



# Maternal Parenting Style and Internalizing and ADHD Symptoms in College Students

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## Abstract

The purpose of the current study was to test for a relation between emerging adult Attention-Deficit/Hyperactivity Disorder (ADHD) status, how they reported being reared (i.e., perceived parenting style), and how the maternal parenting they received in childhood was linked with current adjustment. College students completed online surveys regarding their ADHD status, impairment, and maternal parenting style. Participants with ADHD reported higher levels of maternal authoritarian parenting (controlling/punitive) and lower levels of maternal authoritative parenting (structured/supportive) compared with participants without ADHD. Across the entire sample, higher reported maternal authoritative parenting was associated with lower levels of inattention (IA), hyperactivity/impulsivity (HI), depression, anxiety and stress, and higher levels of maternal authoritarian and permissive parenting was associated with higher levels of IA, HI, depression, anxiety, and stress. Sex moderated the relations between maternal parenting style and psychopathology such that women who reported low levels of authoritative parenting also reported higher levels of symptoms of depression, anxiety, and stress, where no differences in psychopathology were found in men across both low and high levels of authoritative parenting. These links between current adjustment and maternal parenting style suggest authoritative parenting may protect against negative adjustment in college students and may be especially important for women.

**Keywords** College students · ADHD · Parenting · College adjustment · Authoritative parenting

Attention-deficit/hyperactivity disorder (ADHD) is a developmental disorder that primarily manifests with core symptoms of excessive inattention (IA; e.g., failure to follow directions), hyperactivity, and impulsivity (HI; e.g., leaving seat when inappropriate, interrupting, and blurting out answers; American Psychiatric Association, APA 2013). Current estimates of the prevalence of ADHD in children range from approximately 5 to 11% in the United States (Barkley et al. 2008; Centers for Disease Control and Prevention, CDC 2011), as compared to approximately 4 to 7% in adults (de Graaf et al. 2008; Kessler et al. 2006; Murphy and Barkley 1996), signaling that the majority of

those diagnosed in childhood continue to be meaningfully impaired by the disorder into their 20s and beyond (e.g., Barkley et al. 2008).

Parenting styles are typically characterized by two binary traits: low or high responsiveness (also referred to as warmth) and low or high control (also referred to as demandingness; Baumrind 1966; Buri 1991). As outlined by Baumrind (1966), permissive parenting is characterized as not exerting enough control over a child's behavior while also responding with very high urgency and warmth to the child's advertised needs, wherein a child can be over-involved in decisions and the parent provides little external structure to the child's activities and behavior. On the opposite end of the spectrum, the authoritarian parent applies too much control over the child, applying strict rules and has very high expectations, with low warmth and responsiveness to the child. In contrast, parents with an authoritative style strike a balance with moderate-to-high control (e.g., well-defined and logical expectations that are consistently applied and communicated) and moderate-to-high warmth (e.g., empathic regarding child's needs, concerns, and emotions, supportive in child's pursuit of goals),

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generally fostering independence while using appropriate discipline. Parenting practices and child outcomes have been shown to vary cross-culturally. For example, compared to European American parents, African American parents have reported higher levels of authoritarian parenting (Lansford et al. 2011). In contrast to findings with European American families, authoritarian parenting in African American families has been associated with more positive child outcomes (Lamborn et al. 1996). However, lower levels of authoritarian parenting have been associated with better child outcomes when examining samples that include only African American mothers (e.g., better child self-regulation; LeCuyer and Swanson 2017).

Permissive and authoritarian parenting styles can have detrimental effects on children's functioning, especially for those with ADHD. Longitudinal studies have shown that maternal parenting that is characterized by low levels of warmth and overstimulation predicts higher levels of IA and HI in young children (Carlson et al. 1995). Additionally, children with ADHD who perceived their mothers as using aversive parenting strategies (e.g., over-controlling) evidenced increased IA and oppositionality compared to those who perceived their mothers to use authoritative strategies (Molina and Musich 2015; Rogers et al. 2009). Similarly, school-aged children with ADHD tend to engage in more oppositionality (Johnston et al. 2009), more frequently express anger, and are more impatient and restless when reared using authoritarian strategies, whether measured both longitudinally or using in-the-moment reports of behavior (i.e., "electronic diaries"; Whalen et al. 2011). Boys with ADHD and comorbid high levels of aggression paired with maternal negativity and disapproval are generally less able to regulate their emotions than their unaffected peers (Melnick and Hinshaw 2000).

Further, children with ADHD experience greater executive functioning (EF) deficits in the presence of negligible limit setting and poor family organization and cohesion compared to using authoritative strategies (Schroeder and Kelley 2009). Deficits in EF are common in those with ADHD (Willcutt 2015) and lead to poorer academic functioning, among other impairments (Barkley et al. 2008). These difficulties in the presence of overly-controlling parental school involvement (e.g., frequent critical feedback, punishment) in elementary school children with ADHD predict lower academic achievement compared to those who are appropriately supported (e.g., via positive reinforcement of learning; Rogers et al. 2009). Indeed, authoritarian and permissive parenting practices are both linked with future academic impairment, increased symptoms of IA and HI and comorbid disruptive behaviors. Interestingly, maternal negative discipline strategies show a unique association with clinically significant hyperactive/impulsive and inattentive symptoms even when childhood

oppositional and conduct symptoms and parental ADHD symptoms are accounted for, statistically (Ellis and Nigg 2009). In sum, children with ADHD show higher levels of ADHD and comorbid symptoms in the presence of parenting practices that are not authoritative. These early environmental experiences may set the tone for future maladjustment due to impairments related to ADHD symptoms and poorer outcomes related to permissive or authoritarian parenting, despite strong genetic etiological influences.

