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Table of Contents

Journal of Postsecondary Education and Disability, 32(1)

Identifying as a College Student with a Disability: From the Editor

Students choose to attend college for many reasons, chief among them is to establish a vocational identity, fostering "broad-based development of human talent and potential" (Chickering & Reisser, 1993, p. xi). For college students with disabilities, self-identity may be more complex. Do they choose to identify as a college student, or as a college student with a disability? "There may be a degree of choice as to whether disability is a permanent or transient feature of identity" (Riddell & Weedon, 2014, p. 39).

The first couple articles in this issue address identity issues for college students with disabilities. Some authors (e.g., Coduti, Hates, Locke, & Youn, 2016; Demery, Thirlaway, & Mercer, 2012) provided evidence that students may be concerned with disclosing an identity that includes a disability. The stigma associated with having a disability, either perceived or real, has also been addressed by some authors (e.g., Trammell, 2009).

The lead article in this issue of the *Journal of Postsecondary Education and Disability* explores the self-(un)identification of disability in higher education. **Katherine Aquino (Manhattan College)** and **Joshua Bittinger (University of Massachusetts Amherst)** addressed the number of students with self-identified disabilities within higher education and the change in self-identification cases over the course of postsecondary enrollment. Utilizing data from the Beginning Postsecondary Students Longitudinal Study, they found that 59% of students who self-identified with disabilities during the first year of postsecondary education unidentified by the first follow-up and, of those who identified as having a disability at the first follow-up, only 38% also self-identified during the base-year. In the next article, **D. Akin** and **Lisa Huang (University of California, Davis)** addressed disability stigma within higher education. The researchers examined how college students perceive their peers who have a disability and how these perceptions differ depending on the type of disability. The results showed that students with visible disabilities compared to students with non-visible disabilities were perceived as being more sociable and academically capable, but they also were perceived as displaying more disruptive classroom behaviors.

In the third article, college student athletes returning to the classroom following sport-related concussions were discussed. **Amanda Acord-Vira, Diana Davis, Reagan Curtis (West Virginia University)** and **Steven Wheeler (University of Cincinnati)** examined student athletes' perspectives regarding learning following sport-related concussions. The presence of a "return to learn" policy at colleges did not improve the odds that student athletes received education on the effects of concussion on academic performance, or improve concussion reporting or receiving accommodations while recovering from symptoms of concussion. In the next article **Thomas Cox, Brian Ogle,** and **Laurie Campbell (University of Central Florida)** investigated challenges and preferred instructional strategies in STEM learning among higher education students with a learning disability. The participants' self-reported challenges for learning science content included difficulty in interpreting complex texts, trouble recalling content, and content that was not connected to real-world applications; they preferred instruction with hands-on experiential learning opportunities taking place outside of the traditional classroom environment.

In the fifth article, **Michael Faggella-Luby (Texas Christian University), Nicholas Gelbar, Joseph Madaus, Adam Lalor, Allison Lombardi (University of Connecticut),** and **Lyman Dukes III (University of South Florida St. Petersburg)** present a systematic review of the literature on learning strategy instruction for college students with disabilities. Their review analyzes a subset of empirical articles on learning strategy instruction in higher education for students with disabilities spanning 1955-2015 as organized by the PASS Taxonomy (Dukes, Madaus, Faggella-Luby, Lombardi, & Gelbar, 2017). This issue includes two practices briefs; the first one is on the effects of completing the Postsecondary Rewarding Education is Possible (PREP) Academy, a university-based transition project for students with disabilities. **Jeremy Ford, Julianne Wenner,** and **Victoria Murphy (Boise State University)** describe the PREP Academy as a campus-based, weeklong experience in which students participate in activities designed to mirror the "college experience." In the next practice brief, **Feilin Hsiao, Terri Johnson, Daniel Nuss, Michael Doherty (University of the Pacific)** and **Sheryl Burgstahler (University of Washington)** introduce a faculty development program on promoting an accessible learning environment for students with disabilities. The program was a sustainable, yearlong, five-module faculty development program that included universal design of instruction, characteristics of diverse learners, accessible online learning, and disability-related laws and regulations.

The editorial team and review boards associated with the Journal of Postsecondary Education and Disability are proud to provide this issue for your learning and enjoyment.

Roger D. Wessel, Ph.D.
Executive Editor

References

Chickering, A. W., & Reisser, L. (1993). *Education and identity* (2nd ed.). San Francisco: Jossey-Bass.

Coduti, W. A., Hayes, J. A., Locke, B. D., & Youn, S. J. (2016). Mental health and professional help-seeking among college students with disabilities. *Rehabilitation Psychology, 61*, 288-296.

Demery, R., Thirlaway, K., & Mercer, J. (2012). The experiences of university students with a mood disorder. *Disability & Society, 27*, 519-533.

Dukes, L. L. III., Madaus, J. W., Faggella-Luby, M., Lombardi, A., & Gelbar, N. (2017). PASSing College: A taxonomy for students with disabilities in postsecondary education. *Journal of Postsecondary Education and Disability, 30*, 113-129.

Riddell, S., & Weedon, E. (2014). Disabled students in higher education: Discourses of disability and the negotiation of identity. *International Journal of Educational Research, 63*, 38-46.

Trammell, J. (2009). Postsecondary students and disability stigma: Development of the postsecondary student survey of disability-related stigma (PSSDS). *Journal of Postsecondary Education and Disability, 22*, 106-116.

The Self-(un)Identification of Disability in Higher Education

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Abstract

Use of the self-identification process and accommodation services can, in theory, positively contribute to student success; however, students with disabilities may be negatively impacted if they perceive others viewing them as less significant members of the college community. This study identifies the number of students with self-identified disabilities within higher education and the change in self-identification cases over the course of postsecondary enrollment. Utilizing data from the Beginning Postsecondary Students Longitudinal Study, findings indicate that, 59% of students who self-identified during the first year of postsecondary education, unidentified by the first follow-up and, of those who identified as having a disability at the first follow-up, only 38% also self-identified during the base-year.

Keywords: students with disabilities, self-identification process, accommodation use

According to the U.S. Department of Labor (n.d.), individuals with disabilities constitute the largest minority group within the United States. Within the higher education setting, over 2.5 million students enrolled in postsecondary institutions self-identify as having a disability (Synder & Dillow, 2015). Although this number represents only approximately 11% of all undergraduate students registered in higher education, the overall enrollment of this student group is growing (Synder, de Brey, & Dillow, 2016).

Despite the increased presence of students with disabilities within the postsecondary educational environment, there is variability in accurately capturing data on this student group (Alverson, Naranjo, Yamamoto, & Unruh, 2010; Leake, 2015; Schroedel, 2007). When comparing different national postsecondary data collection systems, Leake (2015) concluded that variation in student disability statistics occurs if students do not self-identify a disability within the college setting or fail to reveal their disability status in self-reported data. Inconsistent transition planning into higher education, negative self-perceptions of revealing one's disability, and stigmatization within the college environment can all influence the decision to self-identify in the postsecondary educational sector (Barnard-Brak, Davis, Tate, & Sulak, 2009; Magnus & Tossebro, 2014; May & Stone, 2010).

Disability may be self-disclosed at any point within a student's college experience, with a student requesting or denying accommodation services based on their preference and perception of service functionality. As noted by Riddell and Weedon (2014), with disability, "there may be a degree of choice as to whether disability is a permanent or transient feature of identity" (p. 39). In addition to concealing one's disability, fluidity of a disability status may impinge accurate data collection on this student characteristic, allowing this student group to be imprecisely explored and frequently excluded from mainstream postsecondary research (Peña, 2014; Quick, Lehman, & Deniston, 2003). Namely, research to date has not investigated comprehensively the variation in disability self-identification in national postsecondary student samples. Without appropriate exploration of how students change disability status throughout institutional enrollment, there is no way to gauge the consistency of accommodation use or define reasons to formally remove one's disability status from institutional records.

The purpose of this study was threefold. First, this study identified the number of students with self-identified disabilities within higher education and the change in self-identification cases over the course of postsecondary enrollment. Second, this study explored characteristics of students maintaining the identification of their disability and those unidentifying the disability within the first three years of postsecondary enrollment. Lastly, this study at-

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tempted to identify the potential influence of student characteristics (e.g., demographic characteristics, academic achievement) on potential self-identification. Therefore, this research study was guided by the following questions: (1) How many students identify as having a disability while enrolled in postsecondary education and does this self-identification remain consistent over time?; (2) What are the descriptive differences in student characteristics, based on variation in disability self-identification?; (3) To what extent do student characteristics and academic achievement account for change in the self-identification of one's disability?

