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RESEARCH ARTICLE

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Assessing aberrant salience in young community help-seekers with early psychosis: The approved Italian version of the Aberrant Salience Inventory

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Abstract

Objectives: Aberrant salience (AS) has a crucial role in the onset of psychosis. The Aberrant Salience Inventory (ASI) is the only self-report instrument specifically developed for the assessment of AS. Aim of this study was to examine the reliability and the validity of the approved Italian version of the ASI in a clinical sample of young help-seekers.

Methods: The ASI was completed by 204 individuals, aged 13–35 years. Reliability was assessed examining internal consistency and test-retest reliability. Concordant validity was established with CAARMS ("Comprehensive Assessment of At-Risk Mental States").

Results: The ASI showed high test-retest reliability and excellent internal consistency. The ASI total score had significant positive correlations with CAARMS "Positive Symptoms" subscores.

Conclusions: The ASI showed satisfactory psychometric properties and seems to be a suitable instrument for early detection of psychosis in Italian mental health services.

KEYWORDS

aberrant salience, early detection, early psychosis, first episode psychosis, prodrome, psychosis proneness, ultrahigh risk

1 | INTRODUCTION

The concept of "Aberrant Salience" (AS) was systematized by Kapur (2003) at the beginning of this century. In an influential overview article, he proposed AS (defined as the inappropriate processing of stimuli that would normally be considered irrelevant) as a conceptual bridge linking the neurobiology (brain), the phenomenological experience (mind) and the pharmacological aspects of psychosis (especially schizophrenia) into a unitary framework (Raballo et al., 2019). Although the presumed pharmacological and neurobiological (i.e., mainly dopaminergic) components of such hypothesis have not yet been fully confirmed on an empirical level (Kambeitz et al., 2014), the experiential aspects of AS (i.e., the abnormal attribution of significance to otherwise neutral stimuli resulting in a specific alteration of the figure-background structure of the experiential field) have been recursively acknowledged as potential catalyzers for the development of full-blown psychosis (Cicero et al., 2010).

Since the early description of classical European psychopathology, it is now well known that the prodromal phase of primary delusion (i.e., the time period characterized by early psychopathological features that indicates the onset of a psychosis before more diagnostically defined psychotic symptoms; Landi et al., 2020) is often marked by an impending feeling of meaning that moves from the experiential background, which, previously tacit and familiar, starts to be filled with self-referential and disturbingly salient details, although not yet articulated (e.g., persecutory threats; Conrad, 1959). With the psychotic transformation of experience, the perceptual background subsequently becomes more intrusive and saturated, with meaningful details that accelerate and trigger the development of abnormal significance attribution (Howkes, 2012). In this sense, AS therefore may be considered as a central and promising construct for the profiling of vulnerability to psychosis (Compton et al., 2007), particularly in the context of a multiple-gate screening strategy targeting help-seeking adolescents and young adults (Pelizza et al., 2018). Although there is substantial evidence of a continuum in the risk of psychosis from psychosis proneness and subclinical symptoms toward full-blown psychotic episodes (van Os et al., 2009), mapping AS might enrich the characterization of such continuum (Raballo et al., 2019). In this respect, a direct link between the experience of AS and self-disturbances (which are considered as basic core mechanisms specific to psychosis vulnerability [especially in schizophrenia]) has been recently proposed (Nelson et al., 2014). Indeed, failure to self-ascribe thoughts, as well as aberrant self-relevance attribution to environmental stimuli, both point out to a disturbed basic sense of the self, which can also be observed in trans-cultural studies on schizophrenia (Pankow et al., 2016).

1.1 | Assessment instruments for AS

AS can be explored through both neurocognitive (i.e., task-based) and experiential (i.e., questionnaire-based) assessment. For example, the Salience Attribution Test (SAT) aims to evaluate the attribution of salience to task-relevant and task-irrelevant stimuli (Roiser et al., 2008). The SAT is a probabilistic reward-learning test aims to tap the attribution of salience to task-relevant and task-irrelevant stimuli. By its nature, this instrument is costly and time-consuming, and therefore can be applied to small sample only (Raballo et al., 2019). As larger populations are necessary to investigate dispositional AS as a risk factor for attenuated psychotic psychopathology, more parsimonious and time-saving tools (such as self-report questionnaire) are needed (Pelizza et al., 2019a). To date, the *Aberrant Salience Inventory* (ASI) is the only one self-report instrument available for measuring trait AS.

Developed by Cicero et al. (2010), the ASI was initially conceptualized to assess lifetime occurrence of AS. The reliability and validity of its scores have demonstrated to be good in several US samples (Cicero et al., 2015). As self-report tools are sensitive to the cultural context (i.e., they may be affected by differences in language; Beaton et al., 2000), the cross-cultural adaptation of the ASI in a different country is a necessary preliminary step to assure its generalizability as a measure of the AS construct. In this sense, Preti and Raballo (2011) performed the cultural adaptation of the ASI into Italian (Italy speaks a different language than the United States, and its cultural and

socioeconomic background is different as well). The ASI translation accuracy was then confirmed and optimized with the help of Cicero and coworkers. This approved Italian version of the ASI (i-ASI) showed good reliability and convergent/divergent validity in an Italian nonclinical sample of undergraduate students (Raballo, Scanu, et al., 2014).

Starting from this background, the *aim* of the current study was to investigate the psychometric properties of the i-ASI in a clinical population of Italian adolescent and young adult help-seekers with first episode psychosis (FEP) or at ultrahigh risk (UHR) of psychotic disorder. Specifically, the following study objectives were addressed:

(1) To examine the i-ASI short-term test-retest reliability and internal consistency;
(2) To perform a Confirmatory Factor Analysis (CFA) for evaluating the adequacy of the theoretical 5-factor model proposed in the original validation study of the ASI (Cicero et al., 2010);
(3) To assess concurrent and predictive validity of the i-ASI in relation with positive symptoms of psychosis and 1-year psychosis transition rate (respectively);
(4) To investigate diagnostic accuracy measures (i.e., sensitivity and specificity) of different thresholds for the i-ASI total score, to identify the best cut-off point for an early detection of both FEP and UHR subjects.

To the best of our knowledge, up until now, only pilot psychometric data, derived from a limited clinical sample (i.e., 48 psychiatric outpatients [13 with schizophrenia, 12 with major depression, seven with anxiety disorder, and four with eating disorder] compared to 64 healthy individuals recruited from the general population), with an unofficial, nonauthorized i-ASI were published (Lelli et al., 2015). Specifically, we hypothesized that the i-ASI could represent a promising, alternative screening instrument for an early identification of young individuals with early psychosis, psychometrically comparable to other validated self-report screeners (such as the Prodromal Questionnaire-Brief [PQ-B]) (Loewy et al., 2011; Pelizza et al., 2018).

2 | METHODS

2.1 | Setting

As detailed in Raballo, Chiri, et al. (2014), the "Reggio Emilia At-Risk Mental States" (ReARMS) program is an early detection and intervention infrastructure implemented in the Reggio Emilia Department of Mental Health since September 2012. The ReARMS protocol aims (a) to detect individuals with FEP and at UHR of psychosis according to well-defined diagnostic criteria (Yung et al., 2005) among adolescent and young adult community help-seekers and (b) to provide evidence-based interventions that are shown to be effective in FEP/UHR subjects (i.e., individual Cognitive-Behavioral Therapy [CBT], psychoeducational sessions for family members, intensive case management, and pharmacotherapy [as appropriated]; Pelizza et al., 2019b; Regione Emilia-Romagna RER, 2016).

2.2 | Sample

Psychometric properties of the i-ASI were tested in a sample of help-seeking adolescents and young adults, aged 13–35 years, consecutively recruited within child/adolescent and adult mental health 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 (Pelizza, Paterlini, et al., 2019). Sociodemographic data of the total sample were provided under results.

For the specific purpose of this study, ReARMS inclusion criteria were: (a) specialist help-seeking (defined as a problem focused, planned behavior for a mental health problem, involving a specific intervention with a selected mental healthcare professional; Leuci et al., 2020); (b) age between 13 and 35 years; (c) presence of UHR criteria as defined by the Comprehensive Assessment of At-Risk Mental States (CAARMS; Yung et al., 2005) or (d) a Duration of Untreated Psychosis (defined as the time interval [in weeks] between the onset of a full-blown psychotic symptom and the administration of the first pharmacological treatment) (Ran et al., 2018) <2 years in case FEP is detected at baseline assessment. Specifically, 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 a low functioning maintained for ≤1 month; (b) brief limited intermittent psychotic symptoms (BLIPS), that is, transient positive symptoms that spontaneously disappear within 1 week (i.e., without pharmacological treatment); and (c) attenuated psychotic symptoms (APS), that is, subthreshold positive psychotic symptoms (Yung et al., 2005). According to the CAARMS diagnostic 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 h on each occasion (Yung et al., 2005). Young help-seekers who were below the UHR/FEP threshold were considered as CAARMS negative cases (i.e., CAARMS-).

