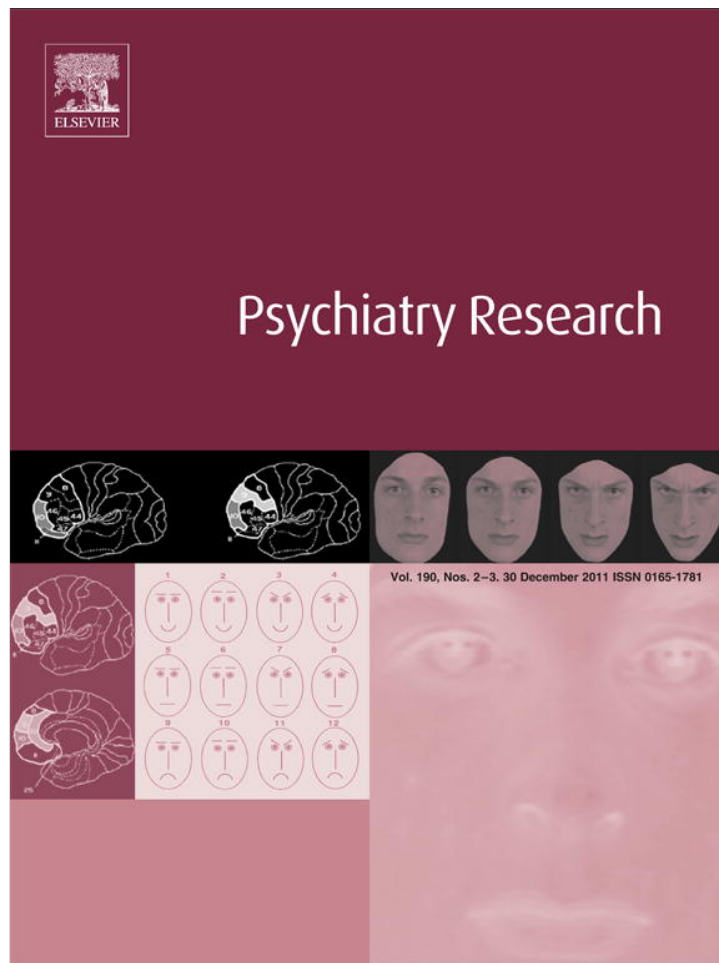


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Schizotypy, emotional–behavioural problems and personality disorder traits in a non-clinical adolescent population

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ABSTRACT

The main goal of the present study was to examine the relationship between the schizotypy dimensions, emotional–behavioural problems and personality disorder traits in non-clinical general adolescent population. A total of 1455 participants ($M = 15.9$ years; $S.D. = 1.2$) were administered the Oviedo Schizotypy Assessment Questionnaire (ESQUIZO-Q), the Strengths and Difficulties Questionnaire (SDQ) and the Personality Diagnostic Questionnaire-4+ (PDQ-4+). Correlation analyses revealed significant associations between the schizotypy and emotional–behavioural problems self-reported by adolescents. Participants with high scores in schizotypy dimensions, reported higher rates of affective and behavioural problems than those with low scores. Also, schizotypy dimensions and personality disorder traits were closely related in adolescent population. These data indicate, as occurs in clinical samples, the high overlap between schizotypy and personality disorder traits. Affective dysregulation and behavioural problems are present at the subclinical level in non-clinical adolescent population. These results have implications for the integration of schizotypy studies within the paradigms of developmental psychology and dimensional models of personality.

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1. Introduction

The study of personality disorder (PD) traits in adolescents has increased since the growth of the developmental psychology paradigm and dimensional models of personality (Widiger and Lowe, 2008), and of efforts to integrate the two approaches within a common framework (De Clercq et al., 2009; Shiner, 2009; Tackett et al., 2009). Adolescence is a stage of great interest for the study of certain personality features, not only because it is a critical period in development in which there can occur a wide range of psychological disorders (Costello et al., 2003; Cohen et al., 2005), but also because many disorders (e.g., schizophrenia or PDs) that emerge in adulthood appear to originate at earlier stages of development (Cohen, 2008; Welham et al., 2009; Widiger et al., 2009). Thus, the study of PD traits in non-clinical population is of great importance for the establishment of links between the normal and maladaptive personalities, the understanding of psychological mechanisms and underlying processes of the disorders, the identification of risk markers for the development of mental disorders, and the development of programmes for prevention and early detection and intervention in at-risk adolescents.