Literature Review

As defined by the Americans with Disabilities Act (ADA Amendments Act, 2008), a disability is a physical or mental condition that causes substantial functional limitations of one or more life activities, including learning. For students with disabilities, the presence of the disability may create additional obstacles when navigating within the college environment. There is evidence that students may be apprehensive to reveal their disability status due to potential labeling or shame (Coduti, Hayes, Locke, & Youn, 2016; Demery, Thirlaway, & Mercer, 2012). Policies within the postsecondary sector ensure the availability of disability support services to assist students in coursework and within their institutional community. Although disability accommodations are, in theory, available to increase equity between students with and without disabilities, there are various reasons as to why students with disabilities may not fully or consistently disclose their disability within the higher education setting.

Integration and Persistence in Postsecondary Education

Research indicates that students with disabilities have challenges integrating into and persisting within the postsecondary environment (Koch, Mamiseishvili, & Higgins, 2014; Mamiseishvili & Koch, 2010; Morina, 2015; Shepler & Woosley, 2012). When entering college, regardless of disability status, students must successfully navigate the postsecondary setting to feel included and welcomed within the socio-academic environment. As noted by Shepler and Woosley (2012), engaging in the socio-academic activities within the college environment creates experiences understood by any student; however, unlike challenges faced by students without disabilities, those with disabilities may have ongoing hindrances integrating within the postsecondary community due to required accommodations and disability-based support. Although an increased sense of belonging allows for improved relationships and feelings of inclusion (Vaccaro, Daly-Cano, & Newman, 2015), disability status may potentially inhibit the student from engaging within their environment, preventing him or her from finding support within the academic setting (Markoulakis & Kirsh, 2013). Demery et al. (2012) found that students with mood disorders did not frequently share information about their disability to members within their institutional community (e.g., friends, academic staff). Not self-identifying may be due to previous and/or self-perceived negative connotations related to their disability; this choice may subsequently be "detrimental" (p. 529) to current socio-academic experiences within the higher education environment.

Students with disabilities may have difficulty familiarizing themselves with new social and academic situations found within the college setting and may consider dropping out of higher education (Adams & Proctor, 2010). Embodying the "characteristics of a nontraditional or at-risk student" (Mamiseishvili & Koch, 2010, p. 100), students with disabilities require additional support from the institutional community, which influences their persistence within postsecondary education (Getzel, 2008). Koch et al. (2014) found that for students with psychiatric disabilities, situations that allowed for increased academic integration (e.g., meeting with academic advisors) and social integration (e.g., participating in school clubs) was significantly related to student persistence. Ultimately, the role of students' ability to academically and socially integrate within the postsecondary environment impacts their overall ability to persist.

Self-identification and Disclosure

Students entering higher education who previously received disability support services within the K-12 sector may also have the opportunity to receive accommodations at the postsecondary level. However, different procedures for requesting disability support services occur within the secondary and postsecondary sectors. Unlike the process and structure experienced within the K-12 environment (i.e., through the use of an individualized education program [IEP]), the student is responsible to notify the institution that he or she will require accommodations and must provide adequate documentation to support this request. Without adequate documentation, students may be unable to access needed accommodations (Sparks & Lovett, 2009). No longer can the student rely on the use of an IEP team, consisting of student advocates including a school counselor/psychologist, teachers,

school administrators, and parents, to support and promote the student's rights and needs.

Disclosing a disability is a voluntary action but until the student formally self-identifies, an institution is not required to support the student through any form of accommodation (United States Department of Education, 2017). To ensure that the student is knowledgeable of the self-identification process within the higher education environment, it is crucial that students with disabilities receive information and be prepared for the transition into postsecondary education (Megivern, Pellerito, & Mowbray, 2003; United States Department of Education, 2017). Institutions will provide accommodations "that are necessary to afford an individual with a disability an equal opportunity to participate in a school's program" (United States Department of Education, 2017, p. 25). However, students with disabilities may be hesitant to accept support services as self-identifying may have a negative impact on their socio-academic postsecondary experience (Hadley, 2009; Milsom & Hartley, 2005). Neither disclosing a disability nor receiving needed accommodations may thwart the student's postsecondary experience; however, students with disabilities are cautious in self-disclosing because of fear of potential stigma by their peers (American Council on Education, 2008; Martin, 2010).

Receiving Accommodations in Higher Education

With the use of the self-identification process, students with disabilities have the opportunity to receive accommodations to support their postsecondary educational experience. Despite this, students with disabilities may not use the available support services if they had preconceived attitudes on accommodation use within the postsecondary institutional setting or did not engage in transition planning prior to entering higher education (Barnard-Brak, et al., 2009; Newman & Madaus, 2015). According to Barnard-Brak et al. (2009), students with disabilities are more likely to request accommodations when they positively perceive the concept and use of disability support services. Moreover, based on data from the National Longitudinal Transition Study-2 (NLTS-2), Newman and Madaus (2015) found that students who received ample transition planning from secondary to postsecondary education were more likely to use available accommodations and support services. Negatively perceived use of accommodations or reluctance to self-identify may cause additional obstacles for the students and their postsecondary success (Magnus & Tossebro, 2014).

Misconceptions on available disability support within the higher education environment may have a negative impact on students' with disabilities postsecondary experience (Sniatecki, Perry, & Snell, 2015). When assessing faculty knowledge and attitudes of students with disabilities and available disability support services, Sniatecki et al. (2015), noted that faculty members often had a lack of understanding regarding the use of accommodations. Additionally, Lombardi, Murray, and Gerdes (2011) found inconsistencies between faculty members "attitudes toward inclusive teaching practices and their self-reported actions" (p. 250) with students with disabilities. Even if students participate in the self-identification process to receive disability support services, the knowledge and actions of members within the institutional environment toward students with disabilities may influence students' continued use and/or effectiveness of the available accommodations.

Stigmatization of Student Disability

Research frequently notes the reoccurring presence of stigmatization towards individuals with disabilities within the higher education environment (Maranzan, 2016; Martin, 2010; May & Stone, 2010; Sachs & Schreuer, 2011; Trammell, 2009). Perceived negative attitudes toward disability may impede the desire and/or action of a student with a disability to seek out needed and available support and accommodations (Maranzan, 2016). Utilizing the Postsecondary Student Survey of Disability-related Stigma (PSSDS), Trammell (2009) found that students with disabilities faced the greatest amount of stigma with relation to how they felt their peers perceived them. Additionally, when surveying students with mental health conditions, Martin (2010) found that approximately two-thirds of their study's sample did not self-identify their disabilities because of previously experienced and/or perceived discrimination specific to the self-identified disability.

Regardless of the type of one's disability, there is evidence of disability stigmatization for both visible and nonvisible disabilities (Sachs & Schreuer, 2011). When assessing the participation of students with physical, sensory, or cognitive disabilities within the postsecondary environment, Sachs and Schreuer (2011) found that students with disabilities partook in fewer social and extra-curricular events, concluding that current supports within the higher education environment "do not satisfy the need to reduce the social gap, stigma, and isolation experienced by many students with disabilities" (p. 15). Moreover, students with learning disabilities (LD) perceive that those within their environment view individuals with the specific disability type as less intelligent than individuals who do not have a LD diagnosis (May & Stone, 2010). Lisle and Wade (2014) found that

a bias existed towards the idea of LD, noting that "a mere presence of a LD label had the ability to cause a differential perception of those with LDs and those without LDs" (p. 212). If students believe that members of their institutional community perceive their disabilities as a negative, lesser-than characteristic, they may be hesitant to self-identify.

Theoretical Framework

This study was guided by the minority group model of disability (Hahn, 1985). Hahn (1986) noted that there is an intertwined relationship between the overall perception of disability and the creation and implementation of disability policy. Moreover, within the framework, individuals with disabilities are often incorrectly judged and negatively viewed, and that societal perception of disability is perpetuated by existing policy. The minority group model of disability frames individuals with disabilities as a group that are susceptible to discrimination, and that "the opportunities of people with disabilities are limited far more by a discriminatory environment than by their impairments" (Scotch, 2000, p. 214). Understanding that students may unidentify their disability statuses for several reasons including the desire to disassociate with formalized documentation of disability (if the student was discriminated against because of the disability status), the theoretical framework cognizes the structure of disability as an oppressed characteristic and recognizes the lack of equity for individuals with disabilities (Hahn, 1985; 1986; 1996).

