

# Perceived Social Support and Parental Emotional Temperament Among Children with Attention Deficit and Hyperactivity Disorder

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## ABSTRACT

**Background:** This research examined how the emotional temperaments of parents of children with attention deficit and hyperactivity disorder correlated with their perceptions of their children's social support from friends, teachers, and families. Additionally, the parents' emotional temperaments in terms of their association with children's low and high perceptions of family support were examined.

**Methods:** The study included 50 children with attention deficit and hyperactivity disorder, 40 neurotypical control subjects, and their parents. The Symptom Checklist-90-R was used to analyze the parents' psychopathology. The parents' affective temperaments were assessed using the Temperament Evaluation of Memphis, Pisa, Paris, and San Diego-auto questionnaire version. The children's perceptions of their support from their families, peers, and teachers were evaluated using the Social Support Appraisal Scale.

**Results:** Mothers' depressive ( $r=-0.419$ ,  $P=.002$ ) and anxious temperaments ( $r=-0.338$ ,  $P=.016$ ) were inversely correlated with perceived social support from parents among children with attention deficit and hyperactivity disorder. Mothers' hyperthymic ( $r=0.443$ ,  $P=.001$ ) and cyclothymic temperaments ( $r=0.310$ ,  $P=.029$ ) and fathers' hyperthymic temperament ( $r=0.371$ ,  $P=.008$ ) were positively correlated with perceived social support from parents. Regression analyses revealed that perceived social support from friends was predicted by paternal low cyclothymic and high anxious temperament. They also showed that inattention and mother's general psychopathology predicted perceived social support from family. Perceived social support from teacher was predicted by hyperactivity, maternal low cyclothymic temperament, and paternal high anxious temperament.

**Conclusion:** While parents' depressive and anxious temperaments were associated with low perceived social support from family, hyperthymic and cyclothymic temperaments were associated with increased perceived social support from the family among children with attention deficit and hyperactivity disorder.

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## INTRODUCTION

Inattention (IA) and/or hyperactivity-impulsivity (HA/I) are hallmarks of attention deficit hyperactivity disorder (ADHD), a neurodevelopmental psychiatric condition. Between 3% and 5% of children in school-age populations are reported to have ADHD.<sup>1</sup> Children with ADHD have high levels of parent-child conflict,<sup>2</sup> face peer rejection, and may be labeled as nasty and oppositional by teachers.<sup>3</sup> Such experiences resulting from interactions with parents, family, and teachers may cause lower perceived social support (PSS) in children with ADHD symptoms.<sup>3</sup>

Perceived social support is a person's sense of common or special emotional and psychological supportive behaviors

from other individuals in their daily environment. Perceived social support can increase a person's functionality and mitigate adverse events. Thus, the feeling of being loved and valued by the individual and the family and belonging to a social network is realized through social support.<sup>4</sup> Parents, teachers, close friends, and peer groups are the main sources of support for children with different functions and outcomes. Perceived social support from parents, friends, and teachers is associated with a wide variety of adjustments, self-identification, self-esteem, and emotional well-being in children. Social support has been found to be an important protective factor for

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children with ADHD.<sup>3</sup> It has been reported that high social support may have positive effects on IA and HA.<sup>5</sup> In a recent study, it was found that PSS in children with ADHD was lower than in healthy controls.<sup>6</sup> Bernardi et al<sup>7</sup> reported that a lifetime history of ADHD is associated with a lower PSS. Demaray and Elliott<sup>8</sup> found that boys with ADHD who had extreme behaviors perceived lower social support, especially from classmates and friends, than those without such behaviors. Perceived social support was inversely associated with parenting stress in children with ADHD.<sup>8</sup>

Affective temperaments are thought to be influenced by biological and genetic causes and last a lifetime.<sup>9</sup> The susceptibility or subsyndromal forms of a variety of psychopathologies, such as depression and anxiety, emotional problems, psychological issues, and suicidality, appear to be linked to affective temperaments.<sup>9,10</sup> The cyclothymic, irritable, anxious, and depressed temperaments,<sup>11</sup> along with conscientiousness, neuroticism, perseverance, and harm avoidance scores of parents of children with ADHD, have been demonstrated to be considerably higher than those of control parents.<sup>12</sup> According to a recent study, children's ADHD is associated with mothers' cyclothymic, irritable, and nervous temperaments.<sup>13</sup>

