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Examining subjective experience of social cognition in early psychosis: validation of the Italian version of the GEOPTE scale in an adolescent and young adult clinical sample

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Summary

Objective

Social cognition is a set of cognitive processes that underlie social interactions. Prior research found that social cognitive impairment is an important determinant of functional outcome in early psychosis. Aim of this study was to assess reliability and validity of the Italian version of GEOPTE scale (i-GEOPTE) of social cognition for psychosis in a clinical sample of adolescent and young adult community help-seekers.

Methods

The i-GEOPTE scale was completed by 325 individuals (aged 13-35 years) entered the "Reggio Emilia At-Risk Mental States" (ReARMS) program. Reliability was evaluated examining internal consistency (using Cronbach(s alpha) and calculating short-term (2-week) coefficient of stability. Concordant validity was established with CAARMS ("Comprehensive Assessment of At-Risk Mental States") subscale scores using Spearman(s correlation coefficients. A confirmatory factor analysis was also carried out.

Results

The i-GEOPTE showed good to excellent short-term test-retest reliability (coefficient of stability = 0.813 for i-GEOPTE total score) and internal consistency (Cronbach(alpha = 0.90). Moreover, i-GEOPTE total scores had significant positive correlations with CAARMS subscale and item scores measuring subjective change of soco-cognitive functions.

Conclusions

The i-GEOPTE showed satisfactory psychometric properties. Thus, it appears to be a suitable instrument for assessing subjective experience of social cognition in Italian mental health care services, also in order to evaluate functional outcomes of intervention.

Key words

Social cognition • Emotion recognition • Theory of mind • High risk mental states • First episode psychosis • Prodrome

Introduction

Social cognition has been defined as a set of cognitive functions that underline social interactions [1]. These mental operations involve the perception, processing, and interpretation of social information in order to generate a response to the intention and behaviors of others [2]. In this sense, social cognition is crucial for daily functioning. Indeed, as suggested by Raballo (2017) [3], "our everyday, pragmatic immersion in the social world strongly relies on a series of face-to-face encounters with others, whose mental states are seamlessly disclosed to us in the immediacy of such interaction".

A growing body of evidence indicate that relevant impairments in social cognition are a common feature in patient with schizophrenia-spectrum disorders [4]. Indeed, these social cognitive deficits are present not only in

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advanced phases of schizophrenia, but are manifested in early phases as well: for example, at the time of the First Episode of Psychosis (FEP) [5 6], in which anomalies of social cognition seem to be significant determinants of bad functional outcome and poor psychosocial adjustment [7 8]. Impaired social cognition has also been found in individuals at Ultra-High Risk (UHR) for psychosis [4 9], in which is considered to result in worse social functioning, a well-established risk factor for psychosis transition [10].

Expert surveys identified four core domain of social cognition in schizophrenia and psychosis research: (1) emotion processing (i.e. the ability in perceiving and displaying emotions, in recognizing different emotional states through facial expressions or voice intonations, and in managing emotions in oneself and in relation to others), (2) theory of mind (i.e. the capacity to represent the mental states of others, intentions, dispositions, or beliefs), (3) social perception (i.e. the ability in decoding and interpreting social cues in others and in identifying social roles and rules, as well as social context), and (4) attributional style (i.e. the way in which individuals explain the cause, or make sense, of social events or interactions to the self, others or the environment) [11]. However, most of the neuropsychological tests used to assess social cognition in schizophrenia research require a long time to be administered and therefore few clinicians use such scales in their daily practice [12]. According to Sanjuan et al. (2003) [13], the great distance between research and clinical practice and the modest utilization of scales by the physician is not primarily a problem of poor praxis, rather it is probably because their use does not seem to substantially improve the therapeutic approach. As an attempt to decrease such gap between research and clinical practice within the field of diagnosis and treatment of psychosis, the Spanish Group for the Optimization and Treatment of Schizophrenia (GEOPTE) developed a new scale for assessing social cognition in psychotic disorders [13]. The GEOPTE scale is a quick and easy (15-item) self-report questionnaire aimed to be able to relate basic cognitive deficits (or more specifically their subjective perception) with the subjective experience of social cognition.

To the best of our knowledge, no study using the GEOPTE scale in an Italian clinical sample has been reported in the literature to date. Thus, in the current research we want to test the reliability and the validity of the Italian version of the GEOPTE scale (i-GEOPTE) (Appendix I) in examining the subjective experience of social cognition in a population of adolescent and young adult help-seekers with FEP or at UHR for psychosis. Moreover, a Confirmatory Factorial Analysis (CFA) was conducted to evaluate the adequacy of the theoretical model proposed in the original validation study of the Spanish version of the GEOPTE scale [13] (Appendix I).

Materials and methods

Setting

As detailed in Raballo et al. (2014) [14], the "Reggio Emilia At-Risk Mental States" (ReARMS) protocol is an early detection and intervention infrastructure implemented in the Reggio Emilia Department of Mental Health (i.e. a semirural catchment area of approximately 550.000 inhabitants, in the Northern Italy) since September 2012. The ReARMS program purposes (a) to detect individuals with FEP and at clinical high risk of psychosis according to defined FEP/UHR diagnostic criteria [15] among young adult and adolescent help-seekers (aged 13-35 years), and (b) to offer evidence-based interventions that are shown to be effective in FEP/UHR subjects (i.e. individual cognitive-behavioral therapy, psychoeducational sessions for family members, intensive case management, and pharmacotherapy [as appropriated]) [16 17].

Participants

Psychometric properties of the GEOPTE scale were tested in a sample of help-seeking (i.e. voluntarily sought treatment) adolescents and young adults, aged 13-35 years, consecutively attending to one of all child/adolescent and adult mental health care services of the Reggio Emilia Department of Mental Health between September 2012 and December 2018. Referrals were mainly performed by General Practitioners, emergency room and general hospital, family members, school, social services, or they were self-referred [18 19].

