

# Temperamental and personality variables in child and adolescent depressive symptomatology

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In this study, we analyzed the relationship between temperament and personality factors and depression in children and adolescents. Temperament was assessed with the *Dimensions of Temperament Survey Revised (DOTS-R)*, personality with the *Big Five Questionnaire-Children (BFQ-C)*, and depressive symptomatology with the *Children's Depression Inventory (CDI)*. The sample was made up of 535 participants (274 boys and 261 girls), aged 8 to 15 years. Results show that temperament and personality are significantly related to depressive symptomatology in children and adolescents. Those with difficult temperaments showed more depressive symptomatology, as did those with high levels of emotional instability or low levels of extraversion, openness, agreeableness or conscientiousness. Multiple regression analyses revealed greater relevance of personality variables than of temperament variables.

*Variables de personalidad y temperamento en la sintomatología depresiva de niños y adolescentes.* El presente trabajo analiza la relación entre factores temperamentales y personales con la sintomatología depresiva de niños y adolescentes. El temperamento fue evaluado con el *Dimensions of Temperament Survey Revised (DOTS-R)*, la personalidad con el *Big Five Questionnaire Children (BFQ-C)* y la sintomatología depresiva con el *Children's Depression Inventory (CDI)*. La muestra se compone de 535 sujetos (274 varones y 261 mujeres) con edades comprendidas entre los 8 y 15 años. Los resultados muestran que el temperamento y la personalidad presentan relaciones significativas con la sintomatología depresiva infantil y adolescente. Los sujetos con temperamento difícil mostraron más sintomatología depresiva, al igual que aquellos niños con altos niveles de inestabilidad emocional o bajos niveles de extraversión, apertura, agradabilidad o conciencia. Los análisis de regresión múltiple mostraron una mayor relevancia de las variables de personalidad que las de temperamento.

There is an important tradition relating emotion, temperament and personality, whose closest antecedents are in the work of Eysenck (Eysenck, 1947; 1967) and Gray (1982; 1991). While temperament and personality have been considered as similar by some authors (e.g., Eysenck op. cit.; Gray, op. cit.), a large number of researchers have agreed in establishing temperament as the nucleus of personality. In contrast, for others it would constitute a set of stable individual differences, of a more constitutional or hereditary nature, present from the moment of birth (Chess & Thomas, 1989; González, Hidalgo, Carranza, & Ato, 2000; Kohnstamm, Bates, & Rothbart, 1989; Strelau, 1996; Thomas, Chess, & Birch, 1968). Many studies, especially with child populations, have related temperaments with personality, and have shown that the former, through multiple routes, may be an important precursor of the latter (Digman & Shmelyov, 1996; Graziano, Jensen-Campbell, & Sullivan-Logan, 1998; Halverson, Kohnstamm, & Martin, 1994).

Children with difficult temperaments have shown in many studies a significantly greater tendency to develop depressive symptomatology (Anthony, Lonigan, Hooe, & Philips, 2002; Guerin, Gottfried, & Thomas, 1997; Windle, 1992; Windle et al., 1986). Although there is no consensus on which specific temperamental characteristic is associated with depression, *negative emotionality* has been one of the characteristics appearing as most relevant (Ato, Carranza, González, Ato, & Galián, 2005; Garner & Power, 1996; Goodyer, Ashby, Altham, Vize, & Cooper, 1993; Kelvin, Goodyer, & Altham, 1996; Lengua, West, & Sandler, 1998; Rende, 1993). Other associated characteristics, but to a lesser extent, are the dimensions of *approach* (Caspi, Henry, McGee, Moffitt, & Silva, 1995), low adaptation (Guerin et al., 1997) and *lack of attentional control* (Caspi et al., 1995; Lengua et al., 1998). Thus, children with a strong tendency to experience negative emotions, who find it hard to adapt to changes, who are withdrawn and who have difficulty controlling their attention, have shown greater proclivity to develop depressive symptomatology.

Low level of activity is another temperamental characteristic related frequently with depression (Colder, Mott, & Berman, 2002).

The work of Windle and colleagues (Windle et al., 1986; Windle, 1991, 1992) on adolescent samples evaluated with the DOTS-R (Windle & Lerner, 1986) has highlighted the fact that depression correlates negatively with favourable temperamental characteristics, such as approach-withdrawal; flexibility-rigidity;

positive mood; rhythmicity; low distractibility or concentration and persistence of attention.