Although there are few studies<sup>3,5,6,7,8</sup> reporting that PSS in children with ADHD is lower than normative examples, we are aware of no prior research addressing variables associated with the degree of PSS. Again, although few studies<sup>11,12,13</sup> have investigated the relationship between parents' temperament traits and ADHD symptoms in their children, we did not find any study that comprehensively evaluated the variables of PSS, parental psychopathology, and parental affective temperaments. In the study reported herein, variations between children with ADHD and those in a neurotypical control subject (NCS) group were investigated in terms of PSS, parent psychopathology, and parental affective temperaments. Additionally, the associations between parental affective temperaments and both high and low PSS among children with ADHD kids were evaluated. Our main hypothesis was that parents with various affective temperaments vary in terms of the degree of perception of existing social support among their children with ADHD.

#### MAIN POINTS

- Increasing severity of attention deficit decreases perceived social support (PSS) from family.
- Severe hyperactivity/impulsivity reduces PSS levels from teachers.
- General maternal psychopathology leads to a decrease in PSS from family.
- Maternal cyclothymic and paternal anxious temperaments are associated with lower and higher PSS from teachers, respectively.
- Anxious and cyclothymic paternal temperaments are associated with higher and lower perceived social support from friends, respectively.

## MATERIAL AND METHODS

### Participants and Procedure

Seventy children (aged 9-13 years) with ADHD were screened among children and parents who presented to our child and adolescent psychiatry division, and we initially screened the children. Children with non-biological parents (n=2) were excluded. The Turkish version<sup>14</sup> of the Kiddie Schedule for Affective Disorders and Schizophrenia Present and Lifetime Version (K-SADS-PL)<sup>15</sup> and the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V)<sup>16</sup> were used for diagnostic evaluations. The K-SADS-PL is a semi-structured psychiatric tool used to assess mental illnesses in children and adolescents using DSM-V criteria. Children with a history (or a current diagnosis) of intellectual disability, bipolar disorder, autism spectrum disorder, psychosis, substance misuse, conduct disorder, specific learning disorders, or any other medical or neurological disease (n=10) were excluded. Children who had taken any antidepressant or antipsychotic medication at least within 6 months prior to the assessment were additionally ineligible (n=8).

For the NCS group, volunteers, hospital visitors, and hospital employees were assessed. A history of mental illness, intellectual disability, traumatic brain injury, or seizure disorder were all NCS exclusion criteria. All parents participated in semi-structured interviews to determine whether they had ever had mental illnesses. Parents who had ever been diagnosed with intellectual disability, schizophrenia, or bipolar disorder in their lifetimes were ineligible for the NCS group. Therefore, the study sample included 40 NCS children (34 boys, 6 girls) between the ages of 9 and 13 years and their parents, as well as 50 children (43 boys, 7 girls) with ADHD and their parents. Through the use of a form created by the authors, sociodemographic data were collected. After being apprised of the study's procedures, all parents provided written informed consent for themselves and their children. This study was approved by the Aydın Adnan Menderes University Medical School Non-Invasive Clinical Research Ethical Board (53043469-050.04.04, March 22, 2019).

### Measurements

The parents were instructed to complete the Turkish version<sup>17</sup> of the Turgay DSM-IV-Based Disruptive Behavioral Disorders Screening and Rating Scale (T-DSM-IV-S)<sup>18</sup> to evaluate the severity of the existing ADHD symptoms in their children after the information was gathered, and the psychiatric examinations had been completed. Based on DSM-IV diagnostic criteria, this tool evaluates for conduct disorder, oppositional defiant disorder, HA/1, and IA. On a 4-point Likert's scale, symptoms are rated as follows: 0=not at all, 1=a little, 2=a lot, and 3=very much. Subscale scores in the T-DSM-IV-S are calculated by adding the item scores for each subscale. Individuals had to fulfill

a minimum of 6 criteria for symptoms of IA, hyperactivity, or impulsivity to be diagnosed with ADHD. Hyperactivity-impulsivity and IA modules' composite scores—which accounted for both paternal and maternal reports—were derived.