Method

Sample

This study utilized data from the Beginning Postsecondary Students study of 2004-2009 (BPS:04/09), sponsored by the National Center for Education Statistics ([NCES]; Wine, Janson, & Wheeless, 2011). While an updated BPS study is currently underway, the 2004-2009 study was the most recent complete iteration. We used data from the base-year (2004) and the first follow-up (2006) waves. The BPS:04/09 study is nationally representative of Title IV-eligible postsecondary institutions across the United States, with a focus on first-time college students. Data for the study were obtained from institutional records, administrative databases, and student interviews. Importantly, students who participated in the BPS:04/09 were asked about disability identification during each wave of data collection.

From the 23,090 students in the BPS:04/06 sample, we created two analytic samples. Our first analytic sample contained only the 1,670 students who identified as having at least one disability during the base-year, which was their first year in postsecondary education. We limited our sample in this way because our aim was to explore the unidentification patterns for students who identified as having a disability in their first year. The second analytic sample included all students who identified as having a disability during the first follow-up. This sample contained 1,820 students. For this sample, we were interested in exploring identification patterns for students who did not identify as having a disability during the base year. All reported sample sizes were rounded to the nearest ten, complying with our NCES restricted data use agreement.

Analytic Methods

To address our research questions, we used a variety of statistical methods. Our first question was best answered using descriptive statistics. The second research question required the use of a series of means comparisons in order to identify where students who remained identified and those who unidentified differed in statistically significant ways. Additionally, we made these comparisons between students who remained identified and the students who newly identified at the first follow-up. These comparisons were conducted using data from both the base-year and first follow-up waves of data collection. We employed logistic regression to answer our third research question, allowing us to identify variables that were correlated with students' decisions to unidentify as having a disability by the first follow-up. These models were run in a nested series to view the impact that subsequent blocks of variables had on previous estimates and the fit of the model.

Utilizing list-wise deletion to address missing data would have been problematic because the sample size would have been cut in half. Instead, we used multiple imputation – the most widely recommended method, partially because it reduces bias in model estimates compared to methods such as list-wise deletion (Cox, McIntosh, Reason, & Terenzini, 2014; van Buuren, 2012). Due to the complex sampling design employed during data collection, sampling and design weights were included in the imputation process (Heeringa, West, & Berglund, 2010) to account for student responses being nested within postsecondary institutions. We used Stata 14's *mi impute chained* command, generating 100 imputed datasets and used Rubin's (1987) rules to pool results. One hundred datasets were imputed due to the large fraction of missing data (i.e., FMI) during some means comparisons, particularly the SAT/ACT score (White,

Royston, & Wood, 2011). Diagnostic analyses were then conducted, raising no causes for concern with the imputed data. For instance, we tabulated values for the original and imputed data and compared to identify significant discrepancies. No more than minor differences were found, which is to be expected.

Following the advice of Manly and Wells (2015), we provide supplemental information about the missing data. Across the samples, the rate of missingness ranged from 3% for parental education up to 42% for SAT/ACT score. All missing data resulted from the question being skipped during the student interview. For SAT/ACT scores, students were not asked for their score if they did not take either test (16%) or were more than 23 years old (26%). Missing data rates for academic and social integration were 12% during the base-year and 25% during the first follow-up. Students no longer enrolled in higher education were not asked this question, nor were students in a degree program less than an Associate's level (12%). Finally, GPA in 2006 had a rate of missingness of 33%. This question was skipped if the student was no longer enrolled in postsecondary education. Excluding students who were no longer enrolled in higher education resulted in nearly identical identification proportions.

Variables

The majority of the variables used in our analyses were captured during the base-year of the survey. Many of these variables were demographic in nature, including self-reports of gender and racial identities, age, parental income and education, and disability type. Because the noted variables were demographic characteristics, it was likely assumed the variables would remain fairly stable over time and were not measured at each time point. This assumption is not always safe to make, as we show by investigating the transitory nature of disability identity, which was measured at each data collection wave. Of note for our disability variables, students who identified as having a disability during the first follow-up were only asked if they had sensory, mobility, or other impairments. This greatly limited our ability to explore trends in identification by disability type.

Variables that we compared from each of the first two waves of data collection included grade point averages and two indexes of integration. The two integration indexes pertained to students' academic and social integration and were constructed by the NCES. These indexes were not perfect, but after reviewing the variables available within the data set, we determined that any attempt to refine or enhance the scale was not worthwhile. The composite measure of academic integration was composed of students' responses about the frequency (i.e., never, sometimes, often) of engaging in the following: participating in study groups, having social contact with faculty, meeting with academic advisor, and talking with faculty about academic matters outside of class (Wine et al., 2011). Social integration represented the frequency students engaged in the following: attended fine arts activities, participated in intramural or varsity sports, or participated in school clubs. Two variables only measured during the first follow-up were utilized: transfer status and attainment or persistence. The reasoning for this was simple: a student could only transfer after first attending a school, and since the base-year wave only captured new students, there was no opportunity for them to have yet transferred. Further, attainment and persistence can only be measured over time.

For the logistic regression models of unidentification, categorical variables were manipulated in order to produce meaningful and interpretable estimates. Manipulation resulted in the dichotomization of the following variables: institutional level indicating whether an institution was 4-year or not, institutional control to indicate whether an institution was public or not, and race to represent whether a respondent was White or not. Inclusion decisions were driven by descriptive comparisons between students who remained identified and those who unidentified as well as through empirical model trimming where variables which did not contribute to a better model fit were excluded. Only unidentification was predicted because we had more disability-related information for these students.

Results

During the base-year of data collection, over 10% of students identified as having any form of disability. This percentage increased slightly to 11% two years later during the first follow-up. To some, this might signal stability in disability identification; however, the students within this group identifying as having at least one form of disability were not consistent. While 1,670 students identified as having a disability during the base-year, 59% unidentified by the first follow-up. Of the 1,820 students who identified as having a disability at the first follow-up, only 38% also self-identified during the base-year.

Few statistically significant differences existed between students who remained identified as having a disability at the first follow-up and those students who unidentified as having any type of disability. The students who remained identified were older, on average, than students who unidentified when they first

enrolled in postsecondary education (25.69 years old versus 22.97 years old, $p < 0.01$). Of those who remained identified, a proportionally higher amount had a sensory disability (23% versus 11%, $p < 0.01$). Students remaining identified also applied for vocational rehabilitation services at disproportionately higher rates during the base wave of data collection (22% versus 14%, $p < 0.01$). Additionally, although not reaching our identified level of statistical significance ($\alpha < 0.05$), during the base-year of the study, the two groups were quite similar, on average, in terms of social integration; however, students who unidentified by the first follow-up appeared to be less socially integrated than those who remained identified. Complete results can be found in Table 1.

Similarly, only a few statistically significant differences were discovered between students who remained identified and those who newly identified at the first follow-up. Students who remained identified were, on average, older when they initially enrolled than students who newly identified (25.69 years old versus 23.14 years old, $p < 0.01$). The proportion of students with physical disabilities was higher in the group of students who remained identified (34% versus 25%, $p < 0.05$). Finally, the proportion of students who had transferred at least once was higher in the group of students who newly identified (15% versus 21%, $p < 0.05$). See Table 2 for complete results.

Descriptively, we saw differences between the students who remained identified and those who unidentified along the lines of disability type and racial identity. Comparing proportions between the two groups, more students in the remained identified group reported having a hearing impairment during the base-year (8% versus 3%). Conversely, for students who identified as having a health impairment during the base-year, a higher proportion moved into the unidentified group by the first follow-up (14% versus 18%). In terms of racial and ethnic identity, students identifying as Black (8% versus 11%) or Hispanic (9% versus 15%) represented a higher proportion of students within the unidentified group, while a higher proportion of White (74% versus 62%) students remained identified. These results can be found in Table 3. In terms of racial and ethnic identities between the students who remained identified and those who newly identified at the first follow-up, a high proportion of White (74% versus 65%) students remained identified while higher proportions of Black (8% versus 11%) and Hispanic (9% versus 15%) students newly identified. Full results for these two groups can be found in Table 4.

