

Sex differences in claimed and behavioral self-handicapping and ADHD symptomatology in emerging adults

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Abstract Although the research is clear that boys with ADHD have higher symptomatology and impairment than girls with ADHD, for adults the research is mixed. Some studies suggest no sex differences, whereas others suggest that women might have higher symptomatology and impairment. The present study examined sex differences in ADHD symptomatology and impairment, and the possible role of claimed and behavioral self-handicapping as an explanation for any differences. Claimed self-handicapping (CSH) involves reports of performance-inhibiting conditions, whereas behavioral self-handicapping (BSH) involves reporting more objective, intentional acts that could undermine performance. College students ($N = 699$) completed an online study. Sex differences were found for hyperactivity such that women reported higher levels, but not for inattention or impairment. The test of the indirect effect of sex through CSH was significant, suggesting that higher levels of CSH in women were associated with elevated ADHD symptoms and impairment. The test of the indirect effect of sex through BSH was also significant,

suggesting that higher levels of BSH in men are associated with elevated symptoms of ADHD and impairment. These data extend the literature by suggesting that self-handicapping might at least partially explain differential self-reporting of ADHD symptoms and impairment in emerging adults across the sexes.

Keywords ADHD · Claimed self-handicapping · Behavioral self-handicapping · Emerging adults

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is characterized by developmentally inappropriate levels of inattention, hyperactivity and/or impulsivity (American Psychiatric Association, APA 2013). ADHD is most commonly diagnosed in childhood and is associated with a number of long-lasting problems, including difficulties in academics, executive functioning, and interpersonal relationships in children and adults (Barkley 1998; Loe and Feldman 2007; Taanila et al. 2014). Although ADHD-related sex differences are fairly well researched in child and adolescent populations (Gaub and Carlson 1997; Gershon 2002), there is less research examining sex differences in adult populations (some exceptions include Biederman et al. 2004; DuPaul et al. 2001; Fedele et al. 2012), including emerging adults (18–25 years; Arnett 2000). The need to examine ADHD-related impairment in adult women is particularly evident (Swanson et al. 2013). Nadeau and Quinn (2002) demonstrated that adult women with undiagnosed ADHD are less able to be consistent parents, manage their jobs and households, and are more likely to be divorced and a single parent, suggesting significant impairment in this group. Although some research

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has shed light on impairment in women with ADHD, more studies with larger samples and equal representation across sexes are greatly needed (Rucklidge 2008).

Of the few studies that have examined impairment in adults with ADHD, Fedele et al. (2012) found sex differences in self-reported ADHD symptom severity (i.e., inattention and hyperactivity) and level of impairment. The authors examined how inattention and hyperactivity symptoms were associated with life impairment across domains (i.e., family, work, school, life skills, self-concept, social, and risk behaviors) and found that emerging adult women reported higher rates of inattention and hyperactivity than men. These results diverged from previous studies that found few or no sex differences in emerging adults with ADHD (Biederman et al. 2004; DuPaul et al. 2001) and are particularly interesting considering that higher levels of inattention and hyperactivity are consistently reported by parents and teachers for boys with ADHD as compared to girls with ADHD (APA 2000; DuPaul et al. 2016; Gaub and Carlson 1997; Gershon 2002). Furthermore, emerging adult women with ADHD also reported higher levels of ADHD-related impairment than men, even after controlling for preexisting sex differences in levels of ADHD symptoms (Fedele et al. 2012). Thus, the research on sex differences in adult ADHD is mixed, with some studies finding few or no sex differences (Biederman et al. 2004; DuPaul et al. 2001) and one study finding several sex differences (Fedele et al. 2012).

If self-reported sex differences are present in adult ADHD, these differences could be due to a number of factors including but not limited to (a) actual differences between the expression of ADHD symptoms in men and women, (b) biased reporting of ADHD symptoms by women, or (c) biased reporting of ADHD symptoms by men. One way that biased reporting of symptoms might manifest is through self-handicapping. Specifically, it is possible that women with ADHD utilize a self-handicapping strategy (i.e., claiming or creating an obstacle to performance to reduce responsibility for failure) which at least theoretically could increase their self-reported symptomatology and impairment. If this is the case, then sex differences in ADHD symptoms and impairment among emerging adults may be accounted for when self-handicapping is taken into account.

