

Hyperactive Behaviors from Childhood to Adolescence: Prospective Outcomes in a Sample of Spanish Children

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Abstract

The continuity of hyperactivity problems over time has become a major focus of attention for developmental and clinical psychologists. However, research in diverse ethnical and sociocultural contexts is needed so as to identify to what extent the findings are generalizable beyond the settings in which these studies are usually conducted. This work analyzes a) the development of parent-reported hyperactivity from childhood to adolescence in a sample of Spanish children, and b) the implications of hyperactivity in terms of adolescent psychosocial adjustment and personality traits. Longitudinal data collected from a sample of 138 Spanish children over a six-year interval was analyzed. Results show that although hyperactive behaviors tend to decrease as children grow, childhood hyperactive problems are related to relatively high levels of emotional, behavioral and social maladjustment in adolescence; hyperactive behaviors in childhood are also related to high Neuroticism and low Conscientiousness in adolescence. This prospective study confirms, in a Mediterranean European context, the impact of hyperactive behaviors not only for the development of behavioral problems but also for the configuration of personality traits.

Keywords: hyperactivity, longitudinal study, stability, behavioral problems, personality traits, childhood, adolescence

1. Introduction

Hyperactive behavior problems are a major focus of research and intervention for developmental and clinical psychologists. In recent years special attention has been paid to how these problems develop over time and how they influence psychological health in adolescence and adulthood (e.g., Barkley, Fischer, Smallish, & Fletcher, 2006). Some studies have stressed the persistence of hyperactivity problems and the diagnosis of Attention Deficit Hyperactivity Disorder (ADHD), especially regarding difficulties of inattention (Hart et al., 1995). Research also suggests hyperactivity problems may have implications for personal and social functioning. It has been found that children with hyperactive behaviors are at a high risk of academic difficulties in childhood and adolescence, as well as antisocial behaviors, and mood/anxiety disorders (e.g., Biederman et al., 2006).

In recent years a large number of research programs have focused on hyperactive problems (Evans, Owens, & Bunford, 2014; Sharma & Couture, 2014; Thapar, Cooper, Eyre, & Langley, 2013). However, more prospective studies are needed to analyze how hyperactive problems develop in the medium and long term, particularly in the course or important developmental transitions, like the transition from childhood to adolescence (see, for example, Sciberras, Roos, & Efron, 2009). Also, the roles of gender and age in the development of hyperactivity problems remain largely unclear (e.g., Diamantopoulou, Henricsson, & Rydell, 2005; Faraone, Biederman, & Mick, 2006; Greene et al., 2001). On the other hand, most longitudinal studies have focused on psychopathological outcomes (e.g., Barbaresi et al., 2013), while other variables like personality traits have been scarcely analyzed from a prospective point of view (Nigg et al., 2002).

Prospective studies need to be conducted especially in diverse sociocultural contexts, since longitudinal research on the development of behavioral disturbances has mainly been conducted in English-speaking environments (e.g. Manuzza, Klein, Abikoff, & Moulton, 2004; Sciberras et al., 2013). In recent years, stress has been placed on the importance of studying the manifestations and development of mental disorders in different ethnic groups

and in different geographical and cultural settings (e.g., Anselmi et al., 2008). This kind of studies will help ascertain to what extent the development of behavioral disturbances shows a universal pattern; it will allow examination of the predictive utility of constructs developed in the United States and Northern Europe when they are transferred to other settings.

Particularly scarce are the studies on developmental patterns for childhood psychopathology in Mediterranean countries, like Spain. Mediterranean cultures have been characterized by the strong emphasis on family ties and on communal values (Reher, 1998); thus, one could hypothesize that these characteristics might act as protection factors for children with behavioral difficulties, so that the outcomes of such disturbances might be more favorable than in Northern countries. At the same time, Mediterranean cultures have been characterized by a relatively low appreciation of values like self-restraint and future orientation (e.g., House, Hanges, Javidan, Dorfman, & Gupta, 2004), so it would be possible that disinhibition problems, like hyperactivity, could be more tolerated and thus less damaging for the individual development. Nevertheless, these hypotheses are very tentative. In fact, previous literature has shown that behavioral problems may have substantial deteriorating effects on family atmosphere (Anderson, Lytton, & Romney, 1986); these effects have also been shown in the Spanish context (Romero, Luengo, & Gómez-Fraguela, 2000). Thus, it would be also possible that hyperactivity problems harm family climate, and this might be particularly dysfunctional for children being raised in a culture strongly oriented to family values. So there is a clear need for studying if the cultural particularities of the Mediterranean world may bring some differences to the development of hyperactivity problems, or if the basic developmental patterns are held similar in different sociocultural settings.

