Testing Accommodations for University Students with AD/HD:

Computerized vs. Paper-Pencil/Regular vs. Extended Time

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Abstract

Prompted by a previous study investigating the effects of pacing on the academic testing performance of college students with AD/HD, we further explored our preliminary findings, which suggested that a computerized testing environment enhanced the testing performance of college students with AD/HD. We compared the effects of a computerized vs. paper-pencil testing format as well as the effects of regular time vs. extended time on the students’ testing performance. Students taking the computerized version of the test performed significantly higher than those who took the paper and pencil version of the same test. The amount of time the participants had to take the test did not significantly affect their performance. Insights gleaned from the qualitative data furthered our understanding of testing accommodation concerns shared by many college students with AD/HD.
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According to a recent survey conducted across 10 countries, the World Health Organization estimates the prevalence of adult Attention-Deficit/Hyperactivity Disorder (AD/HD) is 3.4% (Fayyad, De Graaf Kessler, Alonso, Angermeyer, Demyttenaere, De Girolamo, Haro, Karam, Lara, Lépine, Ormel, Posada-Villa, Zaslavsky, & Jin, 2007). Kessler, Adler, Barkley, Biederman, Conners, Demler, Faraone, Greenhill, Howes, Secnik, Spencer, Ustun, Walters, & Zaslavsky (2006) estimate a rate of 4.4% in the US. AD/HD is not outgrown during adolescence as once was thought (DuPaul, Guevermont, & Barkley, 1991; Resnick, 2005) and is a valid adult disorder (Fayyad et al., 2007; Kessler et al., 2006). Approximately 2% to 4% of college students are affected by it (Weyandt & DuPaul, 2006). College students with AD/HD typically earn lower grade point averages, are on academic probationary status more often, report more academic problems, and have greater difficulty managing time and conforming to schedules than their non-AD/HD peers (DuPaul & Weyandt, 2006; Healy, 2006; Heiligenstein, Guenthter, Levy, Savino, & Fulwiler, 1999; Weyandt & DuPaul, 2006). Due to these increased risks (Swartz, Prevatt, & Proctor, 2005), students with disabilities are encouraged to advocate for basic accommodations and take advantage of educational services provided by university disability offices (Brinckerhoff, McGuire, & Shaw, 2001; Dowrick, Anderson, Heyer, & Acosta, 2005; Greenbaum, Graham, & Scales, 1995; Meaux, Green, & Broussard, 2009).

Accommodation is defined as “a change in testing materials or procedures that enables students to participate in assessments in ways that reflect their skills and abilities rather than their disabilities (Salvia, Ysseldyke, & Bolt, 2010, 416). The most frequent testing accommodations
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provided by disability services in university settings are extended time for tests and the ability to take exams in minimal disturbance testing rooms away from peers (Farrell, 2003; Lancaster, Mellard, & Hoffman, 2001). College students diagnosed with AD/HD who utilize the services offered by the university reportedly perform better academically than those who do not (Getzel, McManus, & Briel, 2004; Meaux, Green, & Broussard, 2009; Sarkis, 2008).

Literature addressing the legal and educational contexts of accommodating students with disabilities is abundant. The reauthorization of the Individuals with Disabilities Education Act (IDEA) in 1997, the passage of the No Child Left Behind Act in 2002, and the 2004 reauthorization of IDEA, emphasizing the inclusion and accountability of students with disabilities in high stakes testing have spurred increased emphasis in this area (Fuchs, Fuchs, & Capizzi, 2005; Niebling & Elliott, 2005; Elliott, McKeveit, & Kettler, 2002). Numerous studies have examined various types of academic interventions to assist college students with AD/HD, such as course-specific strategy training (Allsopp, Minskoff, & Bolt, 2005), training in learning strategies and self-advocacy skills (Getzel, McManua, & Briel, 2004) and coaching (Swartz et al., 2005; Quinn, Ratey, & Maitland, 2000; Zwart, 2001).