ADHD is largely heritable (~.80; Waldman and Gizer 2006), and the combination of a genetic vulnerability for developing the disorder and parenting style may impact the expression of ADHD. Children with an increased genetic risk for ADHD show more inattentive and hyperactive/impulsive symptoms when their parents use inconsistent discipline (Martel et al. 2011). For many parents, the combination of stress related to parenting a child with ADHD, along with difficulties related to their own likely ADHD symptoms, may foster a chaotic home environment. The latter can, in turn, increase child disruptive behavior and consequent maladaptive parenting (Harvey et al. 2003). In fact, compared to families without a child with ADHD, families with a child diagnosed with ADHD are more likely to experience this chaotic and disorganized environment, and parents are more likely to use negative parenting strategies to manage the child's behavior (Modesto-Lowe et al. 2008). Specifically, parents of a child with ADHD are more likely to overreact to children's misbehavior and to use fewer positive reinforcement strategies (McKee et al. 2004). In addition to observations of parent-child interactions, how children perceive parenting (i.e., child self-report of perceived parenting behavior) may also affect functioning. Children with ADHD may be more likely to perceive their parents as using more authoritarian strategies (e.g., more controlling, overly punitive) or, conversely, as providing them with too much autonomy compared to children not diagnosed with ADHD (Molina and Musich 2015). It has been hypothesized that this pattern of parenting in families with a child with ADHD is due to increased parental stress (Cunningham 2007) and more frequent child misbehavior (McKee et al. 2004). Moreover, ADHD symptoms in the parent have also been linked to less-than-optimal parenting practices (Modesto-Lowe et al. 2008). Conversely, it appears that for some families with children who have ADHD, mothers with ADHD actually use more authoritative parenting strategies (Psychogiou et al. 2008). Some have hypothesized that positive interactions occur between child and mother in part because the mother has increased empathy for displays of misbehavior (Johnston et al. 2016).

Indeed, existent research suggests a bidirectional pattern, in which parental behavior impacts child behavior and the child's behavior impacts the parent response. For example,

more severe ADHD symptoms in a community sample of children were linked with lower maternal warmth one year later (Lifford et al. 2008). In addition, parents of children with ADHD report increased distress and increased alcohol consumption after an experimental manipulation in which a child displayed disruptive behaviors compared to the condition in which the child displayed compliant behaviors, indicating children's difficult behavior can impact parent behavior (Pelham and Lang 1999). Further, the relation between ADHD symptoms and parent behavior may be mediated by problems inhibiting aggressive behaviors, problems using organizational, planning and working memory skills (i.e., executive functioning skills), and problems regulating their emotions increase parental stress (Graziano et al. 2011). Therefore, it is established that parenting practices impact children with ADHD, and that children who have ADHD elicit certain parenting practices.

This pattern of family stress for families with a child who has ADHD continues as the child moves into adolescence and beyond. As an adolescent, IA as well as comorbid internalizing problems have been linked with lower maternal warmth and higher maternal control (Gau and Chang 2013). Additionally, adolescents' refusal behavior is predictive of increased permissive parenting (e.g., not enforcing consequences), which can perpetuate negative adolescent behavior, especially for adolescents with comorbid disruptive problems (Burke et al. 2008; Ellis and Nigg 2009). It has been documented that for typically developing children, the presence of authoritarian parenting is linked with poorer psychological adjustment (McKinney et al. 2011) and lower academic achievement in college (Silva et al. 2007). There is preliminary evidence to suggest that the quality of parenting of children with ADHD may moderate academic achievement, ADHD symptoms, and comorbid psychopathology in young adults. For example, college students who reported increased levels of internalizing (i.e., anxiety and depression) and externalizing (i.e., oppositional and conduct) symptoms were likely to report less affection and more controlling parenting from their mothers (Ni and Gau 2015).

Emerging adulthood (i.e., 18 to 25 years of age; Arnett 2000) is a developmental period in which individuals transition out of adolescence, gaining independence and exploring their identities while still maintaining close connection to their families of origin. Individuals vary considerably in the amount and quality of parental support during this transition period (e.g., financial support, place of residence, help with educational/occupational training and decision-making; Arnett 2000). When emerging adults leave home to attend college, they are tasked with managing responsibilities across several domains independently for the first time in their lives. Emerging adult college students with ADHD may be at a particular disadvantage due to

characteristic EF deficits in addition to abruptly losing the scaffolding (i.e., organized, responsive structure) provided by parents and teachers (Fleming and McMahon 2012). Fewer studies have been conducted examining the long-term effects of parenting and adjustment with emerging adult college students in the ADHD population. In one such study, Jones et al. (2015) examined the level of college student adaptation and perceived parenting style in those with ADHD. College students retrospectively reported on how they were reared as a child (using the Parental Authority Questionnaire; Buri 1991) and their current level of functioning. The authors found authoritative parenting was linked to better college adjustment for those who reported few symptoms of ADHD, but not for those who were experiencing more severe symptoms. Unexplored, however, is whether specific parenting styles employed in childhood are linked to emerging-adulthood outcomes related to ADHD when compared to a non-diagnosed control group.

The aims of the current study are to examine how college students with and without ADHD perceived they were parented while growing up and to examine the relations between college students' current levels of impairment and how they were parented. It is hypothesized that students in the ADHD group will report higher levels of maternal authoritarian or permissive parenting and lower levels of maternal authoritative parenting compared to students in the non-ADHD group. It is also hypothesized that higher levels of maternal authoritarian and permissive parenting will be associated with higher levels of student impairment and higher levels of maternal authoritative parenting will be associated with lower levels of student impairment.