In the light of the above considerations, this study, conducted on a sample of Spanish children, analyzes: 1) the stability/change of hyperactivity problems over a six-year period, considering the possible moderating effect of gender and age; 2) the relationship between childhood hyperactivity problems and adolescent psychosocial adjustment in adolescence; both the stability/change of hyperactivity and the relationships of hyperactivity with later adjustment have been a main focus of previous research in Anglo-Saxon countries (e.g., Hart et al., 1995; Biederman et al., 2006), so this study will provide new evidence from an European Mediterranean context; 3) the relationship between childhood hyperactivity problems and adolescent personality traits. Although there has been certain interest on the relationships between personality and hyperactivity, mainly in cross-sectional studies on adults (e.g., Nigg et al., 2002), prospective studies will allow researchers to go deeper into the role of childhood hyperactivity problems for the future development of personality traits.

Parent-reported Conners' scales were used to operationalize the hyperactivity problems. This made it possible to have the same informant in different data collections and reduced inter-observer variability. In order to operationalize outcomes, different informants participated (parents, teachers and children). Thus, the study analyzes the extent to which parent-reported hyperactivity problems are associated with personality and psychosocial outcomes assessed, through different methods, six years later.

2. Method

2.1 Participants

The data comprise part of a larger longitudinal study aimed at identifying the development of behavioral problems from childhood. In 2003 (T1) an initial sample of 192 children (boys: 72.4%; girls: 27.6%) aged 6-11 years (Mean: 8.05, SD = 1.49) were assessed. The children attended different public schools in Galicia (NW Spain) in rural, semi-urban and urban areas. After obtaining parental consent participants were selected using a teacher-reported rating scale, based mainly on the Externalizing scale of the Teacher's Report Form (Achenbach, 1991). This was used as a screening procedure to select a convenience sample including children with high and low levels of conduct problems. Participation was accepted by 87% of the families in the initial sample selection. A follow-up study (T2, 2009) was conducted six years after the first data collection. It was possible to re-assess 138 (68.8% boys) aged 12-17 years (Mean: 13.93, SD = 1.95) of the original 192 participants. Consequently, the attrition rate between the two data collection phases was 28%. Comparisons between participants taking part in both data collections and those who only completed the first showed no statistically significant differences regarding age, gender, behavioral problems measured using the CBCL, or global hyperactivity scores using the Conners' Scale.

2.2 Measures

For the objectives proposed in this study, measures of hyperactivity and externalizing disruptive problems were taken in T1. In T2, through different informants (parents, teachers and children), data was gathered on disruptive (externalizing) and emotional (internalizing) problems, school adjustment and personality.

2.2.1 Measures Administered in T1 and T2

Conners' Parent Rating Scales-Revised (Short Form; Conners, 1997). The 27-item version of this scale was used to measure hyperactivity problems. Specifically, the Hyperactivity/Impulsivity and Distraction/Attention Deficit subscales, as well as the ADHD Global Index were considered. Parents filled in the scales by indicating, with a Likert-scale ranged 0 ("Never or rarely") to 3 ("Always"), the frequency of hyperactive/inattentive behavior (e.g., "He/she is always moving or acting as if he/she were pushed by an engine"; "He/she looks distracted or fails to keep attention on tasks"). Reliability coefficients (Cronbach's alpha) ranged between .85 and .90 in T1, and between .88 and .90 in T2. Conners's scales also provide an ADHD Global Index, which collects the more representative items of the disorder, and serves as a general indicator for identifying children with high-risk of an ADHD diagnosis.

Child Behavioral Checklist (CBCL; Achenbach 1991). In order to have a measure of parent-reported behavioral problems, the CBCL was administered both in T1 and T2. This instrument, widely used in the research on child behavioral disturbances, is composed by 118 items (e.g., "Disobedient at home", "Doesn't get along with other kids") presented in a scale ranging from 0 ("Never") to 2 ("Often" or "always"). In this study, the Externalizing scale (alpha = .91) was used to control for the T1 disruptive behavioral problems in the analysis of the associations between childhood hyperactivity and adolescent outcomes. In T2, both Externalizing (alpha = .92) and Internalizing (alpha = .87) scales were used, with the aim of measuring the difficulties experienced by adolescents who, in childhood, had hyperactive problems.

2.2.2. Measured Administered in T2

Teacher's Report Form (TRF; Achenbach, 1991). In order to measure the behavioral and emotional problems perceived at school, the Externalizing (alpha = .85) and Internalizing (alpha = .79) scales of TRF were used. The 112 TRF items (e.g., "Breaks school rules", "Too concerned with neatness or cleanliness") were rated by teachers in a three-point scale from 0 ("Never or rarely") to 2 ("Often or always").