Self-handicapping

Self-handicapping involves the creation or claim of an obstacle prior to performance in order to provide a viable excuse in anticipation of possible failure (Jones and Berglas 1978). For example, a college student might claim illness or drink alcohol excessively prior to completing an examination for which he or she feels unprepared. In this

way, self-handicapping allows an individual to take credit for, or “internalize,” success and blame the handicap for, or “externalize,” failure. There are two forms of self-handicapping: claimed and behavioral. Claims of the presence of an obstacle, which may or may not be true, have been referred to as “claimed” or self-reported handicaps. Examples of claimed self-handicapping include declarations that one is very anxious (Smith et al. 1982) or experiencing various physical and psychological symptoms (e.g., migraine, stomachache, injury, and sleep disturbance; Hirt et al. 1991). Behavioral self-handicapping refers to engaging in more objectively impairing behaviors (Arkin and Baumgardner 1985; Leary and Shepperd 1986). Behavioral self-handicaps are normally more visible, controllable, and more likely to be directly related to performance than are claimed handicaps (Hirt et al. 1991; Leary and Shepperd 1986). Examples of behavioral self-handicapping include alcohol consumption, drug use, or lack of practice prior to performance.

Researchers have demonstrated a sex difference in self-handicapping among emerging adults (Rhodewalt 1990), and this finding may account for the sex differences in ADHD symptoms and impairment found by Fedele et al. (2012). Specifically, men tend to engage in behavioral forms of self-handicapping more than women, whereas women endorse claimed forms of self-handicapping more often than men (Hirt et al. 1991). These differences are also reflected in scores on the Self-Handicapping Scale (SHS; Jones and Rhodewalt 1982), a well-validated measure of self-handicapping. McCrea et al. (2008a) demonstrated that, consistent with actual behavior, men tend to score higher on measures of behavioral handicapping, whereas women tend to score higher on measures of claimed handicapping. Work by McCrea et al. (2008a) has suggested that differences in behavioral self-handicapping likely stem from the high personal value that women, as compared to men, place on putting forth effort. This, in turn, may relate to societal gender norms that make low effort an acceptable excuse for failure by boys and men. Consequently, women are less likely than men to engage in behavioral self-handicapping (i.e., sabotaging one’s own performance). Consistent with this belief, women also evaluate more negatively those who engage in behavioral self-handicapping, relative to men (McCrea et al. 2008b). On the other hand, women are more likely than men to claim hindering conditions (e.g., “I was nervous,” “I didn’t feel good”) to avoid criticism related to failure.

Considering the existent self-handicapping literature, it is possible that sex differences in ADHD-related symptoms and impairment among emerging adults could be due, in part, to these sex differences in self-handicapping. Emerging adult women might report greater inattention, hyperactivity, and impairment, in part due to the

motivation to engage in claimed self-handicapping. Doing so could allow these women to avoid demoralization and the negative social consequences associated with real failures. Conversely, emerging adult men seem to utilize behavioral self-handicapping strategies more readily (McCrea et al. 2008b). As a result, difficulties could be attributed to self-handicapping behavior rather than to symptoms of ADHD. In other words, behavioral self-handicapping could lead to underreported inattention, hyperactivity, and impairment. The current study first examined self-reported sex differences in ADHD symptomatology and impairment in emerging adults. Based on Fedele et al. (2012), it was hypothesized that sex differences would emerge such that women would report higher symptomatology and impairment. Second, the current study tested the hypothesis that emerging adult women would be more likely to engage in claimed self-handicapping, which in turn would predict greater symptoms of inattention and hyperactivity, as well as higher levels of impairment, in order to deflect responsibility for possible failure. In contrast, it was expected that men would endorse more behavioral self-handicapping, which in turn would be associated with lower levels of self-reported inattention, hyperactivity, and impairment.

Method

Participants

Six hundred and ninety-nine college students (mean age 19.8 years) from two public universities in the Western and Southeastern United States completed the study. Participants were primarily European American (88 %), with the remaining participants identifying as Hispanic (4.5 %), Asian/Asian-American (3.8 %), African-American (2.4 %), or American-Indian (1.3 %). In line with Fedele et al. (2012), those who met *DSM* criteria for ADHD (APA 2013) based on standardized self-reported symptoms (Barkley and Murphy 2005) and/or reported a previous diagnosis on self-reported demographics section (i.e., “Have you ever been given a formal diagnosis of Attention-Deficit/Hyperactivity Disorder or Attention-Deficit Disorder?”) were included in the ADHD group, whereas others were included in the non-diagnosed control group. *DSM-5* criteria were used to determine ADHD status. Individuals who endorsed 5 or more symptoms of inattention or hyperactivity were eligible for the ADHD group. However, as with Fedele et al. (2012), *DSM* criteria for age of onset and level of impairment were not evaluated. For both sex and age, we attempted to match the ratio in the control group to the ratio in the group who met *DSM* criteria for ADHD. With regard to sex and ADHD status, participants included 118 women and 53 men with ADHD (69 and 31 %,