Table 5 contains the results of the final nested logistic regression models in the form of odds ratios. In this study, an odds ratio can be thought of as the effect that a variable has on the odds of a student unidentifying. When a ratio is equal to one, the variable has no effect. Ratios greater than one are associated with increases in the odds of unidentifying while ratios less than one represent lower odds of unidentification. The complete model results are consistent throughout the modeling process (i.e., the estimates remained statistically significant throughout), so only those results are reported here. From the model estimates, we were able to see the impact that different disability types had on students' probability of unidentifying by the first follow-up. Students who reported difficulty learning or who had sensory disabilities were unlikely to unidentify. Converting the odds ratios reported in Table 4, students with difficulty learning had a probability of 0.37 to unidentify. Students with sensory disabilities had a probability of just 0.26.

Vocational rehabilitation services appeared to have a substantial impact on the likelihood of a student unidentifying. For students who applied to receive these services, their probability of unidentifying was particularly low: 0.25. However, students who actually received these services were quite likely to unidentify, with a probability of 0.71. Consistent with the descriptive results above, age had an influence on the decision to unidentify, with the likelihood decreasing as students got older. Finally, our results indicated that White students were unlikely to unidentify, having a probability of only 0.36. This result was consistent with the racial representation in the descriptive results discussed above.

Discussion and Implications

This study brought to light some important distinctions between students who unidentified as having a disability and those who maintained disability identification status throughout postsecondary enrollment, while also raising several new questions about the unidentifying population. As mentioned previously, students with disabilities are likely to have a decreased sense of belonging due to increased social stigma. We conceptualized the social integration index as a manifestation of students' sense of belonging. During the base-year when all students identified as having a disability, the average social integration of both groups was nearly identical. Yet by the first follow-up, students who remained identified became more socially integrated than their peers who unidentified. While this difference was not statistically significant, this trend is worth noting because of the implications it could have on further longitudinal analysis of this and similar measures. Students

who unidentified might have done so due to lower perceived sense of integration, in hopes that by unidentifying they would feel like they belonged. These differences also supported Hahn's (1985;1986) minority group model, particularly the role the environment plays in "disabling" persons.

Another trend that surfaced was the difference in percentages for types of disabilities reported within the groups of unidentified and identified students, particularly for physical and sensory disabilities and students with difficulty learning. Across these three types, only the difference between the percentage of students with sensory disabilities reached statistical significance. For this type of disability, a higher percentage remained identified by the first follow-up. Students with physical disabilities tended to unidentify while those experiencing difficulty learning were likely to remain identified. In compliance with ADA regulations, postsecondary institutions readily work toward making the physical campus accessible. As a result, students with physical disabilities are better able to access buildings and move about campus with more limited interference in their everyday lives, reducing the perceived stigma of their conditions. Conversely, institutions face larger hurdles when making campuses accessible to students with learning and/or sensory disabilities. These students may rely more on accommodation services to access classroom material such as extended time for tests, audio- visual technology, or completing tests in an alternate location. These accommodations, while often proving to be critical for students (Hartman-Hall & Haaga, 2002), enhance feelings of being different (Kranke, Jackson, Taylor, Anderson-Fye & Floersch, 2013; Marshak, Van Wieren, Ferrell, Swiss & Dugan, 2010). Additionally, the higher percentage of students with physical disabilities in the unidentified group of students speaks to the transient nature of some types of disability. For instance, a student responding to the survey during the base-year could have been on crutches because of breaking a leg and identified as having a physical disability. By the first follow-up, the leg could have completely healed and the student no longer identified as having a disability. Also noteworthy was the finding that students who pursued vocational rehabilitation services were more likely to remain identified. Seeking these services implies that these students are in the workforce, prompting further research into the net impact of working on postsecondary persistence and attainment for this population.

Given the measures captured by the NCES in the BPS:04/09 study, we are still left with several questions pertaining to disability identification status. We need to know more about these students, particularly reasons for unidentifying or newly identifying over time. Additional research is also needed to explore whether the students who unidentify do so just when asked on a survey or to the disability services office on their campuses as well. Practitioners will be able to use our results to better serve their students by anticipating unidentification and new identification and providing additional support for these students as they transition. Disability identification is often assumed to be static in the literature; yet, our findings suggest quite the opposite: a large percentage of students with disabilities are much more fluid in their identification. These results warrant the measurement of identification at each time point for longitudinal studies and raise new questions for an understudied population.

Limitations

There are a couple of limitations of this study that should be noted. The first pertains to the measurement of disability by the NCES in the BPS:04/09 study. While disability was measured in some form during each wave of data collection, the approach was not consistent. During the base-year, a measure was included that captured the main disability type for students who identified as having a disability. The more fine-grained nature of this measure is appealing to use for research; however, it completely disregards the issue of comorbidity of disability. Further, this level of detail was not captured in the following wave of data collection, so comparisons over time (the intention of this paper) were not feasible.

An additional limitation to carefully consider is the conceptualization of the academic and social integration scales by the NCES. Integration is a heavily researched topic in higher education and has given rise to multiple operationalizations over time. In this dataset in particular, these indices were composed of relatively few behaviors. This is problematic given the vast realm of possible ways that students are able to become integrated on their campuses. Social integration was particularly flawed in this manner because of its very limited view of social activities (e.g., sports teams, extracurricular clubs). Only one of the three activities allowed for the attendance at an event to be considered social integration; whereas, the other two items necessitate that students formally belong to recognized groups. It is possible that replicating our study with different conceptualizations of these forms of integration using different data would result in differential effects of integration on likelihood of unidentifying.

Conclusion

Continued research is needed on this population of students with disabilities who are unidentifying as having a disability. While the BPS data allowed us to identify this population, few variables were useful to our overall understanding of why students are unidentifying. Our results brought to light some potentially valuable threads to pursue in additional research, particularly around the role of social connection and feelings of belonging in students' identification decisions. Supplementing these data with data from other national studies such as the National Longitudinal Transition Study and/or a qualitative component focusing on students who change their identification status would enhance our understanding of this phenomenon. Currently, we cannot be sure whether this trend should be concerning to researchers and practitioners. These supplementary data would also help to identifying ways in which campus community members can support students during these transitional periods. However, from our results, we hope to highlight the size of this subpopulation of students with disabilities. This subpopulation reinforces the fluid nature of disability and should prompt further discussions of the services being provided to these students at postsecondary institutions across the US and whether we are prepared to fully support students through this decision process.

References

ADA Amendments Act of 2008, Pub. L. No. 110-325, 42 U.S.C. § 1201 et seq. (2008).

Adams, K. S., & Proctor, B. E. (2010). Adaptation to college for students with and without disabilities: Group differences and predictors. *Journal of Postsecondary Education and Disability, 22*, 166-184.

Alverson, C. Y., Naranjo, J. M., Yamamoto, S., & Unruh, D. K. (2010). Methods for collecting postschool outcomes data on young adults with disabilities: A literature synthesis. *Career Development for Exceptional Individuals, 33*, 155-164.

American Council on Education. (2008). *Serving those who serve: Higher education and America's veterans.* Retrieved from http://www.acenet.edu/news-room/Pages/Georgetown-Summit.aspx.

Barnard-Brak, L., Davis, T., Tate, A., & Sulak, T. (2009). Attitudes as a predictor of college students requesting accommodations. *Journal of Vocational Rehabilitation, 31*, 189-198.

Coduti, W. A., Hayes, J. A., Locke, B. D., & Youn, S. J. (2016). Mental health and professional help-seeking among college students with disabilities. *Rehabilitation Psychology, 61*, 288-296.

Cox, B. E., McIntosh, K., Reason, R. D., & Terenzini, P. T. (2014). Working with missing data in higher education research: A primer and real-world example. *The Review of Higher Education, 37,* 377-402.

Demery, R., Thirlaway, K., & Mercer, J. (2012). The experiences of university students with a mood disorder. *Disability & Society, 27*, 519-533.

Getzel, E. E. (2008). Addressing the persistence and retention of students with disabilities in higher education: Incorporating key strategies and supports on campus. *Exceptionality, 16*, 207-219.

