientiousness (Harkness, Bagby, Joffe, & Levitt, 2002; Karsten et al., 2012). A similar pattern of personality traits has been observed in individuals with bipolar disorder who may present with high neuroticism and openness, and lower scores in extraversion, agreeableness, and conscientiousness (Antypa & Serretti, 2014; Dupuis et al., 2016). Although neuroticism has been identified as a predictor of the onset of psychosis (Krabbendam et al., 2002), only one study has described FFM personality profiles in individuals who may be at clinical high-risk for the development of psychosis (CHR). Here CHR participants scored high on neuroticism and openness and low in extraversion, agreeableness, and conscientiousness compared to the normative values (Marshall et al., 2012).

To our knowledge, there are no studies of personality traits among those at-risk for developing SMI. To study youth at-risk of SMI, we have categorized individuals into the following stages (a) asymptomatic individuals with risk factors (Stage 0); (b) individuals with mild symptoms and distress (Stage 1a); and (c) individuals with attenuated syndromes (Stage 1b) that are similar to those proposed by Hickie and McGorry (Hickie et al., 2013; McGorry, 2013). We have previously reported that our allocation process was a good fit clinically to this model (Addington et al., 2019). This study aimed to determine if traits of high neuroticism and low extraversion, and conscientiousness were evident in youth at various stages of risk for SMI. We hypothesize that Stage 1a and Stage 1b participants will have higher scores on neuroticism and lower scores on extraversion and conscientiousness than non-symptomatic youth and healthy controls.

2 | METHODS

2.1 | Participants

Two hundred and forty-three adolescents and young adults were recruited for the Canadian Psychiatric Risk and Outcome (PROCAN) study based at the University of Calgary, and Sunnybrook Health Sciences Centre in Toronto (Addington et al., 2018). The sample consisted of youth with early mood symptoms or sub-threshold psychotic symptoms (symptomatic group; Stage 1a, n = 52; Stage 1b, n = 108), youth at-risk because of a family history of a SMI (Stage 0, n = 41), and healthy controls (HCs, n = 42). Participants were referred by mental health professionals, counselling services, schools, advertisement campaigns, and self-referral (description of the recruitment procedure is provided elsewhere, Addington et al., 2018). Inclusion criteria for the study were: (a) adolescents or young adults (12–25 years old); (b) met the criteria for an attenuated psychotic symptom syndrome or presented with early anxiety or mood symptoms or were asymptomatic but had risk factors for being at risk for SMI. Exclusion criteria for the study were: (a) a lifetime or current Axis I diagnosis of recurrent major depressive disorder, bipolar disorder, or psychotic disorder; (b) an IQ lower than 70; (c) a past or current serious medical condition; or (d) history of a central nervous system disorder.

Those in Stage 0 were asymptomatic youth with risk factors for a SMI such as having: (a) a first-degree relative or several second-degree relatives with a SMI (i.e., bipolar disorder, schizophrenia or psychosis, or recurrent major depressive disorder) as determined by the Family Interview for Genetic Studies (Maxwell, 1996); (b) preterm delivery or low birth weight; (c) sexual or physical childhood abuse; or (d) a developmental disorder. Those in Stage 1a were youth with mild anxiety or early mood symptoms and distress as determined by the Kessler 10 Distress Scale (with scores ranging 20-24) (Kessler et al., 2002). However, they did not meet diagnostic criteria for depression or anxiety based on the Structured Clinical Interview for DSM-5 (SCID-V) (First, Williams, Karg, & Spitzer, 2015). Those in Stage 1b were youth with symptoms of anxiety and depression of moderate severity or subthreshold manic symptoms or met criteria for one of

the psychosis-risk syndromes based on the Structured Interview for Psychosis-Risk Syndromes (McGlashan, Walsh, & Woods, 2010). Entry criteria that were used for stage allocation are described in Table S1.

2.2 | Procedure

Eligibility for the study was assessed through a telephone screen for each participant. Youth who met the inclusion criteria were evaluated in-person by experienced clinical raters who had completed standardized training and who demonstrated adequate reliability at routine reliability checks. The stage allocation of each participant was determined by a consensus decision-making process. Eligibility and consensus on staging were reached by clinical raters after the presentation of detailed vignettes of all participants in weekly meetings supervised by J.A. All participants provided informed consent to participate in PROCAN (parental informed consent and assent were obtained for those under the age of 18). Both the University of Calgary Conjoint Health Research Ethics Board and the Sunnybrook Research Ethics Board granted ethical approval for the study.