Personality characteristics have also been related with child depression. The data appear to show consistently that, basically, high neuroticism and introversion are significant variables in relation to depressive symptomatology (Barbaranelli, Caprara, & Rabasca, 1998; Fisher, 1993; Saflofske, Kelly, & Janzen, 1995; Williams, 1990). To a lesser degree, and considering the rest of the variables of the Big Five Model, it appears to be related to high scores in agreeableness (Barbaranelli, et al., 1998) and openness (Trull & Sher, 1994), and to low scores in conscientiousness (Avia et al., 1995).

The present work aims to study depressive symptomatology in relation to personality and the temperamental characteristics of the child. In accordance with the literature, it could be expected that temperamental difficulties, as well as high neuroticism and low scores in extraversion, agreeableness, conscientiousness or openness, would facilitate the emergence of depressive symptomatology. We shall study the predictive values of personality and temperament in relation to depressive symptomatology.

### Method

#### Participants

A random and representative sample of 535 participants was extracted from the public census. The sample was made up of 274 boys (51.2%) and 261 girls (48.8%), with an age range of 8 to 15 years. Mean age was 11.97 years, with a standard deviation of 2.01. The different ages were grouped in three stages, mid-childhood (8-11 years), early adolescence (12-13 years) and adolescence (14-15 years).

The instrument to be filled in by parents was not completed in all cases, though the figure of 54.5% that filled it in was a highly acceptable one for children in this age range. This sub-sample was made up of 145 sons (49.6%) and 147 daughters (50.4%), for whom data on social class and temperament was provided. The number of participants responding to these measures meant that the estimated populational parameters were maintained.

#### Instruments

Three instruments were used for this study. The first two described below were completed by the child, and the third by the parents. The questionnaires filled in by the children were:

- *Children's Depression Inventory* (CDI, Kovacs, 1992). Spanish adaptation (Del Barrio, Moreno, & López, 1999; Del Barrio & Carrasco, 2004). This CDI consists of 27 items, each of which is given a score of between 0 and 2 according to the intensity of the symptoms it describes. It is applied individually or collectively, and is valid for subjects aged 6 to 17 years. Possible scores range from 0 to 54 points. The psychometric properties of this instrument have been widely confirmed (Kovacs, 1992; Saylor, Finch, Basking, Furey, & Kelly, 1984; Frías, Del Barrio, & Mestre, 1991). In Spanish population the reliability for the total score was, using Cronbach's Alpha .80.
- *The Big Five Questionnaire-Children (BFQ-C)* (Barbaranelli et al., 1998). Spanish adaptation Carrasco, Holgado, & del Barrio, 2005).

The BFQ-C derives from the BFQ for adults, a questionnaire with five scales based on different terms used for describing a person: extraversion, agreeableness, conscientiousness, neuroticism and openness to experience. The Spanish adaptation of the questionnaire has 65 items with five possible responses, ranging from 5 to 1: 5, *nearly always*; 4, *often*; 3, *sometimes*; 2, *rarely*; 1, *almost never*. Each of the statements in the instrument is responded to by the participant, who is instructed to *mark the response that best describes you*. Scoring of this questionnaire provides five different scores, one for each of the five factors extracted.

Reliability found in this study for the factors of the BFQ-C was, using Cronbach's Alpha: .87 for conscientiousness; .77 for extraversion; .82 for openness; .77 for instability; and .71 for agreeableness.

- *Dimensions of Temperament Survey Revised (DOTS-R)* (Windle & Lerner, 1986; Windle et al., 1986). The experimental version was used in the Spanish translation and the adaptation for children by Del Barrio and Carrasco. Parents reported the temperamental characteristics of the child by means of this temperament scale. It has 54 items with four response options: 1, *usually false*; 2, *more false than true*; 3, *more true than false* and 4, *usually true*.

The Spanish adaptation has seven factors emerging from the factorial analysis: *rhythmicity, general activity, mood (happiness), persistence in attention, activity during sleep, flexibility and approach-withdrawal*. In addition to these scores for each factor, the total score of the scale was obtained, with the aim of obtaining a global score for temperament.

Reliability with North-American adolescents has ranged, according to the factor considered, between .54 and .77 for children and from .62 to .89 for adolescents (Windle & Lerner, 1986). Test-retest reliability with a six-week interval ranged from .59 to .69.

Reliability of the factors found in this sample ranged from .73 to .83 (rhythmicity, .83; general inactivity, .79; mood, .71; persistence in attention, .73; activity during sleep, .81; flexibility, .70; approach, .73), with an Alpha coefficient of .77 for the total of the scale.