respectively) and 345 women and 183 men without ADHD (65 and 35 %, respectively). The proportion of men to women in the ADHD group was equivalent to the proportion of men to women in the control group, $\chi^2(1) = .888, p = .346$. Tests of differences in ADHD symptoms and impairment by sex and ADHD diagnosis are provided below. Subsequent analyses assessing the indirect influence of self-handicapping on ADHD symptoms were conducted on the entire sample, regardless of ADHD diagnosis.

Participants with a previous diagnosis of ADHD were recruited at each university through the Psychology Research Subject Pool, advertisements through the Counseling Center, Office of Disability Services, Psychology Clinic, and Student Health Services. Participants with and without ADHD were recruited via the Psychology Department Research Participant Pools at each university. A brief outline of the study, description of compensation (see below), and a hyperlink to the study questionnaire were included in the initial contact with potential participants.

Measures

Participant demographics form

This form included items about sex, age, and any previous diagnosis of ADHD.

Barkley Current Symptoms Scale

This scale (Barkley and Murphy 2005) included 18 ADHD items and instructed participants to rate their behavior over the past 6 months. This rating scale closely follows the *DSM-IV* criteria (APA 2000) for ADHD and takes 10–15 min to complete. Participants responded to these items using a four-point scale (0 = *never/rarely*, 1 = *sometimes*, 2 = *often*, and 3 = *very often*). Item responses for inattention and hyperactivity–impulsivity (nine items for each scale) were summed, and resulting total scale scores were between 0 and 27. Impairment was assessed using Barkley’s Functional Impairment Scale, which consists of ten items on a similar four-point scale (0 = *never/rarely*, 1 = *sometimes*, 2 = *often*, and 3 = *very often*). A summary score of the impairment subscale was calculated by summing the items on the scale, with scores ranging from 0 to 30. Cronbach’s alpha reliability coefficients for the current sample were excellent for inattention ($\alpha = .91$), hyperactivity ($\alpha = .87$), and impairment ($\alpha = .92$).

Self-Handicapping Scale

The SHS (Jones and Rhodewalt 1982) is a 25-item questionnaire that measures the tendency to make

excuses and engage in self-handicapping behavior, such as withdrawing effort (e.g., “I would do a lot better if I tried harder”), claiming illness (e.g., “I suppose I feel ‘under the weather’ more often than most people”), and procrastinating (e.g., “I tend to put things off to the last moment”) in conjunction with evaluative performances. McCrea et al. (2006) found that the scale is comprised of two subscales corresponding to claimed (11 items) and behavioral (8 items) self-handicapping. For the current analyses, we eliminated one item from the claimed self-handicapping scale and one item from the behavioral self-handicapping scale due to potential conceptual overlap with ADHD symptoms (i.e., “I am easily distracted by noises or my own creative thought when I try to read,” “I tend to put things off until the last minute.”); thus, the claimed self-handicapping scale was reduced to 10 items, and the behavioral self-handicapping scale was reduced to 7 items. Participants reported on all self-handicapping items using a Likert scale from 0 to 5. Item responses were summed and resulting total scores ranged from 0 and 50 and 0 to 40 for claimed and behavioral subscales, respectively. Cronbach’s alpha reliability coefficient for the current sample was good for claimed self-handicapping ($\alpha = .81$) and adequate for behavioral self-handicapping ($\alpha = .70$).

Procedure

All study procedures were approved by the Institutional Review Boards of the respective universities. Participants completed all measures online, generally in 15–20 min. Following informed consent, all participants completed the demographics form, followed by *Barkley’s Current Symptoms Scale—Self-Report*, and the *Self-Handicapping Scale*. Participants received either monetary compensation (\$20.00) or research credit for participation, depending on whether they were participating in their respective research pools.

