



Research Article

Comparing Attention-Deficit/Hyperactivity Disorder and Oppositional Defiant Disorder Singly and Together in Terms of Behavioral Problems, Family Conflict, and Cognitive Functions

Arzu Önal Sönmez,¹ Mehmet Levent Kayaalp²

¹Department of Child and Adolescent Psychiatry, Acıbadem Mehmet Ali Aydınlar University Faculty of Medicine, İstanbul, Turkey

²Department of Child and Adolescent Psychiatry, İstanbul University Cerrahpaşa Faculty of Medicine, İstanbul, Turkey

Abstract

Objectives: The purpose of this study is to profile three groups of children with attention-deficit/hyperactivity disorder (ADHD), oppositional defiant disorder (ODD), and both ADHD and ODD, through analyzing their cognitive abilities, personality traits, and family characteristics.

Methods: The study included 60 patients, with 20 patients in each group. Patients were selected according to the DSM IV criteria. They completed the Wechsler Intelligence Scale for Children–Revised (WISC-R) and the Bender Visual Motor Gestalt Test, and their mothers filled out the Child Behavior Checklist (CBCL) and Marital Conflict Questionnaire.

Results: There were no significant differences in picture completion, block design, and coding, which are the WISC-R subtests, between the three groups. In addition, there was no significant difference in verbal, performance, and WISC-R scores. Finally, there was no significant difference when the subdivisions of the CBCL externalizing and internalizing behaviors were analyzed individually. The Frequency of Marital Conflict Score and Conflict Expansion Score were analyzed, and there were no significant differences found between the three groups. The highest average of the Bender Visual Motor Gestalt Test was in the ODD group, whereas the lowest average was in the ADHD group.

Conclusion: When comparing ADHD and ODD in terms of cognitive abilities, the observed differences may be because ODD has no genetic or organic component, and ADHD has an organic basis. In ODD, cognitive abilities are intact, which should underline the environmental and family factors.

Keywords: Attention-deficit/hyperactivity disorder; oppositional defiant disorder; cognition; family.

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Attention-deficit/hyperactivity disorder (ADHD) is the most frequently encountered multifactorial neurodevelopmental disorder in childhood. The distinction between differential diagnosis and comorbidity is not always clear. Generally, if the symptoms can be completely explained by another disorder, then the diagnosis is not

ADHD.^[1] Oppositional defiant disorder (ODD), conduct disorder (CD), anxiety disorder, mood disorder, and learning disorders are comorbidities seen in children.^[2] ODD is the most frequently seen comorbidity among them.^[3, 4]

In a study conducted on children with ADHD, aged 6–17 years, Biederman et al. found comorbidities in 46% of chil-

Address for correspondence: Arzu Önal Sönmez, MD, Acıbadem Mehmet Ali Aydınlar Üniversitesi Tıp Fakültesi, Çocuk ve Ergen Psikiyatrisi Anabilim Dalı, İstanbul, Turkey

Phone: +90 532 516 51 53 **E-mail:** arzuodr@yahoo.com

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dren and 31% of adolescents with ODD, and 25% of children and 42% of adolescents with CD.^[5] In a model in which the relationships between ADHD, ODD, and DBD were defined, it was assumed that behavioral disorders show a progressive progression from mild to severe, and it has been suggested that CD develops only in children with ADHD. In other words, it has been suggested that antisocial personality disorder may develop in a subgroup of children who develop CD.^[6]

Although the role of ADHD in the development of disruptive behavior disorders is controversial, it is emphasized that the association between ODD and ADHD may be determinative for the early onset of the ADHD symptoms. In general, the idea that ADHD affects the developmental course and severity of the CD has been reported as a point of consensus in the literature.^[7]

The treatment approach for ADHD and mood and anxiety disorders is different, and the diagnosis of solely ODD and the evaluation of therapeutic approaches are different. It has been thought that the treatment of the symptoms associated with ODD will contribute positively to the treatment of ODD. In a multimodal treatment study related to ADHD, it was found that stimulant therapy showed positive improvements in patients with ADHD-related oppositional behaviors.^[8]

