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Differences in Parents' and Teachers' Ratings of ADHD Symptoms and Other Mental Health Problems

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ABSTRACT – *Background and objectives:* Attention-Deficit/Hyperactivity Disorder (ADHD) symptoms and other mental health problems appear early in life and proper treatment is essential for a positive long-term outcome. The present study examines the level of agreement, and potential gender differences, between parents' and teachers' reports of ADHD symptoms and other mental health problems in 305 Greek children aged between 6-9 years.

Methods: Parents and teachers of 147 boys and 158 girls attending the first three grades of 10 primary schools in the wider area of Northern Greece completed the Strength and Difficulties Questionnaire (SDQ- Goodman, 1997) and the Child Attention Profile (CAP- Barkley, 1990).

Results: The level of agreement between parents' and teachers' reports was low to moderate for the SDQ (0.16-0.34) and satisfactory for the CAP (0.60-0.66). Parents reported more hyperactivity, emotional, and conduct problems than teachers according to SDQ and more overactivity and attention-deficit with hyperactivity according to CAP. Gender differences in ratings were found as well, since boys were reported as being more hyperactive according to SDQ and as having more overactivity and attention-deficit with hyperactivity according to CAP than girls.

Conclusions: Findings are discussed in terms of the importance of using multiple informants to gather data on disruptive behaviour through rating scales.

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Introduction

Attention-Deficit/Hyperactivity Disorder (ADHD) is one of the most common neuro-behavioural disorders of childhood and among the most prevalent chronic health conditions affecting school-aged children¹. It is characterised by developmentally inappropriate levels of motor activity, difficulty in sustaining attention, and impulsivity². ADHD transcends the limits of childhood; prospective clinical studies and longitudinal studies have shown that the symptoms and the accompanying impairment often persist well into adult life³.

Prevalence of ADHD depends on the diagnostic criteria used, the diagnostic measures, the sampling method, the number of informants, as well as the age and the nature of the population studied⁴. Screening with questionnaires identifies 10-20% of the population as affected⁵, while studies focused on ADHD using definitions based on DSM report prevalence rates from 5-10%⁶. A recent review of prevalence rates in school-aged community samples indicates rates varying from 4% to 12% (median: 5.8%)⁷.

Children with ADHD usually have functional impairment across multiple settings and are at risk for long-term adverse effects on social-emotional development, academic performance, interpersonal relationships with family members and peers⁸⁻¹¹. Other mental health problems that might manifest are anxiety disorders¹², oppositional defiant disorder or conduct disorder¹³, and reading disabilities¹⁴ and they tend to vary with age; in young children there is an overlap between ADHD symptoms and other neuropsychiatric and developmental conditions¹⁵. Older children and adolescents exhibit usually anxiety

disorders, depression, bipolar disorder, substance abuse, and antisocial personality disorder^{16,17}. The identification of these mental health problems is extremely important for diagnosis and treatment, since they may affect the main symptoms of ADHD¹⁸.

DSM-IV criteria for ADHD require that both symptoms and impairment from those symptoms be exhibited in at least two settings¹⁹. Therefore, it is common practice to collect data using both parent and teacher reports that are regarded as optimal for the screening of externalising behaviours, such as ADHD²⁰, since the behaviour of the children is recorded both at home and at school^{21,22}. Teachers observe daily many children who are at the same developmental level and can thus spot behaviours that are not age-appropriate²³, while parents are able to provide more valid information about behaviours at home²⁴. Although parents' reports are considered to be as sensitive as teachers' in detecting changes in their children's ADHD symptoms²⁵, the average correlation between scores obtained from multiple informants (parent, teacher, and self report) was moderate - 0.28²⁶⁻²⁷. Therefore, the aim of this study is to determine the levels of agreement between parents' and teachers' reports of children's ADHD symptoms and other mental health problems in Greek primary schoolchildren. Moreover, since in the general population 9.2% of males and 2.9% of females are found to have behaviours consistent with ADHD²⁸⁻³⁰, and boys are identified with ADHD at least four times as often as girls in general populations³¹, gender differences in ratings will be explored as well. It is expected that parents and teachers will rate boys as having more ADHD symptoms and other mental health problems than girls.