2.3 | Measures

Demographic information was collected. Depression were assessed with the Quick Inventory of Depressive Symptomatology (QIDS; Rush et al., 2003). The QIDS has demonstrated high internal consistency both in adult (α = .83; Rush et al., 2003) and adolescent (α = .80; Bernstein et al., 2010) populations; and high concurrent validity compared to other depression scales (Rush et al., 2003). Symptoms of mania were assessed with the Young Mania Rating Scale (YMRS; Young, Biggs, Ziegler, & Meyer, 1978). The YMRS has showed good internal consistency estimates in both adult (α = .66 to .92; Young et al., 1978) and child samples (α = .80 to .91; Fristad, Weller, & Weller, 1995; Youngstrom, Danielson, Findling, Gracious, & Calabrese, 2002); and good convergent validity with other mania scales for adults (*r*'s = .71, .89; Young et al., 1978) and for children (*r* = .83; Fristad et al., 1995). Anxiety was assessed with the Social Interaction Anxiety Scale (SIAS; Mattick & Clarke, 1998) and the Social Anxiety Scale (SAS; Zung, 1971). The SIAS and the SAS had good (α = .88 to .94; Mattick & Clarke, 1998) and moderate (α = .74 to .77; Zung, 1971) internal consistency, respectively. The SIAS had moderate construct validity with other anxiety scales (r's = .58 to .56; Mattick & Clarke, 1998) and the SAS had moderate discriminat validity with a depression scale (*r* = .55; Zung, 1971). The Structured Interview for Psychosis-Risk Syndromes (SIPS) was used to determine if participants met criteria for being at clinical high-risk for psychosis, and the severity of attenuated psychotic symptoms was assessed with the Scale of Psychosis-risk Symptoms (SOPS; McGlashan et al., 2010). Procedures for establishing SIPS reliability followed standards developed for previous multi-site projects (Addington et al., 2012). Finally, to ensure that individuals did not meet any Axis I disorders from the exclusion criteria, the Structured Clinical Interview for DSM-5 Disorders was used (First et al., 2015). Family history of mental illness (i.e., a psychotic disorder, mania or bipolar disorder, or major depression in a first-degree relative) was assessed with the Family Interview for Genetics Studies (FIGS; Maxwell, 1996), which has demonstrated satisfactory internal consistency (α = .92 for depression; .99 for mania; and .94 for psychosis disorders).

Personality characteristics were assessed with the NEO-Five-Factor Inventory-3 (NEO-FFI-3) (McCrae & Costa, 2010), a 60-item self-report inventory with two separate forms, one for adolescents (12-20 years) and other for adults (≥21 years). The NEO-Five-Factor Inventory-3 is a modification of the Revised NEO Personality Inventory (NEO-PI-R) designed to be more comprehensible for adolescents and measures the FFM in a valid and reliable way for this population (McCrae & Costa, 2007; Mccrae, Martin, & Costa, 2005). The NEO-FFI-3 comprises five scales to measure traits or domains of personality Neuroticism represents the tendency to experience psychological stress manifested by negative affect and self-reproach (i.e., "sometimes I feel completely worthless"). Extraversion comprises positive affect, activity, and sociability (i.e., "I like to have a lot of people around me"). Openness includes the need for change and variety, intellectual curiosity, aesthetic sensitivity, and unconventionality (i.e., "I have a lot of intellectual curiosity"). Agreeableness refers to a non-antagonistic and prosocial orientation characterized by high levels of sympathy, altruism, and trust (i.e., "I try to be courteous to everyone I meet"). Finally, Conscientiousness describes strict orderliness, discipline, goal-striving, and dependability (i.e., "I try to perform all the tasks assigned to me conscientiously") (Costa & McCrae, 1992).

Each of the five scales includes twelve 5-point Likert-type items ranging from 1 ("strongly disagree") to 5 ("strongly agree"). Higher raw scores in each scale (0-48) indicate higher levels of the personality trait. In the published norms, raw scores are converted to *T* scores (≤25 to ≥75), where the range of normal scores falls between 45 and 55 (McCrae & Costa, 2010). Previous versions of the NEO-FFI have been validated with excellent convergent validity (Costa & McCrae, 1992). Internal consistency of the NEO-FFI-3 is high (α = .78 to .86), it has good factor structure, and excellent convergent validity with the NEO-PI (McCrae & Costa, 2007).

2.4 | Statistical analyses

One-way ANOVA analyses were performed for continuous sociodemographic variables, and chi-squared tests were performed for categorical variables to compare the four groups. Tukey's tests were employed for post-hoc analyses. Effect sizes were calculated using partial eta squared (η_p^2) calculated for continuous variables. The bivariate associations between groups and personality characteristics were evaluated with Kruskal–Wallis *H* tests for differences between continuous variables that were not normally distributed. The Bonferroni correction was performed to adjust for multiple comparisons and control against type 1 error. The SPSS Version 24 software was used to conduct all statistical analyses.