Affective temperament traits of parents of children with ADHD (50 mothers, 50 fathers) and NCS parents (40 mothers, 40 fathers) were evaluated using the Turkish version<sup>19</sup> of Temperament Evaluation of Memphis, Pisa, Paris and San Diego-auto questionnaire version (TEMPS-A) developed by Akiskal and Akiskal.<sup>20</sup> Parental psychopathology was evaluated with the SCL-90-R.<sup>21</sup>

The Turkish version<sup>22</sup> of the 41-item revision<sup>23</sup> of the Social Support Appraisal Scale from the Survey of Children's Social Support (SOCSS)<sup>24</sup> was used to measure perceptions of support from parents, friends, and teachers. Thirty-one items make up the original SOCSS, which is used to assess how well children perceive their support from teachers, classmates, and family. Each item is rated by children on a 5-point Likert-type scale, with “most of the time” (1 point) and “never true” (5 points) representing the extremes of the scale. Higher levels of felt support are reflected by high scores across all subscales.

### Statistical Analysis

Statistical Package for Social Sciences version 22.0 (IBM SPSS Corp.; Armonk, NY, USA) was used to analyze the data. The distribution normality of the data was assessed using the Kolmogorov-Smirnov test. The pattern of categorical qualitative factors was compared between the NCS group and children with ADHD using the chi-square test. The Mann-Whitney *U* test was used to compare continuous variables. In cases where the data do not show normal distribution, the median (min-max) is given as descriptive statistics. Spearman correlation coefficient is used to examine the association between each sociodemographic and clinical characteristics. Multiple linear regression analyses were performed using the backward technique to figure out the factors that could predict PSS for each domain.  $P < .05$  was considered statistically significant.

## RESULTS

Children with ADHD and NCS children were similar in terms of age, gender, and father's age, as shown in Table 1. Mother's age was significantly higher in the NCS group. Compared with NCS children, PSS from peers ( $P < .001$ ), family ( $P < .001$ ), and teachers ( $P < .001$ ) were all considerably lower in children with ADHD. Neurotypical control subject parents scored considerably lower than parents of children with ADHD on the depressive ( $P < .001$ ), hyperthymic ( $P < 0.001$ ), cyclothymic ( $P < .001$ ), irritable ( $P < .001$ ), and anxious ( $P < .001$ ) subscales of the TEMPS-A. Additionally, parents of children with ADHD

**Table 1.** The Clinical Comparison of the Children with Attention Deficit Hyperactivity Disorder and Neurotypical Control Subjects

	ADHD (n=50)	NCS (n=40)	Statistical Analysis*
	Median (Min-Max)	Median (Min-Max)	<i>P</i>
Age	10.75 (9-13)	10.75 (9-13.5)	.709
Mother's age	35.50 (26-52)	38.00 (28-49)	.018
Father's age	39.50 (29-63)	42.00 (32-54)	.057
Educational level			
Mother	3.00 (2-4)	3.00 (2-4)	.387
Father	2.00 (2-4)	3.00 (2-4)	.001
T-DSM-IV-S-c			
Inattention	19.00 (4-27)	4.50 (2-8)	<.001
Hyperactivity/impulsivity	15.00 (3-27)	4.00 (2-7)	<.001
APP			
Friends	48.00 (41-59)	74.00 (66-86)	<.001
Family	32.00 (29-46)	52.00 (44-59)	<.001
Teacher	27.00 (21-39)	41.00 (37-43)	<.001
TEMPS-A (mother)			
Depressive	13.50 (3-17)	4.00 (1-6)	<.001
Hyperthymic	8.00 (1-16)	3.00 (1-5)	<.001
Cyclothymic	8.50 (1-16)	2.00 (1-6)	<.001
Irritable	4.00 (0-14)	2.00 (0-3)	<.001
Anxious	13.00 (0-19)	3.00 (1-5)	<.001
TEMPS-A (father)			
Depressive	5.00 (1-12)	3.00 (1-5)	<.001
Hyperthymic	9.50 (4-17)	3.00 (2-5)	<.001
Cyclothymic	9.50 (1-17)	3.00 (1-6)	<.001
Irritable	3.00 (0-17)	1.00 (0-4)	<.001
Anxious	8.00 (0-20)	2.00 (0-5)	<.001
SCL-90			
General score (mother)	1.53 (0.08-1.90)	0.42 (0.10-1.34)	<.001
General score (father)	1.32 (0.30-1.76)	0.38 (0.24-1.00)	<.001