Methods

Participants and sampling procedures

The sample was taken from 10 public elementary schools in the municipality of Thessaloniki, Greece, which were drawn randomly from selected areas of both high and low socio-economic status. The researchers contacted Educational Authorities in order to get the permission to approach the schools' principals and to brief them about the aim of the study. With the principals' authorisation, in every school a class from each of the first three grade levels was randomly selected and twelve pupils (six boys and six girls) were randomly identified by a prepared list of random numbers. This process was necessary to ensure an equal distribution of participants according to their age and gender (a total of 360 pupils – 120 children per grade). The next step was to send a letter to the parents of each selected child explaining the purpose of the research, a consent form, and two questionnaires to fill in at home. The teachers of the selected children were also asked to complete a consent form and to fill in the two corresponding questionnaires.

A total of 660 of the 720 questionnaires that were distributed to the teachers (response rate of 91.7%) and a total of 617 out of the 720 questionnaires that were distributed to the parents (response rate of

86%) were returned completed and were included in the study. Therefore, data was collected from the parents and teachers of 305 out of the 360 schoolchildren that were initially selected (attrition: 15.3%). There were 147 boys and 158 girls, aged between 6 and 9 years old (mean age = 7 years and 36 months). The distribution of the sample is shown on Table I. Since initial analyses showed that there were no age differences in the frequency of ADHD symptoms (for SDQ, $F_{(2,300)} = 2.29$, $p > 0.05$) and other mental health problems (for CAP, $F_{(2,300)} = 1.47$, $p > 0.05$), this variable was not further explored.

Measures

The parents and the teachers of the selected children completed two questionnaires, the Strengths and Difficulties Questionnaire (SDQ)³² and the Child Attention Profile (CAP)³³. The SDQ is a measure of social, emotional and behavioural functioning. It has been used widely in many cultures such as Australia³⁴, Germany³⁵, and the Nordic countries³⁶. It has also been translated and standardised into Greek³⁷. SDQ is a brief screening measure that includes parent and teacher version for children 4-16 year, self-report version for adolescents 11-16 years and a parent and preschool professional version for 3-4 year-olds. This instrument produces scores for hyperactivity, emotional problems, conduct problems, peer prob-

Table I
Distribution of the sample by grade and by gender

Grades	Gender		Total
	Boys	Girls	
Grade 1	46	36	82
Grade 2	55	64	119
Grade 3	46	58	104

lems, and prosocial behaviour (the latter was not included in the present study). Each subscale consists of five items. Each item has the response option of 0 (not at all), 1 (a little, sometimes) or 2 (very much, all of the time)⁵. The reliability of the scale for the present study was $\alpha = 0.79$, which is considered to be satisfactory.

CAP has been translated from English into Greek by one child psychiatrist and one psychologist who were fluent in both languages. In order to ensure that the translation was accurate, it was translated independently back into English by two other child psychologists. The translation was well received by the parents and the teachers who were asked to complete the questionnaires. CAP is designed based on the Child Behaviour Checklist and it consists of 12 items in two subscales of inattention (seven items) and overactivity (5 items). Parents and teachers rate the behaviour of the children by using a 3-point Likert scale from 0 (never/rarely) to 2 (always). Three scores can be derived from CAP: inattention, overactivity, and total score referring to attention-deficit with hyperactivity. The reliability of the scale for the present study was $\alpha = 0.91$, which is extremely satisfactory.

Results

Correlations (Pearson) were used to determine the levels of agreement between parents' and teachers' reports of children's ADHD symptoms and other mental health problems. Statistically significant positive correlations were found between parents' and teachers' ratings on both SDQ: hyperactivity $r(305) = 0.31, p < 0.001$, emotional problems $r(305) = 0.16, p < 0.01$, conduct problems $r(305) = 0.28, p < 0.001$, peer problems $r(305) = 0.34, p < 0.001$ (see Table II); and CAP: overactivity $r(305) = 0.64, p < 0.001$, inattention $r(305) = 0.60, p < 0.001$, and attention-deficit with hyperactivity $r(305) = 0.66, p < 0.001$ (see Table III).

Moreover, a statistically significant correlation was found between parents' ratings on the hyperactivity subscale of SDQ and their ratings on CAP overactivity $r(305) = 0.51, p < 0.001$, CAP inattention $r(305) = 0.48, p < 0.001$, and CAP attention-deficit with hyperactivity $r(305) = 0.55, p < 0.001$. A statistically significant correlation was found also between teachers' ratings on the hyperactivity subscale of SDQ and their ratings on CAP overactivity $r(305) = 0.59, p < 0.001$.