## Method

### Participants

A total of 1,463 students at three public universities in the Southeastern ( $n = 926$ ), Western ( $n = 431$ ), and Midwestern ( $n = 106$ ) regions of the United States completed measures for the current study via online data collection. Participants were recruited primarily from the psychology department research pools at the associated institutions, but also via advertisement soliciting individuals with prior ADHD diagnoses at service provision offices (i.e., respective campus disability services). Students 18 to 25 years of age were eligible to participate. Assignment to an ADHD group occurred if the student participant reported (a) a previous diagnosis of ADHD or six or more childhood IA or HI symptoms, and (b) the student endorsed at least four current symptoms of IA or HI, and (c) the student endorsed current impairment. Students who reported a

**Table 1** Student demographic data by group and maternal parenting *t*-tests

		ADHD group ( <i>n</i> = 196) <i>n</i> (%)	Comparison group ( <i>n</i> = 1,190) <i>n</i> (%)			
Sex	Male	64 (32.7)	404 (34.9)			
	Female	132 (67.3)	1,159 (65.1)			
Ethnicity	European American	180 (91.8)	1,016 (85.4)			
	African American	1 (0.5)	30 (2.5)			
	Native American	1 (0.5)	18 (1.5)			
	Hispanic/Latino	6 (3.1)	33 (2.8)			
	Asian/Asian-American	5 (2.6)	43 (3.6)			
	Biracial or other	3 (1.5)	17 (1.4)			
Education level	Freshman	52 (26.5)	316 (26.6)			
	Sophomore	58 (29.6)	352 (29.6)			
	Junior	42 (21.4)	223 (18.7)			
	Senior	27 (14.5)	161 (13.5)			
	Fifth year senior and beyond	31(1.5)	104 (8.7)			
		ADHD group ( <i>n</i> = 190) <i>M</i> ( <i>SD</i> )	Comparison group ( <i>n</i> = 1,119) <i>M</i> ( <i>SD</i> )	<i>t</i>	<i>p</i>	<i>d</i>
Authoritative parenting	33.28 (8.97)	34.56 (8.78)	1.85	.065	0.14	
Authoritarian parenting	31.46 (8.08)	30.10 (8.67)	2.01	.045	0.16	
Permissive parenting	23.19 (6.88)	23.26 (6.92)	0.13	.898	0.01	

*Note.* Demographic variables were equivalent across the ADHD and comparison groups. Possible parenting style scores can range from 10 to 50 with higher scores indicating more characteristics of that parenting style

previous diagnosis but did not endorse significant current ADHD symptoms (i.e., <4) were omitted from the ADHD group because these students likely experience residual ADHD symptoms that are not substantial and do not impact their daily functioning. We chose the cutoff of four current ADHD symptoms because Hartung et al. (2016) found no significant difference in impairment between college students with four, five, or six self-reported symptoms, but students with this extent of symptoms did express more impairment than those with three or less. We included students in the ADHD group if they did not report a previous diagnosis only if they endorsed at least six childhood IA or HI symptoms and six current IA or HI symptoms (along with current impairment).

Further, because data were collected with the Barkley Adult ADHD Rating Scale (Barkley 2011) and Barkley's Current Symptom Scales (Barkley and Murphy 2006), *Diagnostic and Statistical Manual of Mental Disorders-Fourth Edition, Text Revision* (DSM-IV; APA 2000) ADHD symptom verbiage was used (see below for full measure descriptions). That is, these DSM-IV-based rating scales do not include the parenthetical examples that were added for each symptom in the *Diagnostic and Statistical Manual of Mental Disorders, fifth edition* (DSM-5, APA

2013). Preliminary findings have suggested that individuals endorse more symptoms using the DSM-5 verbiage compared to DSM-IV (Sibley and Kuriyan 2016). Thus, we used a symptom cut-off of 6 current symptoms of inattention and/or hyperactivity (along with related impairment) for those without a previous diagnosis to be conservative in our identification of this ADHD group. To decrease the likelihood that a participant in the comparison group had undetected/undiagnosed ADHD, those who endorsed five current symptoms of IA or HI were removed from the group (per the DSM-5 diagnostic criteria). Within the overall sample, 196 (13.4% of the total sample) met the ADHD inclusion criteria, with 125 reporting a previous ADHD diagnosis and 71 endorsing above threshold symptoms and impairment (with no previous reported ADHD diagnosis; 36.2% of the ADHD group). Of those previously diagnosed, 76 students met DSM-IV diagnostic symptom thresholds and 102 met DSM-5 diagnostic symptom thresholds (60.8 and 81.6% of those with a previous diagnosis, respectively), while 49 and 23 reported subthreshold symptoms based on DSM-IV and DSM-5 criteria (39.2 and 18.4% of those with a previous diagnosis, respectively). Of the students in the ADHD group, 73 (37.2%) reported being currently prescribed medication to address their symptoms. Finally, just 18 students (9.2%) in this group reported currently engaging in psychosocial treatment for ADHD.

The ADHD (*n* = 196) and non-ADHD comparison groups (*n* = 1,190) were equivalent demographically (see Table 1). As expected, in comparison to those in the non-ADHD group, students with ADHD endorsed more current IA,  $t(1,297) = 30.76$ ,  $p < .001$ , and HI symptoms  $t(1,300) = 24.89$ ,  $p < .001$ , and higher levels of related functional impairment,  $t(1,311) = 25.30$ ,  $p < .001$  (See Table 2 for means and standard deviations of self-reported current ADHD symptoms/impairment and self- and mother-reported childhood ADHD symptoms/impairment across the ADHD and non-ADHD comparison group). Students in the ADHD group reported lower high school and college GPAs compared to those in the comparison group,  $t(1,352) = 4.83$ ,  $p < .001$  and  $t(1,325) = 2.95$ ,  $p = .003$ , respectively. Across the entire sample, compared to men, women reported higher levels of HI ( $t[1373] = 10.76$ ,  $p = .001$ ); Anxiety ( $t[1388] = 9.89$ ,  $p = .002$ , Stress ( $t[1388] = 30.84$ ,  $p < .001$ ), and maternal authoritative parenting ( $t[1378] = 11.65$ ,  $p = .001$ ). Women and men reported equivalent levels of IA, impairment, depression, and authoritarian and permissive parenting across the entire sample.