#### Procedure

Once the authorization of parents had been obtained, along with that of the tutors and management at the schools involved, we proceeded to the assessment, in small groups, of the set of participants studied. The subjects were evaluated by a psychologist in the classroom and the teacher was also present.

Participants filled in the instruments individually. The questions were read out loud slowly to the participants, in order to control for reading errors in some of the pupils. The temperament questionnaire was sent to parents and returned via the children themselves. Once all the data had been collected they were analyzed using the SPSS.11 statistical package.

### Results

- Correlation matrix, means and standard deviations
- Pearson correlations (two-tailed) among variables were computed (see table 1). The correlations found to be significant

among the temperament factors and depressive symptoms, were flexibility and persistence, as well as the overall temperament score. Participants with the best temperament characteristics, especially flexibility and persistence, present fewer depressive symptomatology.

The personality variables correlated negatively and significantly with depression except for emotional instability. Of all the personality variables, those that obtained the strongest correlations were emotional instability, openness and conscientiousness. On the other hand, we would like remark that the correlations between temperament and personally ratings were very low.

Table 2 contains means, standard deviations, minimum and maximum for temperament, and personality ratings as well as for the total score of depression.

This construct, *the global temperament*, contributed to explaining depression with a significant predictive value. Predictive capacity of this variable was 3.3% of the variance ( $R^2_{adjusted} = .033$ ;  $\beta = -.191$ ;  $p = .001$ ). Easy temperament decreases, albeit slightly, depressive symptomatology. As can be seen in table 3 (Model 1), the results about scales of temperament show that persistence and flexibility were the variables that contributed to explaining depression with a significant predictive value. Predictive capacity of these variables, were 2% of the variance. High persistence and flexibility decreases, also slightly, depressive symptomatology.

As regards personality (Model 2), depressive symptomatology in the children is explained by 32.6% of the variance. Instability, with 21.8%, emerges as the variable with greatest predictive value, followed by openness, with a value of 9.3% and to a lesser extent

Table 1  
Correlations of variables studied

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Rhythmicity	1													
2. Inactivity	.097*	1												
3. Mood	.191**	-.077	1											
4. Persistence	.078	.179**	-.017	1										
5. Inactivity-sleep	.064	.241**	-.031	.062	1									
6. Flexibility-rigidity	.019**	.085	.190**	-.010	-.105	1								
7. Approach	.085	-.168**	.173**	.008	-.079	.132*	1							
8. Global Temperament	.682**	.457**	.354**	.38**	.352**	.306**	.229**	1						
9. Conscientiousness	.215**	.114	-.032	.19**	.130*	.023	-.027	.250**	1					
10. Extraversion	.064	.019	.040	.022	-.027	-.011	.030	.069	.391**	1				
11. Openness-experien	.151**	.141*	.059	.16**	.058	.046	.056	.243**	.621**	.277**	1			
12. Emotional Instab.	-.181**	-.066	-.015	-.049	-.086	-.056	-.070	-.198**	-.330**	-.22**	-.258**	1		
13. Agreeableness	.19**	.079	.022	.136*	.009	.056	.056	.233**	.409**	.394**	.284**	-.117**	1	
14. Depression	-.007	-.05	-.010	-.11*	-.08	-.11*	-.06	-.19**	-.39**	-.14**	-.42**	.49***	-.23**	1

Temperament (Rhythmicity, Inactivity, Mood, Persistence, Inactivity-sleep, Flexibility, Approach, Global Temperament); Personality (Concientiousness, Extraversion, Openness to experience, Emotional Instability, Agreeableness); Depression (CDI-Total).  
\* Significance  $p < 0.05$ ; \*\* Significance  $p < 0.01$

– Prediction of emotions from the temperament and personality variables

In order to determine the predictive nature of the personality variables, various regression analyses were carried out. The procedures selected were, stepwise multiple linear regression analysis. First of all, we carried out regression analyses by groups of predictive variables (variables related to temperament and variables related to personality); secondly, we studied the total of independent variables for depression symptoms into the multiple regression analysis with a hierarchical order of entry of the predictor variables. Each predictor was initially centered (converted into z scores) to minimize multicollinearity.

Thomas et al. (1968) used the construct of difficult temperament comprising the nine dimensions of their model. In line with these authors, Guerin et al. (1997) and Windle (1992) formed a construct that indicated a profile of difficult temperament. On the basis of these researches we have calculate a total score containing all other temperament scales like a continuous variable. High scores are characterized by high regularity of rhythmicity, approach, persistence, positive affect, flexibility and low levels of activity.