Results

Sex difference analyses

A series of three 2 (sex: men vs. women) \times 2 (diagnosis: ADHD vs. no ADHD diagnosis) univariate ANOVAs were conducted to assess differences in ADHD symptoms by sex and diagnosis. The results of univariate ANOVAs for inattention, hyperactivity, and impairment were partially consistent with the results of the Fedele et al. (2012) study. As expected, participants with ADHD differed significantly in terms of inattention, hyperactivity, and impairment than those without a diagnosis of the disorder (see Table 1). Participants with ADHD reported significantly higher levels of inattention, $F(1, 691) = 545.06, p < .001, \eta_p^2 = .441$, hyperactivity, $F(1, 691) = 348.65, p < .001, \eta_p^2 = .335$, and impairment, $F(1, 691) = 292.42, p < .001, \eta_p^2 = .299$, than participants without ADHD. Regarding sex differences, men and women did not differ in terms of inattention or impairment (see Table 1). For hyperactivity, there was a significant main effect of sex, $F(1, 691) = 9.152, p = .003, \eta_p^2 = .013$, such that women endorsed higher levels of hyperactivity ($M = 7.19, SD = 5.33$) than men ($M = 6.30, SD = 4.56$). The main effect of sex on hyperactivity symptoms was qualified, however, by a significant sex by ADHD interaction, $F(1, 691) = 5.939, p = .015, \eta_p^2 = .009$. Women with ADHD ($M = 13.07, SD = 5.89$) endorsed higher levels of hyperactivity than men with ADHD ($M = 11.02, SD = 5.12$), $t(169) = -2.189, p = .03, \eta_p^2 = .033$. This sex difference in hyperactivity symptoms was not evident, however, among participants without ADHD, $t(522) = -.744, p = .457, \eta_p^2 = .001$. The interaction between sex and ADHD diagnosis was not significant for either inattention or impairment. Thus, only the main effect of sex and the interaction of sex and group for hyperactivity were analogous to the Fedele et al. (2012) study, which found a significant sex by group interactions for all three variables.

Table 1 Mean levels of self-reported ADHD symptoms and impairment by sex and ADHD status

	Participants with ADHD				Participants without ADHD				2 \times 2 ANOVAs <i>df</i> = 691		
	Men <i>n</i> = 53		Women <i>n</i> = 118		Men <i>n</i> = 183		Women <i>n</i> = 345		Main effect of sex	Main effect of ADHD status	Sex \times ADHD interaction
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>F</i>	<i>F</i>
Inattention	13.47	5.88	14.58	5.53	4.99	3.50	4.87	3.50	1.62	545.06***	2.51
Hyperactivity	11.02	5.12	13.07	5.89	4.93	3.31	5.15	3.19	9.15**	348.65***	5.94*
Impairment	11.38	5.95	12.78	6.19	4.25	4.36	4.36	4.41	1.867	292.40***	2.76

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

Table 2 Mean levels of self-handicapping for by sex and ADHD status

	Participants with ADHD				Participants without ADHD				2 × 2 ANOVAs <i>df</i> = 682		
	Men <i>n</i> = 53		Women <i>n</i> = 118		Men <i>n</i> = 183		Women <i>n</i> = 345		Main effect of sex	Main effect of ADHD status	Sex × ADHD interaction
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>F</i>	<i>F</i>
Claimed self-handicapping	22.08	9.40	23.97	8.88	14.41	7.89	17.86	8.40	11.155**	74.078***	.940
Behavioral self-handicapping	21.75	6.83	21.21	7.22	20.59	6.54	17.47	6.68	8.347**	14.407***	3.934*

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

Consistent with previous research (McCrea et al. 2008a, b), significant sex differences were evident for both behavioral and claimed self-handicapping in the full sample. Men ($M = 18.22$, $SD = 6.520$) reported greater behavioral self-handicapping than women ($M = 15.72$, $SD = 6.316$), $F(1, 682) = 10.581$, $p = .001$, $\eta_p^2 = .015$ (see Table 2). Conversely, women ($M = 19.39$, $SD = 8.902$) reported greater claimed self-handicapping than men ($M = 16.14$, $SD = 8.832$), $F(1, 682) = 11.155$, $p = .001$, $\eta_p^2 = .016$. Participants with ADHD ($M = 18.05$, $SD = 6.382$) endorsed significantly higher use of behavioral self-handicapping than participants without ADHD ($M = 16.14$, $SD = 6.462$), $F(1, 682) = 6.592$, $p = .010$, $\eta_p^2 = .010$. Participants with ADHD ($M = 23.37$, $SD = 9.063$) also endorsed significantly higher use of claimed self-handicapping than participants without ADHD ($M = 16.65$, $SD = 8.378$), $F(1, 682) = 14.407$, $p < .001$, $\eta_p^2 = .021$. The interaction between sex and group was not significant for claimed self-handicapping, $F(1, 682) = .940$, $p = .333$, $\eta_p^2 = .001$, but was significant for behavioral self-handicapping, $F(1, 682) = 4.712$, $p = .030$, $\eta_p^2 = .007$. Among participants without ADHD, men ($M = 18.25$, $SD = 6.572$) engaged in more behavioral self-handicapping than women ($M = 15.00$, $SD = 6.116$), $t(517) = 5.626$, $p < .001$, $\eta_p^2 = .062$. This sex difference in behavioral self-handicapping was not evident among participants with ADHD, $t(165) = .610$, $p = .543$, $\eta_p^2 = .002$.

