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The relationship between temperament and character and subclinical psychotic-like experiences in healthy adults

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Abstract

Background: Considerable data support phenomenological and temporal continuity between psychotic disorders and subclinical psychotic-like experiences (PLE's). Although numerous studies have found similar personality correlates for schizophrenia and schizotypal personality disorder patients, their unaffected first-degree relatives, and healthy adults characterized for schizotypal traits, no study has yet investigated personality correlates of PLE's measured by the Community Assessment of Psychic Experiences (CAPE). Our study sought to examine personality correlates of PLE's using the CAPE in healthy adults.

Method: The CAPE and temperament and character inventory (TCI) were administered to 415 healthy adults. Regressions examined links between TCI traits and overall PLE levels as well as positive and negative PLE's separately.

Results: Consistent with past studies, lower self-directedness (SD) and reward dependence (RD) and higher self-transcendence (ST) and harm avoidance (HA) significantly predicted overall PLE levels. Higher ST and persistence (P) and lower SD significantly predicted higher levels of positive PLE's while lower SD and RD and higher HA, ST, and cooperativeness (C) predicted higher levels of negative PLE's.

Conclusions: Associations between TCI and PLE's using the CAPE are strikingly similar to past work in non-clinical and patient samples and provide additional support for phenomenological continuity between psychotic disorders and sub-syndromal psychotic symptoms.

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Disclosure of interest

The authors declare that they have no conflicts of interest concerning this article.

Keywords

Personality; Temperament; Character; Schizophrenia; Psychosis

Considerable data support the phenomenological and temporal continuity between psychotic disorders and subclinical manifestations of psychotic symptoms in the general population. Subclinical psychotic symptoms, often referred to as psychotic-like experiences (PLE's), may encompass ideational thinking or altered perceptual experiences and are distinguishable from clinically significant psychotic symptoms by their clinical relevance. A recent review and meta-analysis of the literature on PLE's spanning over two decades [38] found that nearly all of the demographic and experiential risk factors for psychotic disorders predicted greater risk of PLE's. This overlap between psychotic disorders and PLE's suggests that similarities in premorbid characteristics, such as personality traits, may also be observed. For example, past findings have evidenced similar personality traits across clinically significant psychosis phenotypes, including schizophrenia (SZ), schizotypal personality disorder (SPD) and their unaffected first-degree relatives [10,17,53]. Moreover, a wide range of studies have shown relationships between dimensions of schizotypy and personality profiles in non-clinical samples similar to those observed in patients with psychotic disorders [2,18,32,35]. To date, however, there are no studies examining the relation between personality dimensions and PLE's as measured by the Community Assessment of Psychic Experiences [55]. Confirming the personality correlates found in SZ spectrum disorders and past schizotypy research using the CAPE would lend additional support to the notion of a fully-dimensional psychosis continuum linking subclinical and clinically significant psychosis phenotypes. Further, exploring whether distinct personality patterns are differentially associated with the positive and negative PLE dimensions measured by the CAPE could provide a more nuanced understanding of the role of personality in subclinical symptom expression along the psychosis continuum. Thus, the present study sought to examine associations between personality traits and PLE's measured by the CAPE in a non-clinical sample, with separate analyses for the CAPE's positive and negative dimensions.

Past studies operationalizing personality into Cloninger's [16] dimensions of temperament and character have found similar temperament and character profiles across several clinically significant psychosis phenotypes. Temperament and character differences between patients with schizophrenia and healthy control participants have been largely consistent, with numerous studies [17,27,29,31,34,48,49,54,58,60], including a large-scale birth-cohort study in Finland [42], finding significantly higher harm avoidance [40,53,54,58] and a character pattern of low self-directedness, low cooperativeness, and high self-transcendence [7,16] in patients with SZ relative to controls. Further, some evidence suggests that in patients with SZ high harm avoidance and low self-directedness may be associated with later expression of negative psychotic symptoms, whereas high self-transcendence may indicate positive psychotic symptoms [11,17,49]. A pattern of high harm avoidance and low self-directedness has also been linked to the five-factor model (FFM) personality trait of high neuroticism [19], and high neuroticism has been shown to significantly increase the risk of developing SZ over and above lifetime occurrence of anxiety and mood symptoms [61].