Corresponding parent-report data on ADHD symptoms and impairment for all participants in the ADHD group were sought (*n* = 196), whereas a matched sample (non-diagnosed gender-, ethnicity-, and age-equivalent peers) of parents in the comparison group were contacted (*n* = 340). Collateral reporters were sought to corroborate student

**Table 2** Student- and parent-reported ADHD symptoms and impairment means and standard deviations

	ADHD group						Comparison group					
	Current symptoms			Childhood symptoms			Current symptoms			Childhood symptoms		
	IA	HI	Impairment	IA	HI	Impairment	IA	HI	Impairment	IA	HI	Impairment
Self-report	5.76 (2.12)	5.11 (2.23)	15.00 (5.62)	5.20 (3.10)	5.11 (3.06)	10.74 (6.30)	0.94 (1.19)	1.06 (1.23)	4.42 (4.57)	0.95 (1.76)	1.23 (1.94)	3.41 (4.15)
Parent-report	–	–	–	3.15 (3.41)	2.13 (2.90)	7.10 (6.51)	–	–	–	1.08 (2.14)	0.83 (2.41)	1.86 (3.74)

*IA* inattentive symptoms, *HI* hyperactive/impulsive symptoms

Standard deviations are in parentheses. Only a subset of parents completed childhood symptom measures to corroborate group mean symptoms levels (i.e., parents of students in the ADHD group reported higher levels of IA and HI compared to parents of students in the comparison group). Possible scores on the IA and HI subscales ranged from 0 to 9 and possible impairment rating scores ranged from 0 to 30 (current) and 0 to 24 (childhood). Students in the ADHD group reported higher levels of IA, HI, and impairment compared to students in the comparison group

participant's childhood report of ADHD symptoms, and did not report on their parenting style. Fifty-eight parents or other adult guardians (87.9% mothers; 29.6% response rate) from the ADHD group and 114 (86.0% mothers; 9.6% response rate) from the comparison group completed childhood collateral surveys. Parents of participants in the ADHD and comparison groups were equivalent demographically, with no differences noted in age, sex, ethnicity, and education variables.

## Procedure

The study was approved by each participating university's Institutional Review Board (IRB), and all ethical principles related to human subjects' research were followed. Data collection was completed online in a survey format. Students were able to sign up for the study via online participant management systems at each university by using a hyperlink to the consent form which included the purpose of the study, procedure, duration, risks, benefits, and compensation. Those not participating for course credit contacted the researcher via email to request the link to the consent form. After the student participants consented to participate, the students listed the name and contact information for collateral informants that could report on their childhood behaviors (e.g., a parent). The online survey with the aforementioned measures was sent to student participants and their collateral informants, as appropriate. Following completion of the survey, participants were compensated via research credits or monetarily (\$20). The survey closed with debriefing information, including researcher, IRB, and counseling center contact information.

## Measures

### Demographics form

Student participants reported their sex, date of birth, ethnicity, number of years of education completed, high school

GPA, college GPA (if available), history of mental health treatment (i.e., medication, therapy), and date and provider of initial ADHD diagnosis (if appropriate).

### Barkley Adult ADHD Rating Scale – IV (BAARS-IV)

This self-report includes 18 ADHD and 10 impairment items and was completed by student participants, focusing on the past 6 months (Barkley 2011). Items closely correspond to the DSM-IV-TR (APA 2000) criteria for ADHD and had response choices of Never/Rarely (=0), Sometimes, Often, or Very Often (=3). Higher scores indicate more severe ADHD-related problems. Internal reliability (i.e., alpha,  $\alpha$ ) for items measuring IA, HI, and impairment have elsewhere been shown to be satisfactory (Fedele 2008) and were  $\alpha = .87, .79,$  and  $.92,$  respectively in the current sample.

### Barkley's Childhood Symptoms Scale – Self-Report Form (Child SS)

This form was completed by the student participant and is identical to the Current Symptom Scale except that it indexes behavior between the ages of 5 and 12 years, and has just 8 impairment items (Barkley and Murphy 2006). Unpublished data from a large college student sample ( $n = 980$ ) suggest that internal validity of this form is satisfactory (ADHD symptoms  $\alpha = .95,$  ADHD impairment  $\alpha = .92;$  Fedele 2008), and agree with the  $\alpha$  estimates in the current study ( $= .90, .88,$  and  $.93$  for IA, HI, and impairment, respectively).

### Barkley's Childhood Symptoms Scale – Other-Report Form (Child SS-O)

This form is the parent-report version of the Child SS, formatted accordingly (Barkley and Murphy 2006). The derived Pearson correlation with Child-SS indicated good agreement ( $r = .75;$  Barkley et al. 2008), and the primary

scales of the form have been shown to be internally consistent (parent-reports,  $n = 55$ , ADHD symptoms and impairment  $\alpha = .95$ ; Fedele 2008). In the present study,  $\alpha$  for parent-report was .92, .90, and .94 for IA, HI, and impairment, respectively. Pearson correlations with Child-SS scores indicated strong agreement for IA ( $r = .62$ ), HI ( $r = .50$ ), and impairment ( $r = .59$ ) subscales.

