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Basic Psychological Needs of Undergraduate Students with and without High ADHD Symptomatology

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Abstract

It is well-established in research that students who experience attention-deficit/hyperactivity disorder (ADHD) symptomatology experience academic difficulties. Despite an influx of research on this population, there is still an opportunity to improve the relevant supports and resources necessary to facilitate academic success. The current study examined whether post-secondary students with high (ADHD) symptomatology perceived their classrooms as less autonomy-supportive than post-secondary students without high levels of ADHD symptomatology. A case-control design was used for this study. Participants were undergraduate students with high levels of ADHD symptomatology (n = 49) and without (n = 39) from a large Canadian university. A multivariate Hotelling T^2 test was used to compare groups on their self-reported perceptions of basic psychological needs (BPN). College students with high ADHD symptomatology reported less relatedness at school (d = 0.69), but greater levels of competence (d = 0.70). Students with high ADHD symptomatology in this study reported significantly more negative relationships at school than students without high ADHD symptomatology. However, those with high ADHD symptomatology in this sample may represent a higher functioning subset of individuals with high ADHD symptomatology. The results of this study suggest additional avenues that can be explored to develop and implement evidence-based academic resources that can provide students with high ADHD symptomatology relevant skills.

Keywords: Self-Determination Theory, Undergraduate Mental Health, ADHD

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder defined by impairing levels of inattention, disorganization, and/or hyperactivity (American Psychiatric Association [APA], 2016). Although ADHD is most often identified during elementary school years (APA, 2016), ADHD can affect individuals across the lifespan. A recent follow-up investigation of a multimodal treatment study of ADHD (MTA) shows

that 90% of children with ADHD in MTA continued to experience residual symptoms into young adulthood (Sibley et al., 2021). Symptoms of motoric hyperactivity become less obvious in adolescence and adulthood; however, many individuals with ADHD continue to experience difficulties with restlessness, inattention, poor planning, and impulsivity (APA, 2016). Such symptoms may interfere with young adults' social, academic, and psychological functioning and career choices, especially for those who are pursuing higher education in academically rigorous institutions.

College Students with ADHD

The number of young adults with ADHD pursuing higher education is increasing. ADHD is one of the most common disabilities reported by the college population, with a prevalence rate of 6% (DuPaul et al., 2021; Eagan et al., 2017). Furthermore, students with "hidden disabilities," including ADHD, learning disabilities, and psychological disorders were more likely than their peers to expect to need tutoring in specific courses, to take longer to get a degree, and to receive personal counseling while in college (Pryor et al., 2010). Several aspects of college life may exacerbate symptoms of ADHD in young adults, such as the increased academic demand, loss of the support of home, and the increase in expectations for self-management (Wolf, 2009).

Although all college students need to adjust as they transition from high school, those with ADHD may be further burdened by deficits in planning, follow-through on tasks, keeping track of time and materials, procrastination (Wolf, 2009), and social skills (Sacchetti & Lefler, 2017), which can negatively impact academic achievement. Indeed, Weyandt and colleagues (2013) found college students with ADHD reported significantly lower grades than their non-ADHD peers on course assignments, less well-developed organizational skills, and greater overall executive dysfunction as compared with non-ADHD control participants. Students who experience high ADHD symptomatology may also obtain lower GPAs (DuPaul et al., 2018), less likely to ask for help (Perry & Franklin, 2006), withdraw from their courses more often (Advokat et al., 2011), and are more likely to dropout (Hecktman et al., 2016). Also, Oram and colleagues (2020) showed that college students who experience both clinical and subclinical ADHD struggle to keep up their academic motivation. As human motivation both energizes and directs behavior toward desired outcomes (Deci et al., 1991), addressing the issue of reduced academic motivation in college students can facilitate more adaptive behaviors such as help-seeking (Thomas & Tagler, 2019). Despite recent research exploring ADHD symptomatology and its impact on academic success more frequently, there have been limitations associated with these results. For example, some studies have not included a non-ADHD comparison group or examined the environmental factors that may play a role in the difficulties associated with ADHD (DuPaul et al., 2021).

Self-Determination Theory and Classroom Environment

Self-Determination Theory (SDT) is a theory of human motivation that postulates that all humans have inherent basic psychological needs (BPN): competence, relatedness, and autonomy (Deci & Ryan, 1991; Deci et al., 1991). Competence involves understanding how to accomplish the desired outcomes and feeling confident in performing the required actions; relatedness involves developing secure and satisfying connections with others; and autonomy involves self-initiating and self-regulating of one's actions (Deci et al., 1991).