The unaffected first-degree family members of patients with SZ have also shown a notably similar temperament and character profile to that of SZ patients, with both populations evidencing higher harm avoidance, higher self-transcendence, lower self-directedness, lower novelty-seeking, lower cooperativeness, lower persistence, and lower reward dependence compared to controls [8,24,26,54] although not all studies agree [17,34,56]. One possible, though perhaps somewhat speculative interpretation of non-significant findings in unaffected first-degree family members is that the results may have been biased by the family members wanting to appear healthier than their schizophrenic relatives [17].

Schizotypal personality disorder, which shares many phenomenological characteristics, neuropsychological deficits, genetic risks, and brain function and structure abnormalities with SZ [12,51,52], has also been associated with temperament and character patterns similar to those observed in patients with SZ. Specifically, patients with SPD evidence higher harm avoidance, lower self-directedness, lower reward dependence, lower cooperativeness, and higher self-transcendence versus controls [6,10,39,44,57]. Moreover, a wide range of studies examining personality profiles in healthy adults characterized for schizotypal traits have also been largely consistent with findings derived from patient samples.

The concept of schizotypy [11,41,47] has also considered psychosis-proneness as a personality framework itself [13,22]. Schizotypy studies using Cloninger's [15] temperament and character inventory have found similar results to past work in patient samples, where high levels of schizotypy were linked with higher harm avoidance and self-transcendence as well as low reward dependence, novelty seeking, self-directedness, and cooperativeness [18,24,32] and schizotypy studies using other personality models have found similar results [1–5,28,33,35–37,50,66,67].

In sum, past studies of SZ spectrum disorders and schizotypy in healthy adults have identified a consistent personality profile characterized by a heightened awareness and concern about negative experiences (*i.e.* higher harm avoidance), a greater sense of connectedness to the spiritual/supernatural (*i.e.* higher self-transcendence), alongside a heightened obstinacy (*i.e.* lower cooperativeness) and a disinterest in seeking out new experiences (*i.e.* lower novelty-seeking) and pursuing personal goals (*i.e.* lower self-directedness and lower reward dependence), especially in the face of adversity (*i.e.* lower persistence).

However, despite extensive study of personality profiles for SZ spectrum disorders and psychosis proneness in non-clinical populations, no study has yet examined personality patterns associated with PLE's operationalized through the CAPE or through the CAPE's positive and negative PLE subscales. Examining personality correlates of PLE's may provide a better understanding of the role of temperament and character in the expression of PLE's in non-clinical samples, including the expression of positive versus negative PLE's. Moreover, evidence of personality correlates of PLE's that are similar to past work in SZ spectrum disorders and studies of schizotypy could provide additional support for a fully-dimensional model of the psychosis continuum.

To this end, the primary goal of the present study was to investigate temperament and character dimensions as predictors of the CAPE measure of PLE's in a non-clinical community sample who do not meet criteria for any axis I disorder. A secondary goal of this study was to examine the relations between temperament and character patterns and the CAPE's dimensions of subclinical positive and negative psychotic experiences. In line with past findings on SZ spectrum disorders, we hypothesized that summed PLE scores would be significantly predicted by high harm avoidance, high self-transcendence, low self-directedness, low cooperativeness, low reward dependence, and low persistence [45]. In addition, in line with past work on personality traits in SZ patients, we hypothesized that positive PLE's would be uniquely predicted by high self-transcendence while negative PLE's would be uniquely predicted by high harm avoidance and low reward dependence [17,29].