For the specific aim of the study (i.e. testing psychometric properties of the Italian version of the GEOPTE scale), ReARMS inclusion criteria were: (a) specialist help-seeking; (b) age between 13 and 35 years; (c) presence of UHR criteria as defined by the Comprehensive Assessment of At-Risk Mental States (CAARMS) [15] or (d) a Duration of Untreated Psychosis (DUP) < 2 years in case FEP is detected at baseline assessment. Specifically, in the context of the clinical staging model of psychosis [20], three different subgroups of UHR mental states was identified: (a) Genetic Risk and Functioning Deterioration Syndrome (GRFD), a trait/state risk condition in which the individual has a family history of psychosis (in first-degree relatives) or manifests schizotypal personality disorder along with low functioning maintained for ≤ 1 month; (b) Brief Limited Intermittent Psychotic Symptoms (BLIPS), i.e. transient positive symptoms that spontaneously disappear within 1 week; and (c) Attenuated Psychotic Symptoms (APS), i.e. sub-threshold positive psychotic symptoms [15]. Moreover, according to the CAARMS criteria, FEP threshold is defined by operationalized clear-cut levels of full-blown positive symptoms occurring for the first time for > 1 week, either daily or > 3 time a week with each symptom continuing for > 1 hour on each occasion [15]. Young help-seekers who

were below the UHR/FEP threshold were considered as CAARMS negative cases (i.e. CAARMS-) [21 22].
Exclusion criteria were: (a) previous full-blown psychotic episodes, either schizophrenic and affective, as defined in the Diagnostic and Statistical Manual of Mental Disorders, IV Edition, Text Revised (DSM-IV-TR) [23]; (b) history of previous exposure to antipsychotics; (c) current substance dependence, (d) known mental retardation (IQ < 70), (e) neurological disorders (such as temporal lobe epilepsy), head injury or any other medical condition associated with psychiatric symptoms; and (f) insufficient fluency in the Italian language. Specifically, in the ReARMS protocol, we considered previous exposure to antipsychotic (i.e. before ReARMS enrollment) as an equivalent of past psychotic episode. Indeed, according to the psychosis criteria defined by Yung et al. (2015) [15] in the CAARMS, the threshold of FEP is essentially that at which antipsychotic medication would probably have started in common clinical practice.
All help-seekers entering the ReARMS protocol and their parents (if minors) agreed to participate to the research and gave their informed consent to the psychopathological assessment, composed – among others (for details, see also Raballo et al., 2014) [14] – by the CAARMS (approved Italian version [CAARMS-ITA]) [24] and the GEOPTE scale of social cognition for psychosis (approved Italian translation [i-GEOPTE]) [25]. Relevant local ethical approvals were sought for the study. The current research has been carried-out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki) for experimental protocols including humans.

Instruments and measures

The *CAARMS* is a semi-structured clinical interview specifically developed to examine different aspects of attenuated psychopathology as well as functioning (via the integrated SOFAS ["Social and Occupational Functioning Assessment Scale"] module) [15]. It takes approximately 1-1.5 hours to be administered and consists of 27 items (each one rated in terms of intensity [0-6] and frequency/duration [0-6]), which can be clustered in seven subscales: (a) "Positive Symptoms"; (b) "Cognitive Change, Attention and Concentration"; (c) "Emotional Disturbance"; (d) "Negative Symptoms"; (e) "Behavioral Change"; (f) "Motor/Physical Changes"; and (g) "General Psychopathology". The CAARMS "Positive Symptoms" subscale, which covers delusions, hallucinations and thought disorder, is used to determine both the UHR criteria and the threshold for psychosis. CAARMS interviews are conducted by specialized clinical psychologists and psychiatrists, trained by the main author of the approved Italian translation (CAARMS-ITA) [20], who was trained at Orygen, The National Centre of Youth Mental Health in Melbourne, Australia. Regular CAARMS supervision sessions and scoring workshops ensured the inter-rater reliability of these assessments. Specifically, the CAARMS-ITA showed good to excellent inter-rater reliability [26 27].
The *GEOPTE* scale [13] is a self-report questionnaire specifically aimed, with its simplicity of design, to be of easy and quick use in the clinical practice for measuring social cognition in psychosis. It consists of 15 items, each one rated on a 5-point Likert scale (from 1 = "no" to 5 "a lot"). A total score was obtained by summing all item subscores. The original Spanish version of the GEOPTE scale showed excellent internal consistency and good construct validity in a clinical sample of 87 adult patients with psychosis [13]. An Exploratory Factor Analysis (EFA) identified 2 factors that explained a total variance of 39%. The first factor is composed by the first 7 items, specifically related with basic cognitive functions (i.e. attention, understanding, speech, learning, memory, concentration, and abstraction), and by items 11 and 12, involving tasks (i.e. ability to resolve problems and self-care capacity) that require the application of the basic cognitive functions for their achievement (for details, see Appendix I). The remaining items are related with factor 2, which refers to the four main aspects of social cognition (i.e. recognition of emotions, interpretation of social signals, sensitivity to social signals, activity planning, ability in relationships, and sexual satisfaction) [13]. However, in the original validation study of the GEOPTE scale, extraction of a single factor in the EFA was also satisfactory, explaining 33% of total variance. Therefore, as communality range of all items verified that an underlying common attribute existed, a single score is fully justified[13]. In the current study, we investigated the psychometric properties of the authorized Italian translation of the GEOPTE scale (i-GEOPTE) [21], adapted from the original Spanish version (Appendix I).