The most consistent educational service to be offered for persons with disabilities in post-secondary education is testing accommodations (Tagayuna, Stodden, Chang, Zelenik, & Whelley, 2005). Extended time for tests and the ability to take exams in minimal disturbance testing rooms away from peers are the most frequent accommodations provided by disability services in university settings (Farrell, 2003; Lancaster, Mellard, & Hoffman, 2001). Few empirical studies investigating accommodations for college students with AD/HD have been conducted (Trammell, 2003; Weyandt & DuPaul, 2006) even though there “is a glaring need to
expand the types of strategies to enhance academic performance among students with AD/HD” (DuPaul & Eckert, 1998, p. 9).

Synthesizing the literature associated with testing accommodations for students with disabilities is challenging, because the studies often differ substantially in terms of variables. For example, there is great variability among the ages and range of disabilities of the students sampled, the research methodologies used, as well as the type of technology used to deliver the various accommodations in which technology is a variable. Additionally, the various accommodations investigated are frequently packaged with other accommodations and are seldom investigated in isolation (Tindal & Fuchs, 2000). Most of the studies investigating the effects of accommodations have been with elementary-aged students (Thompson, Blount, & Thurlow, 2002; Tindal & Fuchs, 2000). Few have investigated the effects of testing accommodations on the performance of secondary school students (DuPaul & Eckert, 1998) and even fewer have investigated college students (Lee, Osborne, Hayes, & Simoes, 2008; Tindal & Fuchs, 2000; Wallace, Winsler, & NeSmith, 1999). To situate this study within the existing literature, this review will focus primarily on research investigating assessment accommodations of computer-based vs. paper-pencil format and regular vs. extended time in each of the two presentation formats

*Computer-Based Testing as an Accommodation*

Computer-based testing (CBT) “generally refers to using the computer to administer a conventional (i.e. paper-pencil) test” (Wise & Plake, 1989, p. 5). Studies investigating computer-based presentation as a testing accommodation has had mixed findings (Thompson, Blount, & Thurlow, 2002). Brown & Augustine (2001) found that computer use had no significant effect on the scores of 206 twelfth grade students. Hollenbeck, Tindal, Harniss, & Almond (1999) found
no differences between stories written with computers and those written without. In contrast, Burk (1998) found that the performance of students with disabilities was significantly higher on a computerized administration of a test as compared to a paper and pencil format. Calhoon, Fuchs, & Hamlett (2000) also reported computer use had a positive effect on performance of ninth through twelfth grade students with math and reading learning disabilities, as well as Russell & Plati (2000) with a group of 8th and 10th grade students writing compositions via a computer.

**Regular Time Vs. Extended Time**

Studies exploring an extended time accommodation for college students with learning disabilities have had inconsistent findings. For example, Alster (1997) found no significant difference in algebra test scores between college students with learning disabilities in an extended time condition and students without learning disabilities in both timed and extended-time conditions. Medina (2000) and Zuriff (2000) found that although extended time benefited all participants in the study, extended time did not benefit college students with learning disabilities as compared to their non-disabled peers. In contrast, Weaver (2000) found that postsecondary students with disabilities made significantly higher gains on their reading test in an extended time condition as compared to students without learning disabilities.

According to Wallace, Winsler, & NeSmith (1999) extended testing time may not be sufficient to ”level the playing field” for this population. In fact, some college students with AD/HD report that extended testing time may actually hinder their performance. Many reported “that the pressure to finish the test quickly is what gives them the stimulation they need to focus” (Farrell, 2003, p. 51).

**Our Previous Study/Findings**
In our previous study comparing the testing performance scores of college students with AD/HD, we found no significant differences between a computer-paced and a student-paced testing condition within a computer-based environment. Interview data, however, revealed that the students perceived that the CBT did benefit their overall successful performance under both conditions (Lee, Osborne, Hayes, & Simoes, 2008). This finding prompted the current investigation, comparing the testing performance among college students with AD/HD via computerized vs. paper-pencil and regular vs. extended time.

Local Context of Current Study

Of the 27,000 students enrolled at our large southwestern university, 900 were registered with the Office of Disability Services (ODS). Of these 900 students, 44% had a primary diagnosis of AD/HD. The university’s ODS proctored 3017 exams, totaling 4029 hours within the fiscal year 2008 (Schulz, 2008). These numbers strongly support the need for empirical research in the area of testing accommodations for college students diagnosed with AD/HD.

Statement of Null Hypotheses

(1) \(H_0\): College students with AD/HD will not perform better on a computerized version than a paper-pencil version of the same test.