Intervening variable analyses

Next, we assessed whether self-handicapping accounts for the sex differences (or lack thereof) in self-reported symptoms of ADHD and impairment. Mediation was utilized in favor of moderation in the current study as we are interested in whether the self-handicapping strategies used by either men or women accounts for potential sex differences in ADHD symptoms, rather than whether the relation between self-handicapping and ADHD symptoms differs as a function of sex. Indirect effects were assessed following recommendations by MacKinnon (2008), using bias-corrected bootstrapping. The model consisted of one

predictor variable (sex), two intervening variables (claimed and behavioral self-handicapping), and three dependent variables (inattention, hyperactivity, and impairment) (see Fig. 1). The intervening variables, claimed and behavioral self-handicapping, were allowed to correlate in the tested model, as were the three dependent variables. Confidence intervals of the indirect effects were used to evaluate the statistical support for the model. Confidence intervals for the indirect paths that did not include zero in the interval indicated a significant indirect effect. All paths in the model were assessed simultaneously in Mplus version 7.

Consistent with study hypotheses and ANOVA results reported above, men endorsed greater behavioral self-handicapping than women ($\beta = -.172$, $p < .001$) and women endorsed greater claimed self-handicapping than men ($\beta = .181$, $p < .001$). Also consistent with study hypotheses, greater claimed self-handicapping predicted increased symptoms of inattention ($\beta = .454$, $p < .001$), hyperactivity ($\beta = .408$, $p < .001$) and impairment ($\beta = .511$, $p < .001$). In contrast to the study hypotheses, greater behavioral self-handicapping was associated with increased symptoms of inattention ($\beta = .220$, $p < .001$), hyperactivity ($\beta = .109$, $p = .008$), and impairment ($\beta = .145$, $p < .001$). See Fig. 2 for the fully tested model with standardized path coefficients.

Results indicated significant indirect effects of sex through both behavioral and claimed self-handicapping on level of inattention (see Fig. 2). Men reported that they engaged in greater behavioral self-handicapping, which in turn predicted higher levels of inattention ($\beta = -.038$, $p < .001$; 99 % CI $[-.065, -.011]$). Similarly, women reported engaging in greater claimed self-handicapping, which in turn predicted higher levels of inattention ($\beta = .082$, $p < .001$; 99 % CI $[.036, .128]$). Both behavioral and claimed self-handicapping also accounted for the relation between sex and level of hyperactivity. Men reported engaging in greater behavioral self-handicapping, which in turn predicted higher levels of hyperactivity ($\beta = -.019$, $p = .026$; 95 % CI $[-.035, -.002]$). Similarly, women reported that they engaged in greater claimed self-handicapping, which in turn predicted higher levels of

Fig. 1 Tested path analytic model. *BSH* behavioral self-handicapping, *CSH* claimed self-handicapping