Hadley, W. M. (2009). The transition and adjustment of first-year students with specific learning disabilities: A longitudinal study. *Journal of College Orientation and Transition, 17*, 31-44.

Hahn, H. (1985). Changing perceptions of disability and the future of rehabilitation. In L. G. Pearlman & G. F. Austin (Eds.), *Societal influences in rehabilitation planning: A blueprint for the 21st century* (pp. 53-64). Alexandria, VA: National Rehabilitation Association.

Hahn, H. (1986). Disability and the urban environment: A perspective on Los Angeles. *Society and Space, 4,* 273-288.

Hahn, H. (1996). Antidiscrimination laws and social research on disability: The minority group perspective. *Behavioral Sciences and the Law, 14*, 41-59.

Hartman-Hall, H. M., & Haaga, D. A. (2002). College students' willingness to seek help for their learning disabilities. *Learning Disability Quarterly, 25*, 263-274.

Heeringa, S., West, B. T., & Berglund, P. A. (2010). *Applied survey data analysis*. Boca Raton, FL: Chapman & Hall.

Koch, L. C., Mamiseishvili, K., & Higgins, K. (2014). Persistence to degree completion: A profile of students with psychiatric disabilities in higher education. *Journal of Vocational Rehabilitation, 40*, 73-82.

Kranke, D., Jackson, S. E., Taylor, D. A., Anderson-Fye, E., & Floersch, J. (2013). College student disclosure of non-apparent disabilities to receive classroom accommodations. *Journal of Postsecondary Education and Disability, 26*, 35-51.

Leake, D. (2015). Problematic data on how many students in postsecondary education have a disability. *Journal of Postsecondary Education and Disability, 28*, 73-87.

Lisle, K., & Wade, J. (2014). Does the presence of a learning disability elicit a stigmatization? *British Journal of Education, Society, & Behavioural Science, 4*, 211-225.

Lombardi, A. R., Murray, C., & Gerdes, H. (2011). College faculty and inclusive instruction: Self-reported attitudes and actions pertaining to universal design. *Journal of Diversity in Higher Education, 4*, 250-261.

Magnus, E., & Tossebro, J. (2014). Negotiating individual accommodation in higher education. *Scandinavian Journal of Disability Research, 16,* 316-332.

Mamiseishvili, K., & Koch, L. C. (2010). First-to-second-year persistence of students with disabilities in postsecondary institutions in the United States. *Rehabilitation Counseling Bulletin, 54*, 93-105.

Manly, C. A., & Wells, R. S. (2015). Reporting the use of multiple imputation for missing data in higher education research. *Research in Higher Education, 56*, 397-409.

Maranzan, K. A. (2016). Addressing mental illness stigma in the psychology classroom. *Psychology Learning & Teaching, 15*, 235-249.

Markoulakis, R., & Kirsh, B. (2013). Difficulties for university students with mental health problems: A critical interpretive synthesis. *The Review of Higher Education, 37*, 77-100.

Marshak, L., Van Wieren, T., Ferrell, D. R., Swiss, L., & Dugan, C. (2010). Exploring barriers to college student use of disability services and accommodations. *Journal of Postsecondary Education and Disability, 22*, 151-165.

Martin, J. (2010). Stigma and student mental health in higher education. *Higher Education Research & Development, 29*, 259-274.

May, A. L., & Stone, C. A. (2010). Stereotypes of individuals with learning disabilities: Views of college students with and without learning disabilities. *Journal of Learning Disabilities, 43*, 483-499.

Megivern, D., Pellerito, S., & Mowbray, C. (2003). Barriers to higher education for individuals with psychiatric disabilities. *Psychiatric Rehabilitation Journal, 26*, 217-231.

Milsom, A., & Hartley, M. T. (2005). Assisting students with learning disabilities transitioning to college: What school counselors should know? *Professional School Counseling, 8*, 436- 441.

Morina, A. (2015). 'We aren't heroes, we're survivors': Higher education as an opportunity for students with disabilities to reinvent an identity. *Journal of Further and Higher Education, 41*, 1-12.

Newman, L. A., & Madaus, J. W. (2015). An analysis of factors related to receipt of accommodations and services by postsecondary students with disabilities. *Remedial and Special Education, 36*, 208-219.

Peña, E. V. (2014). Marginalization of published scholarship on students with disabilities in higher education journals. *Journal of College Student Development, 55*, 30-40.

Quick, D., Lehmann, J., & Deniston, T. (2003). Opening doors for students with disabilities on community college campuses: What have we learned? What do we still need to know? *Community College Journal of Research and Practice, 27*, 815-827.

Riddell, S., & Weedon, E. (2014). Disabled students in higher education: Discourses of disability and the negotiation of identity. *International Journal of Educational Research, 63*, 38-46.

Rubin, D. B. (1987). *Multiple imputation for nonresponse in surveys.* New York, NY: Wiley.

Sachs, D., & Schreuer, N. (2011). Inclusion of students with disabilities in higher education: Performance and participation in student's experiences. *Disability Studies Quarterly, 31*, 1-21.

Schroedel, J. (2007). Estimating the number of hard of hearing and late-deafened students: Implications for services delivery and job opportunities. In D. Watson, J. Schroedel, M. Kolvitz, J. Decaro, & D. Kavin (Eds.), *Hard of hearing students in postsecondary settings: A guide for service providers* (pp. 28-44). Knoxville, TN: Postsecondary Education Programs Network.

Scotch, R. K. (2000). Models of disability and the Americans with Disabilities Act. *Berkeley Journal of Employment and Labor Law, 21*, 213-222.

Shepler, D. K., & Woosley, S. A. (2012). Understanding the early integration experiences of college students with disabilities. *Journal of Postsecondary Education and Disability, 25*, 37-50.

Sniatecki, J. L., Perry, H. B., & Snell, L. H. (2015). Faculty attitudes and knowledge regarding college students with disabilities. *Journal of Postsecondary Education and Disability, 28*, 259-275.

Sparks, R. L., & Lovett, B. J. (2009). College students with learning disability diagnoses: Who are they and how do they perform? J*ournal of Learning Disabilities, 42*, 494-510.

Synder, T. D., de Brey, C., & Dillow, S. A. (2016). *Digest of education statistics 2014* (NCES 2016-006). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, D.C.

Synder, T. D., & Dillow, S. A. (2015). *Digest of education statistics 2013* (NCES 2015-011). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, D.C.

Trammell, J. (2009). Postsecondary students and disability stigma: Development of the postsecondary student survey of disability-related stigma (PSSDS). *Journal of Postsecondary Education and Disability, 22*, 106-116.

United States Department of Education. (2017). *A transition guide to postsecondary education and employment for students and youth with disabilities.* Retrieved from https://www2.ed.gov/about/offices/list/osers/transition/products/postsecondary-transition-guide-2017.pdf.

United States Department of Labor. (n. d.) *Diverse perspectives: People with disabilities fulfilling your business goals.* Retrieved from https://www.dol.gov/odep/pubs/fact/diverse.htm.

Vaccaro, A., Daly-Cano, M., & Newman, B. M. (2015). A sense of belonging among college students with disabilities: An emergent theoretical model. *Journal of College Student Development, 56*, 670-686.

van Buuren, S. (2012). *Flexible imputation of missing data*. Boca Raton, FL: CRC.

White, I. R., Royston, P., & Wood, A. M. (2011). Multiple imputation using chained equations: Issues and guidance for practice. *Statistics in Medicine, 30*, 377-399.

Wine, J., Janson, N., & Wheeless, S. (2011). 2004/09 *Beginning postsecondary students longitudinal study (BPS:04/09) methodology report* (NCES 2012-246). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, D.C.