(2) \(H_0\): College students with AD/HD will perform better in the extended time condition than in the regular time condition.

Based on our previous research, we expect to reject both null hypotheses.

Method

This study utilized a mixed-methods design to compare the effects of computerized vs. paper-pencil testing and regular time vs. extended time for college students diagnosed with AD/HD. According to Creswell (2003) this concurrent triangulation strategy was appropriate,
because we collected quantitative and qualitative data concurrently, and utilized two different methods “as a means to offset the weaknesses inherent within one method with the strengths of the other” (p. 217). We employed a 2x2 factorial design so we could simultaneously investigate the effect of the two independent variables, format and time, on the dependent variable (testing performance). Participants were randomly assigned to one of four testing conditions: computerized/regular time; computerized/extended time; paper-pencil/regular time, or paper-pencil/extended time. Following the completion of one of the four treatments, each participant completed a written questionnaire and a follow-up interview.

*Participants*

Thirty-one students enrolled in a mid-sized public university in the southwestern US who were registered with ODS with a primary diagnosis of AD/HD participated in the study. See Table 1. Participants were solicited through advertisements posted around the university campus and through postings in newsletters sent by ODS. Students scheduled a time with an examiner to take the test at their convenience at the university’s psychology department computer lab. Students were randomly assigned to one of the four conditions. After completing the assigned testing condition, a written questionnaire, and a follow-up interview, each participant received twenty dollars as an incentive to participate.

**Table 1**

*Participant Demographics*

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>7</td>
</tr>
<tr>
<td>Female</td>
<td>24</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
</tbody>
</table>
Materials

In order to simulate testing conditions in a university setting as closely as possible, a passage from a college psychology textbook was selected as the prompt for the participants. Multiple-choice questions from the college textbook test bank were used to assess the students’ learning. The text and 11-item multiple-choice test items were taken from a textbook routinely used in introductory psychology classes.

Participants assigned to the paper-pencil/regular time or paper-pencil/extended time treatment were given a paper copy of the 11 multiple-choice questions in one document. This traditional paper-pencil format was used to simulate real testing conditions in the college classroom. Participants recorded their responses on a standardized electronic scoring response form routinely used in the university setting. Participants assigned to the computerized-regular time or computerized-extended time treatment answered the multiple-choice questions using a computer. The tests were administered using the university’s web-based open source course groupware which only allowed one multiple-choice question displayed on the screen at a time. Participants clicked on the correct answer.

After completing the multiple-choice test in the assigned testing condition, each
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participant completed a written questionnaire (see Table 2) and a face-to-face interview with the examiner.

Table 2

*Student Questionnaire*

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>What elements of this testing environment were helpful to you?</td>
</tr>
<tr>
<td>2.</td>
<td>What elements of this testing environment were not helpful to you?</td>
</tr>
<tr>
<td>3.</td>
<td>In your experience as a student, what have you found to be the most effective testing accommodations in managing your AD/HD symptoms?</td>
</tr>
<tr>
<td>4.</td>
<td>If you had the choice to take the same test either by taking a paper-pencil test or taking it on the computer, which would you prefer? Why?</td>
</tr>
<tr>
<td>5.</td>
<td>If you were to take a computerized test, would you prefer that the multiple-choice questions be projected on the screen one at a time, or would you prefer having a list of several questions on the screen at one time? Please explain.</td>
</tr>
<tr>
<td>6.</td>
<td>As a college student, what type(s) of academic assistance and services would help you to perform more successfully?</td>
</tr>
</tbody>
</table>

*Procedures*

Upon arrival to the computer lab, each participant was given a paper form to record the demographic information as the examiner prepared for administering the treatment. To ensure consistency, the examiner followed a script each time she administered one of the four treatment conditions. After providing the written demographic information, the participant was given a pencil, a highlighter, and a paper copy of the reading passage and was instructed that five minutes were allowed to “study” the passage in preparation for 11 multiple choice questions. At that time, the participant was also told how the test would be administered—either via paper-pencil or computerized. After 5 minutes, the reading passage was taken from the participant to begin testing.