Exclusion criteria were: (a) history of 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; American Psychiatric Association APA, 2000); (b) past exposure to antipsychotics; (c) current substance dependence, in accordance with DSM-IV-TR criteria (American Psychiatric Association APA, 2000), (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 (both in writing and reading). Specifically, in the ReARMS program we considered previous exposure to antipsychotic medication (i.e., any past antipsychotic intake in previous illness episodes [thus, before the ReARMS enrollment]) as an equivalent of past psychotic episode. Indeed, according to the CAARMS psychosis criteria (Yung et al., 2005), the threshold of FEP is essentially that at which antipsychotics would probably be commenced in common clinical practice.

All help-seekers entered the ReARMS protocol and their parents (if minors) agreed to participate to the research and gave their informed consent to the psychopathological assessment before their inclusion in the study. 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 experiments including humans. The data that support the findings of this study are available on request from the authors. The data are not publicly available due to privacy and/or ethical restrictions.

2.3 | Instruments

In the current study, the psychopathological assessment was composed of the CAARMS (approved Italian version [CAARMS-ITA]; Raballo et al., 2013), the i-ASI (authorized Italian translation; Preti & Raballo, 2011) and the Schizotypal Personality Questionnaire—Brief version (SPQ-B; approved Italian adaptation; Raballo, 2005).

The *CAARMS* is a semistructured clinical interview specifically developed to evaluate different aspects of attenuated psychopathology as well as functioning (via the integrated SOFAS ["Social and Occupational Functioning Assessment Scale"] module) (Yung et al., 2005). It consists of 27 items (each one rated in terms of intensity [0–6] and frequency/duration [0–6]) that can be clustered in seven main 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; Raballo et al., 2013), 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 (Paterlini et al., 2019; Pelizza et al., 2019c).

The *ASI* (Cicero et al., 2010) is a 29-item self-report with a "yes-no" (1-0) format, specifically developed to assess AS in line with the Kapur's conceptualization, considering phenomenological descriptions of the initial psychosis experiences, reports of the prodromal stages of schizophrenia and transcripts of interviews of people with psychotic disorders (Lelli et al., 2015). Items are expected to group into five correlated subscales: (a) "Feelings of Increased Significance" (items: 1, 5, 10, 15, 16, 21, and 27), (b) "Sense of Sharpening" (items: 3, 9, 12, 18, and 22), (c) "Impending Understanding" (items: 2, 6, 11, 17, and 29), (d) "Heightened Emotionality" (items: 8, 14, 20, 24, 26, and 28), and (e) "Heightened Cognition" (items: 4, 7, 13, 19, 23, and 25). Scores are assigned by summing the "yes" replies and a total score can be found as a result of the sum of all items. In the original validation studies by Cicero et al. (2010), the ASI highly discriminated people with psychosis proneness from controls. Standard procedures were used to translate the ASI into Italian language (Beaton et al., 2000). Specifically, Preti and Raballo (2011) translated the original English version of the ASI as in Cicero et al. (2010). This first Italian version was then back-translated into English, and translation accuracy was confirmed by an English-speaking translator and optimized with the help of Cicero and co-workers (Raballo et al., 2019). The final i-ASI (for details, see also supplementary materials [Supporting Information Appendix S1]) showed excellent reliability and good convergent, divergent, and discriminant validity in an Italian nonclinical sample of undergraduate students (Raballo, Scanu, et al., 2014). In the present study, the i-ASI was administered at baseline, before the CAARMS interview and the division of participants into the three subgroups.

The *SPQ-B* (Raine & Benishay, 1995) is a brief (22-item) self-report screener for the Schizotypal SPD dimensions (i.e., "Cognitive-Perceptual Deficits", "Interpersonal Deficits and "Disorganization"). This questionnaire is recommended before a confirmatory clinical interview (Raine & Benishay, 1995). However, its scores significantly correlated with independent clinical ratings of DSM-IV-TR schizotypal personality traits, indicating good to excellent criterion validity (Pelizza et al., 2019d). In this study, we used an Italian translation adapted from the original English version (Raballo, 2005), which showed good psychometric properties in Italian clinical samples of young people with FEP or at UHR of psychosis (Pelizza et al., 2019d). In the current research, the SPQ-B was administered at baseline, before the CAARMS interview and the division of participants into the three subgroups.

2.4 | Procedures

All the participants entered the ReARMS program underwent an extensive diagnostic and psychopathological assessment (Pelizza, Paterlini, et al., 2019; Raballo, Chiri, et al., 2014). The axis-I diagnosis was made according to DSM-IV-TR criteria (American Psychiatric Association APA, 2000) at least by two trained ReARMS team members using the Structured Clinical Interview for DSM-IV-TR axis I disorders (First et al., 2002). After CAARMS interviews, adolescent and young adult help-seekers 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) (Pelizza et al., 2019c; Yung et al., 2005).

All the UHR/FEP individuals referred to the ReARMS program were assigned to a multi-professional team including a psychiatrist, a clinical psychologist and a case-manager for early rehabilitation, generally within 2–3 weeks. According to their symptoms, UHR/FEP subjects were then provided with a comprehensive 2-year intervention package including (a) a multielement psychosocial intervention (combining individual CBT, psychoeducational sessions for family members, and a recovery-oriented case management) and/or (b) a pharmacological treatment (as appropriate), according to

the current guidelines on the topic (National Institute for Health and Care Centre NICE, 2013; Regione Emilia-Romagna RER, 2016; Schmidt et al., 2015). Specifically, 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. Low-dose atypical antipsychotics were commonly used. Selective serotonin reuptake inhibitors or benzodiazepines were used to treat depressive symptoms, anxiety, and insomnia (Pelizza et al., 2019b).

The overall validation process of the i-ASI was modeled on the methodological procedure adopted by Cicero et al. (2010) to validate the original English version of the instrument. Specifically, we first measured the short-term test-retest *reliability* of the i-ASI over 2 weeks on a subsample of 35 consecutive FEP participants. This rather short-time interval was chosen to limit the possible impact of both symptomatic changes and memory effects (Michel et al., 2014). As further reliability measure, internal consistency of the i-ASI was also investigated.

A CFA was then performed to evaluate the adequacy of the 5-factor structure proposed in the validation study of the original English version of the ASI within the total sample. However, since the factor structure of the ASI may be controversial in different countries (Fernandez-Leon et al., 2019), we first conducted an Exploratory Factor Analysis (EFA) and then compared our emerging EFA factor configuration with that proposed in the original validation study (Cicero et al., 2010).

As measure of concurrent and divergent *validity*, correlation analyses of i-ASI total score with CAARMS "Positive Symptoms" dimension, CAARMS "Anhedonia" item and SPQ-B subscale scores were also performed in the total sample. In the total group, agreement between the i-ASI total score and CAARMS outcomes (i.e., FEP/UHR vs. CAARMS-) was also used to assess concurrent validity by generating the receiver operating characteristic (ROC).

Finally, the 1-year predictive validity of the i-ASI was tested in relation to 1-year psychosis transition rate in people who, at the same time, did not meet CAARMS psychosis criteria at the initial assessment.

2.5 | Statistical analysis

Data were analyzed using the Statistical Package for Social Science (SPSS) 15.0 for Windows (SPSS Inc., 2010) and R version 3.5.3 (R Core Team, 2014) with "Psych" and "Lavaan" software packages (Revelle, 2018; Rosseel, 2012). Continuous parameters were reported as mean ± standard deviation, whereas categorical variables as absolute frequencies and percentages. All tests were two-tailed, with significance level (α) set at .05. Due to non-normality (Kolmogorov-Smirnov test with Lilliefors significance correction: $p < .05$) in all explorations, nonparametric statistics were used.

In intergroup comparisons, categorical data were analyzed with χ^2 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 posthoc procedure with Holm-Bonferroni correction for multiple comparisons; Holm, 1979) were used to compare ordinal variables.

In the current study, we measured short-term test-retest *reliability* of the i-ASI over two weeks calculating Spearman's correlation coefficients of ASI total score and individual ASI item subscores (Lelli et al., 2015) on a subsample of 35 consecutive FEP participants. As further reliability measure, internal consistency of the i-ASI was also investigated, using Cronbach's α within the total sample. A score above 0.70 was considered sufficient internal consistency (Green et al., 2016). Moreover, we examined how each i-ASI item correlated with the total score. Correlations $< r = .30$ indicated that the item might need to be removed from the questionnaire to make it more reliable (Green et al., 2016). Finally, we were interested in Cronbach's α value if any i-ASI item was deleted. If the α value went up after item deletion, removal of such item should be considered to ameliorate the reliability of the instrument (Green et al., 2016).