Procedures and statistical analysis

All the participants underwent an extensive diagnostic assessment (for details, see also Raballo et al., 2014) [14]. The axis-I diagnosis was made according to DSM-IV-TR criteria [23] by two trained ReARMS team members, using the Structured Clinical Interview for DSM-IV-TR Axis I Disorders [28]. After CAARMS interviews, adolescents were divided into three groups according to UHR/psychosis criteria: (a) UHR+ group (i.e. APS, BLIPS and GRFD), (b) FEP group, and (c) CAARMS- group (i.e. those individuals under the threshold of the CAARMS inclusion criteria) [15 19].
All the UHR/FEP help-seekers referred to the ReARMS protocol were assigned to a multi-professional team including a child/adolescent neuropsychiatrist, a clinical psychologist and a case-manager for early rehabilitation, generally within 2-3 weeks. According to their symptoms, UHR/FEP individuals were then provided

with a comprehensive two-year intervention package including (a) a multi-element psychosocial intervention (combining individual cognitive-behavioral therapy [CBT], psychoeducational sessions for family members, and a recovery-oriented case management) as first step and (b) a pharmacological treatment as second step, according to current guidelines [16 17]. The prescription of antipsychotics was avoided unless UHR individuals (a) had an imminent risk of suicide or severe violence, (b) were overwhelmed by abruptly worsening full-blown psychotic symptoms, (c) were rapidly deteriorating in daily functioning, or (d) did not respond to any other treatment [21]. Low-dose atypical antipsychotics were used. Selective serotonin reuptake inhibitor or benzodiazepines were used to treat depressive symptoms, anxiety, and insomnia [22].

The overall validation procedure of the i-GEOPTE was modeled on the methodological procedure adopted by Sanjuan et al. (2003) [13] to validate the original version of the GEOPTE scale. Data were analyzed using the "Statistical Package for Social Science" (SPSS) 15.0 for Windows [29] and R version 3.5.3 [30] with "Psych" and "Lavaan" software packages [31 32]. All tests were two-tailed, with $\alpha = 0.05$. Non-parametric statistics were used, due to non-normality (Kolmogorov-Smirnov test with Lilliefors significance correction: $p < 0.05$) in all explorations. In inter-group comparisons, categorical data were analyzed with Chi-square or Fisher(s exact test, as appropriate (i.e. when any expected frequency was < 1 or 20% of expected frequency was ≤ 5). The Kruskal-Wallis and the Mann-Whitney U test (as post-hoc procedure with Holm-Bonferroni correction for multiple comparisons) [33] were used to compare ordinal variables.

In the present research, we measured short-term test-retest reliability of the i-GEOPTE over two weeks calculating the coefficient of stability [34] on a subsample of 25 consecutive FEP participants. Specifically, as stability coefficients require three time points to estimate reliability, the i-GEOPTE scale was completed after 7 and 15 days from baseline assessment. This rather short-time interval was chosen to limit the possible impact of both symptomatic changes and memory effects [35]. According to Heise (1969) [36], we interpreted test-retest reliability coefficients as follows: ≥ 0.90 excellent reliability, 0.81-0.90 good reliability, 0.71-0.80 acceptable reliability, 0.61-0.70 questionable reliability, 0.51-0.60 poor reliability, and ≤ 0.50 unacceptable reliability.

As reliability measure, internal consistency of the i-GEOPTE was examined using Cronbach(s alpha within the total sample. A score above 0.70 was considered sufficient internal consistency [36]. In addition, we examined how each i-GEOPTE item correlated with the total score. Correlations less than r = 0.30 indicated that the item might need to be removed from the questionnaire to make it more reliable [36]. Finally, we were interested in Cronbach(s alpha value if each iGEOPTE item was deleted. If this value went up after item deletion, removal should be considered to ameliorate the reliability of the instrument [36].

As measure of concurrent validity, correlation analyses between iGEOPTE total scores and CAARMS subscores measuring impairments in basic cognitive functions and social cognition (i.e. subjective cognitive change, observed cognitive change, subjective experience of disorganized speech, avolition/apathy, anhedonia, and social isolation) were performed using Spearman(s correlation coefficient with Holm-Bonferroni correction to revise p-value for multiple comparisons [33]. Furthermore, we examined any relevant association of i-GEOPTE total scores with sociodemographic variables (i.e. gender, age, and years of education) and Duration of Untreated Illness (DUI, defined as the time interval [in weeks] between the onset of a prominent psychiatric symptom and the administration of the first pharmacological/psychological treatment) [37], using Chi-square test or Spearman(s correlation coefficient (as appropriate).

Finally, CFA was carried out to evaluate the adequacy of the 2-factor structure proposed in the validation study of the original Spanish version of the GEOPTE scale [13], using the robust weighted least squares (WLSMV) estimator. Indeed, the WLSMV estimator handles ordinal data well for moderately large samples [38]. The criterion of Brown (2006) [39] was used to assess the results. This criterion recommends using four common fit indices to evaluate fit of the overall model and to calculate both the satisfactory global functioning and model adjustment: Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR). According to Hu and Bentler (1999) [40], the following general rules of thumb were used in the present research: TLI/CFI > 0.95 (good fit), 0.90 to 0.95 (borderline fit), and < 0.90 (poor fit); RMSEA < 0.06 (good fit), 0.06 to 0.08 (fair fit), 0.08 to 0.10 (borderline fit), and > 0.10 (poor fit); SRMS < 0.08 (good fit).

Results

Sample characteristics and i-GEOPTE scores

Over the course of the study, 325 individuals (180 males, 55.4%) consecutively attended an intake interview within the ReARMS protocol. Age ranged from 13 to 35 years (mean age = 21.23 ± 5.85 years), level of education from 7 to 18 years (mean level of education = 11.65 ± 2.41 years), and the DUI from 4 to 208 weeks (mean DUI = 76.81 ± 60.89 weeks). In the total sample, the distribution of age, level of education (in years), and DUI (in weeks) was skewed towards the left (respectively, skewness =

TABLE I. *i-GEOPTE total scores, sociodemographic and clinical characteristics of the total sample and the three subgroups.*