Participants assigned to the paper-pencil/regular time or paper-pencil/extended time treatment were given a paper copy of the 11 multiple-choice questions. They were instructed that they could write on the test itself and they were to mark their answers on a standardized
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electronic scoring response form, routinely used in the university setting. Those in the regular time condition were given 1 minute per question, for a total of 11 minutes to complete the exam. Those assigned to the extended time condition were given 1.5 minutes for each question, for a total of 16.5 minutes. Decisions about allowance of time for “regular” versus “extended” time participants were based on Bolt, Roach and Quenemoan’s (2009) work on accommodations. According to these researchers, the “standard” accommodation is “time and a half.” An “accepted” if not written standard in academia for non-accommodated students is one minute per multiple-choice question. Based on these conclusions, one minute per question was considered “regular” time and 90 seconds per question was considered “extended” time.

Participants assigned to the computerized-regular time or computerized-extended time treatment took their tests via computer. Those in the regular time condition had 1 minute per question, for a total of 11 minutes to complete the exam. Those in the extended time condition were given 1.5 minutes for each question, for a total of 16.5 minutes.

Upon completion of the assigned testing condition, each participant was given a written questionnaire to complete. After the participant finished filling out the questionnaire, the examiner interviewed each participant. The interview served as respondent validation of the written questionnaire (Creswell, 2007). The examiner read each participant’s responses aloud and probed for clarification and validation of the responses. The examiner recorded the participant’s remarks verbatim on the written questionnaire and later typed participant responses to provide consistency and readability. Following the interview, each participant received twenty dollars.

Results

Quantitative Data Analysis
Test score data were analyzed comparing the test format (paper-pencil versus computerized) and time (regular versus extended time) using analysis of variance (Isaac & Michael, 1997). We hypothesized that students would perform better on the computerized version than those given the paper-pencil version of the same test. We predicted that no differences would be found in the scores of those students in the regular and extended time conditions. Although we gathered data from both male and female participants, the already small sample size, overall, and extremely small number of male participants (7 out of 31) precluded including gender as a variable in the ANOVA.

Data analyses demonstrated that both hypotheses were confirmed. Students who took the computerized version of the test performed significantly better (Mean of 10.06) than those who took the paper and pencil version of the same test (Mean of 9.08), $F(1,29) = 8.937, P=.014$. An effect size computation resulted in a Cohen’s $d$, for this main effect of .3389. This places the effect size between Cohen’s description of a small (.20) effect size and a medium (.50) effect size (Cohen, 1992). The time allocation of regular or extended did not make a significant difference on the participants’ test scores across both types of tests (Means of 9.69 and 9.61 for regular and extended time, respectively). It is important to note, however, that both groups (paper-pencil and computerized) performed better with extended time than with regular time although the difference (overall) was not significant. It is also important to note that there was a weak (close to significant) interaction between type of test and test time. In other words, the extended time showed a trend toward making more of a difference on test scores for the computerized test takers (Mean of 10.57) than for the paper and pencil test takers (Mean of 9.43), $F(1,29) = 4.102, P=.066$. The means and standard deviations for both sets of analyses are presented in Tables 3 and 4.
Table 3
*Mean and Standard Deviations for Test Scores as a Function of Format*

<table>
<thead>
<tr>
<th>Test Conditions</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paper-Pencil</td>
<td>9.08</td>
<td>.954</td>
</tr>
<tr>
<td>Computerized</td>
<td>10.06a</td>
<td>1.305</td>
</tr>
</tbody>
</table>

*a=significant difference based on type of test*

Table 4
*Mean and Standard Deviations for Test Scores as a Function Test Time*

<table>
<thead>
<tr>
<th>Test Time</th>
<th>Regular Time</th>
<th>Extended Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Paper-Pencil</td>
<td>8.67</td>
<td>1.21</td>
</tr>
<tr>
<td>Computerized</td>
<td>9.73b</td>
<td>1.55</td>
</tr>
</tbody>
</table>

*b=difference approaches significance based on test time*

*Qualitative Data Analysis*

The open-ended questionnaire and interview responses were typed verbatim. First, the participant responses were organized question-by-question into tables. Next, we analyzed the sorted data by meaning field analysis to determine emergent categories. Then we used open coding, axial coding, and selective coding (Gee, 1999) to determine the core categories. Our final step in the qualitative analyses was interpreting the data and determining the applicability of the findings (Lincoln & Guba, 1985). The collection of emergent themes
provided valuable insights regarding testing concerns shared among college students diagnosed with AD/HD.