ADHD, Attention Deficit Hyperactivity Disorder; APP, Social Support Appraisal Scale for Children; SCL-90, Symptom Checklist; T-DSM-IV-S, Turgay DSM-IV-Based Disruptive Behavioral Disorders Screening and Rating Scale-composite score; TEMPS-A, Temperament Evaluation of Memphis, Pisa, Paris, San Diego Auto questionnaire.

\*Mann-Whitney *U* test;  $P < .05$ .

considerably outperformed NCS parents in terms of SCL-90 ratings ( $P < .001$ ).

The correlation coefficient findings are presented in Table 2.

### Attention Deficit Hyperactivity Disorder, Parental Psychopathology, and Perceived Social Support

Perceived social support from friends ( $r = 0.418$ ,  $P = .002$ ) and teachers ( $r = 0.554$ ,  $P < .001$ ) among children with ADHD were both positively correlated with ADHD-IA severity, whereas low PSS from family was negatively

**Table 2.** The Correlations Between Perceived Social Support and Other Study Variables in Attention Deficit Hyperactivity Disorder Group (n=50)

Variables	PSS–Friends	PSS–Family	PSS–Teachers
IA	0.418, 0.002**	-0.506, <0.001***	0.554, <0.001***
HA/I	-0.563, <0.001***	0.517, <0.001***	-0.708, <0.001
TEMPS-A mothers			
Depressive	0.318, 0.025*	-0.419, 0.002**	0.430, 0.002**
Hyperthymic	-0.547, <0.001***	0.443, 0.001**	-0.597, <0.001***
Cyclothymic	-0.574, <0.001***	0.310, 0.029*	-0.593, <0.001***
Irritable	-0.396, 0.004**	-0.159, 0.271	-0.231, 0.107
Anxious	0.143, 0.323	-0.338, 0.016*	0.358, 0.011*
TEMPS-A fathers			
Depressive	-0.156, 0.278	-0.140, 0.333	0.014, 0.922
Hyperthymic	-0.615, <0.001***	0.371, 0.008**	-0.672, <0.001***
Cyclothymic	-0.706, <0.001***	0.207, 0.150	-0.590, <0.001***
Irritable	-0.173, 0.23	-0.094, 0.518	-0.071, 0.625
Anxious	0.435, 0.002**	-0.330, 0.019*	0.535, <0.001***
Age			
Mother	-0.139, 0.337	0.028, 0.848	-0.018, 0.901
Father	0.106, 0.466	-0.088, 0.545	0.129, 0.372
Educational level			
Mother	0.310, 0.028*	-0.134, 0.352	0.219, 0.126
Father	0.019, 0.894	0.108, 0.456	0.064, 0.660
SCL-90			
Mothers	-0.016, 0.915	-0.403, 0.004**	0.140, 0.333
Fathers	-0.225, 0.116	-0.147, 0.308	-0.031, 0.832

PSS, Perceived Social Support; SCL-90: Symptom Check List; TEMPS-A, Temperament Evaluation of Memphis, Pisa, Paris, San Diego Auto questionnaire.