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Table 1

Mean Comparisons Between Students Who Remained Identified at the First Follow-Up and Those Who Unidentified

	Remained Identified		Unidentified	
Variable	**Mean**	**Std. Err.**	**Mean**	**Std. Err.**
Academic Integration ‘04	68.89	2.66	68.44	2.80
Academic Integration ‘06	80.46	2.86	78.07	3.23
Social Integration ‘04	31.42	2.45	30.78	2.16
Social Integration ‘06	38.01	2.86	34.71	2.79
% Female	0.59	0.03	0.57	0.03
Age First Enrolled**	25.69	0.64	22.97	0.38
Parental Income	$53,882.42	3,184.14	$52,181.61	2,458.47
% Physical Disability ‘04	0.37	0.03	0.42	0.03
% Difficulty Dressing ‘04	0.02	0.01	0.04	0.01
% Difficulty Learning ‘04	0.53	0.03	0.47	0.02
% Sensory Disability ‘04**	0.23	0.02	0.11	0.01
GPA ‘04	2.88	0.05	2.79	0.05
GPA ‘06	3.09	0.04	3.17	0.03
Risk Index	1.81	0.10	1.89	0.10
SAT/ACT Score	929.37	14.69	917.67	14.03
% Persisted/Attained	0.62	0.03	0.55	0.03
% Transferred	0.15	0.02	0.20	0.02
% Applied Voc. Rehab**	0.22	0.02	0.14	0.02
% Received Voc. Rehab	0.16	0.02	0.12	0.02

Notes. ** $p < 0.01$, * $p < 0.05$; $n = 1{,}670$. Results calculated using the WTA000 analytic weight in conjunction with BRR weights.

Table 2

Mean Comparisons Between Students Who Remained Identified at the First Follow-Up and Those Who Newly Identified

	Remained Identified		Newly Identified	
Variable	**Mean**	**Std. Err.**	**Mean**	**Std. Err.**
Academic Integration ‘04	70.12	2.84	67.71	2.89
Academic Integration ‘06	81.97	3.81	95.92	3.77
Social Integration ‘04	36.92	2.71	35.63	2.56
Social Integration ‘06	41.78	4.26	42.77	3.70
% Female	0.59	0.03	0.55	0.02
Age First Enrolled**	25.69	0.64	23.14	0.41
Parental Income	$52,006.26	3,128.133	$53,177.22	2,003.43
% Physical Disability ‘06*	0.34	0.03	0.25	0.02
% Sensory Disability ‘06	0.19	0.02	0.17	0.02
GPA ‘04	2.88	0.05	2.77	0.04
GPA ‘06	3.06	0.06	3.03	0.04
Risk Index	1.81	0.10	1.79	0.08
SAT/ACT Score	919.72	61.79	910.60	42.79
% Persisted/Attained	0.62	0.03	0.59	0.21
% Transferred*	0.15	0.02	0.21	0.02

Notes. ** $p < 0.01$, * $p < 0.05$; $n = 1{,}670$. Results calculated using the WTA000 analytic weight in conjunction with BRR weights.

Table 3

Percentage Comparisons Between Students Who Remained Identified at the First Follow-Up and Those Who Unidentified

Variable	Remained Identified	Unidentified
Enrollment Intensity		
Full-Time	62	67
Part-Time	10	15
Not-Enrolled	22	19
Institutional Level		
Less-than-2-year	7	12
2-year	56	55
4-year	37	33
Institutional Control		
Public	71	68
Private not-for-profit	14	12
Private for-profit	15	20
Main Disability Type		
Hearing Impairment	8	3
Visual Impairment	6	4
Mobility Impairment	21	21
SLD and Dyslexia	8	7
ADD	17	17
Health Impairment	14	18
Emotional/Psychiatric	11	10
Depression	10	12
Other	5	8
Race		
White	74	62
Black/African American	8	11
Hispanic/Latino	9	15
Asian	2	3
Another Race(s)	6	9

Note. n = 1,670; results calculated using the WTA000 analytic weight

Table 4

Percentage Comparisons Between Students Who Remained Identified at the First Follow-Up and Those Who Newly Identified

Variable	Remained Identified	Newly Identified
Enrollment Intensity		
Full-Time	71	66
Part-Time	11	10
Not-Enrolled	24	19
Institutional Level		
Less-than-2-year	7	10
2-year	56	50
4-year	37	40
Institutional Control		
Public	71	69
Private not-for-profit	14	15
Private for-profit	15	16
Race		
White	74	65
Black/African American	8	11
Hispanic/Latino	9	15
Asian	2	4
Another Race(s)	6	5

Note. n = 1,820; results calculated using the WTA000 analytic weight.

Table 5

Odds Ratios of Unidentifying by the First Follow-Up

	Block				
Variable	1	2	3	4	5
Difficulty Learning	0.64**	0.62**	0.58**	0.58**	0.59**
	(0.10)	(0.10)	(0.09)	(0.10)	(0.10)
Sensory Disability	0.34**	0.34**	0.35**	0.34**	0.35**
	(0.07)	(0.07)	(0.07)	(0.07)	(0.07)
GPA in ‘04		0.87	0.88	0.96	0.95
		(0.08)	(0.08)	(0.09)	(0.09)
Transferred			1.34	1.23	1.26
			(0.25)	(0.24)	(0.24)
Applied for Voc. Rehab Services			0.31**	0.36**	0.33**
			(0.13)	(0.13)	(0.13)
Received Voc. Rehab Services			2.17	2.41*	2.44*
			(0.99)	(1.04)	(1.05)
Age in ‘04				0.97**	0.97**
				(0.01)	(0.01)
White				0.55**	0.57**
				(0.09)	(0.09)
Attended 4-Year Institution					0.74
					(0.12)
Attended Public Institution					0.85
					(0.14)

Notes. ** $p < 0.01$, * $p < 0.05$; n = 1,670; results calculated using the WTA000 analytic weight and BRR weights

Perceptions of College Students with Disabilities

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Abstract

A large body of research on disability stigma conducted among young school children and adults in non-educational settings shows that individuals with non-visible disabilities experience more negative stigma compared to individuals with visible disabilities. However, there is a noticeable lack of research on disability stigma within higher education. The main purpose of the current research was to study how college students perceive their peers who have a disability and how these perceptions differ depending on the type of disability. Participants completed measures that assessed their perceptions of sociability, academic ability, and academic performance of students who have one of three disability types: physical (visible), cognitive (non-visible), and psychiatric (non-visible). For the given disability type, they also rated their expectations of classroom behaviors, deservingness of academic accommodations, and ability to deal with the disability. The results showed that students with visible disabilities compared to students with non-visible disabilities were perceived as being more sociable and academically capable, but they also were perceived as displaying more disruptive classroom behaviors. Differences between the two types of non-visible disabilities also were observed. Our study reveals a need for further research on perceptions of disability and how these perceptions impact students within higher education.

Keywords: disability, disability perceptions, higher education, stigma, academic experience

Stigma: Notes on the Management of Spoiled Identity (Goffman, 1963) suggested that the label of "disabled" may negatively impact one's identity. As Goffman discussed in his work, any prominent personal characteristic that sets an individual apart from others can lead to the individual being looked upon unfavorably. In other words, possessing a differentiating characteristic may lead to the experience of stigma—when undesirable qualities are attributed to an individual on account of a characteristic he or she possesses. Handicap, Goffman noted, can provide such differentiation and stigma. Goffman explained that stigma experienced by an individual with a disability can be influenced by whether the individual believes others know about his or her condition (i.e., the condition is visible), or whether his or her condition is non-visible to others. Generally speaking, a given disability can have both visible and non-visible characteristics; often times, however, a given disability is characterized by a tendency toward either visibility or non-visibility (D. Akin & UC Davis Student Disability Center, personal communication, 2016; Higher Education and Disability, 2009; Olney & Kim, 2010; O'Shea & Meyer, 2016; Rickerson, Souma, & Burgstahler, 2004). Physical disabilities tend to be visible—the individual uses a wheelchair, prosthetic, or hearing aid, has movement difficulties, or perhaps has a body part that is abnormally formed or missing (Cahill & Eggleston, 1995; D. Akin & UC Davis SDC, personal communication, 2016; Olney & Kim, 2010; O'Shea & Meyer, 2016; Rickerson et al., 2004). In contrast, psychiatric disabilities and cognitive (i.e., learning) disabilities tend to be non-visible—it may not be immediately apparent that an individual is clinically depressed or has an anxiety disorder, or that an individual struggles with reading due to dyslexia (D. Akin & UC Davis SDC, personal communication, 2016; Higher Education and Disability, 2009; Rickerson et al., 2004; Olney & Kim, 2010; O'Shea & Meyer, 2016; Stone & Colella, 1996). Despite differences in visibility status, it is important to note that both visible and non-visible disabilities can be associated with a variety of stereotypes. For instance, people may think that wheelchair-bound individuals cannot enjoy athletic activities when, in actuality, many wheelchair-bound individuals can enjoy a variety of sports such as wheelchair basketball. Similarly, people may think that people with dyscalculia

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are incapable of successfully completing any sort of math-related tasks when they simply may need a bit of extra time to complete such tasks. Thus, although not always accurate, negative stereotypes about individuals with disabilities still persist—namely, that they are generally needy and incompetent (Nario-Redmond, 2010).