Schizotypy is a complex construct that has been associated at a historical, genetic, cognitive, behavioural, neuropsychological and psy-

chophysiological level with schizophrenia (Raine, 2006; Lenzenweger, 2010). It is made up of an aggregation of cognitive, emotional, and behavioural traits grouped in a multidimensional structure (Positive, Negative and Disorganized factors) similar to that found in patients with schizophrenia (Raine, 2006; Kwapił et al., 2008; Fonseca-Pedrero et al., 2010a). Schizotypal traits are present in the general population and are distributed along a continuum of adjustment, the clinical disorder (psychosis) being found at its extremity (Claridge, 1997). Along this continuum we can find “intermediate” phenotypical expressions which, without reaching a clinical level, are associated with greater current psychopathological intensity, severity and related impairment (Nelson and Yung, 2009; van Os et al., 2009; Armando et al., 2010; Barragan et al., 2011). Moreover, individuals with high scores in self-reports for schizotypy – or Psychotic-Like Experiences (PLEs) – are at greater future risk of developing schizophrenia-spectrum disorders (Poulton et al., 2000; Gooding et al., 2005; Welham et al., 2009; Dominguez et al., 2011). In this sense, schizotypal experiences in healthy individuals may represent the behavioural expression of proneness to psychotic disorders (van Os et al., 2009).

In particular, in adolescent populations schizotypal features – or PLEs – and emotional and behavioural symptoms have frequently been found to be associated, showing a high degree of overlap (Yung et al., 2009; Armando et al., 2010; Fonseca-Pedrero et al., 2011a; Wigman et al., 2011). For instance, Fonseca-Pedrero et al. (2011b), exploring the relationship between schizotypal traits and depressive symptoms in a sample of 1384 Spanish adolescents, found that the

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correlations between the two variables ranged from 0.15 to 0.45. In another study, Wigman et al. (2011), using the Community Assessment of Psychic Experiences (CAPE) in a sample of 5442 non-clinical adolescents, found that those individuals who reported PLEs also presented higher levels of emotional and behavioural symptomatology. Nevertheless, there is a need for further studies with independent samples representative of the general adolescent population which analyze the relationship between the different schizotypy dimensions and emotional-behavioural symptoms at a subclinical level. It may be that the relation between schizotypy and emotional symptomatology varies according to the schizotypy dimension analyzed.

Schizotypy dimensions have also been associated with the features of PDs in non-clinical adult population (Kwapil et al., 2008). For example, Kwapil et al. (2008) found that the negative schizotypy dimension was significantly associated with interview ratings of schizotypal, schizoid, and paranoid symptoms, and the positive dimension was associated with high ratings of psychotic-like, schizotypal, and paranoid symptoms. Longitudinal studies have found that participants with high scores in schizotypy present higher rates of schizophrenia-spectrum disorders (e.g., schizoid and paranoid personality disorders) (Chapman et al., 1994; Gooding et al., 2005); however, there has been no examination of the relationship between schizotypy (based on self-reports specially designed for use with adolescents) and PDs traits in non-clinical adolescents, which is why it is interesting to carry out empirical studies that analyze this relationship.

Within this research context, the main goal of the present study was to examine the relationship between schizotypy dimensions, emotional-behavioural problems and PD traits in a representative sample of adolescents from the general population. This objective contributes to advancing our understanding of the links between schizotypy, emotional problems and PD traits in non-clinical adolescent populations without the confounding effects of medication and stigmatization frequently associated in patients with schizophrenia. It will also facilitate the integration of the schizotypy paradigm within dimensional models of personality and developmental psychology. We are guided by the hypothesis that schizotypy dimensions would be associated with emotional dysregulation and behavioural symptomatology self-reported by adolescents. We also hypothesized that the schizotypy dimensions are closely related to PD traits.