Compared with the general population, comorbidities associated with ODD are frequently seen. When compared with psychiatric and non-psychiatric groups, ODD is an important risk factor when it is evaluated in terms of social incompatibility. Concomitancy between ADHD and ODD is quite common, but in some studies, a significant percentage of ADHD patients did not have comorbid ODD. Childhood mood and anxiety disorders have been also frequently associated with ODD. Comorbidity of CD could not be isolated from studies when investigating the association between ODD and other psychiatric disorders.^[9–13]

Disorders in child–family relationship and family functioning have been reported to be an important factor in the development of ODD and CD in ADHD.^[14] The aim of this study was to compare cognitive abilities, personality traits, and family traits in children with ADHD, ODD, and both ADHD and ODD. Utilizing the psychometric evaluation methods and scales, the differences between the groups are discussed, and it has been planned to obtain the information about the profiles of these three groups.

Methods

In our study, a total of 60 children aged between 6 and 11 years diagnosed with ADHD, ODD, and ADHD+ODD were enrolled in the study. The groups were based on age and socioeconomic status. To evaluate the behaviors of the sub-

jects in the study, the mothers of the children and adolescents aged 4–18 years filled out the Child Behavior Checklist (CBCL). The Marital Conflict Scale was filled out by parents to evaluate the marital relations between them. The WISC-R and Bender Visual Motor Gestalt Test were applied to all children. A history of neurological, physical, or chronic diseases, the presence of another psychiatric disorder, use of medications, and IQ below 85 based on the WISC-R intelligence test results were determined as exclusion criteria in our study. An ethics committee approval was obtained from the ethics committee of Cerrahpaşa Faculty of Medicine.

Data Collection

Child Behavior Checklist for Ages 4–18

The CBCL was developed by Achenbach and Edelbrock in 1983 to evaluate the competence areas and problem behaviors of children and adolescents aged 4–18, in accordance with the information obtained from their parents. The Turkish translation of the 1991 form was made by Erol and Kılıç, and the translation was reviewed in 1985 to ensure its applicability in our country (Akçakın, 1985; Erol and Şimşek, 1998). Adaptation and standardization studies of the scale were performed by Erol et al.^[15]

Marital Conflict Scale

This scale was developed by Hatipoglu in 1993 to measure marriage conflicts. The scale consists of 70 items related to highly potential sources of marital conflicts including communication, relationships among friends and relatives, children, business, economic issues, and sexuality. For each item, there are five options available.^[16]

Wechsler Intelligence Scale for Children–R

The Wechsler Intelligence Scale for Children–R (WISC-R) was developed by Wechsler and adapted to Turkish by Savaşır and Şahin in 1995.

It is a verbal and performance test applied to children aged between 6 and 16 years. One of the verbal parts of the test and all of the performance parts should be responded to within a determined time period. It consists of 12 subtests including verbal and performance skills.^[17]

Bender Visual Motor Gestalt Test

This test, which evaluates visual motor perception, consists of nine cards with figures on them. It was designed by Lauretta Bender at the Bellevue Psychiatric Hospital in New York University in 1938. Its standardization for Turkish children was performed by Somer in 1988.^[18]

Statistical Method

Statistical analysis was conducted using the SPSS for Mac v.13. Data were evaluated as the mean±standard deviation.

Table 1. General characteristics of the groups

	Diagnosis			Total
	ADHD	ODD	ADHD+ODD	
Gender				
Female	1	4	4	9
Male	19	16	16	51
Total	20	20	20	60

ADHD: Attention-deficit/hyperactivity disorder; ODD: Oppositional defiant disorder. *Chi-square and Fisher's exact test were used.

Chi-square test, Fisher's exact test, Kruskal–Wallis test, and analysis of variance were used to compare demographic features (parental education, class) and evaluate the scores. The safety level was accepted as 95%, and a p-value of <0.05 was considered to be statistically significant.