1. Method

1.1. Participants

The study group consisted of a community sample of 415 healthy volunteers aged 18 to 65 years old (mean = 36.91 ± 13.51) recruited through advertisements in newspapers and on the Internet, as well as through posted flyers or personal referrals. Regarding sex and ethnicity, the sample was 58.6% female ($n = 243$) and 56.9% Caucasian ($n = 236$), 25.3% African-American ($n = 105$), 8.4% Latino(a) ($n = 35$), 3.6% Asian ($n = 15$), and 5.8% "Other" ($n = 24$). All participants gave written informed consent to a protocol approved by the Institutional Review Board of the North Shore-Long Island Jewish Health System. Participants were excluded from the study if they had met criteria for a past or present axis I disorder, had a first-degree relative with a known or suspected axis I disorder, had substance abuse within the past month, were intellectually disabled, were taking medications with known adverse cognitive effects, or had significant medical illnesses that could affect brain functioning.

1.2. Clinical assessments

Diagnostic rule-out: to rule out participants meeting full criteria for axis I disorders, all participants were interviewed using the non-patient version of the Structured Clinical Interview for the Diagnostic and Statistical Manual of Mental Disorders (SCID-NP [23]). SCID-NP interviews were conducted by licensed psychologists or by trained graduate-level research assistants who were supervised by the principal investigator. All SCID-NP information was compiled into a narrative case summary and absence of axis I disorders was determined by two expert diagnosticians on the Zucker Hillside Hospital faculty.

History of subclinical psychotic symptoms: PLE's were evaluated using the Community Assessment of Psychic Experiences (CAPE [55]). The CAPE consists of 42 items rated on a Likert-type frequency scale and provides an overall measure of subclinical psychopathology as well as subscale scores for three dimensions of subclinical psychopathology including positive PLE's, negative PLE's, and depressive symptoms. The CAPE conceptualizes a positive PLE as the occurrence of an experience that approximates the positive symptoms of schizophrenia and conceptualizes a negative PLE as the occurrence of an experience that

approximates the negative symptoms of schizophrenia. For example, the positive PLE subscale includes items such as, “Do you ever see objects, people, or animals that other people cannot see?” and “Do you feel as if the thoughts in your head are not your own?” while the negative PLE subscale includes items such as, “Do you ever feel that your emotions are blunted” and “Do you ever feel that you are neglecting your appearance or personal hygiene?” For the present study, the positive PLE and negative PLE subscales, as well as a summed score for positive and negative PLE’s together, were used as dependent variables. The depression subscale was omitted as our primary focus was on PLE’s. All scores are weighted in accordance with Stefanis et al. [55] to account for missing item responses, and only CAPE subscales that were completed 90% or more were considered acceptable for inclusion in the present study.

TCI: personality traits were assessed using the temperament and character inventory (TCI [16]). The TCI is a 240 true-or-false item self-report questionnaire that provides scores for four domains of temperament (thought to be largely heritable) including novelty seeking (NS), harm avoidance (HA), reward dependence (RD), persistence (P), and self-directedness (SD). Briefly, NS measures the tendency to seek novel stimuli and experiences; HA measures the tendency to avoid, anticipate and worry about harm; RD measures the tendency to have a marked response to and pursuit of reward stimuli. The TCI also provides scores for three domains of character (thought to be primarily learned characteristics) including self-directedness (SD), cooperativeness (C) and self-transcendence (ST) [16]. Briefly, P measures the tendency towards perseverance in the face of adversity; SD measures the ability to use the willpower necessary to achieve personal goals; C measures the ability to cooperate with others; ST measures the ability to look beyond self-interest to see oneself as part of a larger whole, which could be described as a marker of maturity but could also be described as a tendency towards spirituality or a belief in the religious or supernatural.