2. Method

2.1. Participants

Selection of participants was carried out using stratified random sampling, by clusters, at the classroom level, in a population of approximately 36,000 students from the Principality of Asturias (a region situated in the north of Spain). Strata were created according to geographical area – East, West, Central and South – and educational stage – compulsory and post-compulsory – and the probability of a school being selected depended on the number of students. Pupils were from different types of secondary school – public, grant-assisted private, and private – and from vocational/technical schools. The sample selection guarantees the representativeness of the sample of adolescents from this geographical region. The initial sample consisted of 1628 adolescents, but participants were discarded if they: a) obtained a high score on the Oviedo Infrequency Scale (more than 2 points) ($n=64$); b) presented learning difficulties ($n=6$); c) were older than 18 ($n=35$); d) omitted demographic data ($n=49$); and e) presented outlier scores ($n=19$). The final sample was made up of a total of 1455 students, 705 male (48.5%) and 750 female (51.5%), from 28 schools and 90 classes. Mean age was 15.92 years ($S.D.=1.18$), with a range of 14 to 18. Distribution of the sample by age was as follows: age 14 ($n=194$; 13.3%), age 15 ($n=357$; 24.5%), age 16 ($n=411$; 28.2%), age 17 ($n=357$; 24.5%) and age 18 ($n=136$; 9.3%).

2.2. Measures

2.2.1. The Oviedo Schizotypy Assessment Questionnaire (ESQUIZO-Q)

The ESQUIZO-Q (Fonseca-Pedrero et al., 2010b) is a self-report developed for the assessment of schizotypal traits in adolescent population. It is based on the diagnostic criteria proposed in the DSM-IV-TR (American Psychiatric Association, 2000) and on Meehl's (1962) schizotaxia model on genetic predisposition to schizophrenia. The ESQUIZO-Q items were selected on the basis of an exhaustive review of the literature on

schizotypy (Fonseca-Pedrero et al., 2008). It comprises a total of 51 items with Likert-type response format in 5 categories (from 1 “totally disagree” to 5 “totally agree”). Its 10 subscales are derived empirically by means of factor analysis, which in turn are grouped into three general dimensions: Reality Distortion (Ideas of Reference, Magical Thinking, Unusual Perceptual Experiences and Paranoid Ideation), Negative (Physical Anhedonia and Social Anhedonia) and Social Disorganization (Odd Thinking and Speech, Odd Behaviour, Lack of Close Friends and Excessive Social Anxiety). The validation of the ESQUIZO-Q was carried out in a sample of 1653 non-clinical adolescents. Internal consistency levels for the subscales ranged from 0.62 to 0.90, and we obtained different sources of validity evidence (Fonseca-Pedrero et al., 2010b, 2011a).

2.2.2. The Personality Diagnostic Questionnaire-4+ (PDQ-4+)

The PDQ-4+ (Hyler, 1994) is a self-report developed for the assessment of personality disorders according to the DSM-IV criteria (APA, 1994). The PDQ-4+ comprises a total of 99 items distributed across 12 subscales, 10 referring to diagnostic categories from the DSM-IV (Axis-II) and another 2 intended for the assessment of the personality categories in Appendix B of the APA manual. In the present study we used a Likert-type response format with 5 options (from 1 “totally disagree” to 5 “totally agree”), with the exception of two items which employ an inventory format in which respondents are required to indicate the presence of impulsive and anti-normative behaviours. The PDQ-4+ has been used in a wide variety of epidemiological studies, some of its items have been used in follow-up studies with adolescents (Cohen et al., 2005), and its properties are widely supported. Internal consistency levels range from 0.42 to 0.83 (Fossati et al., 1998; Davison et al., 2001; Fossati et al., 2005; Chabrol et al., 2007; Huang et al., 2007). In the present study we used the Spanish version adapted by Calvo Piñero et al. (2002) for use in young adults and psychiatric outpatients. Internal consistency levels for the Spanish version of the PDQ-4+ subscales were satisfactory, and we obtained different sources of validity evidence.