Table II
Correlations between parents' and teachers' ratings on SDQ

	1	2	3	4	5	6	7	8
Parents								
1. Hyperactivity	1							
2. Emotional problems	0.29*	1						
3. Conduct problems	0.48*	0.24*	1					
4. Peer problems	0.07	0.24*	0.12**	1				
Teachers								
5. Hyperactivity	0.31*	-0.07	0.21*	0.07	1			
6. Emotional problems	0.09	0.16*	0.03	0.16*	0.24*	1		
7. Conduct problems	0.13**	-0.03	0.28*	0.09	0.50*	0.11	1	
8. Peer problems	0.18*	0.06	0.09	0.34*	0.38*	0.45*	0.21*	1

* $p < 0.01$

** $p < 0.05$

Table III
Correlations between parents' and teachers' ratings on CAP

	1	2	3	4	5	6
Parents						
1. Overactivity	1					
2. Inattention	0.62*	1				
3. Attention-deficit with hyperactivity	0.87*	0.87*	1			
Teachers						
1. Overactivity	0.64*	0.43*	0.60*	1		
2. Inattention	0.44*	0.60*	0.57*	0.60*	1	
3. Attention-deficit with hyperactivity	0.59*	0.57*	0.66*	0.87*	0.91*	1

* $p < 0.01$

0.001, CAP inattention $r(305) = 0.47$, $p < 0.001$, and CAP attention-deficit with hyperactivity $r(305) = 0.57$, $p < 0.001$.

Since SDQ hyperactivity subscale includes five items covering inattention, hyperactivity, and impulsivity, high correlation between SDQ and the three CAP subtypes is expected. Therefore, it was decided to measure the correlation between the different CAP subtypes, for parents' and teachers' ratings, which were as follows: a) parents' ratings on overactivity and inattention $r(305) = 0.62$, $p < 0.001$, on overactivity and attention-deficit with hyperactivity $r(305) = 0.87$, $p < 0.001$, and on inattention and attention-deficit with hyperactivity $r(305) = 0.87$, $p < 0.001$, and b) teachers' ratings on overactivity and inattention $r(305) = 0.60$, $p < 0.001$, on overactivity and attention-deficit with hyperactivity $r(305) = 0.87$, $p < 0.001$, and on inattention and attention-deficit with hyperactivity $r(305) = 0.91$, $p < 0.001$ (see Table III).

Despite these positive correlations, there were some differences in parents' and teachers' ratings according to paired-samples *t*-test. More specifically, parents reported statistically significant higher hyperactivity ($t_{(304)} = 3.41$, $p < 0.005$), emotional problems ($t_{(304)} = 5.57$, $p < 0.001$), and conduct

problems ($t_{(304)} = 2.84$, $p < 0.05$) according to SDQ, and higher overactivity ($t_{(304)} = 5.40$, $p < 0.001$) and attention-deficit with hyperactivity ($t_{(304)} = 3.63$, $p < 0.001$) according to CAP than teachers. Parents and teachers did not report any statistically significant differences in terms of peer problems ($t_{(304)} = 1.64$, $p > 0.05$) according to SDQ and inattention ($t_{(304)} = -1.44$, $p > 0.05$) according to CAP (see Table IV).

Preliminary analysis showed that there were no age differences in terms of parents' and teacher's ratings of ADHD symptoms and other mental health problems, however gender differences were detected. More specifically (see Table V), parents reported that boys exhibited statistically significant higher hyperactivity ($F_{(1,301)} = 13.18$, $p < 0.001$) than girls, while no gender differences were found for emotional problems ($F_{(1,301)} = 0.19$, $p > 0.05$), conduct problems ($F_{(1,301)} = 2.13$, $p > 0.05$), and peer problems ($F_{(1,301)} = 0.83$, $p > 0.05$). Teachers reported that boys exhibited statistically significant higher hyperactivity ($F_{(1,301)} = 15.36$, $p < 0.001$) and conduct problems ($F_{(1,301)} = 19.91$, $p < 0.001$) than girls, while there were no gender differences in emotional problems ($F_{(1,301)} = 0.83$, $p > 0.05$) and in peer problems ($F_{(1,301)} = 0.87$, $p > 0.05$).