Variable	Total sample (n = 325)	CAARMS- (n = 97)	UHR (n = 92)	FEP (n = 136)	χ^2	Post hoc test
Gender (males)	180 (55.4%)	47 (48.5%)	34 (47.8%)	89 (65.4%)	9.58†	FEP > UHR=CAARMS-††
Ethnic group (Caucasian)	284 (87.4%)	83 (85.6%)	84 (91.3%)	117 (86.0%)	1.78	-
Mother tongue (Italian)	295 (90.8%)	91 (93.8%)	85 (92.4%)	119 (87.5%)	3.10	-
Age	21.23 ± 5.85	21.01 ± 6.32	18.78 ± 4.32	23.04 ± 5.80	30.56*	FEP > CAARMS->UHR**,††,‡‡
Education (in years)	11.65 ± 2.41	11.59 ± 2.47	11.48 ± 2.30	11.80 ± 2.46	1.22	-
DUI (in weeks)	76.81 ± 60.89	65.25 ± 53.21	63.28 ± 46.75	96.45 ± 71.06	9.24‡	FEP > UHR=CAARMS-‡‡
i-GEOPTE						
Total score	35.19 ± 11.90	29.57 ± 11.42	38.32 ± 11.02	36.88 ± 11.76	34.91*	UHR = FEP > CAARMS-**
"Basic Cognitive Functions" subscore	19.96 ± 7.40	16.85 ± 7.30	21.50 ± 7.04	21.23 ± 7.08	31.91*	UHR = FEP > CAARMS-**
"Social Cognition" subscore	16.87 ± 5.87	114.29 ± 5.32	18.49 ± 5.37	17.61 ± 6.00	31.84*	UHR = FEP > CAARMS-**

Note. Frequencies (percentages), mean ± standard deviation, Kruskal-Wallis and Chi-squared test (χ^2) values are reported. Post-hoc analyses were performed using Mann-Whitney U test. °p < 0.001; †p < 0.01; ‡p < 0.05; °°Holm-Bonferroni corrected p-value < 0.001; ††Holm-Bonferroni corrected p-value<0.01; ‡‡Holm-Bonferroni corrected p-value < 0.05. i-GEOPTE = Italian version of the GEOPTE Scale of social cognition for psychosis; GEOPTE = "Grupo Espanol para la Optimización y Tratamiento de la Esquizofrenia" (Spanish Group for the Optimization and Treatment of Schizophrenia); DUI = Duration of Untreated Illness; CAARMS = Comprehensive Assessment of At-Risk Mental States; FEP = First Episode Psychosis; UHR = participants who met CAARMS Ultra-High Risk (UHR) criteria; CAARMS- = participants who were below CAARMS-defined UHR/FEP criteria.

0.660, 0.187, and 0.918; Kolmogorov-Smirnov test with Lilliefors significance correction: p < 0.001).

Table I shows i-GEOPTE total scores, demographic and clinical characteristics of the total sample and the three subgroups, i.e. FEP (n = 136; 41.8% of the total sample), UHR (n = 92; 28.4%), and CAARMS- (n = 97; 29.8%).

Among the UHR group, 83 met APS criteria (90.2% of UHR individuals), 5 met BLIPS criteria, and 4 met GRFD criteria.

The FEP group consisted of patients with DSM-IV-TR schizophrenia (n = 63; 46.3% of FEP individuals), affective (bipolar or major depressive) psychosis (n = 31), psychotic disorder not otherwise specified (n = 28), substance-induced psychotic disorder (n = 8), and brief psychotic disorder (n = 6).

The remaining participants were below the CAARMS-defined FEP/UHR criteria and composed the CAARMS- group. They were diagnosed with DSM-IV-TR non-schizotypal personality disorder (n = 37; 38.1% of CAARMS- individuals), depressive disorders (n = 29; 29.9%), anxiety disorders (n= 26; 26.8%), and eating disorders (n = 5).

In comparison with UHR and CAARMS-, FEP patients showed a significantly higher age at ReARMS enrollment, a greater percentage of males, and a longer DUI (Tab. I). Moreover, at baseline assessment UHR individuals had a younger age than CAARMS- participants. No inter-group difference in terms of ethnic group, mother tongue, and years of education was found.

In comparison with CAARMS-, both UHR and FEP subjects showed significantly higher i-GEOPTE total score, as well as "Basic Cognitive Functions" and "Social Cognition" subscale scores (Tab. I).

Reliability

The i-GEOPTE was re-administered to 25 consecutive FEP participants within 2 weeks (i.e. on the 7th and 15th day) from the baseline assessment in order to calculate short-term test-retest reliability. Their sociodemographic characteristics were comparable to those of the total sample, with a mean age of 20.26 ± 1.02 years and a mean level of education of 12.22 ± 1.93 years. Fourteen (56%) out of these 25 FEP participants were males. The coefficient of stability was 0.813 for i-GEOPTE total score, 0.824 for "Basic Cognitive Functions" subscore, and 0.807 for "Social Cognition" subscore.

Within the total sample, i-GEOPTE total score showed a Cronbach(s alpha of 0.90 (95% confidence intervals = 0.88-0.92). All item-total correlations were higher than 0.30 (Tab. II). Thus, all i-GEOPTE items appeared to be worthy of retention, resulting in a decrease in the alpha coefficient if deleted.

Concurrent validity

All i-GEOPTE total scores showed significant positive correlations with DUI and with CAARMS "Subjective Cognitive Change" and "Objective Cognitive Change" subscale scores, as well as with CAARMS "Disorganized speech – Subjective change", "Concentration/

TABLE II. *Internal consistency of the i-GEOPTE scale (n = 325).*

i-GEOPTE items	Item-total correlation	Cronbach(s alpha if item deleted
It is difficult for you to pay attention?	.587	.894
It is difficult for you to follow a conversation in which several people are participating?	.693	.890
It is hard for you to learn new things?	.724	.889
Do you forget to do things asked of you, tasks, or errands?	.524	.896
When you have to speak to someone, do you have problems in expressing yourself?	.692	.890
Do you have problems understanding what a picture is about?	.413	.900
Is it difficult for you to understand the meaning of a conversation?	.678	.892
Is it hard for you to recognize the emotions of others (for example, sadness, happiness, rage)?	.454	.899
When you are in a group, do they usually tell you that you have misunderstood the attitudes, looks, or expressions of the others?	.517	.897
Do you feel very sensitive to looks, words, or expressions of others?	.556	.896
If you are alone at home and some problem arises (for example, an appliance breaks down), is it difficult for you to look for a solution?	.603	.893
Do you find it hard to maintain personal hygiene (to be clean and washed)?	.541	.896
Do you find it hard to make plans for the weekend?	.665	.891
Is it hard for you to make plans with friends?	.580	.895
Are you generally unsatisfied with your sexual life?	.525	.897