Table 2  
Means and standard deviations of the variables studied

	M	SD	Minimum	Maximum
<b>Temperament</b>				
Rhythmicity	26.73	6.41	8	38
Inactivity	12.72	4.55	5	24
Mood	21.69	2.72	11	24
Persistence	12.86	3.58	5	20
Inactivity sleep	8.96	3.72	4	16
Flexibility	14.52	3.28	4	20
Approach	11.87	2.45	5	16
Total temperament	147.30	16.14	93	190
<b>Personality</b>				
Conscientiousness	57.47	10.77	26	80
Extraversion	41.20	5.64	14	50
Openness to experience	16.39	4.55	5	25
Emotional instability	24.25	6.89	10	46
Agreeableness	14.27	3.11	4	20
<b>Depression</b>	11.24	5.65	0	34

low agreeableness (1.1%), facilitates the development of depressive symptomatology.

While the above results have shown us the predictive value of each of the sets of predictive variables separately, they do not allow us to establish the relative weight of some predictive variables in competition with others in the total set. The regression analyses on the depression symptoms shown below (table 4) include a multiple regression analysis on depressive symptom reports with all scales of temperament and personality centered. We used a hierarchical order of entry of the predictors in which personality variables were entered first (variables more strongly related to depressive symptoms), followed by temperament predictors. Variables were entered in two steps: 1) personality scales because they were the most predictive variables; 2) temperament scales in order to explore the percentage of explained variance that these scales added to personality. These results permit us to determine the relative weight and percentage of explained variance of all the predictive variables for the total set,

Model 1 (Temperament Predictors)	Adj. R <sup>2</sup>	Total R <sup>2</sup>	β	T	SE
Persistence	.010	.020	-.118	-2.037	.043
Flexibility	.010		-.116	-2.001	.046
Constant				31.278	.0001
Model 2 (Personality predictors)					
Emotional Instability	.218		.381	10.24	.0001
Openness to experience	.093	.326	-0.287	-7.46	.00001
Agreeableness	.011		-0.113	-3.03	.003
Constant				55.74	.0001

β= Standardized regression coefficients. All predictors were centered.

Model 3 (Temperament and personality predictors)	Δ Adj. R <sup>2</sup>	β	T	SE
Constant			36.15	.0001
Step 1	.285**			
Emotional instability		.320	5.691	.0001
Openness to experience		-.207	-3.154	.002
Agreeableness		-.187	-3.101	.002
Conscientiousness		-.095	-1.200	.231
Extraversion		.150	2.470	.014
Step 2	.030			
Persistence		-.058	-1.110	.268
Flexibility		-.064	-1.217	.225
Rhythmicity		.097	1.821	.070
Inactivity		.025	.459	.647
Mood		-.124	-2.317	.021
Inactivity sleep		-.031	-.595	.552
Approach		-.006	.118	.906

Note. Regression coefficients were taken from the last step of the model. β= standardized regression coefficients. All predictors were centred.

and for the variables measured. We have decided introduce firstly the personality variables according to our previous knowledge and the results obtained in the above analysis.

Global depressive symptomatology gave a regression equation in which the characteristics of personality explain 28.5% of the variance and those of temperament just 3%. Among the personality variables, above all the others in terms of predictive value was emotional instability. The temperament variables obtained scarcely relevant predictive values. As shown in table 4 adding the step of temperament main effects resulted in an insignificant increment in the variance of depression ( $\Delta$  Adj R<sup>2</sup>= .030; F (7, 272)= 1.68, p= .118). Thus, depressive symptomatology is predicted especially by emotional instability, and to a lesser extent by low openness, low agreeableness and low extraversion.

## Discussion

Temperamental and personality characteristics have shown themselves to be significantly related to depressive symptomatology. As regards temperament, the most difficult children displayed more depressive symptoms. Considering the specific temperamental characteristics, flexibility and persistence showed significant correlations and contributed to explaining depressive symptomatology. Rather than these scores, the global temperament, it was the set of temperamental characteristics that provided the greatest explanatory value and this supports Windle's (1991) view on the need for an accumulation of temperamental factors for them to have an effect on emotional adjustment.

Windle et al. (Windle et al., 1986; Windle, 1992b) found, in two samples with mean ages of 11 and 19 years, that depression correlates negatively with favourable temperamental characteristics, obtained with the DOTS-R (Windle & Lerner, 1986), such as approach-withdrawal, flexibility-rigidity, positive mood, rhythmicity, low distractibility or concentration and persistence. As Windle (1991; 1992b) found, difficult temperaments, characterized by lack of rhythmicity, withdrawal from unfamiliar people, objects or situations, inflexibility, poor adaptation to changes, negative mood, high distractibility and low persistence, were consistently related to depressive symptomatology, in both boys and girls. Adolescents with four or more problematic temperamental factors were most at risk of developing depressive behaviours (Windle, 1991).