Visible Disability Stigma

Individuals who have disabilities such as cerebral palsy, blindness, or other disabilities with a visible physical component may encounter a variety of negative reactions toward their disability (Cahill & Eggleston, 1995; Fichten & Amsel, 1986). Reactions range from generally negative behaviors such as avoidance and belittlement, to belittling reactions masked in positivity such as pity and overly-sympathetic behaviors, all of which can impact the self-view of individuals with disability and put a strain on normal social interactions (Allen & Birse, 1991; Cahill & Eggleston, 1995; Green, 2003; Green, Davis, Karshmer, Marsh, & Straight, 2005). An example of an unwelcome and patronizing belief concerning physical disability is that individuals with physical disabilities should be helped and treated especially kindly. Upon encountering an individual with a physical disability, a person may go out of his or her way to provide assistance to the individual even though that individual may not want such assistance (Cahill & Eggleston, 1995). For instance, a person may be overly zealous in opening a door for a wheelchair-bound individual, although the individual with the disability may not need or want such assistance.

Wheelchair users in particular are likely to encounter inconsistent, awkward, and/or difficult social situations due to physical disability stigma. For instance, in contrast to being overly helpful toward wheelchair users, some people may deliberately ignore or try to avoid wheelchair users in public places (Cahill & Eggleston, 1995). These reactions can impact individuals with physical disabilities in various ways during day-to-day activities such as going shopping and eating at restaurants. The designation of "disabled" can deter people from interacting meaningfully or at all with individuals with disability; due to unfamiliarity with disability or hesitation about interactions, people may avoid individuals with physical disabilities altogether (Green, 2003; Green et al., 2005). For example, one study found that participants chose to keep a greater distance from an individual with a physical disability than from an individual without a physical disability (Kleck, 1969).

Interestingly, the perceived severity and permanence of a visible disability can affect social interactions (Green et al., 2005). People with temporary limitations (e.g., an injury that requires a cast or crutches) may be treated more like "normal," non-disabled people, whereas people with more severe, long-term disabilities such as the loss of a limb may be treated in a "different" or "special" way. In some cases, experiencing negative disability stigma for prolonged amounts of time can result in lowered self-esteem, depression, social isolation, and suicidal thoughts. This is particularly concerning, given that an individual with a disability perceived to be severe and long-lasting may experience high amounts of negative stigma over time, which can contribute to lowered self-esteem.

Non-Visible Disability Stigma

Non-visible disabilities include a variety of disabilities that have a psychiatric or cognitive component rather an obvious physical component. Psychiatric disabilities are frequently marked by emotion-based challenges or other mental challenges, whereas cognitive disabilities are marked by information processing difficulties ("Chapter 5," n.d.; American Psychiatric Association, 2013). Several studies have found that perceptions of individuals with non-visible disabilities are often negative. For instance, some common perceptions of people with psychiatric disabilities are that they are difficult to talk to, lazy, responsible for their condition, and dangerous (Crisp, Gelder, Rix, Meltzer, & Rowlands, 2000; Wood, Birtel, Alsawy, Pyle, & Morrison, 2014). According to the disability hierarchy, individuals with psychiatric disabilities are generally perceived most negatively by others, preceded by individuals with cognitive disabilities; individuals with physical disabilities are generally perceived least negatively (Belch, 2011; Miller, Chen, Glover-Graf, & Kranz, 2009; Sniatecki, Perry, & Snell, 2015; Thomas, 2000; Tringo, 1970; Wang, Thomas, Chan, & Cheing, 2003).

Similar to physical disability stigma, psychiatric disability stigma also can vary by perceived severity and type of disability (Wood et al., 2014). For example, people with schizophrenia, a mental dissociation disorder, are thought to be more dangerous, unpredictable, and difficult to talk to compared to individuals with depression and anxiety, although individuals with depression and anxiety may be blamed more for their condition than individuals with schizophrenia. In general, people with psychiatric disabilities are portrayed in the media as being dangerous, responsible for their condition, and as people who ought to be feared (Corrigan & Watson, 2002). Such perceptions

can have serious, real-world implications for individuals with psychiatric disabilities (Susman, 1994). For example, people with psychiatric disabilities are commonly referred to by derogatory terms such as "nuts" and "psychos" in popular culture (Wahl, 1995, 2012). Further, one study found that people with psychiatric disabilities are thought to have poor life prospects (Crisp et al., 2000; Hayward & Bright, 1997).

Along the same lines, people also may believe that individuals with psychiatric disabilities should be able to "pull themselves together" or "snap out of" their disability, and that they are responsible for their condition (Crisp et al., 2000; Hayward & Bright, 1997). Additionally, people tend to believe that individuals with non-visible disabilities may attempt to fake their condition (Green et al., 2005). Such judgements can feel painful and embarrassing to people with disabilities.

People with cognitive disabilities also may experience negative disability stigma. For instance, in one study, participants viewed individuals with cognitive disabilities less favorably than they did individuals with physical disabilities; these participants were less accepting of individuals with cognitive disabilities and perceived them as having lower abilities (Werner, 2015). Additionally, participants were insecure and apprehensive of interacting with individuals with cognitive disabilities, and they displayed greater social distance and withdrawal from these individuals compared to individuals with physical disabilities. Other studies have found that people with cognitive disabilities may experience teasing, avoidance, and discrimination on account of their disability, and that classmates may perceive them as having more serious disabilities than they actually have (Siperstein, Norins, Corbin, & Shriver, 2003; Siperstein, Parker, Bardon, & Widaman, 2007; Werner, Corrigan, Ditchman, & Sokol, 2011). Further, according to a multi-national study, people believe that individuals with cognitive disabilities are less capable of completing complex tasks such as handling an emergency situation (Siperstein et al., 2003).

Disability Stigma in Higher Education

Much of the current research on disability stigma focuses on young school children or adults in non-educational settings, but stigma also may be experienced in a higher education setting. At university, students with disabilities experience a variety of negative social interactions stemming from negative perceptions by faculty and peers (West et al., 1993). Some studies have found that while faculty tend to have overall positive attitudes toward students with disabilities, some believe that these students are faking their condition and are less academically competent than students without disability (Becker, Martin, Wajeeh, Ward, & Shern, 2002; Belch, 2011; Houck, Asselin, Troutman, & Arrington, 1992; Lyman et al., 2016; Sniatecki et al., 2015). Similarly, students without disabilities may doubt the fairness of academic accommodations for their peers with disabilities (Houck et al., 1992). In turn, students with disabilities may feel they are treated as "dumb," "lazy," or "slow" by university faculty, and they often report concerns of being seen as "getting special treatment," or being fragile or burdensome (Lyman et al., 2016; Stein, 2014).

Negative perceptions of students with disabilities are problematic, considering the number of ways disability stigma may uniquely impact a university student's experiences while in school and later in life. College students' perceptions of their peers with disabilities may influence the confidence and self-perceptions of a student with a disability (SWD), which in turn may impact his or her choice of college major, career aspirations, academic performance, and motivation to seek academic help. Perceptions of disability in higher education also may influence the sense of belongingness at university for a SWD, which in turn may impact his or her willingness to engage with and contribute to the university community. Further, research shows that people tend to believe that certain disabilities are controllable (i.e., can be "dealt with"; Crisp et al., 2000; Green et al., 2005; Hayward & Bright, 1997). This may lead to discrepancies in perceived deservingness of university support services for SWDs (Upton & Harper, 2002). Such services, called "academic accommodations," may include extended time on exams, a notetaker, use of adaptive technology, etc. It is possible that the belief that disabilities are controllable may lead to animosity and resentment toward classmates who receive academic accommodations, which in turn may harm the university environment.

The Current Research

In order to understand the negative effects stigma may have on university students with disabilities, it is important to consider how they are perceived by their non-disabled peers. Although some research has examined faculty members' perceptions of students with disabilities, there is relatively less research examining perceptions from non-disabled peers. In this study, non-disabled college students' perceptions of their peers with disabilities within a university setting were examined, specifically, how disability type influences perceptions of social and academic abilities, expectations of academic performance and classroom

behaviors, deservingness of academic accommodations, and ability to deal with disability for SWDs. Feelings of interpersonal warmth toward SWDs were also examined (Bayes, 1972).