Note. i-GEOPTE = Italian version of the GEOPTE Scale of social cognition for psychosis; GEOPTE = "Grupo Espanol para la Optimización y Tratamiento de la Esquizofrenia" (Spanish Group for the Optimization and Treatment of Schizophrenia). Correlation r coefficients and Cronbach(s alpha values are reported.

Attention subjective disorders", "Selective Attention subjective disorders", "Formal Thinking subjective disorders", "subjective Difficulty in Understanding", "Memory subjective problems", "Observed Inattention during the interview", "Observed Inattention during Mental Status Testing", "Avolition/Apathy", "Anhedonia", and "Social Isolation" item subscores (Tab. III).

Furthermore, i-GEOPTE total scores had significant negative correlations with age. Specifically, younger participants (aged ≤ 21 years) showed significantly higher i-GEOPTE total scores than older individuals (aged > 21 years) (Tab. IV). Finally, no significant associations of i-GEOPTE total scores with gender and years of education were found (Tabs. III-IV).

Confirmatory factor analysis

The indices CFI, TLI, RMSEA and SRMR were analyzed to assess the adjustment of the original 2-factor GEOPTE model of 15 items in our sample (Tab. V). All these fit indices remained adequate, maintaining acceptable values (0.957, 0.950, 0.079, and 0.062, respectively). Factor loadings of the i-GEOPTE items are reported in the Tab. V.

Discussion

To the best of our knowledge, no study to validate the Italian version of the GEOPTE scale of social cognition for psychosis in a clinical sample of adolescent and young adult help-seekers has been performed to date.

In comparison with CAARMS-, both UHR and FEP participants had significantly higher i-GEOPTE total scores, indicating a broader impairment. Overall, these results show that the Italian version of the GEOPTE scale has good construct validity and substantially confirm findings of other comparable studies reporting relevant impairments of social cognition both in FEP and UHR individuals [5 6 9]. According to Raballo (2017) [3], this evidence highlights a clinical feature which is rather familiar to any professionals dealing with the field of early detection in psychosis: i.e. UHR and FEP subjects spend considerably more time (i.e. almost twice as much) on emotional recognition (allegedly a core component of social cognition) than healthy controls [41]. This is generally interpreted as the effect of compensatory mechanisms buffering the (more or less mutually reinforcing) decline in neurocognitive and socio-cognitive proficiencies.

However, in the current research no difference in terms of iGEOPTE total scores was found between UHR and FEP individuals. This result is not in line with other studies reporting that performance in social cognitive domains in UHR subjects was generally intermediate between FEP and healthy control groups [5 41].

Reliability

In the current research, the Italian version of the GEOPTE scale showed good short-term (2 week) test-retest reliability (coefficient of stability = 0.813 for the total score, 0.824 for "Basic Cognitive Functions" subscore, and 0.807 for "Social Cognition" subscore).

TABLE III. *Spearman's correlations among GEOPTE scores, age, and CAARMS subscale scores.*

Variables	GEOPTE total score (ρ)	GEOPTE "Basic Cognitive Functions" subscore (ρ)	GEOPTE "Social Cognition" subscore (ρ)
CAARMS			
Disorganized speech – subjective change	.334*	.361*	.257*
Subjective Cognitive Change	.322*	.346*	.258*
Concentration and attention disorders	.302*	.318*	.239*
Selective attention disorders	.358*	.356*	.314*
Formal thinking disorders	.308*	.339*	.248*
Difficulty in understanding	.329*	.370*	.237*
Memory problems	.203*	.242*	.126‡
Objective Cognitive Change	.238*	.267*	.173†
Observed inattention during the interview	.245*	.282*	.174†
Observed inattention during Mental Status Testing	.158†	.177†	.115‡
Avolition/apathy	.361*	.348*	.342*
Anhedonia	.382*	.373*	.357*
Social isolation	.341*	.371*	.324*
Age	-.159†	-.187†	-.112‡
Years of education	-.018	-.031	-.002
DUI (in weeks)	.160‡	.183†	.134‡

*Note. GEOPTE = "Grupo Espanol para la Optimización y Tratamiento de la Esquizofrenia" (Spanish Group for the Optimization and Treatment of Schizophrenia), CAARMS = Comprehensive Assessment of At-Risk Mental States; SOFAS = Social and Occupational Functioning Assessment Scale; DUI = Duration of Untreated Psychosis; *Holm-Bonferroni corrected p-value < 0.001; †Holm-Bonferroni corrected p-value < 0.01; ‡Holm-Bonferroni corrected p-value <0.05. Spearman(s rank correlation coefficient (ρ) values are reported.*

Moreover, we found good to excellent reliability of the iGEOPTE scale with regard internal consistency (i.e. Cronbach(s alpha = 0.90 for the total score). Moreover, all item-total correlations were higher than 0.30. Thus, all i-GEOPTE items appeared to be worthy of retention, resulting in a decrease in the alpha coefficient if deleted. Similarly, in the validation study of the Spanish original version of the GEOPTE scale Sanjuan et al. (2003) [13] found a Cronbach(s alpha of 0.86, with corrected item-total correlations exceeding the 0.30 value for all the items. Therefore, the GEOPTE scale of social cognition for psychosis appears to be reliably good in different samples and cultures.