Since the factor structure of the ASI could be controversial in different cultures and countries (Fernandez-Leon et al., 2019), an EFA was performed to thoroughly investigate AS configuration in the total sample, using a

Principal Component Analysis (PCA) with oblimin direct rotation. To evaluate the factorability, a statistical significance of the Bartlett's Test of Sphericity ($p < .05$) and a Kaiser-Meyer-Olkin (KMO) value of more than 0.75 were used (Marsh et al., 2014). Specifically, item loading values were considered as relevant if >0.45 for each factor (Hair et al., 1998). According to Kline (2000), significant item loadings on more than one factor were not retained unless there was a coherent theoretical or practical rationale for retaining that on the robust loading factor.

In CFA, to evaluate the adequacy of the 5-factor structure proposed in the validation study of the original English version of the ASI within the total sample, we used the robust weighted least squares estimator, which does not assume normally distributed variables and provides the best option for modeling ordinal data in moderately large samples (Flora & Curran, 2004). The criterion of Brown (2006) was applied to assess CFA results: it recommends the use of four common indices to evaluate fit of the overall model and to calculate both the satisfactory global functioning and the 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), the following general rules of thumb were used in the current research: TLI/CFI > 0.90 (accepted fit), RMSEA < 0.08 (accepted fit), and SRMR < 0.08 (good fit).

As measures of concurrent *validity*, we used Spearman's correlation coefficient with Holm-Bonferroni correction to revise *p* value for multiple comparisons (Holm, 1979). Specifically, we examined the convergent validity by testing if the i-ASI total score was positively correlated with positive symptoms and SPQ-B subscores. Moreover, we explored the divergent validity by testing whether i-ASI scores were less strongly correlated with anhedonia than SPQ-B measures. In addition, we examined any relevant association of the i-ASI total score with sociodemographic characteristics (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; Rapp et al., 2017) in the total sample, using Mann-Whitney *U* test or Spearman's correlation coefficients, as appropriate.

In the total sample, agreement between the i-ASI total score and CAARMS outcomes (i.e., FEP/UHR vs. CAARMS-) was also used to assess concurrent validity by generating the ROC curve and calculating the area under the ROC curve (AUC). According to Hosmer et al. (2013), we interpreted the AUC as follows: AUC ≤ 0.5 (no discrimination), 0.51–0.69 (unacceptably low), 0.70–0.79 (acceptable), 0.80–0.89 (excellent), and ≥0.90 (outstanding). Moreover, we calculated diagnostic accuracy measures (i.e., specificity, sensitivity, positive and negative predictive values and positive and negative likelihood ratios [LR− and LR+] that balance sensitivity against specificity). In interpreting LRs, we followed Jaeschke et al. (1994): LRs of 0.5–2 altered pretest probability to a small (and rarely important) degree, LRs of 2–5 and 0.2–0.5 generated small (but sometimes important) changes in probability and LRs of 5–10 and 0.1–0.2 generated moderate shifts in pretest to posttest probability. Moreover, two other criteria were used to confirm optimal cut-off point from ROC curve, giving equivalent weight to specificity and sensitivity: (a) points on ROC curve closest to the point (0, 1) and (b) the Youden index (*J*) (Zhou et al., 2002). In detail, we firstly calculated the distance (d) between the point (0, 1) and each cut-off point on the ROC curve, and subsequently detected the point where this distance was minimal: $d = \sqrt{[(1 - \text{sensibility})^2 + (1 - \text{specificity})^2]}$. The Youden index (*J*) was the point on the ROC curve that was farthest from random chance diagonal line and therefore maximized the difference between true positive rate (sensitivity) and false positive rate (1 − specificity): $J = \max(\text{sensitivity} + \text{specificity} - 1)$.

Finally, the 1-year predictive validity of the i-ASI was tested by consecutively identifying people with baseline i-ASI total score above the most suitable cut-offs identified in our total sample, who at the same time did not meet CAARMS psychosis criteria at the initial assessment. In detail, we examined whether these different cut-off thresholds of the i-ASI total score had any predictive value regarding the development of a psychotic disorder (i.e., a FEP) according to CAARMS-defined diagnostic criteria (Pelizza et al., 2019c; Yung et al., 2005).

3 | RESULTS

3.1 | Sample characteristics and i-ASI scores

Over the course of the study, 204 individuals (122 [59.8%] males, 181 [88.7%] white Caucasian, 182 [89.2%] with Italian as mother tongue) consecutively attended an intake interview within the ReARMS program. Age at entry ranged from 13 to 35 years (M = 21.23 years; SD = 5.85 years), level of education from 7 to 18 years (M = 11.65 years; SD = 2.41 years), and the DUI from 4 to 208 weeks (M = 70.95 weeks; SD = 62.41 weeks). In the total sample, the distribution of age, years of education (in years) and DUI (in weeks) was skewed toward the left (skewness = 0.660, 0.187, and 0.918, respectively; Kolmogorov-Smirnov test with Lilliefors significance correction: $p < .001$, for all explorations). Table 1 shows i-ASI total scores, sociodemographic and clinical characteristics of the total sample and the three subgroups, that is, FEP ($n = 104$; 51.0% of the total sample), UHR ($n = 45$; 22.1%), and CAARMS- ($n = 55$; 26.9%).

Within the UHR group, 39 participants met APS criteria (86.8% of UHR individuals), 3 (6.6%) met BLIPS criteria, and 3 (6.6%) met GRFD criteria.

The FEP group consisted of patients with DSM-IV-TR schizophrenia ($n = 49$; 47.1% of FEP individuals), affective (bipolar or major depressive) psychosis ($n = 28$; 26.9%), psychotic disorder not otherwise specified ($n = 21$; 20.2%), and brief psychotic disorder ($n = 6$; 5.8%).

The remaining participants were below the CAARMS-defined FEP/UHR criteria and composed the CAARMS- subgroup. They were diagnosed with DSM-IV-TR non-schizotypal personality disorder ($n = 23$; 41.8% of CAARMS- individuals), anxiety disorders ($n = 18$; 32.7%), and depressive disorders ($n = 14$; 25.5%).

In comparison with CAARMS-, FEP patients showed a significantly greater percentage of males and a longer DUI. Compared to UHR-, FEP individuals had a significantly older age at the ReARMS enrollment, as well as UHR individuals had a younger age than CAARMS- participants at the baseline assessment. No intergroup difference in terms of ethnic group, mother tongue and years of education was also found (Table 1).

At baseline evaluation, the i-ASI total score was 10.72 ± 7.61 n the total sample. In comparison with CAARMS-, both UHR and FEP subjects showed significantly higher i-ASI total scores (Table 1). No difference in the ASI total score was found between male and female participants (males: M = 11.66, SD = 10.70; females: M = 10.70, SD = 7.97; $Z = -1.063$; $p = .288$), as well as between adolescents (aged < 18 years) and young adults (adolescents: M = 10.67, SD = 7.70; young adults: M = 11.34, SD = 7.52; $Z = 0.411$; $p = .681$).

3.2 | Reliability

The i-ASI was re-administered to 35 consecutive FEP participants after 2 weeks (T1) from the baseline assessment (T0) to calculate short-term test-retest reliability. Their sociodemographic characteristics were comparable to those of the total sample, with a mean age of 20.25 (SD = 1.02) years and a mean level of education of 12.21 (SD = 1.93) years. Twenty (57.1%) out of the 35 FEP patients were males. At baseline, their mean i-ASI total score was 12.69 (SD = 7.61), whereas at T1 was 11.53 (SD = 7.29). Spearman's correlation coefficient (ρ) between i-ASI total scores at T0 and T1 was 0.815 ($p = .0001$). Likewise, correlation analysis for each i-ASI item also revealed significant Spearman's correlation coefficients between item subscores at T0 and T1 (ρ ranging from 0.611 to 0.815; $p = .0001$ in all explorations; for details, see also Table S1).

Within the total sample, the i-ASI total score showed a *Cronbach's* α of 0.925 (95% confidence intervals [CI] = 0.901–0.934). All item-total correlations were higher than 0.30, with the exception of items 8 ("Do you ever have difficulty telling if you are thrilled, frightened, pained or anxious?"; $r = .179$) and 15 ("Do you go through periods in which songs sometimes seem to have an important meaning for your life?"; $r = .203$; Table 2). Thus, most item appeared to be worthy of retention, resulting in a decrease in the α value if deleted. Exceptions to this were the items 8 and 15, for which removal should be considered.