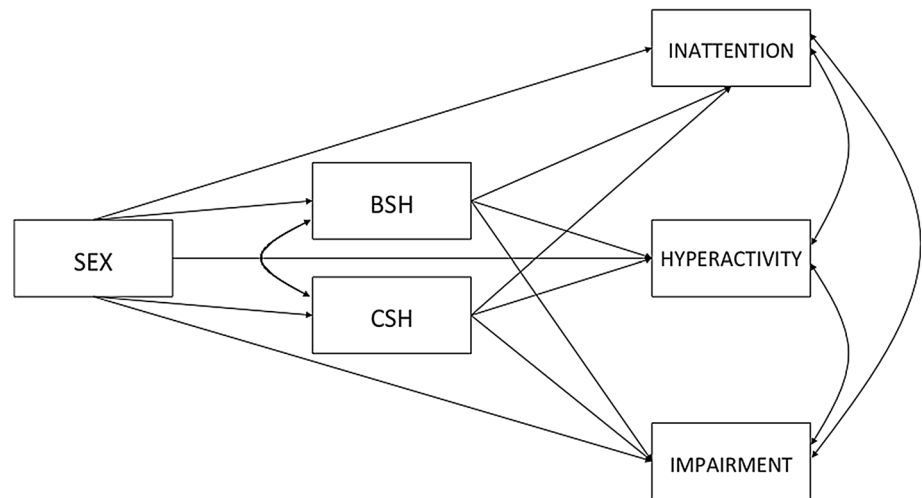
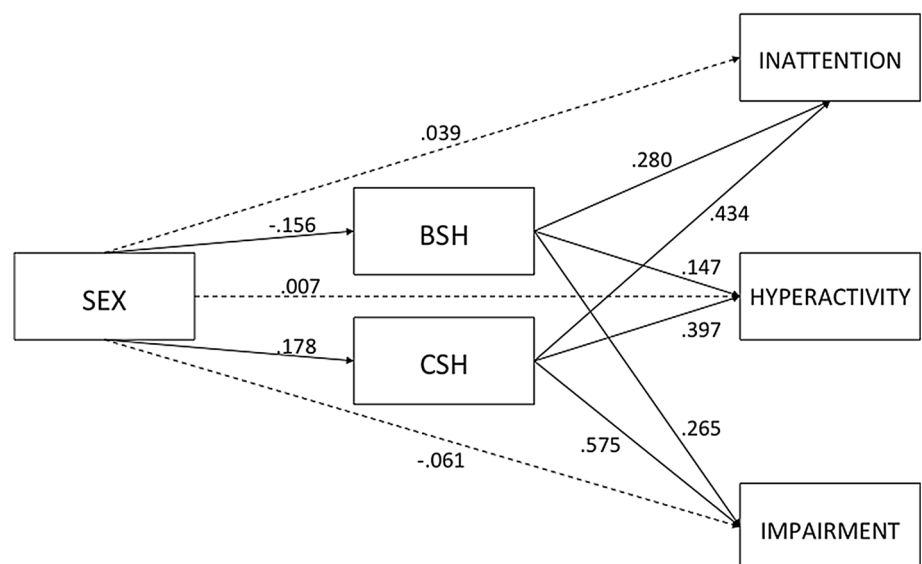


Fig. 2 Fully tested model with results indicated. Values are standardized path coefficients. *Solid lines* indicate significant paths ($p < .01$); *dashed lines* indicate nonsignificant paths



hyperactivity ($\beta = .074$, $p < .001$; 99 % CI [.032, .116]). Finally, there were significant indirect effects of sex through both behavioral and claimed self-handicapping on level of impairment. Men reported engaging in greater behavioral self-handicapping, which in turn predicted higher levels of impairment ($\beta = -.025$, $p = .003$; 99 % CI [-.047, -.003]), and women engaged in greater claimed self-handicapping, which predicted higher levels of impairment ($\beta = .092$, $p < .001$; 99 % CI [.041, .143]).

Discussion

The current study first attempted to deepen our understanding of sex differences in ADHD in emerging adults. Previous research has been mixed, with some studies

finding few or no sex differences (Biederman et al. 2004; DuPaul et al. 2001), but others finding significant sex differences (Fedele et al. 2012). Consistent with Fedele et al. (2012), emerging adult women reported higher levels of hyperactivity than men. Contrary to Fedele and colleagues, but in line with the findings of Biederman et al. (2004) and DuPaul et al. (2001), there were no identified sex differences in either reported levels of inattention or impairment. Thus, the research is still mixed in terms of sex differences in adult ADHD.

Second, the current study examined potential third variables that could account for the presence or absence of sex differences, namely claimed and behavioral self-handicapping. Consistent with previous research (McCrea et al. 2008a, b), we found that claimed self-handicapping was higher among women, whereas behavioral self-

handicapping was higher among men. The test of the indirect effect of sex through claimed self-handicapping was significant, suggesting that higher levels of claimed self-handicapping in women were associated with elevated levels of inattention, hyperactivity, and impairment. Additionally, the sex difference in hyperactivity reported previously for emerging adult men and women was accounted for by greater endorsement of claimed self-handicapping among emerging adult women but not emerging adult men. Although higher levels of hyperactivity were found among emerging adult women, women may be more likely to claim symptoms or impairment in an attempt to self-handicap or justify perceived failures. Therefore, it is possible that emerging adult women who report clinically significant levels of inattention, hyperactivity, and impairment are actually below the diagnostic threshold, if claimed self-handicapping is taken into account.

