

# Schizotypy in Adolescence

## *The Role of Gender and Age*

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**Abstract:** Schizotypy is a multidimensional personality construct that appears to indicate psychosis proneness. Supposedly, schizotypal traits behave differently depending on a person's age and gender, but few studies have examined this relationship. In our study we used the Thinking and Perceptual Style Questionnaire and the Junior Schizotypy Scales. The sample was made up of 321 students (169 males) with an age range of 12 to 17 years. The results show significant differences in gender and age groups. Males score higher than females on Physical Anhedonia, Social Anhedonia, and Impulsive Non-Conformity scales, while females score higher on Positive Symptoms, Negative Evaluation, and Social Paranoia scales. Significant differences were also found among age groups: Unusual experiences, self-referent ideation, social paranoia, thought disorder, and negative evaluation were more frequent in later stages of adolescence. However, the meaning of this difference could be interpreted in terms of emotional turbulence rather than as a direct indicator of vulnerability to psychosis.

**Key Words:** Schizotypy, age, sex differences, schizotypal factors.

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There is sufficient evidence in the literature to suggest that the psychotic phenotype is expressed along a dimensional continuum between the general population and clinical cases of psychosis (Hanssen, et al., 2006; Verdoux and van Os, 2002). Levels of psychotic subclinical experiences are commonly known as schizotypal signs or symptoms. Thus, schizotypy is understood as a multidimensional personality trait that varies along a continuum of normality-abnormality and is present in both the adult and adolescent populations (Cyhlarova and Claridge, 2005; Sánchez-Bernardos and Avia, 2006).

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Significant differences were found according to gender in the attenuated expression of psychotic symptoms in the general population. Women present high levels of positive symptoms (PS), whereas men present higher levels of negative symptoms (NS) (Maric et al., 2003; Mason and Claridge, 2006). Similar data emerge from the study of schizotypy with various measurement instruments, with heterogeneous samples, and with different statistical models.

As far as the adolescent population is concerned, the data on schizotypy and gender follow fairly closely those found for the adult population, even if the number of studies is quite small and/or the available works do not provide data on this relationship (Chen et al., 1997; DiDuca and Joseph, 1999). Venables and Bailes (1994), in a pioneering study on the topic, found that adolescent girls tended to score higher on the Paranoid Ideation factor, whereas boys scored higher on the factors Physical Anhedonia (PA) and Social Anhedonia (SA). Recently, Cyhlarova and Claridge (2005) found that girls tended to score more highly on the Paranoid Ideation/Social Anxiety and Magical Ideation subscales, whereas for the Unusual Perceptual Experiences subscale there were no significant differences.

On contemplating the study of the relationship between schizotypy and age in adolescents, 2 basic problems emerge. On the one hand, there was the scarcity of instruments designed ad hoc for the measurement of schizotypy in adolescents and, on the other, there was the involvement of the maturational processes of development. Factorial studies carried out in adults indicate that certain schizotypal dimensions are positively correlated with age (e.g., introverted anhedonia), whereas others show a negative correlation (unusual perceptual experiences) (Mason and Claridge, 2006; Mata et al., 2005; Rawlings et al., 2001). Thus, on comparing groups of subjects according to age, younger participants tend to score higher on the scales and/or dimensions of schizotypy than older ones. However, the schizotypal dimensions in this group may form part of the processes of maturation, be negatively correlated with age, and/or tend to differ with age. In any case, there seems to be a certain convergence towards a tripartite structure of schizotypy that is invariant across gender and age (Badcock and Dragovic, 2006; Fossati et al., 2003).

In the literature to date there are very few studies, and with inconsistent data, that examine the schizotypal dimensions in terms of differences by gender in adolescents. In turn, there is also scarce research on how schizotypal traits behave

as a function of participants' age. Therefore, the aim of the present study is, on the one hand, to study the relationship between the dimensions of schizotypal personality and gender in adolescents and, on the other, to observe the differences in the schizotypal dimensions in different age groups.

## METHODS

### Participants

A total of 321 Spanish middle and upper socioeconomic class adolescents studying in public secondary schools participated in the study, of whom 169 were boys (52.60%). Age range was 12 to 17 years, and mean age was 13.8 ( $SD = 1.34$ ).