TABLE 1 ASI total scores, sociodemographic and clinical characteristics of the total sample and the three subgroups

Variables	Total sample ($n = 204$)	CAARMS ($n = 55$)	UHR ($n = 45$)	FEP ($n = 104$)	χ^2	Posthoc test
Gender (males)	122 (59.8%)	26 (47.3%)	24 (53.3%)	72 (69.2%)	8.22[c]	FEP > CAARMS-[e]
Ethnic group (white Caucasian)	181 (88.7%)	47 (85.5%)	41 (91.1%)	93 (89.4%)	0.89	-
Mother tongue (Italian)	182 (89.2%)	51 (92.7%)	39 (86.7%)	92 (88.5%)	1.07	-
Age	21.23 ± 5.85	22.58 ± 6.32	18.78 ± 4.32	23.04 ± 5.80	12.52[b]	FEP = CAARMS- > UHR[d,ed,e]
Education (years)	11.65 ± 2.41	11.58 ± 2.47	11.47 ± 2.30	11.79 ± 2.46	1.20	-
DUI (weeks)	70.95 ± 62.41	50.63 ± 54.15	59.61 ± 44.33	87.50 ± 70.73	7.82[c]	FEP > CAARMS-[f]
ASI total score	10.72 ± 7.61	4.87 ± 5.46	12.96 ± 6.24	13.93 ± 7.00	60.59[a]	FEP = UHR > CAARMS-[d]

Note: Frequencies (percentages), mean ± standard deviation, Kruskal-Wallis and χ^2 test values are reported. Posthoc analyses were performed using Mann-Whitney *U* test.

Abbreviations: ASI, Aberrant Salience Inventory; CAARMS, Comprehensive Assessment of At-Risk Mental States; CAARMS-, participants who were below CAARMS-defined UHR/FEP criteria; DUI, duration of untreated illness; FEP, first episode psychosis; UHR, participants who met CAARMS-defined Ultra-High Risk (UHR) criteria.

[a] $p < .001$.

[b] $p < .01$.

[c] $p < .05$.

[d] Holm-Bonferroni corrected $p < .001$.

[e] Holm-Bonferroni corrected $p < .01$.

[f] Holm-Bonferroni corrected $p < .05$.

TABLE 2 Internal consistency of the ASI (n = 204)

ASI items	Item-total correlation (r)	Cronbach's α if item deleted
1) Do certain trivial things ever suddenly seem especially important or significant to you?	.636	.921
2) Do you sometimes feel like you are on the verge of something really big, but you're not sure what it is?	.565	.922
3) Do your senses sometimes seem sharpened?	.572	.922
4) Do you ever feel like you are rapidly approaching the height of your intellectual power?	.448	.923
5) Do you sometimes notice small details that you have not noticed before that seem important?	.592	.921
6) Do you sometimes feel like it is important for you to figure something out, but you're not sure what it is?	.601	.921
7) Do you ever go through periods were you feel especially religious or mystical?	.547	.922
8) Do you ever have difficulty telling if you are thrilled, freightened, pained, or anxious?	.179	.927
9) Do you ever go through periods of heightened awareness?	.435	.924
10) Do you ever feel the need to make sense of seemingly random situations or occurrences?	.587	.921
11) Do you sometimes like you are finding the missing piece to a puzzle?	.546	.922
12) Do you sometimes feel that you can hear with a great clarity?	.518	.923
13) Do you sometimes feel like you are an especially spiritually evolved person?	.658	.920
14) Do normally trivial observations sometimes take on an ominous significance?	.481	.923
15) Do you go through periods in which songs sometimes seem to have an important meaning for your life?	.203	.926
16) Do you sometimes attribute importance to objects which you normally would not?	.623	.921
17) Do you sometimes feel like you are on the verge of figuring out something really big or important, but you aren't sure what it is?	.570	.922
18) Has your sense of taste ever seemed more acute?	.367	.925
19) Do you ever feel like the mysteries of the universe are revealing themselves to you?	.338	.925
20) Do you go through periods in which you feel overstimulated by things or experiences that are normally manageable?	.624	.921
21) Do you often become fascinated by the little things around you?	.668	.920
22) Do your senses ever seem extremely strong or clear?	.640	.921

TABLE 2 (Continued)

ASI items	Item-total correlation (r)	Cronbach's α if item deleted
23) Do you ever feel like a whole world is opening up to you?	.436	.924
24) Do you ever feel that your boundaries between inner and outer sensations have been removed?	.451	.923
25) Do you sometimes feel like the world is changing and you are searching for an explanation?	.550	.922
26) Do you ever have a feeling of inexpressible urgency, and you are not sure what to do?	.572	.922
27) Have you sometimes become interest in people, events, places, or ideas that normally would not make an impression on you?	.654	.920
28) Do your thoughts and perceptions ever come faster that cannot be assimilated?	.419	.924
29) Do you sometimes notice things that you haven't notice before that take on a special significance?	.680	.920

Note: Correlation *r* coefficients and Cronbach's α values are reported.
Abbreviation: ASI, Aberrant Salience Inventory.

3.3 | Exploratory factor analysis

An EFA was first conducted in the total sample, using a PCA extraction method with oblimin direct rotation, in accordance with the validation procedure adopted for the Spanish version of the ASI (Fernandez-Leon et al., 2019). The KMO index was 0.90 and the Bartlett's Test of Sphericity was statistically significant ($2643.4_{[406]}$; $p = .000$), suggesting the EFA adequacy in our data set. Parallel analysis recommended four factors explaining 51.2% of ther variance (Table 3), which were very different from what reported in both the original and the Spanish validation procedure of the ASI. Indeed, a first major factor explaining 33.1% of the total variance included the original ASI "Feeling of Increased Significance" subscale items (with the exception of the ASI item 15), together with ASI 6, 7, 13, 14, 20, 25, 26, and 29 items. A second factor explained 9.2% of the variance and combined the original ASI "Sense of Sharpening" subscale items (with the exception of ASI item 9) with ASI 2, 4, 11, and 28 items. A third factor explaining 4.8% of the total variance included ASI 9 and 24 items. Finally, a fourth factor explained 4.1% of the variance and was composed of ASI 17, 19, and 23 items. ASI 8 and 15 items did not segregate in any of the four domains, suggesting a factor non-specificity.

3.4 | CFA

In our data set, *CFI*, *TLI*, *RMSEA*, and *SRMR* indices were first analyzed to assess the adjustment of the original ASI 5-factor model (Table 4). Although *CFI*, *TLI*, and *RMSEA* were adequate, maintaining acceptable values (i.e., 0.952, 0.946, and 0.059, respectively), *SRMR* was 0.125, showing a poor fit value (for details on factor loadings of the ASI items, see Table S2). Specifically, ASI items 8 and 15 had insufficient factor loading values of <0.45 (i.e., 0.263 and 0.375, respectively).

For our EFA 4-factor configuration, *CFI* was 0.957, *TLI* was 0.952, *RMSEA* was 0.057 and *SRMR* was 0.119. For original ASI 5-factor model without items 8 and 15, *CFI* was 0.951, *TLI* was 0.945, *RMSEA* was 0.061, and *SRMR* was 0.125. Finally, if we considered an ASI unidimensional construct, *CFA* was 0.941, *TLI* was 0.937, *RMSEA* was 0.064, and *SRMR* was 0.132.

TABLE 3 Exploratory factor analisys of the i-ASI in the total group ($n = 204$)

i-ASI item	Factor 1	Factor 2	Factor 3	Factor 4
ASI-1	**0.692**	0.242	0.388	0.203
ASI-5	**0.742**	0.108	0.282	0.184
ASI-6	**0.600**	0.431	−0.042	0.262
ASI-7	**0.595**	0.318	0.066	0.304
ASI-10	**0.707**	0.362	−0.028	0.144
ASI-13	**0.844**	0.252	−0.066	0.294
ASI-14	**0.627**	0.257	−0.307	0.133
ASI-16	**0.762**	0.333	−0.154	0.425
ASI-20	**0.662**	0.380	0.021	0.289
ASI-21	**0.771**	0.308	0.046	0.352
ASI-25	**0.532**	0.397	−0.024	0.432
ASI-26	**0.502**	0.441	0.081	0.266
ASI-27	**0.639**	0.437	0.131	0.396
ASI-29	**0.830**	0.314	0.074	0.295
ASI-2	0.435	**0.490**	0.270	0.440
ASI-3	0.380	**0.828**	0.171	0.261
ASI-4	0.334	**0.451**	0.411	0.413
ASI-11	0.329	**0.638**	0.406	0.402
ASI-12	0.369	**0.760**	−0.022	0.190
ASI-18	0.159	**0.496**	0.186	0.259
ASI-22	0.407	**0.725**	−0.006	0.444
ASI-28	0.221	**0.631**	0.249	0.185
ASI-9	0.269	0.449	**0.610**	0.321
ASI-24	0.368	0.378	**0.633**	0.315
ASI-17	0.425	0.444	0.211	**0.542**
ASI-19	0.154	0.272	0.179	**0.804**
ASI-23	0.247	0.330	0.304	**0.783**
ASI-8	0.244	0.212	−3.778	0.104
ASI-15	0.220	−0.015	−0.211	0.425
Percentage explained variance	33.1%	9.2%	4.8%	4.1%

Note: Significant item loadings are reported in bold.

Abbreviations: ASI, Aberrant Salience Inventory; i-ASI, Italian version of the ASI.