Results

A total of 60 patients aged 6–11 years were included in the study. Fifty cases were male (85%) and 9 (15%) were female. The ADHD group consisted of 1 (5%) girl and 19 (95%) boys; the ODD group consisted of 4 (20%) girls and 16 (80%) boys; and the ADHD+ODD group consisted of 4 (20%) girls and 16 (80%) boys. The mean ages of the ADHD (8.8 ± 1.399 years), ODD (9.0 ± 1.29 years), and ADHD+ODD (8.9 ± 1.25

years) groups were calculated as indicated. There was no statistically significant difference between the three groups in terms of the mean age of the groups ($p=.926$) (Table 1).

The mean values for the picture arrangement, block design, and coding subtests were compared. In the ADHD group, the mean picture arrangement subtest scores were 8.50 ± 1.98 in the ADHD, 9.00 ± 2.07 in the ODD, and 9.70 ± 2.02 in the ADHD + ODD groups. No significant difference was found between the groups. In the ADHD group, the mean subset scores of the block design were 10.10 ± 2.75 in the ADHD, 10.85 ± 2.83 in the ODD, and 11.10 ± 2.55 in the ADHD+ODD groups. There was no significant difference between the groups with respect to the block design subtest. In the ADHD group, the mean scores of coding subtest were 11.10 ± 1.97 in the ADHD, 11.65 ± 3.32 in the ODD, and 10.90 ± 3.21 in the ADHD+ODD groups, respectively. There was no significant difference between the groups regarding the coding subtest (Table 2).

The mean scores of the CBCL were compared between the three groups. The mean Social Introversion subset scores were 60.95 ± 8.36 in the ADHD, 60.50 ± 8.41 in the ODD, and 61.15 ± 6.42 in the ADHD+ODD groups. No significant difference was found between the groups in terms of social introversion ($p=.912$). The mean scores of Somatic Complaints were 60.05 ± 8.28 in the ADHD, 64.35 ± 13.36 in the ODD, and 60.30 ± 9.85 in the ADHD+ODD groups.

Table 2. Psychometric assessments*

Diagnosis	ADHD	ODD	ADHD+ODD	p
WISC-R				
Picture completion	8.50 ± 1.98	9.00 ± 2.07	9.70 ± 2.02	
Block design	10.10 ± 2.75	10.85 ± 2.83	11.10 ± 2.55	
Password	11.10 ± 1.97	11.65 ± 3.32	10.90 ± 3.21	
CBCL				
Social internalizing	60.95 ± 8.36	60.50 ± 8.41	61.15 ± 6.42	.912
Somatic complaints	60.05 ± 8.28	64.35 ± 13.36	60.30 ± 9.85	.646
Anxiety/depression	63.85 ± 8.02	66.45 ± 10.04	63.55 ± 10.79	.601
Social problems	63.80 ± 8.22	64.50 ± 11.05	62.75 ± 7.58	.897
Thought problems	64.20 ± 8.38	64.95 ± 9.64	67.30 ± 8.76	.441
Attention problems	68.70 ± 8.44	68.60 ± 9.00	68.55 ± 8.50	.761
Criminal behavior	65.15 ± 9.01	62.85 ± 8.80	64.15 ± 9.57	.602
Aggressive behaviors	68.10 ± 10.80	65.65 ± 8.79	69.40 ± 8.03	.390
Inward orientation	63.80 ± 11.34	67.05 ± 9.55	64.20 ± 8.58	.721
Outward orientation	66.50 ± 9.45	65.05 ± 8.35	68.30 ± 7.20	.443
Marital Conflict Scale				
Conflict score	6.65 ± 6.49	10.20 ± 9.92	7.45 ± 6.84	.503
Conflict frequency score	1.55 ± 1.14	2.05 ± 1.27	1.81 ± 1.32	.443
Bender Motor Visual Gestalt Perception Test	37.25 ± 8.18	58.25 ± 16.64	41.00 ± 10.20	

ADHD: Attention-deficit/hyperactivity disorder; ODD: Oppositional defiant disorder. WISC-R: Wechsler Intelligence Scale for Children–Revised. *Kruskal–Wallis and analysis of variance tests were used.