Parent and Teacher Report of Reactive and Proactive Behaviors (Dodge & Coie, 1987). Aggressive behaviors constitute one of the main criteria for assessing psychosocial adjustment in childhood and adolescence. Thus, in the analysis of the outcomes of hyperactivity, we measured two main types of aggression (reactive and proactive) rated by parents and teachers. The Parent and Teacher Report of Reactive and Proactive Behaviors is composed by six items. Three items cover aggression in response to provocation or threat ("reactive"; e.g., "Yells at others when he/she feels irritated"; alpha: 0.81 and 0.87 for parent and teacher ratings, respectively); the other three measure instrumental aggression ("Proactive" e.g., "Threatened or bullied somebody"; alpha: 0.86 and 0.83 for parent and teacher ratings, respectively). Both parents and teachers rated the items in a Likert scale ranging from 1 ("Never true") to 5 ("Almost always true").

School Adjustment Scale (adapted from Berry, Phinney, Sam, & Vedder, 2006). This scale was administered to the adolescents, and provided measures of three indicators of school adjustment. First, School Involvement was assessed through six items (e.g., "In the morning, I dislike to go to school") with a four-point Likert scale: from 0 ("Strongly disagree") to 4 ("Strongly agree"); the internal consistency of this scale (alpha) was .82. Second, school absenteeism was measured with one item ("Have you unjustifiably missed any classes during the last month?"), answered with a five-point scale from 0 ("Never") to 4 ("Five or more"). Finally, school performance was assessed through the number of failed subjects, with a six-point scale: from 0 ("None") to 6 ("More than four"). All the items were adapted from the survey on adolescent adjustment by Berry et al. (2006).

Mini-IPIP (Donnellan, Oswald, Baird, & Lucas, 2006). With the aim of measuring the main personality traits, we used a scale generated within the frame of the IPIP project (International Personality Item Pool) (Goldberg, 1999). The Mini-IPIP comprises 20 items, with four items for each of the Big Five dimensions: Extraversion, Neuroticism, Agreeableness, Conscientiousness and Openness/Intellect. For each item (e.g., "I am not very talkative", "I find difficulties to understand abstract ideas", "I get nervous easily"), participants must answer under a Likert scale from 0 ("Strongly disagree") to 4 ("Strongly agree"). Factor structure, psychometric properties and predictive utility of the scale were satisfactorily tested by previous research (Donnellan et al., 2006). In this study, reliabilities ranged from .43 (Openness/Intellect) to .69 (Conscientiousness). Reliabilities fall in the usual range for short personality scales (e.g., Gosling & Rentfrow y Swann, 2003; Romero, Villar, Gómez-Fraguela, & López-Romero, 2012). Nevertheless, considering the low alpha for Openness/Intellect (which, indeed, is the dimension showing more conceptual and measurement problems within the Big Five model), this scale was not used for the analyses of this study.

All the selected scales had previously been translated and used in Spanish studies and demonstrated adequate psychometric properties in terms of reliability and validity (López-Romero, Romero, & Luengo, 2012; López-Romero, Romero, & Gómez-Fraguela, 2015).

3. Results

The stability of hyperactive behaviors was analyzed using the two classic procedures for evaluating the stability of psychological traits: relative stability (consistency in the ranking of individuals in a group over time) and absolute stability (consistency in the mean values of a group over time). As can be seen in Table 1, the analysis of relative stability (Pearson correlations and intraclass coefficients) shows moderate/high consistencies for all the measures of hyperactive behaviors. The results for absolute stability show that hyperactive behaviors tend to decrease in the transition from childhood to adolescence. This is not true, however, for symptoms of Distraction/Attention Difficulties, which remain stable over the six-year period.

Table 1. Relative stability (Pearson correlations and intraclass coefficients) and absolute stability (mean comparisons) for hyperactivity problems from T1 to T2

	Pearson correlations	Intra-class coefficients	Mean (SD) T1	Mean (SD) T2	t(df)
Hyperactivity/Impulsivity	.62***	.62***	6.74	3.20	7.89 (131)***
Distraction/Attention Problems	.62***	.76***	6.37	5.73	1.30 (129)
ADHD Global Index	.72***	.83***	13.51	11.63	2.57(129)*

* $p < .05$; * * $p < .01$; * * * $p < .001$

In order to examine if this development is moderated by gender and/or age, the analysis of absolute stability was conducted again, using a repeated-measures MANOVA. The effects of time x gender, time x age (distinguishing between 6-8 year olds and 9-11 year olds) and time x gender x age were included as interaction terms. None of these interaction terms was significant, which indicates that this pattern of development is maintained in boys and girls and in different age groups.