**Beneficial environmental factors.** The most commonly cited beneficial environmental factors were "quiet" (with many respondents preferring to be alone); an environment of "low distractibility" (minimal room activity and minimal furnishings); "comfortable environment" (comfortable chair/desk, workspace, ample room so as not to feel confined); "a window with natural light" (without fluorescent lighting); and "comfortable temperature". Some participants recommended that the room have relaxing colors of paint and soft music to enhance their performance.

**Non-beneficial environmental factors.** The most common concern was time. Participants often cited time and the pressure associated with a time limit as a stressful condition. Several participants reported being distracted by other environmental conditions such as wind noise outside, fluorescent lights, and being next to a window. A few participants said the computer was not helpful. For example, one participant said, “I would prefer not to take tests on computers.” Another said, "The image on the computer seemed to vibrate." Interestingly, several students reported no criticism of the testing environment. They said that the existing environment was sufficient to meet their needs.

**Most effective testing accommodations in managing AD/HD symptoms.** Students most frequently said that extended time, a quiet environment, and being were their primary concerns for managing their AD/HD symptoms in a testing environment. Additionally, a few mentioned that they required natural light, ample space, and a comfortable temperature to perform most successfully.

**Choice of paper-pencil or computerized test.** Paper and pencil was preferred over a computerized test by the majority of participants. Participants who preferred paper-pencil cited their reason as being their ability to write on the test. Other responses included, “I can quickly recheck an answer”; "I can take notes on the paper"; "It allows me to mark the question and go back"; and "I can make marks and cross
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stuff out.”

Computerized testing provided various advantages according to several students: "I am able to read faster from the screen"; "There’s no chance of mis-bubbling the Scantron"; "I can type much faster than I can write"; "I don't worry about spelling"; and "It’s easier to go back and change answers". Several respondents stated that "it doesn't matter" if the test is paper-pencil or computer.

*Layout preference of computerized multiple-choice questions.* The majority of participants said they would prefer one question at a time in a computerized testing situation. Some remarks were: "My eyes jump around if there are more than one"; "I can focus better and not be distracted by the other questions"; "Otherwise, I lose my place a lot"; "Because the other questions distract me"; and "If I see all the questions it makes me feel like I have to rush through them." Two students stated that they would prefer one at a time, but would prefer the option to view the entire test when they wanted to.

A few participants stated that they would prefer several questions presented on the screen at a time. Reasons included: "I can do them out of order"; "Seeing all questions gives you information that is useful"; "If I get stuck I can move on to the ones I know"; and "Seeing others might help me answer one."

*The ideal testing environment.* Most participants stated that their ideal testing environment is one that is quiet, allows them to be alone, has no time limit, and provides a comfortable chair and workspace. Several participants reported that they would like the option of having soft music in the background to serve as a filter to help them mask other auditory distractions. Several reported a need for relaxing colors of paint, few distracting visuals, and a break that allows them to walk.

Discussion

Since a primary component of AD/HD is difficulty in "attending" to an important stimulus (American Psychological Association, 1994), distractibility during classroom
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examinations is a pronounced problem for college students with AD/HD. Consequently, common accommodations have included a separate and quiet testing environment. Additionally, assuming that distractibility and inattention consume more time when compared with an individual who focuses more easily on a task, extended time for exams has also become commonplace (Farrell, 2003; Lancaster, Mellard, & Hoffman, 2001). Surprisingly, little research has been conducted to determine the efficacy of such existing testing accommodations for college students. The research literature is also in need of new and innovative strategies for accommodating diverse student needs. Not only are educators encouraged to be responsive to the needs of an increasingly diverse student population, they are also encouraged to model and facilitate student learning with contemporary technological tools. We examiners of the current study believe that "time is of the essence" in education. We must successfully accommodate the needs of our changing demographic of students, and we must be efficient in doing so. The current study was undertaken with the goal of determining the efficacy of not only the commonly existing AD/HD testing accommodation strategies of extended time for testing, but also to offer CBT as an accommodation strategy. Furthermore, although quantitative research and resulting data are invaluable, it was our belief that qualitative information, particularly student feedback, was equally important in the consideration of what accommodations may or may not be viable in practice.