TABLE 4 Indices of adjustment obtained in the confirmatory factor analysis: exploring competitive models in the total sample ($n = 204$)

Indice of adjustment		
5-Factor model (Cicero et al., 2010)	ASI (29 items)	Accepted values
CFI	0.952	≥0.90
TLI	0.946	≥0.90
RMSEA	0.059	≤0.08
SRMR	0.125	≤0.08
EFA emerging 4-factor model	ASI (29 items)	Accepted values
CFI	0.957	≥0.90
TLI	0.952	≥0.90
RMSEA	0.057	≤0.08
SRMR	0.119	≤0.08
Cicero's 5-factor model without ASI 8 and 15 items	ASI (27 items)	Accepted values
CFI	0.951	≥0.90
TLI	0.945	≥0.90
RMSEA	0.061	≤0.08
SRMR	0.125	≤0.08
Unidimensional one-factor model	ASI (29 items)	Accepted values
CFI	0.941	≥0.90
TLI	0.937	≥0.90
RMSEA	0.064	≤0.08
SRMR	0.132	≤0.08

Note: Factor loadings of the ASI items are also reported.

Abbreviations: ASI, Aberrant Salience Inventory; CFI, Comparative Fit Index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; TLI, Tucker-Lewis Index.

3.5 | Concurrent validity

The i-ASI total score showed significant positive correlations with all CAARMS "Positive Symptoms" and all SPQ-B subscale scores, as well as with CAARMS "Anhedonia" item subscore (Table 5). Moreover, positive correlations of the i-ASI total score were also found with CAARMS "Alogia" and "Affective Flattening" item subscores.

In the total sample, the i-ASI total score had also a significant positive correlation with DUI (Table 5). No significant association of i-ASI total score with gender, age at entry and years of education was found.

3.6 | Diagnostic accuracy measures

ROC curve was plotted for the i-ASI total score to predict CAARMS diagnosis (i.e., UHR/FEP vs. CAARMS-; for details, see also Figure S1). The *AUC* was excellent (0.854, SE = 0.033, 95% CI = 0.789–0.918, $p = .0001$) (Hosmer et al., 2013). Accuracy measures of different thresholds for the i-ASI total score showed that the ≥5 cut-off performed best in terms of distance (d) of points on ROC curve closest to the point (0,1) and Youden index (J) (Table 5), balancing the best sensitivity (0.906) and specificity (0.709) (Table 6).

TABLE 5 Associations of the ASI total score with sociodemographic and clinical characteristics, CAARMS and SPQ-B subscale scores

Variables		ASI total score (ρ)
CAARMS		
Positive symptoms		0.525[a]
Unusual thought content		0.476[a]
Non bizarre ideas		0.407[a]
Perceptual abnormalities		0.378[a]
Disorganized speech		0.348[a]
Anhedonia		0.166[b]
Alogia		0.297[a]
Affective flattening		0.373[a]
SPQ-B		
Cognitive-perceptual deficits		0.542[a]
Interpersonal deficits		0.274[a]
Disorganizations		0.484[a]
Age		−0.052
Years of education		0.096
DUI (in weeks)		0.350[a]
Males (n = 122)	Females (n = 82)	z
11.66 ± 7.20	10.70 ± 7.97	−1.06

Abbreviations: ASI, Aberrant Salience Inventory, CAARMS, Comprehensive Assessment of At-Risk Mental States; DUI, Duration of Untreated Psychosis; SPQ-B, Schizotypal Personality Questionnaire—Brief version.

[a]Holm-Bonferroni corrected $p < .001$.

[b]Holm-Bonferroni corrected $p < .05$. Spearman's rank correlation coefficient (ρ) and Mann-Whitney U test (z) values are reported.

Compared to the ≥5 cut-off of the i-ASI total score, the ≥4 threshold increased sensitivity value up to 0.940, in spite of a decrease in specificity (0.654). Regarding likelihood ratios, in accordance with Jaeschke et al. (1994), the i-ASI cutoff of ≥5 showed a 0.13 LR− value, generating moderate shifts in pretest to posttest probability, despite a 3.11 LR+, which only changed posttest probabilities to a small degree (Table 6).

Considering removal of i-ASI items 8 and 15, ROC curve was also plotted for the remaining i-ASI-27 item total score to predict CAARMS diagnosis (i.e., UHR/FEP vs. CAARMS-). The *AUC* was slightly less significant, but still acceptable compared to that of the original ASI (29-item) total score (0.865, SE = 0.033, 95% CI = 0.801–0.929, $p = .0001$; Hosmer et al., 2013). Accuracy measures of different thresholds for 27-item i-ASI total score showed that, overall, the ≥3 cut-off performed best in terms of Youden index (J) (0.626) and d value (0.169), increasing sensitivity up to 0.926 with a still acceptable specificity of 0.691 (see Table S3 for details).

3.7 | Predictive validity

Fourteen out of 55 participants scoring ≥5 on the i-ASI total score, who did not meet the CAARMS psychosis criteria at baseline, did not finish the 1-year follow-up period. Eleven of these individuals had a follow-up period of <1 year; the other three subjects went out of the ReARMS protocol catchment area and they could not be

TABLE 6 CAARMS diagnostic classification accuracy by ASI cut-off scores

ASI cut-offs	Sensitivity (%) (95% CI)	Specificity (%) (95% CI)	PPV (%) (95% CI)	NPV (%) (95% CI)	LR+ (95% CI)	LR− (%) (95% CI)	*J*	*d*
ASI ≥ 3	95.97 (91.44–98.51)	56.36 (42.32–69.70)	85.63 (81.50–88.96)	83.78 (69.52–92.13)	2.20 (1.63–2.98)	0.07 (0.03–0.16)	0.523	0.231
ASI ≥ 4	94.00 (88.84–97.20)	65.45 (51.42–77.76)	88.05 (83.63–91.40)	80.00 (67.36–88.58)	2.72 (1.89–3.92)	0.09 (0.05–0.18)	0.594	0.180
ASI ≥ 5	90.60 (84.74–94.77)	70.91 (57.10–82.37)	89.40 (84.77–92.75)	73.58 (62.20–82.51)	3.11 (2.05–4.72)	0.13 (0.08–0.22)	**0.615**	**0.179**
ASI ≥ 6	85.23 (78.50–90.51)	74.55 (61.00–85.33)	90.07 (85.17–93.48)	65.08 (55.16–73.85)	3.35 (2.12–5.29)	0.20 (0.13–0.30)	0.598	0.212
ASI ≥ 7	84.56 (77.74–89.96)	76.36 (62.98–86.77)	90.65 (85.71–94.00)	64.62 (54.95–73.22)	3.58 (2.21–5.78)	0.20 (0.14–0.30)	0.609	0.210
ASI ≥ 8	79.19 (71.79–85.40)	78.18 (64.99–88.19)	90.77 (85.55–94.23)	58.11 (49.61–66.15)	3.63 (2.19–6.03)	0.27 (0.19–0.37)	0.574	0.256

Note: The most promising ASI cut-off threshold balancing the best sensitivity and specificity (and their related diagnostic accuracy measures) is reported in bold.

Abbreviations: ASI, Aberrant Salience Inventory; CAARMS, Comprehensive Assessment of At-Risk Mental States; CI, confidence interval; *d*, distance between the point (0, 1) at each cut-off point on the ROC curve; *J*, Youden index; LR+, positive likelihood ratio; LR−, negative likelihood ratio; NPV, negative predictive value; PPV, positive predictive value.

contacted for the follow-up assessment. After 1 year of follow-up, 8 (19.5%) of the 41 remaining individuals developed a FEP. No other psychosis conversion was found among i-ASI negative screen individuals. Considering a cut-off of ≥4 on i-ASI total score at the baseline assessment, eight transitions to psychosis have been equally detected (i.e., 8 [17.0%] of the 47 participants who had a ≥4 cut-off on the i-ASI total score at baseline, who did not meet the CAARMS psychosis criteria at the initial assessment and who finished the 1-year follow-up period).

4 | DISCUSSION

Aim of the current study was to validate the approved i-ASI in a clinical sample of adolescent and young adult community help-seekers recruited within the ReARMS program. BothUHR and FEP participants more severe levels of AS not only at the onset of a full-blown psychosis, but also in the prodromal phase. These findings confirm what hypothesized by Kapur (2003), who suggested that the unusual or incorrect assignment of salience or significance to innocuous stimuli is a central mechanism in the development of psychotic disorders. These results are also in line with what reported in studies on the ASI in psychosis-proneness individuals. Specifically, Cicero et al. (2010) showed higher ASI total scores in nonclinical individuals (aged 18–24 years) scored two standard deviations above the mean on the Social Anhedonia Scale (Eckblad et al., 1982) or scored 1.96 standard deviations above the mean on either the Magical Ideation Scale (Eckblad & Chapman, 1983) or the Perceptual Aberration Scale (Chapman et al., 1978), compared to a control group (i.e., subjects scored <0.5 standard deviations above the mean on the Perceptual Aberration Scale, the Magical Ideation Scale and the Social Anhedonia Scale). Moreover, Cicero et al. (2010) reported a significantly higher mean of the ASI total score in clinically-stable forensic inpatients with a history of psychosis (identified by a review of their charts) in comparison with a psychiatric control group including clinically stable forensic inpatients with nonpsychotic diagnoses. Moreover, Raballo et al. (2019) reported the highest ASI total scores in a group of undergraduate students (aged 18–22 years) with SPQ scores in the schizotypy range.