Research has shown that the teaching environment can be greatly influenced by the social environment, including the educational environment (Hernandez et al., 2020; Ryan & Deci, 2000). Teachers in post-secondary institutions can promote autonomy by offering their students choices, giving them informative feedback, and allowing them the space to decide for themselves how they want to learn (Reeve & Jang, 2006). By engaging in these supportive behaviours, teachers would be providing an autonomy-support environment. Autonomy-supportive environments Moreover, an autonomy-supportive environment has a positive effect on diverse students' interest, conceptual learning, achievement, stereotype threat, and overall well-being compared to a more controlling environment (Boggiano et al. 1993; Grolnick & Ryan, 1987; Hofferber et al., 2014; Nadler et al., 2016; Patall et al., 2018). Although teachers are typically the source of autonomy support, peers and administrative staff can also support this environment (Rocchi et al., 2017).

It is well-established that students with even sub-clinical symptoms of ADHD have academic difficulties that could be exacerbated by their perception of their learning environments. For example, research has suggested that adolescents with low emotion regulation abilities, such as adolescents with ADHD, may have more negative attitudes towards school and their learning environment. This may lead these individuals to perceive their BPN as less satisfied. Rogers and Tannock (2018) aimed to examine whether ADHD symptomatology influenced children's perceptions of their BPN satisfaction. Their results suggested that children in the ADHD group perceived less autonomy and competence, and they reported more negative relationships with their teachers, providing evidence that ADHD symptoms may contribute to lower satisfaction of BPN. Despite these insightful results, the effects of ADHD symptomatology in the college population in the context of SDT has not been well examined.

In a recent study examining the effect of perceived autonomy support and grit on academic performance in college students, Hernandez et al. (2020) found that the perception of teacher autonomy-support was related to grit-perseverance and subsequent academic performance in college students. Students who perceived their teachers to be more autonomy supportive had higher BPN satisfaction, intrinsic motivation, grit, and academic performance. Because of the difficulties experienced by students with higher

ADHD symptomatology related to motivation and perseverance, providing an autonomy supportive environment is even more crucial for their success.

The Current Study

The current study aimed to examine the influence of ADHD symptoms on college students' perception of their classroom environments in terms of meeting their BPN of autonomy, relatedness, and competence. Due to the increase in prevalence of ADHD symptomatology in the post-secondary student population, as well as their consistent academic difficulties, there is substantial need to further understand how to support the diverse needs of these students. To answer this, we compared college students with high ADHD symptomatology) and without high ADHD symptomatology (i.e., matched controls) on their self-reported perceptions of these variables (i.e., via the BPN). Based on Rogers and Tannock's (2018) findings, it was hypothesized that college students with high ADHD symptomatology would report significantly more feelings of incompetence, perceive less relatedness in their classroom environment, and perceive their classrooms as more controlling (i.e., less autonomy) than college students without high ADHD symptomatology. By identifying these challenges experienced by students with higher ADHD symptomatology, institutions will be more well-equipped to design effective intervention strategies.

Methods

Participants and Measures

Total Sample

All participants were undergraduate students from a large Canadian university (N = 88). Students were recruited through advertisements, as well as through a research participant pool in which students receive course credit for participation in studies. Approximately 73% were female (n = 64) and 71% were 20-29 years old (n = 62). All other participants were under the age of 20, except for one participant between 30-39. Forty-nine students were identified as having high ADHD symptomatology and thirty-nine students without high ADHD symptomatology. Approximately 94% of those who were identified as having high ADHD symptomatology confirmed that they had a current diagnosis of ADHD. Independent t-tests were used to confirm that there were no statistically significant differences in age or year of the program for students with and without high ADHD symptomatology ($p > .05$). Chi-square tests were used to confirm there were no differences in gender for students with and without high ADHD symptomatology ($p > .05$).

Measures

Adult ADHD Self-Report Scale (ASRS-S)

The ASRS-Screening Test (ASRS-S) is the short-form screener of the ASRS-v1.1, consisting of the first six items of the 18-item scale. The ASRS-S identifies current ADHD symptoms (Kessler et al., 2005). Symptom severity is rated on a 5-point Likert-type scale ranging from 0 (never) to 4 (very often; Sonnby et al., 2015). An example of an item on the ASRS-S which measures inattention includes the question "How often do you have difficulty getting things in order when you have to do a task that requires organization?". The ASRS-S has been shown to have good internal consistency (Cronbach's alpha = 0.92; Brevik et al., 2020), as well as higher sensitivity in predicting clinical ADHD symptomatology as a dimensional construct (Kessler et al., 2005; Gray et al., 2014). The matched controls without high ADHD symptomatology subgroup were created by selecting students with a score of 15 or lower on the ASRS Short Form Screener. The ASRS requires the first 3 questions to have a positive response ranging from "sometimes" to "very often" while the remaining require an "often" or "very often" response (Salla et a., 2019). When converted numerically, this would result in a score of 15. SPSS procedures were then used to match as many students with ADHD as possible on sex, age, and year of study.