### Parental Authority Questionnaire

This 30-item scale (PAQ; Buri 1991) was completed by student participants. Participants responded to statements about their mother's parenting style (e.g., "As I was growing up I knew what my mother expected of me in my family, but I also felt free to discuss those expectations with my mother when I felt that they were unreasonable") by choosing Strongly Disagree, Disagree, Neither Agree or Disagree, Agree, or Strongly Agree. Items map onto three parenting styles: Permissive (e.g., "As I was growing up, my mother seldom gave me expectations and guidelines for my behavior"), authoritarian (e.g., "My mother has always felt that more force should be used by parents in order to get their children to behave the way they are supposed to"), and authoritative (e.g., "As I was growing up, once family policy had been established, my mother discussed the reasoning behind the policy with the children of the family"). Higher scores suggest more endorsement of that style of perceived parenting. Two week test-retest reliability coefficients have been shown to be good (.81 for mother's permissiveness, .86 for mother's authoritarianism, .78 for mother's authoritative, and  $\alpha$  values ranged from .74 to .87 (Buri 1991). In the current study, Cronbach's  $\alpha$  values for permissive, authoritarian, and authoritative subscales were .81, .88, and .90, respectively. Authoritarianism was very modestly related to permissiveness ( $r = -.08$ ,  $p < .001$ ) and authoritative ( $r = .10$ ,  $p < .001$ ); Authoritativeness was also related to permissiveness ( $r = .36$ ,  $p < .001$ ). The PAQ has been used in college student samples to examine perceived parenting in studies examining the level of ADHD symptomatology and academic achievement (Jones et al. 2015), academic motivation and self-efficacy (Turner et al. 2009), and self-perception of competence across several domains (e.g., social relationships, academic self-worth; Klein et al. 1996).

### Depression Anxiety Stress Scale-21 (DASS-21)

This measure includes 21 items that employ a 4-point Likert scale and relate to perceived stress in addition to depression and anxiety (7 items/subscale) over the preceding seven days (Henry and Crawford 2005). Higher scores indicate greater distress. Internal consistency for the DASS- 21 has been found to be excellent ( $\alpha = .90$ , Stress scale; Henry and

Crawford 2005), and in the current study was estimated at .92, .87, and .89 for the depression, anxiety, and stress subscales, respectively.

### Data Analyses

Independent samples *t*-tests will be used to analyze differences for authoritarian, permissive, and authoritative parenting across the ADHD and non-ADHD groups. Analyses for the entire sample will be conducted using multiple regression. Maternal authoritarian, permissive and authoritative parenting style variables will be entered as the predictors and the ADHD symptoms and depression, anxiety, and stress symptoms will be entered as the outcome variables.

## Results

### Perceived Parenting Style across Groups

Out of the 196 and 1,190 students who made up the ADHD and comparison groups, 190 (96.9%) and 1,119 (94.0%) completed the PAQ, respectively. All respondent values were within the expected range on all survey measures. To test whether students with ADHD would describe their mothers as more authoritarian or permissive and less authoritative compared to those without ADHD, a series of independent samples *t*-tests were conducted to compare PAQ data. Participants in the ADHD group reported significantly higher levels of maternal authoritarian parenting,  $t(1,307) = 2.01$ ,  $p = .045$ ,  $d = 0.16$ , and marginally lower levels of authoritative parenting,  $t(1,307) = 1.85$ ,  $p = .065$ ,  $d = 0.14$  (see Table 1). No group differences were found for maternal permissive parenting. Participants within the ADHD group differed on some study variables. Students who did not report a previous diagnosis but endorsed at least six symptoms of IA or HI reported higher levels of authoritarian parenting, and depression, anxiety, and stress symptoms compared to students who reported a previous diagnosis and at least four symptoms of IA or HI ( $p$ -values  $< .05$ ).

### Perceived Maternal Parenting Style and Psychopathology in Entire Sample

We examined the relation between maternal parenting (levels of authoritarian, permissive, and authoritative styles as predictors) and ADHD and internalizing symptoms (outcome variables) using a dimensional approach given that clinical interviews were not used to augment ADHD group assignment. Using regression analyses, ADHD and internalizing symptoms significantly predicted parenting

**Table 3** Summary of parenting style and psychopathology multiple regressions

$R^2$	Inattention		Hyperactivity/impulsivity		Depression		Anxiety		Stress	
	0.03**		0.03**		0.03**		0.05**		0.05**	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
Sex	-0.05	.07	-0.10	<.001	-0.06	.041	-0.10	<.001	-0.16	<.001
Authoritarian	0.12	<.001	0.12	<.001	0.14	<.001	0.15	<.001	0.16	<.001
Permissive	0.10	.001	0.09	.003	0.10	.001	0.16	<.001	0.10	.001
Authoritative	-0.16	<.001	-0.12	<.001	-0.14	<.001	-0.16	<.001	-0.09	.001

For the overall model, ns denotes non-significant  $R^2$  value, \*\*denotes  $p \leq .001$

**Table 4** Sex by authoritative, authoritarian, and permissive parenting multiple regressions

	Inattention		Hyperactivity/Impulsivity		Depression		Anxiety		Stress	
<i>Authoritative</i>										
$R^2$	0.01**		0.01**		0.01**		0.02**		0.03**	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
Sex	-0.19	.079	-0.19	.075	-0.26	.015	-0.30	.004	-0.37	<.001
Authoritative	-0.14	<.001	-0.09	.007	-0.13	<.001	-0.13	<.001	-0.08	.012
Sex $\times$ authoritative	0.15	.165	0.10	.358	0.22	.041	0.22	.040	0.23	.029
<i>Authoritarian</i>										
$R^2$	0.01**		0.02**		0.02**		0.02**		0.04**	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
Sex	0.12	.219	-0.02	.865	0.02	.823	-0.01	.892	-0.00	.972
Authoritarian	0.13	<.001	0.12	.001	0.13	<.001	0.14	<.001	0.17	<.001
Sex $\times$ authoritarian	-0.16	.103	-0.07	.454	-0.07	.505	-0.08	.439	-0.15	.114
<i>Permissive</i>										
$R^2$	0.00 (ns)		0.01*		0.00 (ns)		0.01**		0.03**	
	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$	$\beta$	$p$
Sex	0.05	.591	-0.12	.217	-0.13	.179	-0.11	.257	-0.25	.008
Permissive	0.05	.152	0.03	.430	0.02	.606	0.08	.017	0.03	.396
Sex $\times$ permissive	-0.09	.349	0.03	.758	0.09	.348	0.02	.837	0.10	.277