### Measurement Instruments

Participants completed 2 psychometric measures of schizotypy: (a) A Spanish adaptation of the Thinking and Perceptual Style Questionnaire (TPSQ) (Linscott and Knight, 2004). Internal consistency of the questionnaire is in the range 0.77 to 0.89. Factor analysis of the items and the scales basically reveals 3 factors: Social Paranoid Type Aberrant Information Processing, Aberrant Beliefs, and Anhedonia (Fonseca-Pedrero et al., 2007). The TPSQ consists of 99 5-point Likert-type items, divided into 9 subscales. (b) The Multidimensional Schizotypal Traits Questionnaire-Reduced (Martínez-Suárez et al., 1999) is the Spanish adaptation of the Junior Schizotypy Scales questionnaire (Rawlings and MacFarlane, 1994), consisting of 51 dichotomous items, similar to that used by DiDuca and Joseph (1999) and comprising 3 subscales: PS, NS, and Impulsive Nonconformity (INC).

### Procedure

Administration of questionnaires was carried out in groups of 25 to 30 students. The study was presented to the students and teachers as research on personality characteristics. Participants were clearly informed that their involvement was voluntary and that all responses would remain strictly confidential.

### Data Analysis

A study of the significant differences according to gender across the scales and the schizotypal dimensions was carried out by means of the parametric  $t$  test. Subsequently, we created 3 age groups and, through analysis of variance (ANOVA) and the Scheffé test, we compared the results of the scales and the schizotypal dimensions.

## RESULTS

### Study According to Gender

Comparison by means of the  $t$  test reveals statistically significant differences according to gender of the adolescents (Table 1). Boys tend to score higher than girls on the scales INC, PA, and SA, and in F2 (Aberrant Beliefs) and F3 (Anhedonia). The result of F3, Anhedonia, should be interpreted in an inverse sense, so that the lower the factorial score the greater the degree of anhedonia. As regards the girls, they tend to score higher than the boys on the scales PS, social paranoia (SP), and negative evaluation (NE). The data indicate—although there are no significant differences—that the girls tend to also score higher than the boys on the hallucination scale and in F1, social paranoid type aberrant information processing.

**TABLE 1.** Scores of Boys and Girls on the Scales of MSTQ-R and TPSQ, and the Factors of TPSQ

Scales and Factors	Boys Mean (SD)	Girls Mean (SD)	$t$	$p$
PS	9.57 (5.19)	11.45 (5.56)	-3.13	0.002**
NS	2.05 (1.54)	2.17 (1.62)	-0.67	0.505
INC	3.56 (2.32)	2.72 (1.97)	3.46	0.001***
PA	39.47 (9.82)	34.61 (9.48)	4.50	0.000***
SA	21.39 (8.50)	14.23 (7.09)	8.03	0.000***
HS	10.82 (7.17)	12.26 (7.05)	-1.80	0.072
SP	4.11 (3.38)	4.95 (3.44)	-2.21	0.028*
NE	4.99 (3.60)	6.15 (3.77)	-2.82	0.005**
TD	20.14 (12.2)	21.80 (11.2)	-1.27	0.207
MI	13.07 (8.95)	13.13 (8.24)	-0.06	0.950
SI	5.02 (4.50)	5.21 (3.94)	-0.39	0.694
PI	5.88 (6.75)	5.52 (6.17)	0.49	0.624
F1	-0.10 (0.99)	0.11 (1.00)	-1.95	0.052
F2	0.13 (1.01)	-0.15 (0.97)	2.50	0.013*
F3	-0.45 (0.94)	0.50 (0.81)	-9.53	0.000***

\* $<0.05$ , \*\* $<0.01$ , \*\*\* $<0.001$ .

MSTQ-R indicates Multidimensional Schizotypal Traits Questionnaire-Reduced; PS, positive symptoms; NS, negative symptoms; INC, impulsive nonconformity; PA, physical anhedonia; SA, social anhedonia; HS, hallucination; SP, social paranoia; NE, negative evaluation; TD, thought disorder; MI, magical ideation; SI, self-reference ideation; PI, perceptual illusion; F1, social paranoid type aberrant information processing; F2, aberrant beliefs; F3, anhedonia.