\*Spearman’s correlation coefficient \* $P < .05$ ; \*\* $P < .01$ ; \*\*\* $P < .001$ .

correlated ( $r = -0.506, P < .001$ ). In contrast, the severity of HA/I was positively correlated with PSS from family ( $r = 0.527, P < .001$ ) and negatively correlated with PSS from friends ( $r = -0.563, P < .001$ ) and teachers ( $r = -0.708, P < .001$ ). Mothers’ overall psychopathology and PSS from family were negatively correlated ( $r = -0.403, P = .004$ ).

**Affective Temperaments of Mothers and Children’s Perceived Social Support**

Mothers’ depressive temperament was positively correlated with PSS from friends ( $r = 0.318, P < .025$ ) and teachers

( $r = 0.430, P = .002$ ) and inversely correlated with PSS from family ( $r = -0.419, P = .002$ ). Mothers’ hyperthymic and cyclothymic temperaments were negatively correlated with children’s PSS from friends ( $r = -0.547, P < .001$ ;  $r = -0.574, P < .001$ , respectively) and teachers ( $r = -0.597, P < .001$ ;  $r = -0.593, P < .001$ , respectively) but positively correlated with PSS from family ( $r = 0.443, P = .001$ ;  $r = 0.310, P = .029$ , respectively). Perceived social support from the family was negatively correlated with mothers’ anxious temperament ( $r = -0.338, P = .016$ ), while PSS from teachers was significantly positively correlated with mothers’ anxious temperament ( $r = 0.358, P = .011$ ).

**Affective Temperaments of Fathers and Children’s Perceived Social Support**

Children’s PSS scores from friends and teachers were inversely correlated with fathers’ hyperthymic ( $r = -0.615, P < .001$ ;  $r = -0.672, P < .001$ , respectively) and cyclothymic temperaments ( $r = -0.706, P < .001$ ;  $r = -0.590, P < .001$ ). In contrast, fathers’ anxious temperament was associated with increased PSS from friends ( $r = 0.435, P = .002$ ) and teachers ( $r = 0.535, P < .001$ ). Fathers’ hyperthymic temperament was positively correlated with PSS from family ( $r = 0.371, P = .008$ ). On the other hand, the fathers’ anxious temperament was negatively linked with the PSS levels from the family ( $r = -0.330, P = .019$ ).

**Regression Analyses**

Multiple linear regression analyses were conducted to determine the factors that might predict PSS in each domain. Independent variables included in the model were determined according to the results of the correlation coefficient. PSS–friends, PSS–family, and PSS–teacher were included as dependent variables separately and analyzed in different regression models. In the first model, after 7 steps of backward linear regression, it was found that paternal low cyclothymic temperament ( $\beta = -0.557, SE = 0.126, p < .001$ ) and high anxious temperament ( $\beta = 0.227, SE = 0.111, P = .047$ ) significantly predicted PSS–friends (Table 3). Furthermore, we found that PSS–family was significantly associated with low IA ( $\beta = -0.388, SE = 0.082, P < .001$ ) and low levels of maternal SCL-90 psychopathology ( $\beta = -2.638, SE = 0.901, P = .005$ ) (Table 4). In the last model, PSS–teacher was associated with low hyperactivity ( $\beta = -0.515, SE = 0.084, P < .001$ ), maternal

**Table 3.** Regression Analysis Examining Perceived Social Support from Friends in Relation to ADHD Symptoms, Parent Temperament and Psychopathology (Backward regression analysis 7 steps)

Dependent Variable	Independent Variables	B	SE	t	Adj. R <sup>2</sup>	P
Perceived social support–friends	Hyperactivity	-0.194	0.102	-1.906	0.589	.063
	Cyclothymic temperament (father)	-0.557	0.126	-4.410		<.001*
	Anxious temperament (father)	0.227	0.111	2.039		.047*

Included variables: Hyperactivity; inattention; mother TEMPS-A depressive, cyclothymic, hyperthymic, irritable; father TEMPS-A hyperthymic, cyclothymic, anxious  
 $P < .05^*$ ,  $P$  value of the regression model:  $P < .001$ .