Concurrent validity

As expected, iGEOPTE total scores showed significant positive correlations with CAARMS subscale and item subscores measuring impairments in basic cognitive functions and social cognition (e.g. subjective cognitive change, observed cognitive change, subjective experience of disorganized speech, avolition/apathy, anhedonia, and social isolation). These findings suggest good concurrent validity of the Italian version of the GEOPTE scale and are a further confirmation of the construct validity of the instrument, also reported in the original validation study by Sanjuan et al. (2003) [13]. Moreover, our CFA findings suggest that the 2-factor model of the original Spanish version of the GEOPTE scale fitted our data reasonably well, and that these two subscales (i.e. "Basic Cognitive Functions" and "Social Cognition") measure discrete constructs, although related to each other.

In the present study, significant negative correlations between age and iGEOPTE total scores were also found. Specifically, younger individuals (aged ≤ 21 years) had significantly higher levels of subjective experience of impaired basic cognitive functions and social cognition than older participants. Differently, in a meta-analysis on social cognition in individuals in the early stage of psychosis, van Donkersgoed et al. (2015) [10] found no moderator effects for age. However, our findings could first be interpreted in the light of a greater awareness of subjective deficits in social cognition in adolescents than in young adults. Indeed, in the developmental age social cognition is crucial for an adequate psychosocial adjustment and to be accepted in the peer group. Therefore, subjective experience of impaired social functioning may slow or stop the basic developmental stage that leads adolescent to a pragmatic immersion in the social world, so inducing a higher psychological distress. Otherwise, in the current research older participants were more frequently diagnosed with FEP and consequently

TABLE IV. *Association of i-GEOPTE total scores with age and gender (n = 325).*

Variable	Total sample (n = 325)	Age group I < 15 years (n = 52)	Age group II 15-18 years (n = 92)	Age group III 18-21 years (n = 56)	Age group IV > 21 years (n = 134)	χ^2	Post hoc test
i-GEOPTE							
Total score	35.19 ± 11.90	37.50 ± 13.60	36.71 ± 11.62	36.96 ± 11.99	32.61 ± 10.95	11.10‡	I = III = II > IV‡‡
"Basic Cognitive Functions" subscore	19.96 ± 7.40	22.37 ± 9.39	21.14 ± 7.34	20.56 ± 7.30	18.61 ± 6.87	11.76†	I = II = III > IV‡‡
"Social Cognition" subscore	16.87 ± 5.87	16.30 ± 6.97	17.76 ± 5.82	17.71 ± 6.27	16.12 ± 5.44	8.02‡	II = III = I > IV‡‡

Variable	Total sample (n = 325)	Age group I < 21years (n = 191)	Age group II > 21 years (n = 134)	Z
i-GEOPTE				
Total score	35.19 ± 11.90	37.00 ± 12.23	32.61 ± 10.95	-3.33††
"Basic Cognitive Functions" subscore	19.96 ± 7.40	21.13 ± 7.65	18.61 ± 6.87	-3.05††
"Social Cognition" subscore	16.87 ± 5.87	17.52 ± 6.16	16.12 ± 5.44	-2.10‡‡

Variable	Males (n = 180)	Females (n = 145)	Z
i-GEOPTE			
Total score	34.08 ± 11.35	36.57 ± 12.45	-1.71
"Basic Cognitive Funtions" subscore	19.54 ± 7.13	20.48 ± 7.71	-0.94
"Social Cognition" subscore	16.29 ± 5.62	17.58 ± 6.10	-1.83

*Note: i-GEOPTE = Italian version of the GEOPTE scale of social cognition for psychosis; GEOPTE = "Grupo Espanol para la Optimización y Tratamiento de la Esquizofrenia" (Spanish Group fo the Optimization and Treatment of Schizophrenia). Frequencies (percentages), mean ± standard deviation, Kruskal-Wallis test (χ2) and Mann-Whitney U test (Z) values are reported. Post-hoc analyses were performed using Mann-Whitney U test. *p < 0.001; †p < 0.01; ‡p < 0.05; **Holm-Bonferroni corrected p-value < 0.001; ††Holm-Bonferroni corrected p-value < 0.01; ‡‡Holm-Bonferroni corrected p-value < 0.05.*

could have a lower insight on their subjective experience of attenuated psychopathology and psychosocial functioning. Consistently with this hypothesis, there is also evidence of positive correlation between i-GEOPTE total scores and a longer DUI, which has been widely reported to be related with lower insight and poor daily functioning both in UHR than FEP individuals [37].

Finally, in the present study no significant correlations of i-GEOPTE total scores with gender and years of education were found. Likewise, a meta-analysis on social cognition in UHR individuals reported no significant moderator effect for gender and level of education [10].

Limitations

In the current research, there are some methodological limitations to be acknowledged. First, a possible weakness is that the GEOPTE scale was specifically developed to measure subjective experience of social cognition and related basic cognitive functions. This does not allow a direct comparison with results of previous studies on social cognition using specific neuro-socio-cognitive tasks for emotional recognizing, theory of mind, social perception, and attributional style. Indeed, main aim of the GEOPTE scale was to be a quick and easy self-report questionnaire contributing to decrease the gap between research and clinical practice within the field of diagnosis and treatment of early psychosis [13].

Secondly, another weakness of this study is that findings on iGEOPTE total scores were not checked for IQ and antipsychotic dosage. Thus, further research involving specific measures on intelligence quotient and use of antipsychotics are needed.

Conclusions

Findings of this research indicate that the Italian version of the GEOPTE scale of social cognition for psychosis is reliable and valid, showing satisfactory psychometric

TABLE V. *Indices of adjustment and item factor loadings obtained in the Confirmatory Factor Analysis (CFA) using the original Spanish version of the GEOPTE scale of social cognition for psychosis (Sanjuan et al., 2003)* [13].