Table IV

Means and standard deviations (s.d.) of ADHD symptoms and other mental health problems in Greek children aged 6-9 years according to their parents and teachers

	Parents M (s.d.)	Teachers M (s.d.)	<i>t</i>
SDQ			
Hyperactivity	3.10 (1.88)	2.51 (2.27)	3.41*
1. Restless, overactive, cannot stay still for long			
2. Constantly fidgeting or squirming			
3. Easily distracted, concentration wanders			
4. Thinks things out before acting†			
5. Sees tasks through to the end, good attention span†			
Emotional problems	2.29 (1.29)	1.54 (1.29)	5.57**
1. Often complains of headaches, stomach-aches or sickness			
2. Many worries, often seems worried			
3. Often unhappy, down-hearted or tearful			
4. Nervous or clingy in new situations, easily loses confidence			
5. Many fears, easily scared			
Conduct problems	1.67 (1.09)	1.35 (1.18)	2.84***
1. Often has temper tantrums or hot			
2. Generally obedient, usually does what adults request†			
3. Often fights with other children or bullies them			
4. Often lies or cheats			
5. Steals from home, school or elsewhere			
Peer problems	1.19 (0.98)	1.32 (1.27)	-1.44
1. Rather solitary, tends to play alone			
2. Has at least one good friend†			
3. Generally liked by other children†			
4. Picked on or bullied by other children			
5. Gets on better with adults than with other children			
CAP			
Overactivity	3.04 (2.27)	2.31 (1.70)	5.40**
1. Can't sit still, restless, or hyperactive			
2. Fidgets			
3. Impulsive or acts without thinking			
4. Messy work			
5. Talks too much			
Inattention	3.52 (2.70)	3.25 (1.78)	1.64
1. Can't concentrate, can't pay attention for long			
2. Daydreams or gets lost in his/her thoughts			
3. Inattentive, easily distracted			
4. Difficulty following directions			
5. Fail to carry out assigned tasks			
Attention-deficit with hyperactivity	6.43 (4.78)	5.51 (4.90)	3.63**
All of the above 10 items			

† These items are scored reversely

* $p < 0.005$

** $p < 0.001$

*** $p < 0.05$

Table V

Means and standard deviations (s.d.) of ADHD symptoms and other mental health problems in Greek boys and girls aged 6-9 years according to their parents and teachers

	Boys M (s.d.)	Girls M (s.d.)	<i>F</i>
SDQ - Parents			
Hyperactivity	3.59 (1.97)	2.62 (1.66)	13.18*
Emotional problems	2.24 (1.21)	2.33 (1.37)	0.19
Conduct problems	1.81 (1.01)	1.54 (1.16)	2.13
Peer problems	1.26 (0.96)	1.11 (0.94)	0.83
SDQ - Teachers			
Hyperactivity	3.11 (2.62)	1.90 (1.74)	15.36*
Emotional problems	1.44 (1.21)	1.62 (1.34)	0.83
Conduct problems	1.78 (1.42)	0.94 (0.82)	19.91*
Peer problems	1.42 (1.23)	1.24 (1.18)	0.87

* $p < 0.001$

As far as ADHD symptoms are concerned (see Table VI), parents reported that boys exhibited statistically significant higher overactivity ($F_{(1,301)} = 23.17, p < 0.001$) and attention-deficit with hyperactivity ($F_{(1,301)} = 8.85, p < 0.05$) than girls, while no gender differences were found for inatten-

tion ($F_{(1,301)} = 1.60, p > 0.05$). Teachers reported that boys exhibited statistically significant higher overactivity ($F_{(1,301)} = 11.22, p < 0.05$), inattention ($F_{(1,301)} = 4.27, p < 0.05$), and attention-deficit with hyperactivity ($F_{(1,301)} = 8.11, p < 0.05$) than girls.

Table VI

Means and standard deviations (s.d.) of ADHD symptoms in Greek boys and girls aged 6-9 years according to their parents and teachers

	Boys M (s.d.)	Girls M (s.d.)	<i>F</i>
CAP - Parents			
Overactivity	3.80 (2.52)	2.32 (1.82)	23.17*
Inattention	3.72 (2.61)	3.26 (2.68)	1.60
Attention-deficit with hyperactivity	7.35 (4.90)	5.57 (4.53)	8.85**
CAP - Teachers			
Overactivity	2.84 (2.63)	1.79 (1.56)	11.22**
Inattention	3.60 (2.78)	2.83 (2.63)	4.27**
Attention-deficit with hyperactivity	6.42 (5.09)	4.67 (4.60)	8.11**

* $p < 0.001$

** $p < 0.05$

Discussion

The present study explored the level of agreement between parents' and teachers' reports of children's ADHD symptoms and other mental health problems. The level of agreement for mental health problems, as measured by the SDQ, varied from a low 0.16 for emotional problems to a moderate 0.31 for conduct problems and a 0.34 for peer problems. Parents reported more emotional and conduct problems than teachers, while no difference was found for peer problems. This finding corresponds to the observation by Roussos *et al.*³⁸ that parents tend to pay more attention to emotional and social aspects of their children's problematic behaviour. The reported low to moderate levels of agreement between parents and teachers on the particular rating scale suggest that it should be used with caution to gather conclusive data on mental health problems that might affect the main ADHD symptoms.