**Table 4.** Regression Analysis Examining Perceived Social Support from Family in Relation to ADHD Symptoms, Parent Temperament and Psychopathology (Backward regression analysis 8 steps)

Dependent Variable	Independent Variables	B	SE	t	Adj. R <sup>2</sup>	P
Perceived social support–family	Inattention	-0.388	0.082	-4.736	0.408	<.001*
	SCL-90 general psychopathology (mother)	-2.638	0.901	-2.928		.005*

Included variables: Hyperactivity; inattention; mother TEMPS-A depressive, cyclothymic, hyperthymic, anxious, mother SCL90 general; father TEMPS-A hyperthymic, anxious  
*P* < .05\*, *P* value of the regression model: *P* < .001.

**Table 5.** Regression Analysis Examining Perceived Social Support from Teacher in Relation to ADHD Symptoms, Parent Temperament and Psychopathology (Backward regression analysis 7 steps)

Dependent Variable	Independent Variables	B	SE	t	Adj. R <sup>2</sup>	P
Perceived social support–teacher	Hyperactivity	-0.515	0.084	-6.103	0.723	<.001*
	Cyclothymic temperament (mother)	-0.375	0.143	-2.620		.012*
	Anxious temperament (father)	0.469	0.082	5.702		<.001*

Included variables: Hyperactivity; inattention; mother TEMPS-A depressive, cyclothymic, hyperthymic, anxious; father TEMPS-A hyperthymic, cyclothymic, anxious.  
*P* < .05\*, *P* value of the regression model: *P* < .001.

low cyclothymic temperament ( $\beta = -0.375$ ,  $SE = 0.143$ ,  $P = .012$ ), and paternal high anxious temperament ( $\beta = 0.469$ ,  $SE = 0.082$ ,  $P < .001$ ) (Table 5).

## DISCUSSION

The findings of this investigation showed that NCS children had higher PSS from friends, family, and teachers than children with ADHD. Mothers and fathers of children with ADHD scored substantially higher than NCS parents in terms of temperament and overall psychopathology. Our research also revealed a strong association between specific parental emotional temperament features and reduced PSS from family in children with ADHD; similar qualities may potentially be linked to higher PSS from friends and teachers.

### The Relationship Between Attention Deficit Hyperactivity Disorder and Perceived Social Support

Mastoras et al<sup>3</sup> showed that children with ADHD often experience stigmatization and are thought to be socially rejected and viewed negatively by their peers and teachers. Parents of children with ADHD are less rewarding and responsive and thought to be more testing and ignoring of their children than parents of children without ADHD.<sup>25</sup> Some previous studies have shown that individuals with ADHD have less PSS from parents, classmates, teachers, and close friends than neurotypical individuals; our findings are consistent with these results.<sup>3,8</sup> We found a significant relationship between HA/I scores of children with ADHD and low PSS from their friends and teachers. Conversely, elevated HA/I scores were significantly correlated with increased PSS from family. In regression analysis, we also found that HA/I predicted low PSS from teachers but not from friends or family. However, IA was significantly

correlated with low PSS from family. Therefore, we concluded that HA/I was independently associated with low PSS from teachers, whereas IA independently predicted low PSS from family. In a previous study, teachers reported higher levels of stress when teaching children with ADHD, especially those with more aggression or social difficulties.<sup>26</sup> Children with ADHD who exhibit signs of hyperactivity and impulsivity may experience higher rates of rejection, disdain, and stigma by their peers and teachers. Our findings also showed that ADHD-IA symptoms were significantly associated with higher PSS from teachers, as well as reduced PSS from family. We suggest that IA symptoms in children with ADHD may result in increased parent-child conflict, more negative parenting behaviors, and decreased parental involvement. As a result, teachers may wish to provide social support to facilitate the belonging and attachment necessary for children to achieve well-being. This social help from teachers may assist the development and maintenance of self-identify and self-esteem to help children cope with stressors more effectively. We also suggest that HA/I symptoms may be more important for teachers to exhibit social support; however, for parents, IA symptoms may be more pertinent for child-parent relationships involving children with ADHD.