**TABLE 2.** Correlation Coefficients Between Age and Scores on the Scales of MSTQ-R and TPSQ, and the Factors of TPSQ

Scales and Factors	Total (n = 321)	Boys (n = 169)	Girls (n = 152)
PS	0.224**	0.004	0.483**
NS	0.130*	0.029	0.249**
INC	0.208**	0.292**	0.100
PA	-0.064	-0.060	-0.068
SA	-0.016	0.040	-0.092
HS	0.232**	0.102	0.398**
SP	0.253**	0.204**	0.314**
NE	0.137*	0.050	0.242**
TD	0.285**	0.221**	0.372**
MI	-0.020	-0.067	0.044
SI	0.054	-0.006	0.139
PI	0.148**	0.086	0.233**
F1	0.331**	0.268**	0.412**
F2	-0.047	-0.098	0.022
F3	-0.007	-0.060	0.056

\**p* < 0.05, \*\**p* < 0.01.

MSTQ-R indicates Multidimensional Schizotypal Traits Questionnaire-Reduced; PS, positive symptoms; NS, negative symptoms; INC, impulsive nonconformity; PA, physical anhedonia; SA, social anhedonia; HS, hallucination; SP, social paranoia; NE, negative evaluation; TD, thought disorder; MI, magical ideation; SI, self-reference ideation; PI, perceptual illusion; F1, social paranoid type aberrant information processing; F2, aberrant beliefs; F3, anhedonia.

**TABLE 3.** Analysis of Variance (ANOVA) of Scores on the Scales and Factors as a Function of 3 Age Groups: (1) 12–13 years (*n* = 129); (2) 14–15 years (*n* = 152); (3) 16–17 years (*n* = 40)

Scales	<i>F</i>	<i>p</i>	Scheffé
PS	6.767	0.001	1 < 2, 1 < 3
NS	3.093	0.047	
INC	5.470	0.005	1 < 2, 1 < 3
PA	2.368	0.095	
SA	1.588	0.206	
HS	12.868	0.000	1 < 2, 1 < 3
SP	13.175	0.000	1 < 2, 1 < 3
NE	3.591	0.029	1 < 2
TD	21.783	0.000	1 < 2, 1 < 3
MI	2.347	0.097	
SI	5.313	0.005	1 < 2
PI	9.421	0.000	1 < 2
F1	24.916	0.000	1 < 2, 1 < 3
F2	2.185	0.114	
F3	1.559	0.212	

MSTQ-R indicates Multidimensional Schizotypal Traits Questionnaire-Reduced; PS, positive symptoms; NS, negative symptoms; INC, impulsive nonconformity; PA, physical anhedonia; SA, social anhedonia; HS, hallucination; SP, social paranoia; NE, negative evaluation; TD, thought disorder; MI, magical ideation; SI, self-reference ideation; PI, perceptual illusion; F1, social paranoid type aberrant information processing; F2, aberrant beliefs; F3, anhedonia.

**Study According to Age**

In the total sample, statistically significant correlations are found between age and the scales PS, NS, INC, HS, SP, NE, Thought Disorder (TD), Perceptual Illusion (PI), and F1 (Social Paranoid Type Aberrant Information Processing) (Table 2), but the data seem to indicate some degree of variation as a function of gender. Thus, on comparing the correlations between the scales and age in girls with the correlations found in the total sample, they are found to be similar, though 2 points should be borne in mind. On the one hand, the correlations for the girls are higher and, on the other, the relationship with the INC scale disappears. In adolescent boys, we find statistically significant correlations on the scales INC, SP, Thought Disorder, and F1 (Social Paranoid Type Aberrant Information Processing). In boys, there is a decrease in the number of relationships between the scales and age as well as in their intensity, and there is also a notable relationship between age and the INC scale.

Finally, comparing 3 age groups, the ANOVA reveals significant differences on the scales PS, INC, Hallucination, SP, NE, Thought Disorder, Self-Referential Ideation and Perceptual Illusion, and in F1 (Social Paranoid Type Aberrant Information Processing) (Table 3). For the scales with statistically significant results, we found differences between age group 1 (12–13 years) with respect to age groups 2 (14–15 years) and 3 (16–17 years), with the exception of the scales NE, Self-Referential Ideation and Perceptual Illusion, for which significant differences were only found between age groups 1 and 2. In all cases, the 12 to 13 years age group scored lower than the remaining age groups on the scales of both questionnaires.