The level of agreement between parents' and teachers' ratings on hyperactivity according to SDQ was moderate (0.31) and in line with the mean level of agreement (0.28) between multiple informants provided by Achenbach *et al.*^{24,26}. Other studies have also shown the cross-cultural low levels of agreement between parents' and teachers' rating³⁹⁻⁴². Although it has been implied that this low level of agreement might be due either to the 'reliability hypothesis'⁴³ or to response bias, it could be due caused by numerous factors: a) parents are not adequately informed about the actual behaviours of their children in the classroom setting²⁴, and could be why they reported more hyperactivity than teachers; b) teachers attend to the same student on multiple occasions and with long breaks and vacations²⁵; and c) children behave differently in diverse settings²⁴.

Parents' and teachers' agreement on ADHD symptoms according to CAP were considerably higher, ranging from 0.60 for inattention to 0.64 for hyperactivity and 0.66 for attention deficit with hyperactivity. The argument that the distribution of subtypes of ADHD constitutes an artefact of the single-informant methodology^{44,45} is not supported in the present study, since parents' and teachers' agreement for individual inattentive and hyperactive dimensions of the scale was high. Parents rated their children higher on the hyperactive and combined dimensions of the scale than teachers, while no differences were found among informants on inattentive dimension, as was observed also in other studies^{46,47}.

The levels of agreement between scores in the hyperactivity scale of SDQ and the three dimensions of ADHD measured by CAP were fair (between 0.47 and 0.59) both for parents and for teachers and show that they were consistent in their reporting of symptoms across measures. However, this is partly predictable, since SDQ hyperactivity subscale includes items covering inattention, hyperactivity and impulsivity. In the present study the mean correlation between parents and teachers on hyperactivity, emotional problems, conduct problems, and peer problems was 0.433, whereas the mean correlation among the three scales of CAP was 0.787 for parents and 0.793 for teachers. These findings indicate that disruptive behaviour scales have relatively poor discriminant and convergent validity^{48,49}, and that measures developed in the future should protect against the halo effect.

The gender differences that have been documented in other research⁵⁰⁻⁵² were also evident in the present study. Boys exhibited more symptoms of ADHD than girls; the male-to-female ratio was 3:1 according to the parents and 5:1 according to the teach-

ers, matching the worldwide average gender distribution^{31,53}. Boys were more overactive and exhibited more behavioural problems than girls, as reported also by Biederman *et al.*, Frigerio *et al.*, and Rowland *et al.*⁵⁰⁻⁵²; this is expected, since children who are hyperactive usually present more behavioural problems⁵³. Girls, on the other hand, were found to be more inattentive than boys, as was documented also by Biederman *et al.*, Hynd *et al.*, and Skansgaard *et al.*^{50,54,55}, who argued that attention problems might lead to cognitive deficits that were not assessed in the present study. Although it is possible that gender difference regarding ADHD and comorbidity reflect a more rigid gender role for boys than for girls⁵⁶, they should be addressed also in the treatment that children with ADHD follow⁵⁰. Although the cross-cultural gender differences in ADHD scores is well established, an interesting aspect of this study is that the gender difference persisted although the participants were randomly sampled from the classrooms.

A limitation of the present study is that there is no data on who the non-respondents were and whether they differed to some extent from respondents. For example, Rowland *et al.*²¹ reported that some of the parents who did not participate in their study had children with many ADHD related symptoms and did not want their children to be identified and possibly stigmatised, while others did not think that the study was relevant to them²¹. However, the percentage of parents and teachers who completed both questionnaires was higher than 80%, which is deemed necessary⁵⁷. It should also be stressed that children who face more serious ADHD symptoms and other mental health problems are very likely to attend inclusion schools, which were not among the schools that were studied here.

Despite the limitations that were mentioned above, this study is –as far as we know– the first large scale epidemiological study in Greece that measures the frequency of ADHD and other mental health problems and supports the necessity to diagnose ADHD on the basis of independent reports collected both by parents and teachers, as suggested also by Tripp *et al.*⁵⁸.

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