These results may be explained by recent findings demonstrating that, instead of utilizing an internal explanation for threats to one's self-esteem that is centered on personal responsibility ("I am lazy, I am stupid"), individuals may be more likely to use a less central and less personally controllable explanation ("I have ADHD") for their failures (Suhr and Wei 2013). These findings suggest that self-reported symptoms may be unreliable as individuals may attempt to justify perceived failures. Another possible explanation is that the emerging adult women who reported clinically significant levels of inattention, hyperactivity, and impairment demonstrated greater insight regarding symptom severity. If that is the case, women may be more accurate in their self-report of ADHD symptoms and impairment. Regardless of the interpretation, the implication remains the same: Self-reported symptoms of ADHD and impairment are likely to provide inaccurate or insufficient information regarding symptom severity as well as the presence of the disorder. As is discussed in a later paragraph, the results of the current study reinforce the importance of using collateral reports to verify symptoms of ADHD and impairment (Suhr and Wei 2013; Sibley et al. 2012).

The hypothesis that men would underreport ADHD-related symptoms and impairment because they were attributed instead to behavioral self-handicapping strategies was not supported. Indeed, the test of the indirect effect of sex through behavioral self-handicapping suggests that the opposite is true. That is, greater use of behavioral self-handicapping in men was associated with more severe inattention, hyperactivity, and impairment. These results are perhaps not surprising, given that the use of behavioral self-handicapping strategies (e.g., lack of sleep, inadequate preparation, drug and/or alcohol use) often produces symptoms that are quite similar to ADHD. The results of

the current study suggest that participants did not distinguish between consequences of behavioral self-handicapping and ADHD-related symptoms and impairment. An alternative explanation is that the converse is true: the presence of ADHD increases the likelihood of engaging in self-handicapping strategies (both claimed and behavioral) which further exacerbates symptom severity and impairment. Given the cross-sectional nature of the study design, these relations are impossible to rule out, but suggest that reducing the use of self-handicapping techniques among individuals with ADHD may be a viable treatment target.

Researchers have demonstrated that women view behavioral self-handicapping as unacceptable and are therefore less likely to engage in it than are men (Hirt et al. 2003). Self-handicapping can guard against the potentially detrimental impact of failure on one's sense of self-worth (McCrea and Hirt 2001). Whereas women may resort to claimed self-handicapping because of the implications of low effort, men seem willing to engage in behavioral self-handicapping to minimize the impact of failure on their self-esteem. The current results supported this view, demonstrating that men engaged in more behavioral self-handicapping than women. Indeed, the use of behavioral self-handicapping in men was similarly high regardless of ADHD diagnosis. Among women, use of behavioral self-handicapping strategies was significantly greater in participants with ADHD compared to those who did not meet diagnostic criteria for the disorder. These results suggest that the use of behavioral self-handicapping strategies may be a fundamental component of the disorder, and assessing for use of behavioral self-handicapping may be especially useful when diagnosing ADHD, particularly among emerging adult women. Women who report low levels of behavioral self-handicapping may be less likely to have the disorder. In comparison, assessing for behavioral self-handicapping may not be as informative for men, who report greater use of behavioral self-handicapping strategies regardless of whether or not they have a diagnosis of ADHD.

Limitations, implications, and future directions

One limitation of the current study was the homogeneity of the sample (i.e., university students). This approach limited the range of age, SES, ethnicity, and achievement levels of the participants, and thus results may not generalize well to other subgroups in the population with ADHD. Additionally, the disproportionate number of women as compared to men in the study may have been related to the number of women who self-select into psychology courses and are therefore more likely to participate in the psychology research subject pool. The disproportionate sample size of women to men may have impacted the power to detect sex differences.

A second limitation is that only self-reported measures were used in the current study, and collateral reports were not included. Given that the current findings suggest that self-reported symptoms may be unreliable, future studies using collateral reports in addition to self-reports might help determine the degree to which self-handicapping impacts self-reports of ADHD symptoms. Although the validity of collateral reports is unclear (Moffitt et al. 2015), the use of collateral reports is recommended in the assessment of ADHD in adults (Sibley et al. 2012). Incorporating a second form of reporting through the use of collateral reports of ADHD symptoms, impairment, and self-handicapping would likely increase the probability of a reliable diagnosis in clinical contexts and provide more evidence toward the accuracy or inaccuracy of self-reported results in research contexts.