Basic Need Satisfaction – Work Domain (BPN-W)

BPN was measured using a modified version of the Basic Psychological Need Satisfaction—work domain (Deci et al., 2001; Ilardi et al., 1993; Kasser et al., 1992). The scale was adapted for the university context. For example, an autonomy satisfaction item was "I am free to express my ideas and opinions at school". The scale includes 21 items that form three subscales—autonomy satisfaction, competence satisfaction, and relatedness satisfaction. The subscales are created by averaging item responses for each subscale after reverse scoring the items that were worded in the negative direction. There are 7 autonomy satisfaction items, 6 competence satisfaction items, and 8 relatedness items. The scale has been shown to have sufficient reliability for all three psychological needs (Johnstone & Finney, 2010).

Procedure

Ethical approval was obtained from the university's Research Ethics Board. Data were collected from September 2017 to November 2018. Participants were selected to participate in this study through advertisements and a research pool at a large Canadian University. Participants completed an adapted 30-minute online questionnaire regarding

their university experience which included the BPN-W and the ASRS-S. Upon completion of the study, participants were compensated with one course-credit or entered into a draw for a $50 gift card.

Data Analyses

A multivariate Hotelling T^2 test was used to compare groups on their self-reported perceptions of autonomy, competence, and relatedness on the BPN. Additional analyses confirmed that we did not need to control for the effect of medication on students with ADHD. Specifically, students with high ADHD symptomatology who took medication (n = 31), did not differ from students with high ADHD symptomatology who did not take medication (n =18) on self-reported autonomy (t[47] = .917, p = .934, competence (t[47] = 1.732, p = .098), and relatedness (t[47] = 1.319, p = .092).

Results

Descriptive Statistics

After matching for age, year of program, and gender, 49 students with ADHD and 39 controls (without ADHD) were available for analysis. There were no significant differences between groups for age (t[86] = .617, p = .604), year of program (t [86] = .065, p = .889), and gender ($\chi 2$ [2] = 2.083, p = .353).

Table 1: Mean differences between ADHD and control group

	ADHD Group		Control Group		Cohen's *d*
	M	*SD*	*M*	*SD*	
Autonomy	4.34	.644	4.51	.695	-.25
Competence	4.41	.759	3.93	.610	.70
Relatedness	4.28	.482	4.62	.506	.69

Group Differences

Means and effect sizes for BPN-W ratings by group are in Table 1. Results of the multivariate Hotelling T2 test yielded a significant overall group difference: Wilks' Λ = .72, F(3, 74) = 10.89, p <.001. Separate univariate analyses of variance determine that

participants in the high ADHD symptomatology group reported significantly greater feelings of competence (F[1,86] = 10.323, p = .002; η2=.108; Cohen's d = 0.70), yet more negative relationships with their teachers (F[1,86] = 10.371, p = .002; η2=.107; Cohen's d = -.0.69). Results also indicated that college students with high ADHD symptomatology perceived their classrooms as more controlling (i.e., less autonomy) than college students without high ADHD symptomatology, but not at a statistically significant level (F[1,86] = 1.377, p = .244; η2=.016; Cohen's d = -0.25).

Discussion

The academic difficulties experienced by students with ADHD are well-established in the literature; however, the elements of the learning environment that may exacerbate these difficulties have been less examined. To our knowledge, this is the first study to examine differences in the perception of BPN satisfaction in college students with and without high ADHD symptomatology. Like younger children with ADHD in Rogers and Tannock's (2018) study, college students with ADHD in this investigation reported significantly more negative perceptions of relatedness in their school environment. Similarly, the present study replicated Roger and Tannock's findings in that college students with high ADHD symptomatology perceived their classrooms as more controlling (i.e., less autonomy) than college students with low ADHD symptomatology, but not at a statistically significant level.

Previous research has shown that college students with ADHD experience difficulties connecting with their professors or have had negative experiences when explaining their difficulties to their professors (Perry & Franklin, 2006). More specifically, students have reported that their professors may be unwilling to provide accommodations for them, experience difficulties with teaching styles, and feel stigmatized and discriminated against due to their disability (Kefler et al., 2016). College students who experience greater ADHD symptomatology may also experience more difficulties in their peer relationships. Social skill deficits in individuals with higher ADHD symptomatology have been demonstrated by several studies (Blasé et al., 2009; McKee, 2017; Sacchetti & Lefler, 2017). Moreover, the difficulties in peer relationships experienced by those with ADHD have likely been exacerbated by distance education and the COVID-19 pandemic (Laslo-Roth et al., 2020). Although there have been many effective interventions targeting social skills, there have not been any SDT-based interventions tested in an ADHD population (Morsink et al., 2021). Our results suggest that the use of an SDT framework may be beneficial for fostering positive relationships with peers and professors, as well as perceptions of relatedness and support. Disability services on college campuses may want to integrate SDT-based intervention techniques into their programs and services provided to their students to improve social skills. For example, disability services could provide workshops on interacting with peers and professors. Research has shown that registering

with disability services has been shown to predict better academic performance for students with ADHD (DuPaul et al., 2021).