2.2.3. The Strengths and Difficulties Questionnaire (SDQ)

The SDQ (Goodman, 1997) is a self-report widely used for the assessment of different social, emotional and behavioural problems related to mental health in children and adolescents over the previous 6 months. The SDQ is made up of a total of 25 statements grouped in 5 subscales (each with 5 items): Emotional Symptoms, Conduct Problems, Hyperactivity, Peer Problems and Prosocial Behaviour. The first four subscales yield a “total difficulty score”. In this study we used a Likert-type response format with 5 options (from 1 “totally disagree” to 5 “totally agree”), so that the score on each subscale ranged from 5 to 25 points. The psychometric properties of the SDQ in its self-report version have been widely analyzed (Goodman, 1999, 2001; Bourdon et al., 2005; Vostanis, 2006; Ruchkin et al., 2008). In the present study we used the version adapted and translated into Spanish which is available on the Internet (<http://www.sdqinfo.com>).

2.2.4. The Oviedo Infrequency Scale (INF-OV)

The INF-OV (Fonseca-Pedrero et al., 2009) is a 12-item self-report instrument with a Likert-type response format using 5 categories (from 1 “totally disagree” to 5 “totally agree”). Its objective is to detect those participants who respond to self-reports in a random, pseudo-random or dishonest fashion. Respondents who reply to more than two of these items incorrectly are automatically discarded as participants in the study.

2.3. Procedure

This study is part of broader research programme on the detection of psychological disorders in adolescence and early intervention. The questionnaire was administered collectively, in groups of 10 to 35 students, during normal school time and in a classroom specially prepared for this purpose. The study was presented to participants as part of a research project on the diverse characteristics of personality. For subjects under 18, parents were asked to provide written informed consent in order for their child to participate in the study. Participants were informed of the confidentiality of their responses and the voluntary nature of the study, and no incentive was provided for their collaboration. The administration took place under the supervision of the researchers. The study was approved by the Research and Ethics Committees at the University of Oviedo and the Education Department of the Principality of Asturias.

2.4. Statistical analysis

First, the descriptive statistics were examined in relation to the mean, standard deviation, asymmetry, kurtosis, score range and levels of internal consistency for the subscales. Second, the Pearson correlations between the SDQ subscales and the ESQUIZO-Q subscales and PDQ-4+ schizotypal subscale were analyzed, followed by the Pearson correlations between the subscales of the ESQUIZO-Q and the PDQ-4+. Third, we carried out Canonical Correlation Analysis. This multivariate technique permits examination of the degree of relationship between two sets of variables. The squared canonical correlation is the simple square of the canonical correlation. It represents the proportion of variance shared by two synthetic variables. Fourth, with the aim of examining the underlying structure of the subscales of the three self-report instruments, a Principal Components Analysis was conducted using Oblimin rotation. The number of components to be extracted was determined by the Kaiser criterion, the percentage of explained variance, and the interpretability of the obtained components. The SPSS 15.0 package was used for the statistical analyses.

3. Results

3.1. Descriptive statistics

Table 1 shows the descriptive statistics for the subscales of the three self-reports employed referring to the mean, standard deviation, asymmetry, kurtosis, range of scores and internal consistency levels. As it can be seen, in the majority of subscales the levels of asymmetry and kurtosis are within the range of normality, as well as the levels of internal consistency.