With the aim of studying how hyperactivity symptoms in childhood are associated with psychosocial adjustment and personality in adolescence, the sample was split into two groups based on the scores in the ADHD Global Index. A T score of 70, which, following the scale norms, suggests significant ADHD symptoms, was used as cut-off point. Using this cut-off point, 61 participants presented high indications of ADHD in T1 (this group will hereafter be referred to as hyperactive). Both groups (“hyperactive” and “non-hyperactive”) were compared in T2 measures as shown in Table 2. Given that the measures of psychosocial adjustment are inter-correlated, multivariate analyses (MANOVAs) were used. The variables were grouped together according to the constructs they assess and/or the informant providing the information. The MANOVAs were conducted controlling for the effect of age and gender.

The results showed significant differences in all the sets of variables. Particularly, adolescents who had been hyperactive showed higher levels of behavioral problems both externalizing ($p < .001$) and internalizing ($p < .001$), regardless of whether informants were parents or teachers. Hyperactive participants also show more aggression both reactive and proactive, except in the case of parent-reported proactive aggression, where no significant differences were found.

Hyperactive participants also show, in the follow-up, more difficulties in the school context. Particularly, they show less school involvement ($p < .001$) and poorer school performance ($p < .001$), while no differences were found as regards to school absenteeism. When personality is analyzed, hyperactive participants show higher

Neuroticism ($p < .001$) and lower Conscientiousness ($p < .001$) than non hyperactives, with no differences for Extraversion and Agreeableness.

To check to what extent the outcomes are due to the disruptive behaviors commonly associated with hyperactive problems, the comparisons were conducted again, controlling for externalizing problems (CBCL) in T1. The results showed that when controlling for externalizing problems the differences between the hyperactive and non-hyperactive groups diminish. However, the hyperactive participants are still significantly different to the non-hyperactive ones in both the parent-reported ($p < .01$) and the teacher-reported ($p < .001$) externalizing problems, in school failure ($p < .01$) and in the Conscientiousness trait ($p < .01$).

Table 2. Comparisons of psychosocial adjustment of adolescents (T2) who were hyperactive and non-hyperactive children during childhood (T1), according to Conners' ADHD Global Index. Age and gender controlled

	Hyperactive Mean (SD)	Non hyperactive Mean (SD)	λ	$F(df)$	η^2
<i>CBCL Behavioral problems</i>			.74	23.53 (2,132)***	.26
Externalizing	17.27 (11.00)	7.27 (5.58)		46.85 (1,132)***	.25
Internalizing	12.98 (8.25)	8.29 (6.72)		13.42 (1,132)***	.09
<i>TRF Behavioral problems</i>			.64	80.15 (2,110)***	.24
Externalizing	19.62(12.33)	6.59(11.14)		26.43 (1,110)***	.23
Internalizing	13.59(9.31)	7.51(8.44)		10.28 (1,110)***	.10
<i>Aggressive conduct</i>			.75	17.54 (4,109)***	.24
Reactive (Parents)	1.97 (0.68)	1.50 (0.61)		12.56 (1,109)***	.11
Reactive (Teachers)	2.39 (0.92)	1.51 (0.80)		22.58 (1,109)***	.20
Proactive (Parents)	1.19 (0.42)	1.07 (0.24)		3,22 (1,109)***	.03
Proactive (Teachers)	1.47 (0.65)	1.15 (0.46)		7.96 (1,109)***	.07
<i>Adjustment to school</i>			.66	20.72 (3,121)***	.34
School involvement	13.60 (4.34)	15.90 (4.48)		8.21 (1,121)***	.06
School failure	2.79 (1.89)	0.60 (1.27)		62.31 (1,121)***	.33
Absenteeism	0.25 (0.81)	0.07 (0.30)		3,04 (1,120)	.02
<i>Personality</i>			.86	8.13 (4,130)***	.16
Extraversion	2.34 (0.69)	2.12 (0.70)		3.11 (1,130)	.02
Neuroticism	2.14 (0.79)	1.68 (0.85)		10.20 (1,131)***	.09
Agreeableness	2.85 (0.67)	2.94 (0.64)		0.61 (1,130)	.01
Conscientiousness	1.56 (0.88)	2.10 (0.82)		13,65 (1,132)***	.11

* $p < .05$; * * $p < .01$; * * * $p < .001$

4. Discussion

The first objective of this study was to examine the stability/change of hyperactivity problems from childhood to adolescence, both in relative and absolute terms. The results on relative stability were coherent with the findings of other longitudinal studies with similar follow-up intervals (Anselmi et al., 2008). When means are compared (absolute stability) results are also consistent with previous studies (Hart et al., 1995): hyperactivity/impulsive behaviors tend to decrease, where inattention remains stable. Thus, this study supports, in a South-European context, the pattern of continuities and changes which has been depicted by studies in Anglo-Saxon countries.