1.3. Data analysis

The relationships between CAPE subscale scores and the demographic variables of age and sex were first evaluated. Sex differences in the CAPE and the TCI subscales were assessed using *t*-tests and age differences in CAPE and TCI variables were investigated using Pearson correlations. Next, a stepwise regression was used to evaluate which of the seven TCI domains would best predict CAPE psychosis summed scores. To assess the differential impact of personality on positive versus negative symptoms, two follow-up stepwise regressions were conducted on the CAPE positive and negative psychotic symptom subscales. All statistical analyses were conducted using SPSS version 11.5.

2. Results

Consistent with past work showing CAPE data to not be normally distributed [62,63], the CAPE psychotic symptoms summed score as well as both CAPE positive and negative symptom subscales were not normally distributed in the present study, and all subscales of the TCI were similarly not normally distributed with the exception of novelty seeking. Due to this non-normality, sex differences in the CAPE and the TCI subscales were assessed using Mann-Whitney U tests, with the exception of novelty seeking, which was assessed

using a *t*-test. Age differences in CAPE and TCI variables were investigated using Spearman's rho correlations, with the exception of novelty seeking, which was assessed using a Pearson correlation.

No significant sex differences were observed in the CAPE psychotic symptoms summed score in the CAPE positive symptoms subscale or in the CAPE negative symptoms subscales ($U = 20\,378.5$, $U = 19\,796.5$, and $U = 19\,797$, respectively, all P 's > 0.05). Age was not significantly correlated with CAPE psychotic symptoms summed score, CAPE positive symptoms or CAPE negative symptoms ($\rho = -0.01$, $\rho = -0.03$, $\rho = 0.015$, all P 's > 0.05). Sex differences were observed for the TCI variables of harm avoidance ($U = 17\,546$, $P < 0.01$) and reward dependence ($U = 17\,457$, $P < 0.01$), but not for novelty-seeking, persistence, self-directedness, cooperativeness or self-transcendence ($t(1,413) = -0.24$, $U = 19\,785$, $U = 20\,152$, $U = 18\,848$, $U = 19\,933$, all P 's > 0.05). Age was significantly correlated with novelty seeking ($r = -0.17$, $P = 0.001$), reward dependence ($\rho = 0.13$, $P < 0.01$), persistence ($\rho = -0.15$, $P < 0.01$), self-directedness ($\rho = 0.19$, $P < 0.05$) and self-transcendence ($\rho = 0.16$, $P = 0.001$), but not harm avoidance or cooperativeness ($\rho = -0.04$, $\rho = 0.09$, all P 's > 0.05). Since significant relationships between demographic variables and the variables of research interest were observed, age and sex were included as control variables in the primary analyses.

The stepwise multiple regression on CAPE psychotic symptom summed score (controlling for age and sex) resulted in a significantly predictive model with four TCI variables accounting for 31.6% of the variance in PLE's ($F(4,414) = 47.353$, $P < 0.001$), where lower self-directedness ($\beta = -0.01$, $P < 0.001$) higher self-transcendence ($\beta = 0.01$, $P < 0.001$), higher harm avoidance ($\beta = 0.008$, $P < .001$) and lower reward dependence ($\beta = -0.004$, $P < 0.05$) were each significantly predictive of higher endorsement of PLE's. Because past literature has shown linear regression to remain valid for non-normal data given adequate sample size [39] and normal distribution of the residuals [64], each regression's unstandardized residuals were subsequently analyzed to investigate the normality of their distributions. Indeed, the unstandardized residuals for the regression model on the CAPE summed score were found to be normally distributed ($D = 1.287$, $P > 0.05$).