In the current study, although the mean of the i-ASI total score in both FEP and UHR participants was similar to the results reported by both Cicero et al. (2010) in stable forensic patients with a history of psychosis and Lelli et al. (2015) in Italian psychiatric subjects (aged 18–65 years) with psychotic symptoms, all these findings are definitely lower than those observed by Cicero et al. (2010) in a nonclinical sample of psychosis-proneness subjects (i.e., 22.26 ± 5.40) and by Raballo et al. (2019) in their "High Aberrant Salience" class of Italian undergraduate students (i.e., 20.20 ± 2.90). Therefore, the ASI seems to be particularly suitable for early detection of young individuals with a specific vulnerability to psychosis (such as those highly scoring in schizotypy scales) and/or in the psychosis prodromes. The privileged link of measures of AS with schizotypy and pre-psychotic symptoms appears to reinforce its value as potential catalyzer of the development of full-blown psychosis (Raballo et al., 2019).

Our findings also confirm what previously reported by Cicero et al. (2010) and by Raballo et al. (2019), who showed a substantial independence of ASI scores from gender, ethnic group, mother language, age at entry and years of education. Only DUI positively correlated with the i-ASI total score. This result could be intrinsically associated with the FEP condition, which often delays the first help-seeking contact with mental health services, also due to a catastrophic fear relating to going mad, to fears of stigma or to the risk of a possible hospitalization (Pelizza, Raballo, et al., 2019).

The i-ASI showed an excellent short-term test-retest *reliability*, in line with with what reported by Lelli et al. (2015) in a clinical sample of Italian adult psychiatric patients using an unofficial, non-authorized version of the questionnaire. During this short span of time (i.e., approximately 2 weeks), pharmacotherapy was not substantially modified to exclude a drug-induced interference with the dopamine system linked to salience.

Moreover, we found an excellent internal consistency of the i-ASI in our total sample, in line with what reported by Cicero et al. (2010) (in both native-English speaking college students [$\alpha = .890$] and clinically stable forensic inpatients with a history of psychosis [$\alpha = .910$]), by Raballo, Chiri, et al. (2014) in a nonclinical population

of Italian undergraduate students ($\alpha = .900$), by Lelli et al. (2015) in a clinical sample of Italian psychiatric patients, aged 18–65 years ($\alpha = .890$) and by Fernandez-Leon et al. (2019) in a Spanish general adolescent population (ordinal $a = .950$). Thus, the ASI appears to be reliably good in different samples and cultures. However, in the current research, as item-total correlations of i-ASI items 8 and 15 were associated with a decrease in the a value if these items were deleted, their removal from the instrument should be reasonably considered.

Our *EFA* results identified an ASI 4-factor configuration. A first major dimension extended the "Increased Significance" (IS) subscale to other eight items (e.g., item 6: "Do you sometimes feel like it is important for you to figure something out, but you're not sure what it is?"; item 14: "Do normally trivial observations sometimes take on an ominous significance?"; item 25: "Do you sometimes feel like the world is changing and you are searching for an explanation?"). Consistently with what reported in the validation procedure of the Spanish version of the ASI (Fernandez-Leon et al., 2019), in which a more item-wide IS subscale explaining 26.9% of the total variance was identified, the unceasing search to give significance to personal experiences seems to be the most crucial aspect measured by the ASI and, probably, the main core feature of AS. Moreover, a second factor reflects a mixed domain combining the sense of sensory sharpening (e.g., item 3: "Do your senses sometimes seem sharpened?") with "Impending Understanding" components (e.g., item 2: "Do you sometimes feel like you are on the verge of something really big, but you're not sure what it is?"; item 11: "Do you sometimes feel like you are finding the missing piece to a puzzle?"). Finally, a specific third factor involved two ASI items describing an awareness diffusion, while a fourth factor reflects three ASI items illustrating an imminent revelation of the cosmos/world mysteries.

In our data set, *CFA* results comparing different ASI factor configurations (i.e., the original 5-factor model, our EFA emerging 4-factor structure, the original 5-factor model without ASI items 8 and 15, and a unidimensional configuration combining all the ASI items in a one-factor structure) showed the best fit indices for our EFA 4-factor model, which seems to be even slightly better that the ASI original 5-factor structure (Cicero et al., 2010). Specifically, in our EFA emerging configuration the removal of the ASI items 8 and 15 appeared to be useful.

As expected, the i-ASI total score showed highly significant positive correlations positive symptoms and the positive dimensions of schizotypy (i.e., cognitive perceptual deficits and disorganization). These findings support good concurrent and construct *validity* of the i-ASI, as reported in the original validation study by Cicero et al. (2010). Specifically, the instrument shows to be related with specific measures that have been hypothesized to be associated with dopamine functioning and to comprise the nomological network of AS (Cicero et al., 2010; Kapur, 2003).

As hypothesized, the i-ASI total score was also positively correlated with anhedonia and the interpersonal deficits of schizotypy, but not as strongly as with the above mentioned positive symptom dimensions. According to Cicero et al. (2010), these results provide further evidence for the discriminant validity of ASI scores. However, positive correlations of AS with anhedonia, alogia and affective flattening suggest the lack of absolute independence between AS and negative symptoms of psychosis.

In the present study, diagnostic accuracy measures further confirm that the i-ASI has a good concurrent validity with interview-based CAARMS diagnoses. Indeed, it effectively differentiated between UHR/FEP individuals versus CAARMS- (i.e., nonpsychotic spectrum) patients. Specifically, in our help-seeking sample of adolescents and young adults, a cut-off threshold of ≥5 on the i-ASI total score appears to be a promising cutoff (balancing 91% sensitivity with 71% specificity). This cut-off value is definitely lower than that (≥14) suggested by Lelli et al. (2015) and based on mean values of the ASI total score observed in an Italian clinical sample of psychotic patients, aged 18–65 years. However, the lower ASI cut-off thresholds proposed in clinical setting in comparison with nonclinical ones (e.g., a score of 17.5 reported in a Spanish general adolescent population) (Fernandez-Leon et al., 2019) must be still clarified.

Furthermore, as for screening purposes greater weighting should be given to sensitivity over specificity, especially if part of a 2-step diagnostic process (e.g., screening tool followed by in-depth interview; Loewy et al., 2011), an alternative, equally promising cut-off is a threshold of ≥4 on the i-ASI total score, which increased sensitivity value up to 94%, in spite of a slight decrease in specificity (65%). Indeed, in most cases, having a few more false positives during a screening process is less of an issue than missing appropriate individuals from a

clinical perspective (Scazza et al., 2018). However, in our UHR/FEP-enriched clinical sample, a higher sensitivity implies that full assessment burden can be considerably reducing with little impact on missing UHR/FEP individuals (Azzali et al., 2018). According to Jaeschke et al. (1994), the i-ASI cutoff of bot ≥5 and ≥4 showed LR− values that generated moderate shifts in pretest to posttest probability (despite LR+ values that only changed posttest probabilities to a small degree). Thus, at these thresholds, the i-ASI total score appears to be better in ruling out than in ruling in possible UHR/FEP status.

As an alternative, considering removal of i-ASI items 8 and 15, a cut-off threshold of ≥3 on the 27-item i-ASI total score performed best in terms of diagnostic accuracy measures (increasing sensitivity up to 93% with a specificity of 69%).

After 12 months of follow-up, a percentage ranging from 17% to 19.5% of participants who at baseline scored above the most suitable i-ASI cut-off thresholds identified in our total sample (i.e., respectively ≥4 and ≥5 on the i-ASI total score) and who did not meet CAARMS psychosis criteria at the baseline assessment, developed a FEP. Considering these results, some methodological peculiarities of the present research should be considered. Indeed, ReARMS program is a clinical protocol providing evidence-based interventions that are shown to be effective in UHR/FEP individuals (i.e., pharmacotherapy, intensive case management, psychoeducation for family members, individual CBT within the framework of an assertive community treatment) (Pelizza, Paterlini, et al., 2019). Precisely because providing the optimal treatment for help-seekers was the main ethical mandate in ReARMS clinical setting, our interventions were not controlled (e.g., against placebo group or other treatments), but evenly delivered to all UHR/FEP participants (Raballo, Scanu, et al., 2014). This could therefore affect current psychosis transition rates.