Indice of adjustment	GEOPTE scale (15 items)	Accepted values
CFI	0.957	≥ 0.90
TLI	0.950	≥ 0.90
RMSEA	0.079	≤ 0.06-0.08
SRMR	0.062	≤ 0.08
Item	Factor 1 Basic cognitive functions	Factor 2 Social cognition
Geopte1	0.678	-
Geopte2	0.801	-
Geopte3	0.825	-
Geopte4	0.575	-
Geopte5	0.775	-
Geopte6	0.549	-
Geopte7	0.820	-
Geopte11	0.703	-
Geopte12	0.646	-
Geopte8	-	0.579
Geopte9	-	0.593
Geopte10	-	0.644
Geopte13	-	0.795
Geopte14	-	0.697
Geopte15	-	0.611

Note. GEOPTE = "Grupo Espanol para la Optimización y Tratamiento de la Esquizofrenia" (Spanish Group for the Optimization and Treatment of Schizophrenia)CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardized Root Mean Square Residual.

properties in assessing subjective experience of socio-cognitive functions in adolescent and young adult community help-seekers. Hence, the iGEOPTE appears to be a suitable self-report instrument for routine use in mental health care services, also in order to evaluate functional outcomes of our intervention. Indeed, it is becoming clearer that to assess if psychopharmacological and/or cognitive-behavioral treatments (as well as cognitive rehabilitation programs) have a repercussion in daily life and improve the individual(s prognosis, we should measure the change in social functioning and not simply the variations in the neurocognitive tests [13]. Furthermore, as psychotic experiences during adolescence index increased risk for psychotic disorders in adult life and are commonly correlated to specific neurocognitive anomalies (such as working memory deficits), the routine use of instruments assessing subjectively experienced socio-cognitive functions may also be useful to provide prompt and targeted intervention counteracting the possible early cognitive functioning decline in psychotic disorders [42].

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Conflict of interest

The Authors declare to have no conflict of interest.

References

1 Green MF, Penn DL, Bentall R, et al. *Social cognition in schizophrenia: an NIMH workshop on definitions, assessment, and research opportunities*. Schizophr Bull 2008;34:1211-20.

2 Ostrom TM. *The sovereignty of social cognition*. In: Wyer RF, Skrull TK, Eds. *Handbook of social cognition*. Hillsdale, NJ: Lawrence Erlbaum Associated, p. 1-38.

3 Raballo A. *Further angles to this story: time consumption in mind-reading, psychosis risk and phenomenology of social cognition.* Schizophr Res 2017; Nov 4: https://doi.org/10.1016/j.schres.2017.10.038 (E-pub ahead of Print).

4 Cotter J, Bartholomeusz C, Papas A, et al. *Examining the association between social cognition and functioning in individuals at ultra-high risk for psychosis*. Austr N Z J Psychiatry 2017;51:83-92.

5 Thompson A, Papas A, Bartholomeusz C, et al. *Social cognition in clinical "at risk" for psychosis and first episode psychosis populations*. Schizophr Res 2012;141:204-9.

6 Glenthoj LB, Fagerlund B, Hjorthoj C, et al. *Social cognition in patients at ultra-high risk for psychosis: what is the relation to social skills and functioning?* Schizophr Res Cogn 2016;5:21-7.

7 Buck BE, Healey KM, Gagen EC, et al. *Social cognition in schizophrenia: factor structure, clinical and functional correlates.* J Ment Health 2016;25:330-7.

8 Mondragon-Maya A, Ramos-Mastache D, Roman PD, et al. *Social cognition in schizophrenia, unaffected relatives and ultra-high risk for psychosis: what do we currently know?* Actas Esp Psiquiatr 2017;45:218-29.

9 Lee TY, Hong SB, Shin NY, et al. *Social cognitive functioning in prodromal psychosis: a meta-analysis.* Schizophr Res 2015;164:28-34.

10 van Donkersgoed RJM, Wunderink L, Nieboer R, et al. *Social cognition in individuals at ultra-high risk for psychosis: a meta-analysis*. PLoS One 2017;10:e0141075, https://doi.org/10.1371/journal.pone.0141075

11 Kim HS, Shin NY, Jang JH, et al. *Social cognition and neurocognition as predictors of conversion to psychosis in individuals at ultra-high risk.* Schizophr Res 2011;130:170-5.

12 Gilbody SM, House AO, Sheldon TA. *Psychiatrists in the UK do not use outcome measures: national survey*. Br J Psychiatry 2002;180:101-3.

13 Sanjuan J, Prieto L, Olivares JM, et al. *GEOPTE scale of social cognition for psychosis.* Actas Esp Psiquiatr 2003;31:120-8.

14 Raballo A, Chiri LR, Pelizza L, et al. *Field-testing the early intervention paradigm in Emilia-Romagna: the Reggio Emilia At Risk Mental State (ReARMS) project*. Early Interv Psychiatry 2014;8(Suppl 1):88.

15 Yung AR, Yuen HP, McGorry PD, et al. *Mapping the onset of psychosis: the comprehensive assessment of at-risk mental states. A*ustr N Z J Psychiatry 2005;39:964-71.

16 National Institute for Health and Care Centre (NICE). *Psychosis and schizophrenia in children and young people: recognition and management.* Leicester: British Psychological Society 2013.

17 Schmidt SJ, Schultze-Lutter F, Schimmelmann BG, et al. *EPA guidance on the early intervention in clinical high risk states of psychoses.* Eur Psychiatry 2015;30:388-404.

18 Pelizza L, Azzali S, Paterlini F, et al. *The Italian version of the brief 21-item prodromal questionnaire: field test, psychometric properties and age-sensitive cut-offs.* Psychopathology 2018;51:234-44.

19 Azzali S, Pelizza L, Paterlini F, et al. *Reliability of the Italian version of the 16-item Prodromal Questionnaire (iPQ-16) for psychosis risk screening in a young help-seeking community sample.* J Psychopathol 2018;24:16.23.

20 McGorry PD, Hickie IB, Yung AR, et al. *Clinical staging of psychiatric disorders: a heuristic framework for choosing earlier, safer and more effective interventions*. Austr N Z J Psychiatry 2006;40:616-22.