3.2. Relationship between the SDQ subscales and the ESQUIZO-Q subscales and PDQ-4+ schizotypal subscale

Table 2 shows the Pearson correlations between the SDQ subscales and the ESQUIZO-Q subscales and PDQ-4+ schizotypal subscale. The results showed that the Emotional Symptoms subscale of the SDQ correlated strongly with the Social Disorganization dimension of the ESQUIZO-Q. The Conduct Problems and Hyperactivity subscale of the SDQ correlated positively with all the subscales of the ESQUIZO-Q (except Negative dimension). Also, the Peer Problems subscale of the SDQ correlated significantly and positively with all the subscales of the ESQUIZO-Q, and notably so with the Social Disorganization subscale of the ESQUIZO-Q. The Prosocial Behaviour subscale of the SDQ was negatively associated with all subscales, and in particular with the Negative subscale of the ESQUIZO-Q. For its part, the PDQ-4+ schizotypal subscale correlated in statistically significant fashion with the SDQ subscales, with a range of -0.15 (Prosocial Behaviour) to 0.48 (Peer Problems).

We next conducted a canonical correlation analysis between the ESQUIZO-Q and SDQ subscales. The results showed that the canonical correlation coefficient between the two canonical variates was 0.72, indicating 51.5% of shared variance between the subscales of the two self-reports (Wilks'λ = 0.367, F (15, 3995) = 116.48; p < 0.001).

Table 1 Descriptive statistics for the subscales of the questionnaires.

	Mean	S.D.	Asymmetry	Kurtosis	Range	Alpha
<i>ESQUIZO-Q</i>						
Negative	15.50	4.20	0.75	0.85	9–33	0.66
Reality distortion	31.90	11.85	1.97	5.27	21–96	0.86
Social disorganization	44.96	12.39	0.59	0.38	21–97	0.85
<i>PDQ-4+</i>						
Paranoid	16.77	5.21	0.42	0.15	7–35	0.70
Schizoid	13.84	3.67	0.77	1.72	7–34	0.46
Schizotypal	16.32	5.66	0.95	0.83	9–44	0.75
Antisocial	14.59	4.99	0.74	0.37	7–36	0.71
Borderline	18.58	5.49	0.72	0.46	8–41	0.69
Histrionic	18.40	4.67	0.41	0.05	8–36	0.56
Narcissistic	20.18	5.65	0.41	0.06	9–43	0.71
Avoidant	16.62	5.21	0.44	-0.02	7–35	0.73
Dependent	16.59	5.36	0.64	0.25	8–35	0.72
Obsessive-compulsive	21.33	4.91	-0.12	-0.19	8–40	0.55
Depressive	16.25	4.43	0.49	0.26	7–35	0.74
Negative	17.31	5.44	0.43	-0.29	7–34	0.59
<i>SDQ</i>						
Emotional symptoms	12.17	3.96	0.46	-0.19	5–25	0.71
Conduct problems	10.35	3.13	0.78	0.90	5–25	0.58
Hyperactivity	14.34	3.82	0.14	-0.17	5–25	0.67
Peer problems	9.26	2.89	1.18	2.06	5–24	0.56
Prosocial behaviour	20.35	2.71	-0.63	0.85	5–25	0.65

Note: ESQUIZO-Q: Oviedo Schizotypy Assessment Questionnaire; PDQ-4+: Personality Diagnostic Questionnaire-4+; SDQ: Strengths and Difficulties Questionnaire.

Table 2

Pearson correlations between the Strengths and Difficulties Questionnaire (SDQ) subscales and the Oviedo Schizotypy Assessment Questionnaire (ESQUIZO-Q) subscales and Personality Diagnostic Questionnaire-4+ (PDQ-4+) schizotypal subscale.

	SDQ				
	Emotional symptoms	Conduct problems	Hyperactivity	Peer problems	Prosocial behaviour
Negative	-0.11*	0.13*	0.01	0.09*	-0.42*
Reality distortion	0.34*	0.38*	0.23*	0.36*	-0.14*
Social disorganization	0.59*	0.33*	0.34*	0.49*	-0.13*
Schizotypal (PDQ-4+)	0.39*	0.31*	0.15*	0.48*	-0.14*

* p < 0.01.