Our study employed commonly existing testing strategies of paper-pencil testing, and regular or extended time as a condition for some participants, while other conditions employed the variables of computerized testing with regular or extended time. All conditions utilized the most common accommodation of a quiet individualized environment. As reported, the quantitative data analysis supported the hypothesis that students performed better on a computer–
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Based than paper-pencil test and is supported in the literature as cited previously in studies by Burk (1998), Calhoon, et al. (2000), and Russell and Plati (2000). It is essential to note, however, that our findings must be considered within the light of an admittedly small sample size, especially for conducting a 2x2 factorial analysis.

The small sample size of this study also decreased the generalizability of our findings. The difficulty in solicitation of students diagnosed with AD/HD and registered with ODS by way of posted announcements contributed to the small sample size as well as the challenges of many of the participants in following through with their scheduled appointments to participate in the study. A larger sample size would allow for identifying differences among participants related to gender, medication regime, and diagnosis of other possible co-existing learning disabilities. A larger sample size would also afford a detailed investigation of other important design factors such as the formatting of the paper-pencil and CBT tests. The CBT test was formatted according to the existing constraints of the assessment feature in the university’s groupware which only allowed for testing items to be viewed on the screen one at a time. The paper-pencil version of the test was administered in the traditional format of the participant receiving all questions of the test in one document and recording the responses on a standardized electronic scoring response form.

Although the quantitative data found that students performed better in CBT, the qualitative data suggested that the majority of students preferred paper-pencil tests over computerized ones. They cited a preference for being able to write on and make notes on the test. One reason for the preference of paper-pencil over computer testing might be one of familiarity (comfort) with paper-pencil, while few may have much prior experience with a computerized testing environment. Furthermore, it must be noted that the ability to write on the test may be
viewed as an accommodation, since writing on tests is sometimes not allowed in the university classroom testing. In the interest of accommodating individual student needs, perhaps college students with AD/HD could be given a choice of paper-pencil or computer, with the willingness and approval of the instructor. Computer testing also could be offered with the ability to make notations in the margins, skip questions and return to them, and/or view one at a time or as many as desired.

Quantitative data analysis also showed no significant difference in performance in the conditions of regular time vs. extended time in either paper-pencil or computerized testing conditions. Again, analysis of the qualitative data suggested that extended time is a preferred accommodation as reported by college students with AD/HD. However, a closer look at the quantitative data did indicate that overall scores were higher (although not reaching the level of significance) in the condition of extended time, whether paper-pencil or computer. This finding is also supported in previously reported studies by Medina (2000), Zuriff (2000), and Weaver (2000). It should be mentioned, however, that only Zuriff (2000) found extended time to be a benefit to learning disabled students only, as compared to all students. Overall, it seems that the statistical trend of higher scores with extended time, along with extended time as a preference of students with AD/HD, supports extended time as a viable accommodation.

Qualitative data further reinforced the assumption that reducing distractibility will assist students with AD/HD in performing better on exams. When asked about other variables that might impact their testing performance, several participants reported a variety of preferences such as a quiet environment with comfortable yet few furnishings, a comfortable temperature setting, and natural light. Some participants reported that they would prefer background music while others said they preferred a quiet environment. The reported variety of individual
preferences demonstrates a need to individualize accommodations in order to provide students with AD/HD the most effective accommodations.

In conclusion, findings indicated that college students with AD/HD scored significantly higher with computerized testing as compared to paper-pencil. This supports CBT as a viable and beneficial accommodation for university disability services to utilize. While several students with AD/HD stated a preference of a traditional paper-pencil format, they may likely adapt to computerized testing over time as their skills with computers increase and as computerized testing becomes more sophisticated with the ability to make notes in the margin, etc., as previously mentioned. Although computerized testing may at first represent more effort on the part of educators, it may prove to be more efficient and cost effective over time. In fact, computers may provide a distinct advantage to paper-pencil for all students. Grading and recording grades may be more easily accomplished with an electronic computer-testing format. Perhaps college students with disabilities could return to the general classroom in which all students were afforded choices in testing accommodation, including computerized versions of tests, that would best accommodate individuals’ diverse academic needs. As researchers continue to investigate the diverse needs of college student populations, such as those struggling with AD/HD, it may also contribute to our overall understanding of how best to educate all students and creatively utilize technology to improve learning.

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