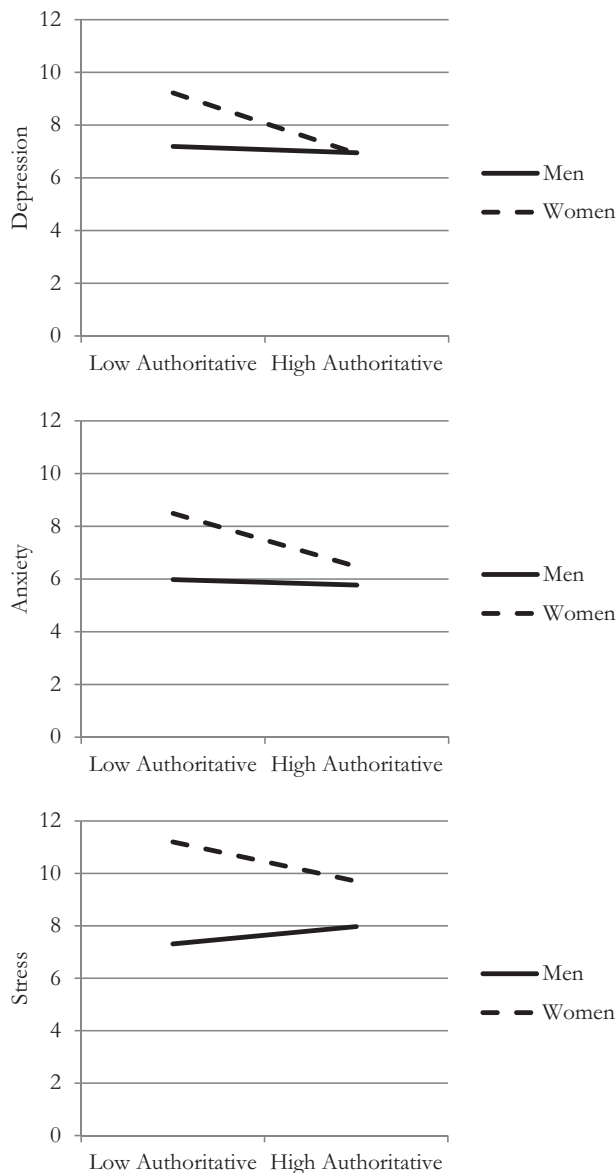
For the overall model, ns denotes non-significant  $R^2$  value, \* denotes  $p < .05$ , \*\* denotes  $p \leq .001$

style levels across the entire sample. As expected, higher levels of authoritarian and permissive parenting and lower levels of authoritative parenting across participants in the entire sample were associated with higher levels of psychopathology. A series of multiple regressions were conducted for each symptom subscale (dependent variables: IA, HI, depression, anxiety, and stress), with sex and authoritative, permissive, and authoritative parenting subscales as the predictors entered simultaneously. Sex was included in the models in addition to the three parenting style subscales because women reported higher mean levels of HI, anxiety and stress than men. The models accounted for 3–5% (all  $p$ -values  $\leq .001$ ) of the variability in IA, HI, depression, anxiety, and stress when sex and the three parenting styles were included (see Table 3 for summary of regressions). Each parenting style significantly contributed unique variance to the association with each dependent variable in the expected directions, with higher levels of reported authoritative parenting associated with lower levels of IA, HI, depression, anxiety and stress, and higher levels of authoritarian and permissive parenting associated

with higher levels of IA, HI, depression, anxiety, and stress.

### Psychopathology and Perceived Maternal Parenting Style by Sex

Women endorsed higher levels of HI, anxiety, stress, and authoritative parenting compared with men. Due to this sex difference in reported levels of HI, anxiety, stress, and authoritative parenting, multiple regressions that included sex by parenting style variables (e.g., sex by authoritative parenting) were conducted to determine whether sex moderated the relation between the parenting styles and the six psychopathology subscales. No a priori hypotheses were made for these analyses. Separate multiple regressions were run for the dependent variables: IA, HI, depression, anxiety, and stress, each using sex, parenting style (authoritative, authoritarian, or permissive), and sex by parenting style entered simultaneously as the predictors (see Table 4). The sex by authoritative parenting interaction was significant for neither IA ( $\beta = 0.15$ ,  $p = 0.165$ ) nor HI ( $\beta = 0.10$ ,



**Fig. 1** Depression, anxiety and stress severity for low and high authoritative parenting across men and women. Possible depression, anxiety, and stress scores range from 0 to 63

$p = 0.358$ ), as the negative relation between authoritative parenting and these ADHD subscales were equivalent across men and women. Sex differences in the relations between authoritative parenting and depression ( $\beta = 0.22$ ,  $p = 0.041$ ), anxiety ( $\beta = 0.22$ ,  $p = 0.040$ ), and stress ( $\beta = 0.23$ ,  $p = 0.029$ ) were found (see Fig. 1). Women with lower levels of authoritative parenting reported significantly higher levels of depression, anxiety, and stress compared with women with higher levels of authoritative parenting. Follow-up simple slope regression analyses for women yielded significant negative associations between authoritative parenting and depression ( $R^2 = 0.02$ ,  $p < .001$ ), anxiety ( $R^2 = 0.02$ ,  $p < .001$ ), and stress ( $R^2 = 0.01$ ,  $p$

$= .016$ ). In contrast, for men, the simple slope relations between authoritative parenting and depression, anxiety, and stress were not significant, indicating that men reported the same levels of depression, anxiety, and stress across levels of authoritative parenting. For authoritarian and permissive parenting, no significant interactions with sex across any psychopathology subscales were found. As such, the associations between these negative parenting styles and IA, HI, depression, anxiety, and stress were equivalent for women and men.