There was no significant difference between the groups in terms of somatic complaints ($p=.646$). In the subset of Anxiety/Depression, mean scores were 63.85 ± 8.02 in the ADHD, 66.45 ± 10.04 in the ODD, and 63.55 ± 10.79 in the ADHD+ODD groups. There was no significant difference between the groups in terms of the anxiety/depression subset scores ($p=.601$). The mean Social Problems subset scores were 63.80 ± 8.22 in the ADHD, 64.50 ± 11.05 in the ODD, and 62.75 ± 7.58 in the ADHD+ODD groups.

No significant difference was found between the groups in terms of social problems ($p=.897$). The mean scores in the section of Thought Problems were 64.20 ± 8.38 in the ADHD, 64.95 ± 9.64 in the ODD, and 67.30 ± 8.76 in the ADHD+ODD groups. No significant difference was found between the groups in terms of Thought Problems ($p=.441$). The mean scores in the section of Attention Problems were 68.70 ± 8.44 in the ADHD, 68.60 ± 9.00 in the ODD, and 68.55 ± 8.50 in the ADHD+ODD groups.

There was no significant difference between the groups in terms of attention problems ($p=.761$). The mean subset scores in the section of Criminal Behavior were 65.15 ± 9.01 in the ADHD, 62.85 ± 8.80 in the ODD, and 64.15 ± 9.57 in the ADHD+ODD groups. No significant difference was found between the groups in terms of criminal behavior ($p=.602$). The mean subset scores in the section of Aggressive Behaviors were 68.10 ± 10.80 in the ADHD, 65.65 ± 8.79 in the ODD, and 69.40 ± 8.03 in the ADHD+ODD groups.

A significant difference was not detected between groups ($p=.390$). The mean subset scores of the section of Internalizing Behaviors were 63.80 ± 11.34 in the ADHD, 67.05 ± 9.55 in the ODD, and 64.20 ± 8.58 in the ADHD+ODD groups. There was no significant difference between the groups in terms of internalizing behaviors ($p=.721$). The mean subset scores of the Externalizing Behaviors section were 66.50 ± 9.45 in the ADHD, 65.05 ± 8.35 in the ODD, and 68.30 ± 7.20 in the ADHD+ODD groups without significant difference between groups ($p=.443$). The mean total scores of the Internalizing and Externalizing Behaviors were 67.65 ± 10.35 in the ADHD, 69.20 ± 7.64 in the ODD, and 70.45 ± 6.75 in the ADHD+ODD groups. A significant intergroup difference was not detected ($p=.944$) (Table 2).

The Marital Conflict Scale was analyzed in two subsets, as the "Conflict Score" and the "Conflict Frequency Score," and it was compared between groups. The mean Conflict Scores were 6.65 ± 6.49 in the ADHD, 10.20 ± 9.92 in the ODD, and 7.45 ± 6.84 in the ADHD+ODD groups. A significant difference was not found between groups ($p=.503$). The mean Conflict Frequency Scores were 1.55 ± 1.14 in the ADHD, 2.05 ± 1.27 in the ODD, and 1.81 ± 1.32 in the ADHD+ODD groups. No significant difference was found between

groups ($p=.443$) (Table 2). The mean Bender Visual Motor Gestalt Test scores were compared between three groups. The mean scores were 37.25 ± 8.18 in the ADHD, 58.25 ± 16.64 in the ODD, and 41.00 ± 10.20 in the ADHD+ODD groups. A significant difference was detected between the three groups as for the Bender Motor Visual Gestalt Perception Test. The highest mean score was found in the ODD group and the lowest mean score in the ADHD group (Table 2).