3.3. Relationship between the subscales of the ESQUIZO-Q and the PDQ-4+

We next explored the relationship between the subscales of the ESQUIZO-Q and the PDQ-4+ by means of Pearson correlations. The results are shown in Table 3. As it can be seen, all the correlations found between the Reality Distortion dimension of the ESQUIZO-Q and the PDQ-4+ subscales were statistically significant, ranging from 0.33 (Schizoid) to 0.72. (Schizotypal). For their part, the correlations between the Social Disorganization dimension of the ESQUIZO-Q and the PDQ-4+ subscales ranged from 0.35 (Antisocial) to 0.69 (Schizotypal), all of them being also statistically significant. The correlations found between the Negative dimension of the ESQUIZO-Q and the PDQ-4+ subscales ranged from -0.18 (Obsessive-compulsive) to 0.19 (Schizoid), all of them being statistically significant, exception for the correlations with the Schizotypal, Narcissistic, Dependent and Depressive subscales of the PDQ-4+. The canonical correlation analysis carried out between the subscales of the ESQUIZO-Q and PDQ-4+ yielded a canonical correlation coefficient of 0.84, indicating that the two canonical variates shared 71.3% of variance (Wilks'λ = 0.198, F (33,4246) = 95.27; p < 0.001).

3.4. Principal Components Analysis of the subscales

With a view to exploring in some depth the relationship between this set of variables, we conducted a Principal Components Analysis with Oblimin rotation. The mean adequacy sampling was 16560.6 (p < 0.001) and the KMO was 0.93. The most parsimonious solution, with a clear psychological interpretation and in accordance with empirical criteria, was that which considered the extraction of five first-order components. The resulting factor weights for this solution are presented in Table 4. As it can be observed, the first component explained 41.50% of the total variance and comprised the Histrionic, Narcissistic, Obsessive-compulsive and Dependent subscales of the

Table 3

Pearson correlations between the dimensions of the Oviedo Schizotypy Assessment Questionnaire (ESQUIZO-Q) and subscales of the Personality Diagnostic Questionnaire-4+ (PDQ-4+).

PDQ-4+	ESQUIZO-Q		
	Negative	Reality distortion	Social disorganization
Paranoid	-0.09*	0.58*	0.59*
Schizoid	0.19*	0.33*	0.43*
Schizotypal	0.03	0.72*	0.69*
Antisocial	0.08*	0.42*	0.35*
Borderline	-0.07*	0.61*	0.64*
Histrionic	-0.11*	0.44*	0.37*
Narcissistic	-0.03	0.51*	0.46*
Avoidant	-0.07*	0.38*	0.63*
Dependent	-0.03	0.43*	0.55*
Obsessive-compulsive	-0.18*	0.41*	0.47*
Depressive	0.01	0.49*	0.64*
Negative	-0.13*	0.42*	0.60*

* p < 0.01.

Table 4

Principal components analysis of the Oviedo Schizotypy Assessment Questionnaire (ESQUIZO-Q), the Personality Diagnostic Questionnaire-4+ (PDQ-4+) and the Strengths and Difficulties Questionnaire (SDQ) subscales.

	Components				
	I	II	III	IV	V
Histrionic (PDQ-4+)	0.77				
Narcissistic (PDQ-4+)	0.73				
Obsessive–compulsive (PDQ-4+)	0.52				
Hyperactivity (SDQ)		0.84			
Conduct problems (SDQ)		0.74			
Antisocial (PDQ-4+)		0.66			
Borderline (PDQ-4+)		0.40		0.38	
Schizoid (PDQ-4+)			0.76		
Peer problems (SDQ)			0.74		
Schizotypal (PDQ-4+)			0.67		
Reality distortion (ESQUIZO-Q)			0.54		
Paranoid (PDQ-4+)	0.38		0.45		
Emotional symptoms (SDQ)				0.84	
Avoidant (PDQ-4+)				0.78	
Negative (PDQ-4+)				0.70	
Dependent (PDQ-4+)	0.51			0.60	
Social disorganization (ESQUIZO-Q)			0.40	0.54	
Depressive (PDQ-4+)				0.36	
Negative (ESQUIZO-Q)					–0.86
Prosocial behaviour (SDQ)					0.76
Eigenvalue	8.30	2.05	1.56	1.14	0.94
% Explained variance	41.50	10.27	7.80	5.70	4.69

Note: Factor weights under 0.35 have been eliminated.