## Discussion

Although ADHD is largely heritable (Waldman and Gizer 2006), the home environment impacts adjustment in childhood, adolescence and, potentially, emerging adulthood for individuals with ADHD. In the current study of college students, we investigated whether the perceived maternal parenting styles that emerging adults with and without ADHD received in childhood differs and whether that relates to the emerging adults' current ADHD symptomatology, impairment, and comorbid internalizing symptoms. Overall, we found that perceptions of mothers' parenting styles did vary across the ADHD and comparison groups and reported parenting style was related to current ADHD symptoms and internalizing problems.

As expected, college students in the ADHD group differed in their report of their mothers' parenting behaviors during childhood from those in the comparison group. Those in the ADHD group reported higher levels of authoritarian parenting and marginally lower levels of authoritative parenting, indicating they recalled their mothers using more punitive parenting and less emotionally supportive parenting. This is consistent with prior studies tapping child and adolescent populations, in that parents of children with ADHD have generally tended to exhibit harsher discipline coupled with lower warmth (e.g., authoritarian parenting; Johnston and Mash 2001). Contrary to expectations, students reported equivalent levels of permissive parenting across groups. Given that ADHD group participants were current college students, their parents may have been more involved and less permissive so that they could closely monitor their child's academic functioning to increase the likelihood of college acceptance.

The second a priori expectation was that participants in both groups would be more likely to endorse symptoms of ADHD and internalizing comorbidity when they reported experiencing a negative maternal parenting style while growing up, and this was largely supported. Across both groups, maternal permissive and authoritarian parenting styles were associated with higher self-reported IA, HI, anxiety and stress. This is generally consistent with



previous studies examining the impact of parenting style on various outcomes in typically developing individuals. For example, children and adolescents raised by parents with a more permissive style commonly have lower self-competence, individuation, and be less able to independently execute the demands that are present during college (Baumrind et al. 2010; Kaufman et al. 2000), while an overly harsh and demanding parenting style (i.e., authoritarian) is linked to emotional dysregulation (Aquilino and Supple 2001), aggression (Thompson et al. 2003), anxiety, lower academic achievement (Silva et al. 2007) and generally poorer functioning in college (McKinney et al. 2011).

The relation between parenting style and child ADHD symptoms, impairment, and comorbid problems has been shown elsewhere to be bidirectional (Modesto-Lowe et al. 2008). Child characteristics, temperament, and disruptive behaviors can elicit negative parenting behaviors (McKee et al. 2004). Moreover, children with challenging temperaments at 6 months showed increased maladaptive social, cognitive, academic, and behavioral functioning at age 11 when in a home and/or daycare setting with poor caregiving compared to children with easier temperaments (Pluess and Belsky 2010). Genetic predispositions for ADHD may leave infants particularly sensitive to the caregiving environment, thus reacting more positively to nurturing parenting and more negatively to overly punitive parenting. The current findings lend support for these detrimental differential effects extending into emerging adulthood.

Further, children with ADHD are at higher risk for developing conduct, oppositional defiant, and mood disorders as adolescents compared to non-diagnosed peers (Kessler et al. 2006; Yoshimasu et al. 2012). The propensity for experiencing significant stress and anxiety, in particular, may interact with the nature of parenting. Youth with ADHD encounter significant problems across multiple domains (e.g., academic, interpersonal relationships) and not meeting expectations in the school and social arenas may put a strain on the parent-child relationship. That relationship and the home setting, then, where the child might expect to find a safe haven, can be transformed into an additional source of stress. This increased vulnerability, coupled with the specific risks associated with authoritarian parenting (e.g., questioning of one's own competence or worth given rejecting behavior of parent) may potentiate long-term personal distress, depression, anxiety, and other functional impairment. This suggests, along with other research (Deault 2010; Ellis and Nigg 2009; Johnston and Mash 2001; Modesto-Lowe et al. 2008), that the quality of family context for those growing up with ADHD—and, in this case authoritarian parenting—could be a productive target for intervention in families of youth with ADHD. In fact, there is ample evidence that supports replacing authoritarian parenting strategies with authoritative methods

in families of children with ADHD in the literature on behavioral parent training (Pelham and Fabiano 2008).

Across the entire sample, perceived permissive maternal parenting was related to ADHD symptoms, depression, anxiety, and stress, as higher levels of permissiveness was linked with higher levels of psychopathology in the regression models that included the three parenting styles and sex as predictors and each symptom subscale as the dependent variable. There have been equivocal findings related to the influence of permissive parenting and child and adolescent outcomes. Increased laxness has been associated with both higher and lower academic achievement, higher tobacco and alcohol use (Cohen and Rice 1997), yet has not been shown to impact self-esteem (Buri et al. (1988) or other measures of psychopathology (Uji et al. 2014). However, for children with behavioral problems, permissiveness has been related to increased disruptiveness (Parent et al. 2011). The associated low levels of structure do not provide sufficient scaffolding to facilitate the child staying on task, paying close attention to detail, and following through with directives.

Moreover, reported maternal authoritative parenting was shown to be generally associated with lower levels of symptom endorsement across both groups, which was in agreement with a priori expectations. Although correlational, this extends prior research suggesting a link between authoritative parenting and better outcomes for children, especially for those with IA or HI symptoms (Healey et al. 2011). However, less is known about whether these effects are seen in emerging adults, especially in those with ADHD. Jones et al. (2015) analyzed the relation between parenting style and academic adjustment in college students and found that college students who reported high ADHD severity experienced lower adjustment regardless of level of authoritative parenting style. Even in the context of authoritative parenting, those who were more highly impaired were not buffered against negative effects of ADHD. Given these findings, future studies should examine ADHD dimensionally with the goal of describing potential differential detrimental effects of authoritarian and permissive parenting and potential protective factors related to authoritative parenting.