To assess the impact of TCI variables on positive and negative PLE's separately, follow-up stepwise multiple regressions were conducted on the CAPE positive symptom and negative symptoms subscales. The stepwise multiple regression on the CAPE positive symptom subscale (controlling for age and sex) resulted in a significantly predictive model with three TCI variables accounting for 26.1% of the variance in CAPE positive symptom scores ($F(3,414) = 48.30$, $P < 0.001$), where higher self-transcendence ($\beta = 0.10$, $P < 0.001$), lower self-directedness ($\beta = -0.009$, $P < 0.001$) and higher persistence ($\beta = 0.01$, $P < .01$) were significantly predictive of higher endorsement of CAPE positive symptoms. The stepwise multiple regression for the CAPE negative symptom subscale (controlling for age and sex) resulted in significantly predictive model with five TCI variables accounting for 31.4% of the variance in CAPE negative symptom scores ($F(5,414) = 37.40$, $P < 0.001$), where lower self-directedness ($\beta = -0.016$, $P < 0.001$), higher harm avoidance ($\beta = 0.018$, $P < 0.001$), higher self-transcendence ($\beta = 0.01$, $P < 0.001$) lower reward dependence ($\beta = -0.01$, $P < .01$), and higher cooperativeness ($\beta = 0.008$, $P < .05$) were each significantly predictive of

higher endorsement of CAPE negative symptoms. For a full summary of all stepwise regression analyses, see Table 1. However, unlike the CAPE summed score, the unstandardized residuals for the CAPE positive symptom ($D = 2.66, P < 0.05$) and the CAPE negative symptom ($D = 1.56, P < 0.05$) regression models were both found to be not normally distributed.

Thus, to confirm that regression results were not the direct result of skew, we examined the relationships between CAPE subscales and TCI dimensions using median splits. The median for the CAPE positive symptoms subscale was 1.10 (range = 1.0–2.05) and the median for the CAPE negative symptoms subscale was 1.21 (range = 1.0–2.43), as CAPE scores were weighted for non-response by dividing scores by the number of questions answered (*i.e.* the range of possible CAPE weighted scores was between 0.0 and 3.0). Group differences were assessed using a series of Mann-Whitney U tests for all TCI variables except novelty seeking, which was assessed using a *t*-test. Significant group differences between low and high positive PLE's were found for novelty seeking ($t(1,413) = -2.14, P < 0.05$), persistence ($U = 18,253, P < 0.01$), self-directedness ($U = 15,836.5, P < 0.001$), and self-transcendence ($U = 10,515.5, P < 0.001$), but not for harm avoidance, reward dependence, or cooperativeness ($U = 21,032.5, U = 20,610, U = 20,854, \text{all } P\text{s} > 0.05$). Significant group differences between low and high negative PLE's were found for harm avoidance ($U = 13,961, P < 0.001$), persistence ($U = 18,184, P < 0.01$), self-directedness ($U = 14,822.5, P < 0.001$), and self-transcendence ($U = 16,223, P < 0.001$), but not for novelty seeking, reward dependence, or cooperativeness ($t(1,413) = -0.39, U = 19,063.5, U = 20,336, \text{all } P\text{s} > 0.05$). Although more TCI variables were found to be significant when analyzing group differences than when conducting step-wise multiple regression models, this was likely related to TCI dimensions being significantly correlated with each other. For a full table of correlations between study variables, see Table 2.

3. Discussion

The present study found that healthy adults' levels of endorsement of PLE's as measured by the CAPE were significantly associated with personality profiles derived from the TCI, and that these profiles were notably similar to those observed in past studies of clinical populations, such as SZ patients, SPD patients, and unaffected first-degree relatives. Findings were also consistent with past work on personality profiles associated with schizotypal traits in non-clinical samples. In addition, we found distinct personality dimensions associated with positive versus negative PLE's.

A primary finding of this study was that a pattern of lower self-directedness, higher self-transcendence, higher harm avoidance, and lower reward dependence was found to significantly predict PLE's. This pattern is consistent with past meta-analytic work evidencing a unique temperament and character profile in SZ compared to controls, with the largest effect sizes for high harm avoidance and low self-directedness, followed by medium effect sizes for high self-transcendence, low cooperativeness, and low reward dependence, followed by a small effect for low persistence [45]. In addition, our results are consistent with past work on temperament and character differences in first-degree relatives of SZ patients [8,26,53,54] and patients with SPD [6,10,20,44,57], who have also evidenced

similar personality profiles to individuals with SZ. Finally, the current findings were also consistent with past work on temperament and character patterns associated with schizotypal traits in non-clinical populations, which linked higher levels of schizotypy to lower levels of novelty seeking, reward dependence, self-directedness and cooperativeness and higher levels of harm avoidance and self-transcendence [18,32]. The convergence of these findings suggests that the relation between personality characteristics and psychosis is generalizable across the psychosis continuum.