PDQ-4+; this first component was called *Dramatic Personality*. The second component explained 10.27% of the total variance, and comprised the Hyperactivity and Conduct Problems subscales of the SDQ and the Antisocial and Borderline subscales of the PDQ-4+; this component was labelled *Behavioural alteration*. The third component explained 7.80% of the total variance, comprised the Schizoid, Schizotypal and Paranoid subscales of the PDQ-4+, the Reality Distortion subscale of the ESQUIZO-Q and the Peer Problems subscale of the SDQ, and was called *Eccentric Personality*. The fourth component comprised the Emotional Symptoms subscale of the SDQ, the Avoidant, Negative, Dependent and Depressive subscales of the PDQ-4+ and the Social Disorganization subscale of the ESQUIZO-Q, and explained 5.70% of the total variance. It was called *Emotional Inhibition*. Finally, the fifth component explained 4.69% of the total variance, comprised the Negative dimension of the ESQUIZO-Q and the Prosocial Behaviour subscale of the SDQ, and was called *Social Isolation*. The correlation between the components ranged from 0.39 (FIII–FIV) to –0.11 (FII–FV).

4. Discussion and conclusions

The main goal of the present study was to examine the relationship between schizotypy dimensions, emotional–behavioural problems and personality disorder (PD) traits in a representative sample of adolescents from the general population. This would allow the integration of schizotypy research within the taxonomy of PDs in the context of a developmental stage (adolescence) that involves particular risk for the development of psychological disorders, and without the confounding effects commonly found in patient with schizophrenia. It would also help us to understand how emotional and behavioural problems impact on schizotypy dimensions at a non-clinical level. The results revealed, on the one hand, the high degree of overlap between schizotypy, emotional and behavioural problems and PD traits; on the other hand, they supported the presence of affective dysregulation and behavioural alteration at a subclinical level.

Participants with high scores in schizotypy dimensions, measured by the ESQUIZO-Q, showed higher levels of emotional and behavioural symptoms than those with low scores. Moreover, the subscales of the ESQUIZO-Q and the SDQ shared approximately 50%

of variance, also indicating a high degree of overlap. In accordance with previous research findings, affective dysregulation is also found on studying schizotypal traits – or Psychotic-Like Experiences (PLEs) – in non-clinical adolescent population (Yung et al., 2009; Wigman et al., 2011; Fonseca-Pedrero et al., 2011a), in non-clinical young adults (Kwapil et al., 2008), in individuals at clinical high risk (Lemos-Giráldez et al., 2009) and in patients with non-affective psychosis (Peralta and Cuesta, 2009). For instance, Yung et al. (2009) and Armando et al. (2010), using the Community Assessment of Psychic Experiences (CAPE) in a sample of non-clinical adolescents, found a correlation of over 0.50 between the positive dimension of schizotypy and depressive symptoms. Also, Wigman et al. (2011), using the CAPE and the SDQ in a large sample of non-clinical adolescents, found that those individuals who reported PLEs also presented higher levels of emotional and behavioural symptoms. It is worth mentioning that the relation between emotional and behavioural problems, PD traits and schizotypy was stronger for the Social Disorganization and Reality Distortion dimensions than for the Negative dimension. This results may be attributable to the small number of items making up the Negative dimension of the ESQUIZO-Q (9 items); however, it is also plausible that: a) the impact of the negative dimension on adolescents is more at the level of prosocial behaviour than at the level of emotional aspects and/or hyperactivity; or b) the Positive and Social Disorganization characteristics of schizotypy are more closely related to severe psychopathology and possibly have greater weight in the prediction of future psychological problems in this sector of the population.

