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# Reliability and normative data of the Perceptual Aberration Scale in an Italian juvenile general population sample

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## ABSTRACT

Psychometric tools, such as the Perceptual Aberration Scale (PAS), have been developed to identify people at risk to develop psychosis. This paper aims at providing an Italian version of the Perceptual Aberration Scale and its normative data for the general juvenile Italian population. The Italian version of the PAS was produced using three independent translators. It was administered to 1089 non-clinical participants, stratified into three age-groups, i.e., 8–13, 14–17 and 18–24. The Italian version of the PAS displayed good internal consistency in each age-group evaluated (i.e. Alpha Coefficients: 0.90 for the 8–13 age-group, 0.84 for the 14–17 age-group, and 0.87 for the 18–24 age-group) and the assumption of unidimensionality was corroborated. Furthermore, normative data for the three groups were collected (i.e. cut-offs: 25 for the 8–13 age-group, 21 for the 14–17 age-group and 20 for the 18–24 age-group) and an age-related difference, as the 18–24 group scored lower than the younger groups, was found. The Italian version of the PAS proved to be a reliable psychometric tool to investigate perceptual aberration during childhood, adolescence and young adulthood.

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## 1. Introduction

The term ‘schizotypy’ refers to a personality organization proposed to reflect vulnerability to schizophrenia or, more generally, psychosis proneness (Meehl, 1962; Chapman *et al.*, 1995; Yung *et al.*, 2003; Van Os *et al.*, 2009).

Indeed schizotypal features include sub-clinical psychotic symptoms like bizarre behavior, magical ideation, social withdrawal/anxiety, lack of feelings, and perceptual abnormalities (Raine, 2006). These sub-threshold psychotic experiences are common in general population (Van Os *et al.*, 2009; Fagnani *et al.*, 2011; Brambilla *et al.*, 2014) and they are associated to an increased risk of developing a psychotic disorder both temporally and for experiential continuity (Linscott and Van Os, 2013). Even though only a small group of schizotypal individuals will develop the disease, as a result of the complex interaction between personality, environment and life-experiences, schizotypy may

represent a dynamic continuum between psychological health, subclinical psychotic-related disorders and schizophrenia (Kwapil *et al.*, 2008; Lenzenweger, 2010; Kwapil and Barrantes-Vidal, 2012; Ettinger *et al.*, 2014; Picardi *et al.*, 2014).

Therefore, the early characterization of people at-risk of developing psychotic disorders is crucial to inform preventive interventions and research (Cella *et al.*, 2013).

The Wisconsin Schizotypy Scales, including the Perceptual Aberration Scale (PAS) (Chapman *et al.*, 1978), the Magical Ideation Scale (MIS) (Eckblad and Chapman, 1983), the Physical Anhedonia scale (Chapman *et al.*, 1976) and the Revised Social Anhedonia scale (Eckblad *et al.*, 1982), have been proposed as useful instruments to identify psychosis proneness. There is wide experience in the use of these scales in non-clinical populations to detect people at high risk of developing psychotic disorders (Horan *et al.*, 2008).

The PAS was created by Chapman in 1978 to evaluate schizophrenic body image aberration. This scale was initially called Body-Image Aberration Scale, with the aim to tap aberrant features of schizophrenic experience (e.g., unclear boundaries of the body; feeling of unreality or estrangement of parts of one's body; feeling of deterioration of one's body; perception of change in the size, proportions, spatial relationship of one's body part;

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changes in the appearance of the body). After the addition of seven items covering other visual perceptual aberration experiences (e.g., ‘Sometimes when I look at things like tables and chairs, they seem strange’), the Body-Image Aberration Scale changed its name into PAS. Thus, the PAS scale, composed by 35 dichotomous True/False items, aims at measuring aberrations and distortions in perception of the body and other objects.

Indeed, disturbances of body image and unusual sensory experiences were identified as schizotypy sign in several studies. Indeed PAS scale was created to tap a positive schizotypy factor, characterized by these distortions. For instance, a study (Chapman et al., 1980) found that college students who scored at least two standard deviations above the mean on the PAS reported with greater frequency several psychotic-like experiences, such as hallucinations, aberrant beliefs, thought transmission. The PAS and the MIS present high inter-correlation ( $r=0.60-0.70$ ) (Kwapil et al., 1997) and together define positive schizotypy which is associated with increased risk of developing psychosis (Chapman et al., 1978; Lenzenweger, 1994; Gooding et al., 2005; Kwapil et al., 2008). In a 10-year longitudinal study (Chapman et al., 1994; Kwapil et al., 2013), the individuals who scored high on MIS and PAS had higher rates of psychoses, psychotic relatives, schizotypic symptoms, and psychotic-like experiences at follow-up, as compared with those scoring in the normal range.

The validity, internal consistency, test–retest reliability and unidimensionality of the PAS have been established by several studies carried out on university students (Fonseca-Pedrero et al., 2008; Kwapil et al., 2008; Fonseca-Pedrero et al., 2009).

The aims of the present study, were to develop an Italian version of the instrument, to test its reliability, and to provide normative data for the childhood, adolescence and young adulthood in the Italian population. Although most schizotypal subjects will never develop the clinical form of psychosis, individuals with high scores in the PAS scale present a greater probability of developing schizophrenia-spectrum disorders. Thus the availability of the Italian PAS scale will allow to detect subjects with subpsychotic symptoms and personality traits that indicate greater risk for the psychotic disorder.