4.1 | Limitations

In the present research, there are some methodological limitations to be acknowledged. First, a possible weakness is that CAARMS- and UHR total sample sizes were relatively small. Thus, further studies on larger populations of people at UHR of psychosis and nonpsychotic psychiatric controls are needed to confirm these promising psychometric properties of the i-ASI.

Second, another limitation of this study is that the i-ASI was completed in a population "enriched" for the target diagnoses (i.e., adolescent and young adult help-seekers with clinical features of early psychosis and a decline in social functioning). Therefore, our results are not comparable with those reported in the general population, where self-reported, transient psychotic-like experiences occur commonly, although not necessarily accompanied by distress or treatment seeking (Pelizza et al., 2019c; Raballo et al., 2019).

Third, the ASI seems to be not sensitive enough to discriminate between UHR mental states and FEP. However, since the i-ASI was tested as a candidate screening tool, followed by the CAARMS interview (which perfectly allows UHR vs. FEP discrimination), such issue appears to be less relevant.

Fourth, another limitation of this study is that our findings on the i-ASI total score were not checked for antipsychotic dosage. Indeed, FEP and UHR participants could not be antipsychotic medication naive at baseline and when they initially completed the i-ASI. In this respect 99 (95.2%) FEP and 27 (60%) UHR individuals were taking antipsychotics at the ReARMS enrollment (i.e., for no more than one month in the current illness episode). Thus, further research involving specific measures on the use of antipsychotics are needed.

Fifth, the wide age range, spanning adolescence and mixing it with adulthood, could be problematic. In this respect, in the Spanish validation procedure of the ASI (Fernandez-Leon et al., 2019), the average of the ASI total score was higher than that reported by Cicero et al. (2010) in an adult nonclinical population, suggesting that during changes in development, transitory psychotic experiences could appear with more AS and/or ideas of reference (Rodriguez-Testal et al., 2019), so confounding these transitory experiences with

prodromal symptoms or UHR indicators. Moreover, younger subjects could also have difficulties in expressing AS phenomena (e.g., for problems between internal and external boundaries), so potentially misunderstanding some ASI items. However, in the current study, no difference on the ASI total score between adolescent and young adult participants were found. Further studies on mixed adult and adolescent clinical populations are thus needed (especially considering that a cut-off point ≥4 or ≥5 could lead to many false positive in adolescents).

Finally, as the "Screening Schedule for psychosis" (Jablenski et al., 1992) was used before the i-ASI administration in all individuals entered the ReARMS protocol (Pelizza, Paterlini, et al., 2019; Raballo, Scanu, et al., 2014), this is likely to impact the generalizability of our findings (for details on the "Screening Schedule for psychosis", see supplementary materials [Supporting Information Appendix S2]). Indeed, the i-ASI is ideally indicated for being used as the first step in a 2-stage screening process. Therefore, by excluding a certain amount of true negative cases in the pre-ASI step, this could further reduce the specificity of the screener.

4.2 | Conclusions

Findings of this study indicate that the approved Italian version of the ASI (i-ASI) is reliable and valid, showing satisfactory psychometric properties in a clinical sample of adolescent and young adult community help-seekers. Specifically, this instrument appears to be a suitable self-report screener for routine use in mental health care services within specialized, evidence-based programs of early detection/intervention in psychosis.

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CONFLICT OF INTERESTS

The authors declare to have no conflict of interests.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the authors. The data are not publicly available due to privacy and/or ethical restrictions.

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REFERENCES

American Psychiatric Association (APA). (2000). Diagnostic and statistical manual of mental disorders, IV Edition, Text Revised, Washington DC: APA Press.

Azzali, S., Pelizza, L., Paterlini, F., Garlassi, S., Scazza, I., Chiri, L. R., … Raballo, A. (2018). Reliability of the Italian version of the 16-item Prodromal Questionnaire (iPQ-16) for psychosis risk screening in a young help-seeking community sample. *Journal of Psychopathology*. *24*, 16–23.

Beaton, D.E., Bombardier, C., Guillemin, F., & Ferraz, M. B. (2000). Guidelines for the process of cross-cultural adaptation of self-report measure. *Spine*, *25*, 3186–3191.

Brown, T. A. (2006). *Confirmatory factor analysis for applied research*, New York, NY: Guilford Press.

Chapman, L. J., Chapman, J. P., & Raulin, M. L. (1978). Body-image aberration in schizophrenia. *Journal of Abnormal Psychology*, *87*, 399–407.

Cicero, D. C., Docherty, A.R., Becker, T. M., Martin, E. A., & Kerns, J. G. (2015). Aberrant salience, self-concept clarity, and interview-rated psychotic-like experiences. *Journal of Personality Disorders*, *29*, 79–99.

Cicero, D. C., Kerns, J. G., & McCarthy, D. M. (2010). The Aberrant Salience Inventory: A new measure of psychosis proneness. *Psychological Assessment*, *22*, 688–701.

Compton, M. T., McGlashan, T. H., & McGorry, P. D. (2007). Toward prevention approaches for schizophrenia: An overview of prodromal states, the duration of untreated psychosis, and early intervention paradigms. *Psychiatric Annals*, *37*, 340–348.

Conrad, K. (1959). *Die beginnende schizophrenie: versuch einer gestaltanalyse des wahns*, Stuttgard: Thieme.

Eckblad, M., Chapman, L. J., Chapman, J. P., & Mishlove, M. (1982). *The revised social anhedonia scale*, Madison: Wisconsin University Press.

Eckblad, M., & Chapman, L. J. (1983). Magical ideation as an indicator of schizotypy. *Journal of Consulting and Clinical Psychology*, *51*, 215–225.

Fernandez-Leon, S., Senin-Calderon, C., Gutierrez-Lopez, M. L., & Rodriguez-Testal, J. F. (2019). Spanish validation of the Aberrant Salience Inventory in a general adolescent population. *Psychothema*, *31*, 210–217.

First, M. B., Spitzer, R. L., Gibbon, M., & Williams, M. B. (2002). *Structured clinical interview for DSM-IV-TR axis I disorders (SCID-I)*, New York, NY: New York State Psychiatric Institute.

Flora, D. B., & Curran, P. J. (2004). An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychological Methods*, *9*(4), 466–472.

Green, S. B., Yang, Y., Alt, M., Brinkley, S., Gray, S., Hogan, T., & Cowan, N. (2016). Use of internal consistency coefficients for estimating reliability of experimental task scores. *Psychonomic Bulletin & Review*, *23*(3), 750–63.

Hair, J., Anderson, R., Tathan, W., & Black, W. (1998). Multivariate data analysis (5th Ed.). London: Prentice Hall International.

Holm, S. A. (1979). A simple sequentially rejective multiple test procedure. *Scandinavian Journal of Statistics*, *6*, 65–70.

Hosmer, D. W., Lemeshow, S., & Sturdivant, R.X. (2013). *Applied logistic regression* (3rd edition.). Hoboken, NJ: John Wiley & Sons Inc.

Howkes, E. (2012). Making meaning. *Schizophrenia Bulletin*, *38*, 1109–1110.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, *6*(1), 1–55.

Jablenski, A., Sartorius, N., Ernberg, G., Anker, M., Korten, A., Cooper, J. E., … Bertelsen, A. (1992). Schizophrenia: Manifestations, incidence and course in different cultures, a World Health Organization ten-country study. *Psychological Medicine*, *20*(Monogr. Suppl.), 1–97.

Jaeschke, R., Guyatt, G., & Sackett, D. L. (1994). Users' guides to the medical literature – III: How to use an article about a diagnostic test—A: Are the results of the study valid? Evidence-based medicine working group. *Journal of the American Medical Association*, *271*, 389–391.

Kambeitz, J., Abi-Dargham, A., Kapur, S., & Howes, O. D. (2014). Alterations in cortical and extrastriatal subcortical dopamine function in schizophrenia: Systematic review and meta-analysis of imaging studies. *British Journal of Psychiatry*, *204*(6), 420–429.

Kapur, S. (2003). Psychosis as a state of aberrant salience: A framework linking biology, phenomenology, and pharmacology in schizophrenia. *American Journal of Psychiatry*, *160*, 13–23.

Kline, P. (2000). *Handbook of psychological testing*. London: Routlwdge.

Landi, G., Leuci, E., Quattrone, E., Azzali, S., Pellegrini, C., Pellegrini, P., & Pelizza, L. (2020). The "Parma-Early Psychosis" programme: Characterization of help-seekers with first episode psychosis [published online ahead of print April 20, 2020]. *Early Intervention in Psychiatry*. https://doi.org/10.1111/eip.12968

Leuci, E., Quattrone, E., Pellegrini, P., & Pelizza, L. (2020). The "parma-Early Psychosis" program: General description and process analysis after 5 years of clinical activity. *Early Intervention in Psychiatry*, *14*, 356–364.