In this study we also found a close association between the schizotypy dimensions and PD traits in adolescents. The ESQUIZO-Q and SDQ subscales shared 71.3% of variance, indicating a high degree of overlap. Previous studies, of a cross-sectional and longitudinal nature, have found a relationship between schizotypy and PD traits (Kwapil et al., 2008; Chapman et al., 1994; Gooding et al., 2005); for example, Kwapil et al. (2008) found that the negative schizotypy dimension was significantly associated with interview ratings of schizotypal, schizoid, and paranoid symptoms and the positive dimension was associated with high ratings of psychotic-like, schizotypal, and paranoid symptoms. Extending these results to studies carried out exclusively with PD traits, high degrees of overlap are also found in non-clinical adolescents and young people (Ekselius et al., 2001; Cohen et al., 2005), in clinical samples of adolescents with PD (Becker et al., 2000; Cohen et al., 2005) and in adults with PD (McGlashan et al., 2000; Torgersen et al., 2001).

The study of the dimensionality underlying the sub-scales of the self-reports yielded a five-dimensional solution based on the components: Dramatic Personality, Behavioural Alteration, Eccentric Personality, Emotional Inhibition and Social Isolation. This factor structure seems to reflect to some extent, and as was to be expected, the axis-II clusters proposed by the DSM-IV-TR. For example, the Emotional Inhibition factor is comparable to the neuroticism factor found in the literature. The results permit us to examine and understand the relationship between the different facets of schizotypy, emotional problems and personality disorders in adolescents, as well as facilitating the integration of these results within the common research paradigm of developmental psychology. Nevertheless, it should be stressed that the factor structure found in this work is difficult to compare with the findings of previous studies, since there are few studies, in either adult or adolescent population, that analyze the factor structure underlying the combination of the type of measures employed here.

The results support the validity of schizotypy as the phenotypical expression of proneness to schizophrenia and contribute new evidence of validity on the ESQUIZO-Q as an instrument specifically designed for the assessment of schizotypy in adolescent population. Our data are in line with those of previous studies indicating that individuals presenting schizotypal experiences report higher levels of affective, cognitive, social, interpersonal and behavioural deficits (Yung et al., 2009; Armando et al., 2010; Barragan et al., 2011;

Fonseca-Pedrero et al., 2011b; Wigman et al., 2011). Thus, the deficits characteristic of patients with schizophrenia can also be found in samples of the general population below a clinical threshold, indicating a possible continuity between the clinical and subclinical phenotypes (van Os et al., 2009). Schizotypal experiences would be situated at some point on this extended phenotype, and could be seen as an “intermediate” phenotype, qualitatively similar to and quantitatively less serious than the symptomatology found in patients with schizophrenia, appearing with less intensity, persistence, frequency and associated impairment (Nelson and Yung, 2009; van Os et al., 2009; Armando et al., 2010).

The results of the present study should be interpreted in the light of the following limitations. First of all, age is a relevant factor to take into account in the phenomenological expression of these traits and symptoms. Adolescence is a maturational period of development involving a series of changes at different levels (biological, affective, cognitive and social) that may be playing an important role in the results of the study. Second, there are the problems inherent to the application of any type of self-report, with the possible difficulties of interpretation and comprehension of some items on the part of the participants, as well as the high rate of false positives, so that it would have been advantageous to use external informants, such as parents or teachers, via hetero-applied questionnaires. Third, we should not overlook the cross-sectional nature of this research, which precludes the inference of cause-effect relationships.

In conclusion, the current data supported positive links between measures of schizotypy, PD traits and emotional and behavioural symptomatology in a non-clinical adolescent sample. Within the paradigms of development and of dimensional models of personality, future research lines should continue to explore how the combination of these personality, emotional and behavioural variables can be useful in predicting outcomes in at-risk adolescents.

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