21 Pelizza L, Raballo A, Semrov E, et al. *Validation of the "early detection Primary Care Checklist" in an Italian community help-seeking sample: the "Checklist per la Valutazione dell'Esordio Psicotico".* Early Interv Psychiatry 2019;13:86-94.

22 Scazza I, Pelizza L, Azzali S, et al. *Reliability of the Italian version of the Brief (21-item) Prodromal Questionnaire (iPQ-B) for psychosis risk screening in a young help-seeking population.* J Psychopathol 2018;24:204-14.

23 American Psychiatric Association (APA). *Diagnostic and statistical manual of mental disorders, 4th ed, text revised*. Washington, DC: APA Press 2000.

24 Raballo A, Semrov E, Bonner Y, et al. *Traduzione e adattamento italiano della CAARMS (the Comprehensive Assessment of At Risk Mental States)*. Bologna: Centro stampa della Regione Emilia-Romagna 2013.

25 Raballo A. *GEOPTE*. Reggio Emilia: Centro Stampa dell'AUSL di Reggio Emilia 2012.

26 Pelizza L, Paterlini F, Azzali S, et al. *The approved Italian version of the Comprehensive Assessment of At-Risk Mental States (CAARMS-ITA): field-test and psychometric features.* Early Interv Psychiatry 2019;13:86-94.

27 Paterlini F, Pelizza L, Galli G, et al. *Inter-rater reliability of the authorized Italian version of the Comprehensive Assessment of At-Risk Mental States (CAARMS-ITA).* Journal of Psychopathol 2019;25:24-8.

28 First MB, Spitzer RL, Gibbon M, et al. *Structured Clinical Interview for DSM-IV-TR Axis I Disorders (SCID-I).* New York, NY: New York State Psychiatric Institute 2002.

29 SPSS Inc. *SPSS for Windows*, rel. 15.0. Chicago, IL: SPSS Inc. 2010.

30 R Core Team. *R: a language and environment for statistical computing*. Wien: R Foundation for Statistical Computing 2014.

31 Revelle W. *Psych: procedures for psychological, psychometric, and personality research.* Evanston, IL: Northwestern University Press 2018.

32 Rosseel Y. *Lavaan: an R package for structural equation modeling*. J Stat Softw 2012;48:1-36.

33 Holm SA. *A simple sequentially rejective multiple test procedure.* Scand J Stat 1969;6:65-70.

34 Heise DR. *Separating reliability and stability in test-retest correlation*. Am Soc Rev 1969;34:93-101.

35 Michel C, Schultze-Lutter F, Schimmelmann BG. *Screening instruments in child and adolescent psychiatry: general and methodological considerations.* Eur Child Adolesc Psychiatry 2014;23:725-7.

36 Green, SB, Yang Y, Alt M, et al. *Use of internal consistency coefficients for estimating reliability of experimental task scores*. Psychon Bull Rev 2016;23:750-63.

37 Rapp C, Canela C, Studerus E, et al. *Duration of untreated psychosis/illness and brain volume changes in early psychosis.* Psychiatry Res 2017;255:332-7.

38 Flora DB, Curran PJ. *An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data.* Psychol Methods 2004;9:466-72.

39 Brown TA. *Confirmatory factor analysis for applied research.* New York, NY: Guilford Press 2006.

40 Hu L, Bentler PM. *Cut-off criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives.* Struct Equ Model Multidiscip J 1999;6:1-55.

41 Zhang T, Guo X, Tang Y, et al. *Time consumption in mind-reading: a potentially important factor for social cognition assessment in early psychosis*. Schizophr Res 2017;192:491-2.

42 Rossi R, Zammit S, Button KS, et al. *Psychotic experiences and working memory: a population-based study using signal-detection analysis.* PLoS One 2016;11:e0153148.

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APPENDIX I. *The Italian version of the GEOPTE Scale of social cognition for psychosis (Raballo, 2005)* [21].

Cognome ……..Nome……Data…….

Di seguito sono elencate alcune situazioni, sensazioni, emozioni che potrebbero esserti capitate o che potresti avere provato. Segna con una crocetta il numero corrispondente alla frequenza con cui sono/sono state presenti.

		No/per nulla	Poco	Medio	Abbastanza	Molto
1	Fai fatica a stare attento?	1	2	3	4	5
2	Trovi difficile seguire una conversazione in cui partecipano molte persone?	1	2	3	4	5
3	Ti risulta faticoso apprendere cose nuove?	1	2	3	4	5
4	Ti dimentichi di fare cose che ti vengono chieste, compiti, commissioni?	1	2	3	4	5
5	Quando devi parlare con qualcuno, hai dei problemi a esprimerti/farti capire?	1	2	3	4	5
6	Fai fatica a comprendere il soggetto di un quadro?	1	2	3	4	5
7	È difficile per te comprendere il significato di una conversazione?	1	2	3	4	5
8	Ti è difficile riconoscere le emozioni degli altri (per esempio: tristezza, allegria, collera)?	1	2	3	4	5
9	Quando sei in gruppo, ti viene detto spesso che hai frainteso gli atteggiamenti, gli sguardi o le espressioni degli altri?	1	2	3	4	5
10	Ti senti particolarmente sensibile agli sguardi, parole o espressioni degli altri?	1	2	3	4	5
11	Se ti trovi da solo in casa e subentra qualche problema (per esempio si rompe un apparecchio domestico), fai fatica a trovare una soluzione?	1	2	3	4	5
12	Fatichi a badare alla tua igiene personale (essere pulito, lavato)?	1	2	3	4	5
13	Trovi difficile fare piani per il fine settimana?	1	2	3	4	5
14	Ti risulta difficile fare amicizia?	1	2	3	4	5
15	Sei globalmente insoddisfatto della tua vita sessuale?	1	2	3	4	5

Note. GEOPTE = "Grupo Espanol para la Optimización y Tratamiento de la Esquizofrenia" (Spanish Group fo the Optimization and Treatment of Schizophrenia).