As regards the second objective, this study analyzed the association between childhood hyperactivity conducts and psychosocial adjustment in adolescence. In line with earlier studies (Biederman et al., 2006; Owens, Hinshaw, Lee, & Lahey, 2009), we found that hyperactive conducts in childhood are associated to higher levels of behavioral problems, both externalizing (delinquency, aggression) and internalizing (anxiety, depression), reported by different informants. A closer look to aggression reveals that the results are more consistent among informants (parents, teachers) for reactive than for proactive aggression. The fact that reactive aggression is more consistently associated with hyperactivity is coherent with the self-control problems which underlie ADHD, which characterize reactive aggression rather than proactive aggression. However, proactive aggression may also manifest itself more obviously in school settings (e.g. peer bullying). Consequently, teachers could be more accurate informants on this type of aggression and thus the association between hyperactivity and parent-reported proactive aggression could be diminished.

Previous research has also shown that hyperactive children are at higher risk of school difficulties (e.g., Capano et al., 2008). Attentional problems, impulsivity and difficulties for behavioral inhibition, usually found in the hyperactive children, hinder the adjustment to school, and provoke a cascade of failures in the academic field. This tendency is also supported by our results, which show less school involvement and poor school performance in the adolescents who had, as children, hyperactive problems.

This profile of results also matches well with the results in the sphere of personality traits. This study shows that hyperactivity problems in childhood are related with the development of low Conscientiousness and high Neuroticism. Both these traits, conceptually associated with impulsiveness (Whiteside & Lynam, 2001), have been related to adult ADHD mainly in cross-sectional studies (e.g., Nigg et al., 2002). This study provides further evidence that early hyperactivity problems are associated, from a longitudinal perspective, with a disinhibited personality pattern within the Big Five framework.

As hyperactivity is known to be strongly related to disruptive problems, this study also controlled for the T1 scores on disruptive problems, in order to get a more accurate view of the relations of hyperactivity with future behaviors and personality traits. When disruptive problems were partialled out, the relations were attenuated, but the differences between hyperactives and non-hyperactives were still significant for externalizing problems, school performance and personality. These results show that hyperactivity problems are related to a higher risk of dysfunctional development, beyond the co-occurrence with disruptive conducts, as suggested by other studies (Mannuzza, Klein, Abikoff, & Moulton, 2004).

This study has also some limitations. As we pointed out above, the attrition does not appear to be related to variables relevant to this study; however, as usually occurs in longitudinal studies in this field, the medium/long-term follow-up, covering the developmental transition from childhood to adolescence, resulted in a considerable participant loss rate, which reduces the sample size and the power of the statistical analyses. Longitudinal studies in different cultural settings with larger samples and more data collection waves are needed so as to identify to what extent findings on the developmental course of hyperactive problems are cross-culturally generalizable. Furthermore, although this study used a multi-informant perspective with data collected from parents, teachers and the adolescents themselves, this line of research could become more robust by means of the use of a richer variety of assessment tools (e.g., diagnostic interviews, direct observation).

Despite the limitations, these results indicate that parent-reported hyperactive behaviors allows us to predict greater maladjustment in adolescence, reported not only by parents but also by teachers and the adolescents themselves. This study supports the relevance of hyperactive behaviors for the personal and psychosocial development of young people in a different sociocultural context from those which have traditionally generated the knowledge on hyperactivity. As stated in the introduction, Mediterranean cultures, like the Spanish, show some features which might affect the development of behavioral problems, like hyperactivity. Nevertheless, this study found that, despite the cultural peculiarities in the Spanish setting, children with hyperactivity problems show a higher risk for dysfunctional development, with a pattern very similar to the one found in Northern countries. As indicated by other authors (Anselmi et al., 2008), it is possible that the trajectory of behavioral and

emotional problems is more influenced by age-specific effects than by cultural variables. This study provides new cross-cultural evidence on the continuities of hyperactivity problems, and their implications not only for disadjustments in adolescence, but also for the development of basic personality dimensions. Finally, in practical terms, the relevance of hyperactivity problems for the developmental course also suggests that intervention on hyperactive problems during childhood may be an efficient investment for prevention and health promotion over the longer term.

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