### Parental Psychopathology and Perceived Social Support of Children with Attention Deficit Hyperactivity Disorder

Chronis-Tuscano et al<sup>27</sup> found that parental psychopathology is widespread in families of individuals with ADHD. They demonstrated an inverse link between ADHD symptomatology and parental psychopathology in children.<sup>27</sup> Psychopathology in parents of children with ADHD increases parenting stress and thus hinders positive parenting.<sup>2</sup>

We found that the general psychopathology of mothers of children with ADHD was importantly linked with low PSS from family. Regression analysis also confirmed this finding, as mother's SCL-90 psychopathology was an obvious factor associated with low PSS from family. Previous research on the role of parental psychopathology in the growth of children's emotional and behavioral problems has focused more on mothers. Mothers undertake more parenting responsibilities and are more interested in their children than fathers.<sup>28</sup> It has been reported that a depressogenic parenting style, which is characterized by hostility, irritability, lack of parental warmth, and overprotectiveness, is an important risk factor for children.<sup>29</sup> Depressed mothers may be less tolerant of ADHD symptoms and problematic behaviors in their adolescent children. The presence of any maternal psychopathology may reduce the mother's capacity and motivation to establish a warm and close relationship with her children diagnosed with ADHD.<sup>30</sup> Therefore, any maternal psychopathology can lead to a reduction in PSS from the family in children with ADHD.

#### Parental Affective Temperaments and Perceived Social Support of Children with Attention Deficit Hyperactivity Disorder

Parental character traits are thought to be linked with the development of child psychopathology, but certain parental affective temperament traits related to childhood ADHD and linked troubles have been relatively less studied. Previous studies have demonstrated that personality traits are associated with PSS in adults. Yuh et al<sup>31</sup> suggested that temperament is related to vulnerability and depression, as well as the ability to consolidate social support. The personality traits related to social support are expressiveness, introversion-extraversion, and hostility.<sup>31</sup> Some previous research has reported some affective temperaments in parents of children with ADHD.<sup>11,12</sup> All temperaments have both good and bad traits, and as a result, they all have the potential to either positively or negatively impact social relationships and quality of life.

Consistent with our hypothesis, we found that mothers' depressive and anxious temperaments, in addition to fathers' anxious temperament, had significant associations with reduced PSS from family in children with ADHD. Furthermore, these parental temperament traits had opposite effects on PSS from friends and teachers. However, it was also important that in the regression model, we found that parental affective temperaments were not associated with PSS—family after controlling for maternal psychopathology. This finding may indicate that maternal psychopathology may be more important for PSS from the family.

Individuals with depressive temperaments are generally pessimistic, humorless, unable to have fun, prone to anxiety, introverted, passive, and lethargic; they often have constant feelings of inadequacy, failure, and tend to

be suspicious, self-critical, or over-critical. Additionally, it is expected that people with depressive temperaments tend not to perceive existing social help because they have problems with interpersonal relations and they are relatively inhibited compared.<sup>32</sup> Anxious temperaments have been associated with worry, alertness, tension, and hypersensitivity.<sup>33</sup> It has been reported that an anxious temperament is a high-risk element for anxiety and depressive disorders.<sup>10</sup>

Depressive temperaments are less conducive than cyclothymic and hyperthymic temperaments to perceiving social support. Individuals with depressive temperaments may easily ignore the available social support from their loved ones due to the expectation that their families, friends, and teachers will make excessive demands to achieve their life goals.<sup>34</sup> Depressive temperament partially overlaps with behavioral inhibition because it is linked with a low ability to relate to others and troubles with interpersonal relationships.<sup>32</sup> A highly anxious temperament is associated with greater uncertainty about the future of work and lower support from coworkers.<sup>35</sup> Sakai and colleagues<sup>36</sup> found that an anxious temperament predisposes individuals to role conflict, role ambiguity, interpersonal conflict, and quantitative workload. Therefore, we suggest that the negative temperament dimensions that characterize the depressive and anxious temperaments of parents may facilitate a predisposition to children's psychosocial stress and may be related to children's perceptions of lower levels of social support from their families. Therefore, parental anxious temperament traits may lead children with ADHD to engage in compensatory social relations with important others, which can be associated with increased PSS from friends and teachers.