3 | RESULTS

3.1 | Demographics

There were 41 participants in Stage 0, 52 in Stage 1a, 108 in Stage 1b, and there were 42 HCs. There were 134 females and 109 males and the mean age of the sample was 17.83 (*SD* = 3.7). Stage 1b participants were significantly younger and had less years of education. See Table 1.

3.2 | Clinical variables

All participants in Stage 1a had complaints of mild anxiety or depression and were distressed. However, the symptoms were non-specific. In Stage 1b, 76.9% (*n* = 83) met criteria for CHR status (i.e., met criteria for the Attenuated Psychotic Symptoms Syndrome) according to the Criteria for Psychosis-Risk Syndromes based on the SIPS. Of the other 25 participants in Stage 1b, 10.2% (*n* = 11) met the criteria for moderate depression, 10.2% (*n* = 11) for anxiety syndromes, 1.9% (*n* = 2) for self-harm, and 0.9% (*n* = 1) presented with subthreshold symptoms of mania.

3.3 | Comparison of personality characteristics among stages of risk and healthy controls

There were significant differences between the groups for all the NEO-FII-3 scales (*T* scores), except for the openness subscale. Stage 1a and 1b participants scored significantly higher in neuroticism and lower in extraversion and conscientiousness than Stage 0 participants and HCs. Stage 1b participants scored significantly lower on the agreeableness subscale compared to Stage 0 participants (see Table 2).

3.4 | Comparison of personality characteristics with published norms

The mean *T* scores on all scales were examined relative to the standards provided in the profile form for adolescents (12-20 years), where the range for normal scores falls between 45 and 55. Compared to the normative population, HCs had average scores on all scales except for the neuroticism, in which they scored in the lower range. For Stage 0 participants, similar results were found, with average scores on all the scales, scoring low on neuroticism and high in agreeableness. Both Stage 1a and Stage 1b participants had average ratings on agreeableness, and low ratings on extraversion and conscientiousness, while only Stage 1b participants scored high on neuroticism and Stage 1a participants on openness (See Table 3).

4 | DISCUSSION

This study used a transdiagnostic staging model to explore the personality profiles from the Five Factor Model in a sample of adolescents and young adults. As hypothesized, both Stage 1a and Stage 1b participants had significantly higher scores on neuroticism and lower scores on extraversion and conscientiousness than Stage 0 participants (non-symptomatic youth) and HCs, as well as in comparison to published norms. All groups were in the normal range for openness and agreeableness, whereas the two symptomatic groups were low on extraversion and conscientiousness and those in Stage 1b had high ratings on neuroticism. As a group, Stage 1b participants present with the personality profile of an individual who is undergoing significant psychological distress and has poor resources to cope with the demands. Stage 1a participants seemed to have a similar profile, although they may have better tolerance to stress, reacting with less negative affect to potential adverse events (Costa and McCrae, 1992).

TABLE 1 Demographic characteristics of the sample (*n* = 243)

	Stage of risk					
	HCs (*n* = 42)	Stage 0 (*n* = 41)	Stage 1a (*n* = 52)	Stage 1b (*n* = 108)	Test statistic	Effect size
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)	*F*	η^2
Years of education	12.4 (3.3)	11.5 (3.4)	11.4 (2.6)	10.3[a] (2.6)[a]	6.07***	0.07
Age	19.1 (3.8)	18.4 (4.3)	18.4 (3.5)	16.8[a] (3.3)[a]	5.25**	0.06
	n (%)	*n* (%)	*n* (%)	*n* (%)	χ^2	Cramer's V
Gender[b]	20 (47.6)	23 (56.1)	30 (57.7)	61 (56.5)	1.19	0.07
Race[c]	21 (50.0)	29 (70.7)	33 (63.50)	68 (63.0)	3.99	0.13

Abbreviations: f, female; HCs, healthy controls; Stage 0, non-help seeking with risk factors; Stage 1a, with mild symptoms/distress; Stage 1b, attenuated syndromes.

[a]Post-hoc Tukey's test (alpha level set at .05); Significantly differs from HCs.

[b]Female.

[c]Caucasian.

**$p \leq .01$,

***$p \leq .001$.

TABLE 2 Comparison between different groups and personality traits

	Stage of risk (*n* = 236)									
	HCs (*n* = 41)		Stage 0 (*n* = 41)		Stage 1a (*n* = 52)		Stage 1b (*n* = 102)			
NEO-FII-3	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	$F_{(3,232)}$	η^2
Neuroticism	40.73	10.48	41.37	11.57	55.17[a,b]	10.16	57.26[a,b]	11.06	36.81***	0.32
Extraversion	51.32	10.74	50.22	8.97	42.92[a,b]	9.65	39.63[a,b]	9.41	20.77***	0.21
Openness	52.95	8.31	52.90	10.53	56.15	11.68	52.46	9.74	1.64	0.02
Agreeableness	55.12	10.07	56.88	10.50	52.87	12.16	49.63[b]	13.10	4.44**	0.05
Conscientiousness	52.02	11.37	51.37	9.71	42.58[a,b]	11.22	41.86[a,b]	11.48	13.35***	0.15

Abbreviations: HCs, healthy controls; Stage 0, non-help seeking with risk factors; Stage 1a, with mild symptoms and distress; Stage 1b, attenuated syndromes.
[a]Differs from HCs.
[b]Differs from Stage 0.
**$p \leq .01$,
***$p \leq .001$.