Discussion

In this study, we aimed to investigate similar and different aspects of cognitive abilities, and personality and family traits, in children with ADHD, ODD, and both ADHD and ODD. Although ODD is a common clinical diagnosis, it is a rare subject of research.^[19] Some researchers have suggested that because of the frequent association of ODD with ADHD, ODD is a different phenotypic appearance of ADHD rather than a separate disorder, while some others have advocated that it is a milder form of CD.^[20] Still others have suggested that it is difficult to distinguish it from normal oppositional behaviors.^[21]

In one research study, it has been shown that ODD comorbidity in ADHD is associated with aggression and negative parent-child rapport.^[22] Social (high crime rates), familial (low socioeconomic level, problematic parenting functions, fragmented families, parental psychopathology), and child-related (temperament, other psychiatric disorders) risk factors are detected in the etiology of disruptive behavior disorders.^[23] In this study, there was no significant difference between the three groups in terms of parental education. In our study, the fact that the families were not fragmented, that they were homogeneous in terms of belonging to the middle socioeconomic level, and that the education level of parents did not differ between the three groups provides homogeneity between the groups and eliminates sociodemographic differences.

The problems experienced by children with ADHD in the field of selective attention disrupt the processing of information in short-term memory.^[24] Children with ADHD are unable to recover their attention in the number sequences subtest of the WISC-R, and as a result, they have difficulty in processing the numbers in short-term memory. Similarly, in the arithmetic subtest, they experience difficulty in keeping their attention on the same subject, and they usually use the right method of solving arithmetic problems they need to solve mentally, but they could not give the right answer.^[25-29] Children with ADHD who have a visual perception disorder are often unable to form the required shapes using cubes together with simple errors in the block design test. Rotational errors are often found in the

shapes they form correctly. Due to the fact that the cubes are three-dimensional, children are experiencing difficulties in the perception of depth, and they form figures on different surfaces of the cubes. In this study, no significant difference was found between the groups regarding the block design subtest. In the coding subtest, which measures the motor coordination skill and attention-gathering ability with visual perception, it was observed that many symbols are configured wrongly or upside-down, and the subjects could not use their time efficiently.^[30] In this study, no significant difference was found between the groups regarding the coding subtest results. Children with ADHD receive low scores from the WISC-R coding, arithmetic, number sequences, block design, and image-editing subtests.^[31, 32] The findings of this study were not consistent with the literature. Since IQs of all of the children were over 85, the patients who met the diagnosis of mental retardation were excluded from the study, and because there was a lack of any significant difference between the three groups as well regarding the WISC-R scores, we can conclude that ADHD and/or ODD develop irrespectively of the intelligence quotient.

In another study, it was shown that the verbal score, performance score, and all other scores were lower in the ADHD group than in the control group.^[33] It is assumed that an inadequate development of planning and editing skills, which are shown as the elements of ADHD that make learning difficult and also decrease work performance and lead to carelessness, concentration difficulties, and impatience may be responsible for low school success.^[34] It is thought that ADHD may lead to grade repetition irrespectively of the IQ level.^[35] For this reason, it is observed that problems continue through adulthood.^[36-38] In this study, no significant difference was found between the three groups in terms of the verbal score, performance score, and all other scores.

It is known that the CBCL subsets of social introversion, somatic problems, and anxiety/depression demonstrate problems-inward orientation.^[39]

In this study, no significant difference was found between the groups in terms of the mean subset scores of social introversion, somatic problems, and total inward orientation problems. Exclusion of additional diagnoses is thought to be a cause of finding no difference between the groups in terms of these subdivisions. It was concluded that untreated adolescents with ADHD had problems of inward orientation more frequently than children with ADHD, and these complaints were seen more often in patients who were not treated with age than in control subjects.^[40] Other mental disorders, mainly anxiety and mood disorders, are frequently associated with ADHD.^[41-43] The symptoms of

anxiety and depression were more frequently encountered in children with ODD compared to children with ADHD.^[44] In this study, no significant difference was found between the three groups in terms of anxiety/depression based on CBCL.