Our findings demonstrated that paternal cyclothymic and anxious temperaments were significant predictors of PSS—friends after controlling for other variables. Similarly, paternal anxious temperamental traits and maternal cyclothymic temperamental traits were associated with PSS—teacher in the last regression model. In the regression model, it can be said that parental anxious traits had better effects on children's PSS from friends and teachers. As mentioned before, parental anxious traits may at least partly explain compensatory social relations in school. However, it seems like parental cyclothymic temperaments had negative effects on PSS from teachers and friends. The cyclothymic temperament trait is characterized by chronic cycling between high and low moods, each lasting several days.<sup>33,37</sup> Individuals with cyclothymic temperaments have variable mood, energy, self-esteem, and creativity, and they are unstable in social relations. These people tend to make sophisticated efforts to seize situations and are ready to enter new relationships quickly.<sup>38</sup> The hyperthymic temperament trait is characterized by increased energy, risk-taking behaviors, as well as over-energetic, overoptimistic, overtalkative, and excessive

self-confident traits, plus extraversion toward others and interpersonal warmth.<sup>33,37</sup> This temperament is associated with positive feelings for daily life,<sup>36</sup> high resilience to daily stress,<sup>36</sup> preferring to be with others in daily life,<sup>39</sup> and feeling relaxed and happy after a stressor.<sup>40</sup> People with hyperthymic temperaments perceive social support more than those with cyclothymic and anxiety-somatic temperaments. These people easily express their needs and feelings and communicate their own needs for help.<sup>38</sup> Despite these positive findings, our results suggest that only a cyclothymic but not a hyperthymic temperament of parent's had a negative impact on children's PSS. This finding may be the result of inconsistent parental behavior, which may lead children with ADHD to misbehave in school. However, it is too early to draw firm conclusions, and there is a need for further studies in this area.

As the biological foundation upon which a character is created, temperament renders people to varied degrees of vulnerability to environmental stimuli. Unfavorable temperamental traits might make a person more likely to engage negatively with important people in their lives.<sup>35</sup> Our findings showed that higher ADHD-HA/I severity significantly predicted lower PSS levels from teachers, while ADHD-IA symptoms were significantly associated with reduced PSS from family. We also found that in addition to high ADHD-IA severity, general maternal psychopathology significantly predicted low PSS levels from family. While depressive and anxious parental temperaments were associated with low PSS from family, hyperthymic, and cyclothymic temperaments were associated with increased PSS from the family in children with ADHD. However, this finding was no longer significant after controlling for parental psychopathology. The influence of parental temperament on PSS from friends, teachers, and relatives of children with ADHD should be examined in further research, considering some mediating factors, such as psychopathology, personality disorders, and parental Axis I disorders.

The primary limitations of this research were its cross-sectional design and relatively small sample size, which may reduce the generalizability of the results. It is important to note that the relationship of study variables may be bidirectional and offspring psychopathology could be an important predictor for parental psychopathology. Thus, our findings should be evaluated carefully. Additionally, the number of children in the control group was less than the number of children with ADHD, and the control group was selected from the children of the hospital staff. The lack of randomization may be another limitation. Also, we did not evaluate current and lifetime parental Axis I diagnoses in study participants. Despite these limitations, our findings are important, as we showed that parental factors might be important for PSS in various domains among children with ADHD. Future research may expand the literature by examining PSS, parental psychopathology, and temperament in children with ADHD.

**Ethics Committee Approval:** This study was approved by Aydin Adnan Menderes University Medical School Non-Invasive Clinical Research Ethical Board (Approval No: 53043469-050.04.04, Date: March 22, 2019).

**Informed Consent:** Written informed consent was obtained from the children who agreed to take part in the study and their parents.

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