TABLE 3 Levels of personality factors between different stages of risk compared to normative values

NEO-FII-3	HCs (*n* = 41)	Stage 0 (*n* = 41)	Stage 1a (*n* = 52)	Stage 1b (*n* = 102)
Neuroticism	Low	Low	Average	High
Extraversion	Average	Average	Low	Low
Openness	Average	Average	High	Average
Agreeableness	Average	High	Average	Average
Conscientiousness	Average	Average	Low	Low

Note: HCs, healthy controls; NEO-FFI-3, the NEO-Five Factor Inventory-3; Stage 0, non-help seeking with risk factors; Stage 1a, with mild symptoms and distress; Stage 1b, attenuated syndromes.

Analogous results, with evidence of a profile of high neuroticism and low extraversion and conscientiousness, have been noted in individuals with anxiety (Rosellini & Brown, 2011), depression (Hayward, Taylor, Smoski, Steffens, & Payne, 2013), bipolar disorder (Dupuis et al., 2016), schizophrenia (Gurrera, Nestor, & O'Donnell, 2000), psychosis (Lysaker & Taylor, 2007), and those at clinical high risk for psychosis (Marshall et al., 2012). Moreover, these findings have been replicated longitudinally for schizophrenia (Boyette, Nederlof, Meijer, De Boer, & De Haan, 2015) and depression (Hakulinen et al., 2015) showing stability on the traits despite symptom fluctuation. This may indicate that these personality characteristics are not related to the acute phase of these disorders. Since it has been suggested that personality profiles do not seem to have diagnostic specificity (Kotov et al., 2010), a premorbid personality profile may play a role in the risk for developing a SMI broadly vs in a diagnostic-specific manner. However, longitudinal studies from a transdiagnostic model are needed to provide a better understanding of the role of personality profiles in the development of SMI.

Interestingly, Stage 0 participants had lower levels of neuroticism than the average population, which may be a protective factor indicating resilience to develop a SMI. Low neuroticism has been associated with better functioning, lower psychopathology, and resilience (Campbell-Sills, Cohan, & Stein, 2006; Kwapil et al., 2013). Stage 0 is a singular group as they have a family history of SMI; however, they do not present with any psychiatric symptoms themselves. As a group, they also rated high in agreeableness, which has been associated with high warmth (Costa and McCrae, 1992) showing concern, compassion, and care for others (Williams & Simms, 2018). It is possible that, for these particular individuals, their lived experience of having a family member with SMI has shaped their personality traits from early childhood to be resilient and to adopt the role of family carers towards their family members.

Finally, there may be treatment implications as specific personality profiles have been related to differential treatment outcomes. For example, low neuroticism is associated with better treatment outcome (Canuto et al., 2009), and low openness and agreeableness with poorer treatment outcome (Canuto et al., 2008). In depression, a profile of high neuroticism and low agreeableness predicted poorer response to cognitive behavioural therapy compared to pharmacotherapy (Bagby et al., 2008). The identification of specific personality profiles may therefore be useful in predicting treatment outcomes and even in choosing treatments.

A strength of this study is the large sample of adolescents and young adults describing the stages of risk for SMI. However, there are limitations. First, this study is based on cross-sectional data, making it impossible to draw inferences between personality traits and risk of SMI. Secondly, many of our participants were recruited through community health professionals, via triage services or were self-or family

referrals and not directly from ongoing clinical services. Since our sample could be considered non-clinical, it may be that our data cannot be generalized to participants in clinical services. Finally, a common problem to all studies examining personality traits from the FFM personality model is the fact that The Big Five traits are not totally independent of one another (ie, neuroticism is negatively correlated with extraversion, agreeableness, and conscientiousness) (Markon, Krueger, & Watson, 2005).

In summary, youth at-risk for SMI who present with early signs of mood, anxiety or subthreshold psychotic symptoms were characterized by higher neuroticism, lower extraversion, and lower conscientiousness compared to the asymptomatic groups and to published norms, a pattern observed in mental illness such as depression and psychosis. Since personality characteristics typically develop in early childhood and remain quite stable along the lifespan, early characterization of personality profiles could aid in the identification of youth who are might be more vulnerable to SMI, and possibly guide treatment selection in the early stages of illness.

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CONFLICT OF INTEREST

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DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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