Another potential limitation is related to overlap in content between ADHD and self-handicapping items such that these items may have inflated relations in our analyses. Specifically, there may be conceptual overlap between symptoms of inattention and claimed self-handicapping as well as overlap between symptoms of hyperactivity and behavioral self-handicapping. To address this concern, one item from each of the self-handicapping subscales was removed. Although certain items were correlated, it is important to note that both the ADHD and self-handicapping scales have been empirically validated and each account for unique variance not explained by the other, indicating that overall the scales are distinct (Barkley and Murphy 2005; Jones and Rhodewalt 1982). Furthermore, the results of our analyses remained the same even after the overlapping items were removed. Nonetheless, the issue of conceptual overlap between scale items may remain a limitation, and there is a need for future research to consider incorporating collateral reports as well as observational methods.

A significant number of research studies within the broader literature as well as within ADHD research have utilized a cross-sectional design (Fayyad et al. 2007; Fedele et al. 2012; Lingineni et al. 2012; Mann 2003). Specifically, cross-sectional research promotes efficient data collection without being complicated and costly and provides preliminary data for conducting studies that can make causal inferences. However, it is also important to consider the consequences of this form of research and that these results in no way imply causal relations in any of the analyses. In working with a series of interrelated variables that were collected at the same time, it is possible to rearrange the model, for example, specifying inattention, hyperactivity, and impairment as the intervening variables. This model would evaluate the indirect effects of sex on self-handicapping by way of ADHD symptoms. Although there is a range of plausible pathways for further

investigation, there are limits on the types of conclusions that can be made from such analyses. However, the present configuration of variables provides a strong theoretical and conceptual approach to understand the presentation of ADHD symptoms and impairment in men and women, as well as potential underlying mechanisms that may impact how men and women interpret and report these symptoms.

In terms of assessing and diagnosing ADHD in emerging adults, it may be important to evaluate the extent to which women and men engage in claimed and behavioral self-handicapping. For example, if men are more likely to engage in behavioral self-handicapping, such as alcohol consumption or substance use, they may also be more likely to engage in maladaptive behaviors in general. These behavioral self-handicaps, such as lack of preparation or lack of sleep, have the potential to mimic symptoms of ADHD. Consequently, it is possible that individuals engaging in behavioral self-handicapping appear to have ADHD because of the impact behavioral self-handicapping has on self-reported ADHD-related symptoms and impairment. Conversely, the presence of ADHD may increase the likelihood of engaging in self-handicapping strategies that promote increases in symptom severity and impairment. Therefore, it is important for future research to examine more closely the relation of self-handicapping to ADHD-related symptoms and impairment.

In clinical settings, it may be difficult to take self-handicapping into account. Consequently, the use of collateral reports as well as normative ADHD and self-handicapping data differentiated by sex may facilitate more accurate assessments of inattention and hyperactivity symptoms, as well as impairment. It is suggested that, for clients who engage in self-handicapping, it is important to recognize and motivate them to provide accurate reports of their ADHD-related symptoms and impairment. More accurate reporting of ADHD symptoms may be achieved by modifying normative beliefs about the extent of symptoms and impairment for those who engage in higher levels of self-handicapping. Whereas interventions for women may target modifying beliefs about the extent of their symptoms, interventions for men may be more valuable if they focus on the prevention of disruptive behaviors.

Conclusions

Overall, this study identifies the potential utility of examining claimed and behavioral self-handicapping in relation to self-reported ADHD symptoms and impairment in emerging adults. Although few sex differences were indicated in levels of ADHD symptoms and impairment among emerging adults (i.e., women in the current study reported higher hyperactivity only), there is evidence to suggest that

men and women may use different styles when reporting these symptoms. For both men and women, the use of claimed self-handicapping predicted self-reported severity of inattention, hyperactivity, and impairment. However, women used more claimed self-handicapping which may mean that women are more likely to inflate reports of ADHD-related symptoms and impairment in an effort to compensate for perceived failures and limitations. Similarly, for men and women, self-reported ADHD symptom severity and impairment were associated with the use of behavioral self-handicapping strategies. As use of behavioral self-handicapping was high among both men and women with ADHD, it may be a fundamental component of the disorder and useful in making diagnostic decisions. The influence of claimed and behavioral self-handicapping on ADHD assessment, diagnosis, and treatment should be investigated further.

Compliance with ethical standards

Conflict of interest All authors declare no conflicts of interest.

Ethical approval All procedures performed in studies involving human participation were in accordance with the ethical standards of the institutional research committee. Informed consent was obtained from all individual participants included in the study.

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