Another central aim of the present study was to distinguish temperament and character patterns predictive of positive versus negative PLE's. Analyses revealed that higher self-transcendence, lower self-directedness and higher persistence significantly predicted higher levels of positive PLE's while lower self-directedness, higher harm avoidance, higher self-transcendence, lower reward dependence, and higher cooperativeness significantly predicted higher levels of negative PLE's. That is, self-transcendence and self-directedness were significant predictors for both positive and negative PLE's and thus were not specific to positive *versus* negative PLE's. In contrast, higher persistence was predictive of positive but not negative PLE's while higher harm avoidance, lower reward dependence and lower cooperativeness were predictive of negative but not positive PLE's. These results are consistent with past research linking low harm avoidance and low reward dependence to negative but not positive psychotic symptoms in clinical populations [17,29].

Notably, the patterns of self-transcendence, persistence, and cooperativeness in our non-clinical sample differed from the patterns found in past work on clinical populations. Previous work found patients with SZ were characterized by low persistence and low cooperativeness [45], whereas in our non-clinical sample, high persistence was linked with positive PLE's and high cooperativeness was linked with negative PLE's. A possible explanation for these findings is that high persistence and high cooperativeness may denote personal resilience factors separating those on the healthier/subclinical end of the psychotic spectrum from patients with SZ. That is, higher persistence may confer a greater ability to overcome the adversity associated with positive symptoms while higher cooperativeness may confer a greater capacity to resist tendencies towards social withdrawal and a greater ability to accept social support from others. Future studies are needed to replicate the current findings as well as elucidate how differences in persistence and cooperativeness may influence outcomes and symptom presentation along the psychosis continuum.

Regarding self-transcendence, our results are consistent with past reports linking self-transcendence to psychosis-proneness [18,32]. However, we found links between self-transcendence and both negative and positive PLE's, whereas past research in SZ has uniquely linked self-transcendence to positive but not negative psychotic symptoms [17,29]. It is possible that for those on the healthier/subclinical end of the psychosis continuum, dissolution of self-other boundaries may be more primary to the overall presentation of both their positive and negative PLE's. Alternatively, although self-transcendence has been linked to positive psychotic symptoms in SZ, high self-transcendence was initially conceived of as a protective character trait against mental illness (e.g. personality disorders) since it measures an ability to look beyond oneself and thus may be considered characteristic of developmental maturity [16]. Thus, in non-clinical samples it may indeed play both these

aforementioned roles, partially denoting psychosis-proneness as well as partially denoting the protective character trait of selflessness and developmental maturity. If self-transcendence acts as a protective factor helping to ensure both positive and negative symptoms remain below the clinical threshold, this might explain why it was predictive of both positive and negative PLE's in the present study. Future work is needed to investigate the possible dual role of self-transcendence as a protective and risk factor in PLE's.

A secondary finding of the present study was that a set of small but statistically significant correlations were observed between age and temperament and character dimensions, including novelty-seeking, reward dependence, persistence, self-directedness and self-transcendence. Although temperament and character were initially theorized to be heritable and thus largely stable across the lifespan [16], our results showing modest increases in self-directedness and self-transcendence as well as modest declines in novelty seeking, reward dependence and persistence with increasing age are consistent with past work in adult populations [9,14,15,21,30,46,59,65,68]. Indeed, authors have noted that early, genetically inherited temperament and character traits interact with later environmental and social forces [16,25], helping to explain changes in personality traits with age [21]. Females also evidenced significantly higher harm avoidance and reward dependence compared to males, which is consistent with a past meta-analysis examining sex differences in temperament and character dimensions [43].