## 2. Methods

### 2.1. Participants

A total of 1091 participants were enrolled in primary, secondary, high schools, and in university settings. Results of two participants were excluded from subsequent analyses because in their questionnaires there was more than 10% of omissions. Indeed a questionnaire was considered valid if there were no more than three omitted items (i.e., less than 10% of omissions). In particular, a female participant from 14 to 17 age-group (22 omissions) and a female participant from 18 to 24 one (19 omissions) were ruled out.

Different cities and different types of school were selected in order to guarantee the representativeness of the sample. Random cluster sampling was performed, using the classroom as the sample unit.

About half ( $N=549$ , 50.5%) of participants were females, and about half ( $N=536$ , 49.5%) were males. Due to compilation errors, information about gender was not available for four subjects (0.4%), who were excluded from gender-related analyses.

Participants' age was between 8 and 24 years. They were stratified into three age-groups, i.e., 8–13 ( $N=391$ , 35.8%), 14–17 ( $N=279$ , 25.6%) and 18–24 ( $N=421$ , 38.6%).

After 1 month, the PAS was re-administered to 43 participants in the 18–24 age-group (mean age:  $21.5 \pm 1.28$ ; gender: 38 female, 5 male) to test temporal stability.

The procedure was approved by the local Ethics Committee. The questionnaires were collected anonymously. For the participants aged less than 18 years, parents provided informed consent to participate in the study, and children provided verbal assent.

### 2.2. Instruments

A standardized form was used to collect sociodemographic information. The PAS is a 35-item self-report questionnaire, scored on a True/False scale. Its total

score ranges from 0 to 35 and it is calculated as the sum of the ‘True’ responses to all items, except four (i.e. items 6, 13, 24, 25) that are reverse-keyed.

### 2.3. Procedures (Italian adaptation)

To obtain a valid Italian version of the instrument, we followed traditionally accepted steps in the cross-cultural adaptation of psychosocial measures (Guillemin et al., 1993). Three independent translators, who were all fluent in English, produced an initial translation. Then, each translator independently reviewed the other two versions and provided comments and suggestions. Each translator included those suggestions deemed to be relevant in a second version. This process was repeated iteratively, until consensus was reached. The clarity and the acceptability of the resulting version were tested in a pilot administration until a final Italian version of the PAS was produced. We focused our efforts on producing a good translation and refrained from performing iterative back-translation, because several authors (Harkness, 1999) have argued persuasively against back-translation for both theoretical and practical reasons, characterizing it as a sub-optimal procedure for checking translations which merely achieves linguistic and conceptual equivalence without paying attention to clarity and understandability and without taking due account of context and milieu (Bulmer, 1998).

Also, a specific version of the questionnaire was produced for children aged 8–13 years. In this version, some words and statements were simplified in order to facilitate children understand the meaning of the sentences (Table 1).

### 2.4. Administration

The PAS was administered in the participants' classroom, in accordance with school/college organization. Only individuals who accepted to participate in the study received the questionnaire, while no information was recorded about those who did not agree to participate. None of the participants explicitly refused to complete the questionnaire. To reduce the number of missing items, the questionnaires were visually screened at the end of the session, and in case of omitted items, children were requested to complete them. Nevertheless there were some omissions; we considered omitted an item with no response or with two responses (i.e., with marked both ‘True’ response and ‘False’ one). Specifically: 25 items (0.18% of responses) were omitted in 8–13 age-group; 48 items (0.49%) in 14–17 one; 40 items (0.27%) in 18–24 one. In case of valid protocol, omitted answers were counted as absence of described experience (i.e., scored as 0).

During administration, an experienced psychologist was in the classroom to resolve any doubt about the items and to ensure that participants responded to all items. The questionnaire was administered via pencil and paper to all participants. Despite group administration, each participant consigned the completed questionnaire without fixed schedule. Individual compilation times were not formally recorded.

### 2.5. Statistical analysis

All analyses were conducted using SPSS for Windows, version 15.0 (SPSS Inc, 2006).

The Levene's test was used to test data for homoscedasticity, and parametric analysis was used when the homoscedasticity assumption was met.

One-way analysis of variance (ANOVA) with Bonferroni's post-hoc correction was used to test for differences in PAS scores between different age-groups. Student's *t*-test was used to test for gender-related differences in PAS scores.

For each age-group, participants' scores on the PAS were expressed as means, median, variance, standard deviation (S.D.), minimum, maximum, range, interquartile range, 95% confidence interval (CI) of the mean, kurtosis, and skewness.

With regard to reliability, coefficient Alpha was calculated to test the internal consistency of the scale for each age-group, whereas the intra-class correlation coefficient (ICC) was used to examine temporal stability in the subsample of participants who completed again the PAS after a 1-month interval. In order to corroborate the assumption of unidimensionality for the PAS, principal component analyses were performed for different age-groups. In particular, principal component analyses on PAS items were used to evaluate the percentage of variance explained by the first factor extracted and the ratio of the first to second eigenvalue. Also, the factor structure of the PAS was compared across age-groups.

## 3. Results

### 3.1. Descriptive statistics

The mean score, S.D., CI of the mean, interquartile range, and cut-off for each age-related group are reported in Table 2. Cut-off scores for each age group were set at 2 S.D. above the mean.

Skewness and kurtosis values for children (8–13 years) were 0.46 ( $\pm 0.12$  standard error) and  $-0.83$  ( $\pm 0.25$ ), respectively; for

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