A recent study found that these social difficulties are more pronounced for female college students compared to males (Ryan et al., 2016). Given that our sample included more females than males, it may partially explain the magnitude of the difference between the high ADHD symptomatology and control group when it comes to relatedness satisfaction, which was in the medium to large range. Although not statistically significant, students with higher ADHD symptomatology did report lower perceived autonomy satisfaction compared to the matched controls, a difference in the small effect size range. Previous research has suggested that college students with ADHD may experience difficulties self-advocating, which could contribute to lower perceptions of autonomy (Stamp et al., 2014). These students may have also developed learned helplessness due to setbacks associated with their ADHD (Dipeolu, 2011). The development of an SDT-based intervention that focuses on supporting students' BPN through the creation of an autonomy-supportive environment may provide a new avenue for addressing some of these difficulties experienced by students with ADHD.

Fostering an autonomy supportive environment within each individual classroom in the post-secondary environment is important, but it is also important to foster this throughout the entire institution. The use of autonomy supportive strategies and the subsequent satisfaction of BPN for diverse student populations can have positive impacts on creativity, intrinsic motivation, sense of community, and better adjustment (Núñez & León, 2015). Through training, post-secondary institutions can improve professor's abilities to foster supportive and reciprocal relationships with their students, which would be even more beneficial for those with high ADHD symptomatology experiencing social difficulties (Oram & Rogers, 2022).

Contrary to the original hypotheses and past research, college students with higher ADHD symptomatology reported greater levels of competence than college students without high ADHD symptomatology, a group difference in the medium to large range. Possible explanations for discrepant findings in our study include how college students with high ADHD symptomatology represent a distinct, higher functioning subset of individuals with the disorder who have higher ability levels, greater academic success during primary and secondary school, and better compensatory skills than individuals with ADHD from the general population (Glutting et al., 2005). Alternatively, these incongruous results could be explained by a positive illusory bias, a phenomenon of individuals with ADHD reporting substantially higher competence than their actual competence, particularly in areas where they are experiencing difficulties (Prevatt et al., 2012).

Approximately 40% of our sample were in their first and second year. Thus, it's possible that they were still in the process of adapting to the college environment. As they

adapt to their increased autonomy and reduced support in their new environment, their awareness of their functional impairment may increase. Therefore, it is possible that some of the students in our sample have not yet become fully aware of their difficulties and subsequently, their competence had not yet been affected. Moreover, individuals with ADHD aged 21 tend to underreport ADHD symptoms and impairment compared with their parents' reports. By age 27, participants would report increased symptoms and difficulties that would align with the parental report (Barkley et al., 2010).

Limitations

Although preliminary in nature, we believe this study provided several important findings in the context of BPN, SDT, and ADHD. However, we must acknowledge some of the limitations associated with this research. Most importantly, our sample size was small, which may have increased the likelihood of type II errors. For example, the group difference in terms of perceived level of autonomy in classrooms may have reached statistical significance if the sample size was larger. We suggest that this research is replicated in a larger matched sample. In addition, we used self-report scales to obtain information related to ADHD diagnosis, as well as the perception of BPN satisfaction. Despite the reliability of the ASRS-S, it would be beneficial to replicate this study with a confirmed clinical sample of students with ADHD.

Conclusion and Future Research

The current study aimed to examine the influence of ADHD symptoms on college students' perception of their classroom environments in terms of meeting their BPN of autonomy, relatedness, and competence. Aligned with previous research examining social relationships and skills in the context of ADHD, our results suggested that students with high ADHD symptomatology experience lower relatedness satisfaction. Because lower need satisfaction may be the result of both the student as well as the professor, results support the development of social skill interventions that focus on students as well as professors. For example, colleges could provide training for professors on how to create an autonomy-supportive climate that would facilitate a sense of belonging among students. Disability services may also provide social skills training to students registered with ADHD. In contrast to previous research, individuals with high ADHD symptomatology in our study perceived greater competence in the academic domain. Although positive illusory bias has been found in younger populations, this is a phenomenon that has not been well-studied in the ADHD college population. Future research should explore the implications of this counter-intuitive finding, and whether this poses a barrier when it comes to accessing appropriate supports and accommodations for students with ADHD.

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