The present study was limited by the non-normal distribution of the CAPE psychotic summed score, the CAPE positive and negative symptom subscales, and all dimensions of the TCI except novelty seeking. However, all of our analyses were adequately controlled to account for this non-normality [39,64]. The lack of a comparable patient group in the present study also limited our ability to draw direct comparisons between temperament and character and the full spectrum of psychotic symptom manifestations. Unfortunately, such a sample was not available for this comparison. However, associations between temperament and character in patient samples have been comprehensively studied and current findings are largely consistent with this past work. In addition, the present study was limited by small effect sizes. Specifically, although the present study found many significant associations between TCI traits and CAPE total and subscale scores, many of the beta weights were quite small and generally hovered around zero, which is notable given the large sample size of present study. However, it should also be noted that these small beta weights were expected given that CAPE scores had small values ranging from 0 to 3 after being weighted for non-response.

In conclusion, the present study suggests that PLE's are significantly predicted by a pattern of temperament and character similar to that previously found in clinical populations with SZ spectrum disorders. The similarity of these temperament and character profiles provides additional evidence in support of a psychosis continuum. In addition, this study identified some important temperamental and character differences between patients with SZ and the expression of PLE's in healthy individuals, such as high persistence and cooperativeness, which may denote resilience. Such findings may help to illuminate protective factors in the development from psychosis proneness to persistence of psychotic symptoms to impaired functioning and SZ diagnosis.

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Table 1

Stepwise regression analyses of temperament and character dimension predicting psychotic-like experiences.

TCI dimensions	β	<i>P</i>
Stepwise model for psychotic symptoms summed		
Self-directedness	-0.01	< 0.001
Self-transcendence	0.011	< 0.001
Harm avoidance	0.008	< 0.001
Reward dependence	-0.004	< 0.05
Stepwise model for positive symptoms		
Self-transcendence	0.01	< 0.001
Self-directedness	-0.009	< 0.001
Persistence	0.01	< 0.01
Stepwise model for negative symptoms		
Self-directedness	-0.016	< 0.001
Harm avoidance	0.018	< 0.001
Self-transcendence	0.01	< 0.001
Reward dependence	-0.01	< 0.01
Cooperativeness	0.008	< 0.05

Note: R^2 psychotic symptoms summed = 0.316; R^2 positive symptoms = 0.261; R^2 negative symptoms = 0.314.

Table 2

Inter-correlations between study variables.

	Sex	Age	CAPE Pos. Sx	CAPE Neg. Sx	CAPE Summed	NS	HA	RD	P	SD	C	ST
Sex		-.06	-.02	.05	.02	.01	.14**	.14**	-.05	.03	.08	.04
Age			-.03	.02	-.01	-.16**	-.04	-.13**	-.15**	.19**	.09	.16**
CAPE Positive Symptoms				.57**	.86**	.08	.04	-.06	-.17**	-.30**	-.05	.45**
CAPE Negative Symptoms					.90**	.003	.33**	-.08	-.08	-.34**	-.08	.25**
CAPE Summed Symptoms						.05	.22**	-.09	-.03	-.36**	-.08	.38**
NS							-.09	.05	-.09	-.20**	-.11*	.004
HA								-.01	-.23**	-.31**	-.18**	-.12*
RD									.10*	.17**	.47**	.03
P										.05	.04	.17**
SD											.46**	-.12*
C												.11*
ST												

All correlations are Spearman's rho except correlations between NS and age and sex, which are Pearson correlations. NS: novelty seeking; HA: harm avoidance; RD: reward dependence; P: persistence; SD: self-directedness; C: cooperativeness; ST: self-transcendence.

* $P < .05$.

** $P < 0.01$.