It was stated that children with ADHD are not wanted by their peers and that they have difficulty in maintaining peer relations.^[38] It was also indicated that children with ADHD have more behavioral problems, experiencing difficulties in socialization and complying with social order in each period of their lives, including the pre-school period.^[45]

The subsets of the CBCL showing externalizing behavior problems include aggressive and criminal behaviors. In our study, there was no significant difference between the groups in these subdivisions. In a study, it was determined that aggression in boys with ADHD started in the early stages of life and was frequently associated with ODD symptoms.^[46]

It has been suggested that children with ADHD more frequently commit delinquent acts and enter correctional facilities, and that they carry a high risk of getting involved in criminal acts.^[47, 48] As indicated by various authors, if pediatric patients with do ADHD have behavioral problems, then they are more prone to committing crimes in adulthood. Besides, it was also stated that ADHD patients with more severe ODD symptoms are more frequently arrested and commit crimes more ruthlessly.^[49, 50]

In this study, no significant difference was found between the mean scores of the subdivisions of the crime-related behaviors of the CBCL in the three groups. It was thought that there could be no difference due to the lack of a healthy control group.

There was no significant difference between the groups in the Marriage Conflict Scale.

It has been detected that both male and female children reacted unfavorably to conflicts, while girls were more likely to show their reaction of anger, sadness, and fear more heavily than boys.^[51] In contrast, in a longitudinal study conducted with 1747 families for 5 years, the relationship between the marital conflict and child harmony was investigated, and no difference was observed with respect to gender.^[52]

Similarly, in a study in which the responses of children to interparental conflicts were investigated, no gender differences were found.^[53] The most important result of this study was the statistically significant difference between the three groups in the Bender Motor Visual Gestalt Perception Test. The highest mean score was found in the ODD group. Although it is frequently used to determine the

visual impairment of children with ADHD, it is seen that a scarce number of studies have been performed regarding visual impairment in patients with ADHD. In other studies, it was found that children with ADHD had significantly lower scores in CD compared to the healthy control group.^[54–57] It has been reported in the literature that the high error score obtained from the Bender Motor Visual Gestalt Perception Test was related to the increase in the severity of ADHD.^[58, 59] When the characteristics of the participants of these studies are examined, it is noteworthy that these cases received drug treatment. The findings of the Bender Motor Visual Gestalt Perception Test can be considered to be a result of these conditions. It has been thought that these features measured by the Bender Motor Visual Gestalt Perception Test represent various functions of intelligence, and it can be used as an intelligence test.^[60]

The Bender Motor Visual Gestalt Perception Test is also used to evaluate adult patients with brain damage and neurological disorders, and those with schizophrenia and mental disability. It may also be used as a component of the neuropsychological test battery in patients with brain damage.^[61] The tool is used to detect both developmental features and organic disorders.

The low Bender Motor Visual Gestalt Perception Test scores in the ADHD group support the fact that ADHD may be of organic origin.

Numerous studies performed on adults and experimental animals suggest that dysregulation of hyperactivity and motor movements are associated with impairments in the frontostriatal structures. Differences are observed in the frontostriatal pathway, which connects the frontal lobe, supplementary motor area, and parietal cortices in ADHD.^[62–65] The fact that an excessive mobility and carelessness are thought to be caused by disturbances in the frontostriatal area is an important finding favoring the argument that ADHD is of organic origin.^[57, 66]

As a result, the highest and the lowest mean scores of the Bender Visual Motor Gestalt Test were found in the ODD and the ADHD groups, respectively.

Similar studies should be carried out in larger groups to enrich the findings obtained in this study. In addition, it is thought that among the ADHD subtypes, attention deficit is in the forefront, and neuropsychological evaluations should be considered separately in patients with mobility.

Limitations

In our study, the lack of a healthy control group was one of the most important limitations. Increasing the number of samples and adding the control group will help to obtain more meaningful results.

Disclosures

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Conflict of Interest: None declared.

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