Sex was included as a potential moderator for the relations between parenting style and psychopathology to determine whether there were differential relations for men and women. For maternal authoritarian parenting, the sex interaction was not significant, as higher levels of authoritarian parenting were linked with higher levels of all types of psychopathology (IA, HI, depression, anxiety, and stress) for both men and women. This suggests men and women's college adjustment may be similarly negatively impacted when their mothers exhibited more authoritarian parenting behaviors (e.g., harsh discipline, lower levels of warmth).

For permissive parenting, no significant interactions by sex were found.

The sex by authoritative interactions were significant for depression, anxiety, and stress, but not for IA and HI. Levels of depression, anxiety, and stress were differentially associated with authoritative parenting for women. Lower levels of authoritative parenting (less structured and supportive parenting) were associated with increased depression, anxiety and stress, while higher levels of authoritative parenting were associated with decreased depression, anxiety and stress. In other words, maternal authoritative parenting may have a positive impact on internalizing psychopathology for both men and women, but especially for women with vulnerability for developing depression and anxiety. This is comparable with other findings on the protective nature of authoritative parenting. In a largely female college student sample, Meinzer et al. (2015) found that parental warmth, involvement, and autonomy-granting behavior were associated with lower levels of depression and ADHD symptoms. The authors also found that parental support partially mediated the relation between ADHD and depression symptoms, suggesting that parenting practices may be especially important in preventing the development of depression in college women with ADHD (Meinzer et al. 2015). Authoritative parenting is linked with the development of secure attachments with caregivers (Karavasilis et al. 2003) and increased internal locus of control (Ahlin and Antunes 2015). A secure attachment style and internal locus of control may be more important for women's well-being compared to men because girls are generally expected to have a greater emotional attachment to their parents (Lamb and Lewis 2011). Girls receive warmer parenting (supported in the current study as women reported higher levels of authoritative parenting compared to men) and may also be more sensitive to parenting behavior (Hankin et al. 2007). Boys may manifest fewer internalizing symptoms in the presence of less authoritative parenting (i.e., more negative parenting). This may be due to differences across boys and girls in genetic susceptibilities, socialization to focus more on attachments to others in girls, the expectation for boys to not express sadness, among others (Daughters et al. 2013; Hankin et al. 2007; Lamb and Lewis 2011). Furthermore, beginning in adolescence and through adulthood, women have higher rates of depression compared to men (APA 2013). For college women with ADHD who are susceptible to problems with depression, anxiety, and stress, authoritative parenting has been shown to protect against these difficulties.

### Limitations and Future Research Directions

Several limitations deserve mention regarding the current study. The relation between maternal parenting style and

college student adjustment described above does not prove causation, a point that is even more salient given the cross-sectional nature of the study. Therefore, future longitudinal studies are needed that measure symptoms, impairment and parenting variables at multiple time points (and include paternal parenting style [see below]), via multiple sources, from at least early adolescence into early adulthood. This will provide the ability to measure the developmental trajectory of psychopathology as compared to parenting style experienced by individuals with ADHD. Further, the overarching style and impact of maternal and paternal parenting may differ based on child sex and outcome being assessed. As such, future research should include reports on paternal parenting and strive to discern whether women are impacted differently by paternal authoritarianism, compared to men, across adolescence and emerging adulthood. Although such paternal parenting style effects are beyond the scope of the current study, these results provide an impetus to examine the sex of both parents and children as potential predictors of the influence of parenting on ADHD and comorbid problems. This would provide a foundation for a more tailored approach to parent interventions in the treatment of their child's ADHD. Although beyond the scope of the current study, other variables related to parenting (e.g., parenting stress, positive and negative attributions of child and parent for each other, amount of scaffolding behavior on part of parents, amount of cooperative behavior on part of children) should be examined to determine the relations among the quality of the parent-child relationship and quantity and nature of support parents provide with adjustment of college students with ADHD.

College student populations have inherent restriction of range limitations, and future research could productively focus on the recruitment of more diverse samples. The current findings were derived in a largely European American sample, and thus the demonstrated effects may not generalize to those of other ethnic backgrounds. Cultural acceptability of varying degrees of authoritarianism and permissiveness, for example, may mediate the impact on behavior difficulties of children who have reached young adulthood and are in college. Additional family characteristics that have been shown to specifically affect children with ADHD, such as maternal depression (Chronis et al. 2007), the role of paternal involvement (Romirovsky and Chronis-Tuscano 2013), and the parent-child relationship (Graziano et al. 2011; Johnston and Mash 2001), should be included as potential moderators of the relation between maternal parenting style and ADHD symptoms. Although informative, the retrospective self-report of how students perceived how they were parented may be subject to cognitive biases (e.g., positive illusory bias, rosy retrospection; Mikami et al. 2010; Walker et al. 2003), and despite the fact that these biases are likely to be present across both groups

in the study this warrants supplemental measurement in future research. Observations of parent-child interactions would provide nuanced and objective insight into exactly which parenting behaviors (i.e., warmth, reactivity) may drive the detrimental outcomes for those with ADHD, and allow for more efficacious parent training interventions. The ADHD group was largely made up of students who reported a previous diagnosis (62%) compared to those who were identified solely based on self-endorsed symptoms. Therefore, the findings probably generalize better to college students who have been diagnosed by a medical doctor, psychologist, or mental healthcare professional, and less so for those who are undiagnosed yet experiencing clinically significant ADHD symptoms.

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**Author Contributions** AS designed and executed the study, analyzed the data, and wrote the paper. WC designed the study, assisted with data analysis, collaborated with writing the paper, and assisted with final edits of the paper. EL collaborated with the design, collaborated with data analysis, and assisted with paper edits. CH collaborated with the design, assisted with data analysis, assisted with paper edits and supervised data collection.

## Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflict of interest.

**Ethical Approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee at Appalachian State University and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent** Informed consent was obtained from all individual participants included in the study.

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