In this paper depressive symptomatology also varies according to subjects' personality characteristics, and this coincides with the findings of numerous studies (Fisher, 1993; Jorm et al., 2000; Saklofske et al., 1995; 1998; Watson & Clark, 1992; Williams, 1990). In accordance with such research, the present results show that children who are highly open, agreeable or stable present lower levels of depressive symptomatology than those who are reluctant to conform, closed or unstable.

Other studies with Spanish adolescent populations have obtained similar results (Del Barrio, Moreno, López, & Olmedo, 1997; Lemos, Fidalgo, Calvo, & Menéndez, 1992): depressive symptomatology has been associated positively with neuroticism and psychoticism, and negatively with extraversion. Barbaranelli et al., (1998), using the same instruments with an Italian population, obtained significant correlations with depression score (CDI, Kovacs, 1992): adolescent depression correlated positively with emotional instability (.38) and negatively with the factors extraversion (-.35), friendliness (-.30), conscientiousness (-.40) and mental openness (-.46).

Emotional instability was the dimension most notably related to depressive symptomatology, as has been the case in other research (Barbaranelli et al., 1998; Del Barrio et al., 1997; Fisher, 1993; Heaven & Shochet, 1995; Jorm et al., 2000; Lemos et al., 1992; Saklofske et al., 1995). Introversion has also been repeatedly associated with depression (Barbaranelli et al., 1998; Del Barrio et al., 1997; McFatter, 1994; Trull & Sher, 1994) and, to a lesser extent, psychoticism (Del Barrio et al., 1997; Lemos et al., 1992). Some studies have reported a link between high agreeableness and depressive symptomatology (Avia et al., 1995; Mongrain, 1993; Zuroff, 1994), in the results of the present study, low agreeableness was associated with an increase in depressive symptomatology. These data are in line with the instrumental model of personality and emotions (Diener & Larsen, 1993; McCrae & Costa, 1991), according to which certain features of personality propitiate a favourable or unfavourable environment that influences emotional states. From this model, McCrae and Costa (1991) attribute to high agreeableness and conscientiousness a mediating role in relation to the environment.

The literature reflects contradictory results with regard to openness and depression: openness has been associated with depression both with positive (Trull & Sher, 1994) and negative correlations (Costa & McCrae, 1984, 1994).

Nevertheless, in child populations, with the BFQ-C questionnaire, the results from Barbaranelli et al. (1998) were similar to those obtained here: depression correlated negatively with conscientiousness, agreeableness and openness. The relationship between openness and depression can be explained by the association openness has shown with extraversion through different personality instruments (Aluja, García, & García, 2002).

As regards the predictive nature of the temperamental and personality variables, personality characteristics predicted depression to a greater extent than temperament and the most

explanatory variable was emotional instability. Temperament construct is less complex than personality; which is a possible explanation for a stronger relationship of personality and depression than temperament and depression; additionally depression is also a complex emotion. On the other hand there is a limitation: the BFQ-N is a self-report test while the DOTS-R is a test reported by parents. Each of informants (children and parents) can reflect different dimensions of the child's life (eg., family context versus private context) (Harris, 1999).

If we consider the temperamental and personality variables jointly in the regression model, we found that personality has a more relevant position than temperament, whose predictive value is minimal and its increment insignificant. We also found that mood was included and persistence and flexibility excluded. These results show that personality (emotional instability, openness to experience, agreeableness and extraversion) overlap the factor of temperament of persistence and flexibility, however mood predict depression significantly but the increment is insignificant.

Finally, we should mention an important possible limitation of this study related to the use of different sources in the evaluation of the measures, in that personality was assessed by the children themselves and temperament by their parents. This may be a factor explaining the discordance between the explicative values of temperament and personality, given the evidence from previous research on divergence between sources (Del Barrio, 1990; Ekins, 1993; Lefkowitz & Tesiny, 1985). Despite this consideration, several studies have demonstrated the validity of data when parents are the source in relation to stability of temperament, heredity and problems of adaptation (Cyphers, Philips, Fulker, & Mrazek, 1990; Guerin et al., 1997; Lemery, Goldsmith, Klinnert, & Mrazek, 1999). Nevertheless, future studies should consider this aspect and use a multi-source evaluation that will show whether these results are maintained when all the information comes from the same source.

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