**DISCUSSION AND CONCLUSIONS**

Significant differences are found as a function of gender and age of the adolescents. Boys tend to score significantly higher than do girls on the scales PA, SA, and INC. In contrast, girls score higher than boys on the scales PS, NE, and SP. The girls also tend to score higher than the boys in F1. These data are in accordance with those found both in patients with schizophrenia (Bardenstein and McGlashan, 1990) and in normal adult (Mason and Claridge, 2006), and adolescent population (Venables and Bailes, 1994). The adolescents' scores follow the expected direction according to gender: boys score higher on the subscales with "negative" components—PA and SA—whereas girls score higher on those with "positive/paranoid" components—NE and SP.

As is well known, comparison between different studies is hindered by the heterogeneity of the samples and measurement instruments used. Cyhlarova and Claridge (2005), using the Schizotypal Traits Questionnaire for Children, found significantly higher scores for girls on the scales Paranoid Ideation/Social Anxiety and Magical Thinking, as did another research with this age group (Wolfradt and Straube, 1998). However, this scale does not measure NS or the symptoms of INC, so that there are no data for the comparison of these dimensions. Likewise, Venables and Bailes (1994) found significantly higher scores in boys for PA and SA and in girls for the Factor Paranoid Ideation/Unusual Perceptual Experiences. Both these studies, then, largely concur in their findings with those of the present work. A novel finding in our study in relation to an aspect largely ignored in adolescents concerns the statistically significant difference in boys' higher score on the INC scale. In adult population, however, there are no findings of

significant differences as a function of gender in this dimension (Mason et al., 1995).

The results on the relationships between age and the TPSQ and Multidimensional Schizotypal Traits Questionnaire-Reduced scales are also noteworthy; these relationships tend to be positive and statistically significant, with no findings of a significant negative correlation. In adolescents, and especially girls, as age increases, scores on the schizotypy scales increase. These results are in contradiction to those reported up to now in the literature on adolescents (Cyhlarova and Claridge, 2005) and adults (Mata et al., 2005; Rawlings et al., 2001). The ANOVA in accordance with age groups also reveals significant differences. As participants' ages increase, so do their scores on the subscales, especially in the 12-to-15 age ranges. This result seems to indicate that certain components of schizotypal personality expressed during the maturation process may develop before others (DiDuca and Joseph, 1999), be less differentiated at these ages (Wolfradt and Straube, 1998), or vary with age (Chen et al., 1997).

A novel aspect of the present study is the joint application of 2 questionnaires used as measurement instruments of propensity for psychosis in adolescents. The results presented here provide further evidence of individual differences in schizotypal traits as a function of gender and of age in adolescents. This highlights the need for more research on schizotypal personality in relation to subjects' gender and age. Nevertheless, there is also a need for caution with these data, given the possible role of developmental processes in these age groups and the small sample, especially for the third group. In this regard, it is important to bear in mind that unusual experiences and prodromal signs of psychosis are relatively frequent in adolescence (McGorry et al., 1995). Such features are related to the emotional turbulence and tensions generated by the quest for independence and by the family itself, as well as to other processes characteristic of adolescence, such as egocentrism, fantasy and imaginary audiences, feelings of uniqueness, or unrealistic optimism (Harrop and Trower, 2003). Thus, the meaning of the scores obtained in these or other instruments assessing schizotypy, apart from indicating a position along a continuum of normality-abnormality (Claridge, 1997), should be interpreted in accordance with the adolescent's age, and with other factors—in particular, affective changes of a depressive nature, loss of security and links with the family, which are associated with the process of becoming an individual—rather than as direct indicators of predisposition to psychosis.

Finally, future research should re-examine the role of the INC dimension in this age group, as well as considering the combined use of different psychometric measurement instruments and neurocognitive markers (Lemos-Giráldez et al., 2004). Furthermore, these findings should be replicated in other types of sample (Gutiérrez Maldonado et al., 2006; Jang et al., 2005) and other disorders and constructs (Marzillier and Steel, 2007; Suhr et al., 2006).

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