Lelli, L., Godini, L., Lo Sauro, C., Pietrini, F., Spadafora, M., Talamba, G. A., & Ballerini, A. (2015). Validation of the Italian version of the Aberrant Salience Inventory (ASI): A new measure of psychosis proneness. *Journal of Psychopathology*, *21*, 281–286.

Loewy, R. L., Pearson, R., Vinogradov, S., Bearden, C. E., & Cannon, T. D. (2011). Psychosis risk screening with the prodromal questionnaire—Brief version. *Schizophrenia Research*, *129*, 42–46.

Marsh, H. W., Morin, A.J., Parker, P. D., & Kaur, G. (2014). Exploratory structural equation modeling: An integration of the best features of exploratory and confirmatory factor analysis. *Annal Review of Clinical Psychology*, *10*, 85–110.

Michel, C., Schultze-Lutter, F., & Schimmelmann, B. G. (2014). Screening instruments in child and adolescent psychiatry: General and methodological considerations. *European Child and Adolescent Psychiatry*, *23*, 725–727.

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

Nelson, B., Withford, T. J., Lavoie, S., & Sass, L. A. (2014). What are the neurocognitive correlates of basic self-disturbances in schizophrenia? Integrating phenomenology and neurocognition—part 2 (Aberrant Salience). *Schizophrenia Research*, *152*, 20–27.

Pankow, A., Karthegen, T., Diner, S., Deserno, L., Boehme, R., Kathmann, N., … Schlagenhacf, F. (2016). Aberrant salience is related to dysfunctional self-referential processing in psychosis. *Schizophrenia Bulletin*, *42*, 67–76.

Paterlini, F., Pelizza, L., Galli, G., Azzali, S., Scazza, I., Garlassi, S., … Raballo, A. (2019). Interrater reliability of the authorized Italian version of the Comprehensive Assessment of At-Risk Mental States (CAARMS-ITA). *Journal of Psychopathology*, *25*, 24–28.

Pelizza, L., Azzali, S., Paterlini, F., Garlassi, S., Scazza, I., Chiri, L. R., … Raballo, A. (2019a). Screening for psychosis risk among help-seeking adolescents: Application of the Italian version of the 16-item prodromal questionnaire (iPQ-16) in child and adolescent neuropsychiatry services. *Early Intervention in Psychiatry*, *13*, 752–760.

Pelizza, L., Azzali, S., Paterlini, F., Garlassi, S., Scazza, I., Chiri, L. R., … Raballo, A. (2019b). The "Reggio Emilia At-Risk Mental States" program: A diffused, "liquid" model of early intervention in psychosis implemented in an Italian Department of Mental Health. *Early Intervention in Psychiatry*, *13*(6), 1513–1524.

Pelizza, L., Azzali, S., Paterlini, F., Scazza, I., Garlassi, S., Chiri, L. R., … Raballo, A. (2018). The Italian version of the brief 21-item Prodromal Questionnaire: Field test, psychometric properties and age-sensitive cut-offs. *Psychopathology*, *51*, 234–244.

Pelizza, L., Paterlini, F., Azzali, S., Garlassi, S., Scazza, I., Pupo, S., … Raballo, A. (2019). The approved Italian version of the comprehensive assessment of at-risk mental states (CAARMS-ITA): Field-test and psychometric features. *Early Intervention in Psychiatry*, *13*, 86–94.

Pelizza, L., Poletti, M., Azzali, S., Paterlini, F., Garlassi, S., Scazza, I., … Raballo, A. (2019c). Anhedonia in adolescents at ultra-high risk (UHR) of psychosis: Findings from a 1-year longitudinal study. *European Archives of Psychiatry and Clinical Neuroscience*, *270*(3), 337–350. https://doi.org/10.1007/s00406-019-01018-9

Pelizza, L., Poletti, M., Azzali, S., Paterlini, F., Garlassi, S., Scazza, I., … Raballo, A. (2019d). Suicidal thinking and behavior in adolescents at Ultra-High Risk of psychosis: A two-year longitudinal study. *Suicide and Life Threatening Behavior*, *49*(6), 1637–1652.

Pelizza, L., Raballo, A., Semrov, E., Chiri, L. R., Azzali, S., Scazza, I., … Pupo, S. (2019). Validation of the "early detection Primary Care Checklist" in an Italian community help-seeking sample: The "Checklist per la Valutazione dell'Esordio Psicotico". *Early Intervention in Psychiatry*, *13*, 86–94.

Preti, A., & Raballo, A. (2011). ASI. Cagliari: Studio CAPIRE—Cagliari-Psychosis Investigation on Risk Emergence.

Raballo, A., Cicero, D. C., Kerns, J.G., Sanna, A., Pintus, M., Agartz, I., … Preti, A. (2019). Tracking salience in young people: A psychometric field test of the Aberrant Salience Inventory. *Early Intervention in Psychiatry*, *13*, 64–72.

Raballo, A. (2005). Italian translation adapted from the English original brief version of the Schizotypal Personality Questionnaire (SPQ-B). Reggio Emilia: Centro stampa dell'Azienda USL di Reggio Emilia.

Raballo, A., Chiri, L. R., Pelizza, L., Fontana, F., Favazzo, R., Pensieri, L., … Semrov, E. (2014). Field-testing the early intervention paradigm in Emilia-Romagna: The Reggio Emilia At Risk Mental State (ReARMS) Project. *Early Intervention in Psychiatry*, *8*(Suppl. 1), 88.

Raballo, A., Scanu, R., Petretto, D. R., & Preti, A. (2014). Aberrant salience and psychosis risk symptoms in Italian undergraduate students: Further validation of the Aberrant Salience Inventory. *Early Intervention in Psychiatry*. *8*(Suppl. 1), 134.

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

Raine, A., & Benishay, D. (1995). The SPQ-B: A brief screening instrument for schizotypal personality disorder. *Journal of Personality Disorders*, *9*, 346–355.

Ran, M. S., Xiao, Y., Chui, C. H. K., Hu, X. Z., Yu, Y. H., Peng, M. M., … Chan, C. L. (2018). Duration of untreated psychosis (DUP) and outcome of people with schizophrenia in rural China: 14-year follow-up study. *Psychiatry Research*, *267*, 340–345.

Rapp, C., Canela, C., Studerus, E., Walter, A., Aston, J., Borgwardt, S., & Riecher-Rössler, A. (2017). Duration of untreated psychosis/illness and brain volume changes in early psychosis. *Psychiatry Research*, *255*, 332–337.

R Core Team. (2014). R: A language and environment for statistical computing. Wien: R Foundation for Statistical Computing.

Regione Emilia-Romagna (RER). (2016). *Raccomandazioni regionali per la promozione della salute e del benessere in persone all'esordio psicotico*, Bologna: Centro stampa della Regione Emilia-Romagna.

Revelle, W. (2018). *Psych: Procedures for psychological, psychometric, and personality research*, Evaston, IL: Northwestern University Press.

Rodriguez-Testal, J. F., Bendela, P., Perona-Garcelan, S., & Senin-Calderon, C. (2019). Examining the structure of ideas of reference in clinical and community samples. *Comprehensive Psychiatry*, *93*, 48–55.

Roiser, J. P., Stephan, K. E., Ouden, H. E., Barnes, T. R., Friston, K. J., & Joyce, E. M. (2008). Do patients with schizophrenia exhibit aberrant salience? *Psychological Medicine*, *39*, 199–209.

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling. *Journal of Statistical Software*, *48*(2), 1–36.

Scazza, I., Pelizza, L., Azzali, S., Paterlini, F., Garlassi, S., Chiri, L. R., … Raballo, A. (2018). Reliability of the Italian version of the Brief (21-item) Prodromal Questionnaire (IPQ-B) for psychosis risk screening in a young help-seeking population. *Journal of Psychopathology*. *24*, 204–214.

Schmidt, S. J., Schultze-Lutter, F., Schimmelmann, B. G., Maric, N.P., Salokangas, R. K., Riecher-Rössler, A., … Ruhrmann, S. (2015). EPA guidance on the early intervention in clinical high risk states of psychoses. *European Psychiatry*, *30*, 388–404.

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

van Os, J., Linscott, R. J., Myin-Germeys, I., Delespaul, P., & Krabbendam, L. (2009). A systematic review and meta-analysis of the psychosis continuum: Evidence for a psychosis proneness-persistence-impairment model of psychotic disorder. *Psychological Medicine*, *39*, 179–195.

Yung, A.R., Yuen, H. P., McGorry, P. D., Phillips, L. J., Kelly, D., Dell'Olio, M., … Buckby, J. (2005). Mapping the onset of psychosis: The comprehensive assessment of at-risk mental states. *Australian and New Zealand Journal of Psychiatry*, *39*, 964–971.

Zhou, X., Obuchowski, N. A., & McClish, D. K. (2002). *Statistical methods in diagnostic medicine*. New York, NY: Wiley and sons.

SUPPORTING INFORMATION

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

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