Perceptions of SWDs were expected to differ based on visibility status. Visible disability stigma is frequently negative, although it may be masked in a positive but patronizing attitude (Cahill & Eggleston, 1995). In contrast to visible disability stigma, non-visible disability stigma is mostly negative. According to the disability hierarchy, people with non-visible disabilities such as psychiatric and cognitive disabilities generally may be perceived more negatively than people with physical disabilities, possibly due to uncertainty surrounding interactions with these people (Belch, 2011; Miller et al., 2009; Sniatecki et al., 2015; Thomas, 2000; Tringo, 1970; Wang et al., 2003; Werner, 2015). As such, it was expected that students with psychiatric or cognitive disabilities would be perceived more negatively overall than students with physical disabilities.

First, it was hypothesized that students with non-visible (i.e., psychiatric or cognitive) disabilities would be perceived as less sociable and academically capable compared to students with visible (i.e., physical) disabilities. Research shows that individuals with psychiatric disabilities are typically seen as dangerous and unpredictable, and individuals with cognitive disabilities are typically seen as having difficulty interacting with non-disabled peers in group activities such as sports (Crisp et al., 2000; Hayward & Bright, 1997; Siperstein et al., 2003; Siperstein et al., 2007). In addition, students with cognitive disabilities are believed to struggle academically (Siperstein et al., 2007). Second, it was predicted that students with psychiatric and cognitive disabilities would be expected to display more disruptive classroom behaviors and to perform worse on academic tasks because individuals with psychiatric disabilities are typically seen as being unstable, and because individuals with cognitive disabilities are typically seen as being less capable of completing complex tasks (Crisp et al., 2000; Hayward & Bright, 1997; Siperstein et al., 2003).

Next, in line with research by Upton and Harper (2002), it was expected that participants would perceive students with non-visible disabilities as being less deserving of academic accommodations than students with visible disabilities. Non-visible disabilities typically are not evident to the casual observer; individuals with non-visible disabilities can appear to be non-disabled and therefore can be perceived as not needing any academic accommodations. For similar reasons, it was also expected that participants would think that students with non-visible disabilities would be better able to deal with their disability compared to students with visible disabilities.

It was also expected that participants would feel less warmly toward students with non-visible disabilities than students with visible disabilities because non-visible disabilities are typically not evident to the casual observer. Individuals with non-visible disabilities thus can appear to be non-disabled and therefore might be met with more uncertainty and hesitation from others. It was also expected participants to feel less warmly toward students with non-visible disabilities because people may tend to feel more sympathetic to individuals with visible disabilities (Cahill & Eggleston, 1995).

In addition to perception differences based on visibility status, it was expected participants to perceive students with the two non-visible disabilities (i.e., psychiatric and cognitive) differently because they are associated with different kinds of challenges. Whereas individuals with psychiatric disabilities have emotion regulation challenges, individuals with cognitive disabilities have cognitive processing and learning-related challenges. It was expected that individuals with psychiatric disabilities would be viewed as less sociable than individuals with cognitive disabilities because people typically think that these individuals are less capable of regulating their emotions, and that they should be regarded with apprehension or avoided completely (Corrigan & Watson, 2002; Crisp et al., 2000; Hayward & Bright, 1997; Wahl, 1995, 1999, 2012). Further, it was expected that participants would have higher academic expectations for students with psychiatric disabilities than for students with cognitive disabilities because they may be aware that cognitive disabilities can hinder learning, or they may believe that students with psychiatric disabilities are faking their disability (Green et al., 2005).

Additionally, it was expected that participants would think that students with cognitive disabilities are more deserving of academic accommodations than students with psychiatric disabilities because they may assume that learning-based challenges pose more of a hurdle to academics than emotion-based challenges, although in actuality both can hinder academic success without proper support in place. For instance, depression—a psychiatric disability—is known to impact academic performance (DeRoma, Leach, & Leverett, 2009). We also expected that participants would think that students with psychiatric disabilities should be able to "deal with" their condition more so than students with physical disabilities or cognitive disabilities because people tend to

believe that individuals with psychiatric disabilities should be able to respond to an emotionally stressful situation in a typical, socially-acceptable manner (Crisp et al., 2000; Hayward & Bright, 1997).

Method

A total of 149 undergraduate students at the University of California, Davis participated in the study. Participants were randomly assigned to one of three disability type conditions: psychiatric, cognitive, or physical disability. They responded to questions pertaining to the assigned disability type.

Participants were given a brief description of their assigned disability type and examples of disabilities that fall under that disability type. The examples were selected based on a pilot study that assessed participants' familiarity with different disabilities. Disabilities that participants recognized and correctly categorized by disability type were included in the disability descriptions of the present study. The descriptions appeared at the top of each page of the study for reference. Psychiatric disabilities were defined as disabilities that affect an individual's mood and thought patterns. Examples were anxiety disorders, bipolar disorder, depression, obsessive compulsive disorder, or other related disorders. Cognitive disabilities were defined as disabilities that affect an individual's ability to learn. Examples were attention deficit-hyperactivity disorder (ADHD), dyslexia (a learning disorder characterized by difficulty processing written information), or other information processing disorders. Physical disabilities were defined as disabilities that relate to physical impairments. Examples were cerebral palsy (a brain-based movement disorder) and mobility disorders, or other disorders that may necessitate the use of a clearly evident assistive device such as a wheelchair, prosthetic, etc.

Participants rated the sociability and academic ability of students with the given disability type, their expectations of these students' academic performance and classroom behaviors, their beliefs regarding the deservingness of academic accommodations for students with disabilities, their beliefs about these students' ability to deal with their disability, and the warmth they felt toward SWDs as measured by a feeling thermometer. Perceptions of sociability and academic ability were measured by ratings on a five-point scale, with one indicating "not at all" and five indicating "a great deal." Sociability was measured with four traits including sociable, isolated from others, friendly, and socially awkward, which were combined to form a single index of sociability (α = 0.63). Academic ability was measured by ratings on seven traits including achievement-oriented, motivated, smart, hard-working, academically-challenged, nerdy, and organized. The items were combined to form a single index of academic ability. However, the "nerdy" item was removed from the scale due to low reliability, leaving a total of six items (α = 0.73).

Expectations of academic performance were measured with five items, including expectations of performance on exams, homework assignments, and writing assignments such as essays and papers, expected ability to manage class assignment deadlines and due dates, and expected GPA. Ratings were made using a seven-point scale, with one indicating "significantly worse" and seven indicating "significantly better" compared to non-disabled students. The items were combined to form a single index of academic performance expectations (α = 0.83).

Expectations of disruptive classroom behaviors were measured with nine items that were combined to form a single index of expectations of classroom behaviors (α = 0.80; see Table 1). Ratings were made using a seven-point scale, with one indicating "significantly worse" and seven indicating "significantly better" compared to non-disabled students.

Beliefs about the deservingness of academic accommodations for SWDs were measured with seven items which were combined to form a single index of deservingness of academic accommodations (α = 0.79; see Table 2). Ratings were made using a seven-point scale, with one indicating "strongly disagree" and seven indicating "strongly agree." An additional six items assessed participants' beliefs about the deservingness of specific accommodations, including extended time on exams, a notetaker, permission to record lectures, priority class registration, use of the mobility assistance shuttle, and permission to reschedule exams. Ratings were made using a seven-point scale, with one indicating "strongly disagree" and seven indicating "strongly agree." The six items were combined to form a single index of deservingness of specific academic accommodations (α = 0.83).

Next, perceptions of SWDs' ability to deal with their disability were measured by a seven-point scale, with one indicating "strongly disagree" and seven indicating "strongly agree." Lastly, warmth felt toward SWDs was measured by a one hundred-point slider scale with zero being "very cold" and one hundred being "very warm."

Results

Thirty-three participants were excluded from analysis: 12 for reporting that they have a disability,

two for reporting that they have used academic accommodations, 12 for not reporting their disability status or use of academic accommodations, seven for incomplete data. Of the remaining 116 participants retained for analysis, the mean age was 20.52 years, $SD = 1.56$. Thirty-one participants were male, and 85 participants were female.

Analytic Plan

A one-way between-subjects ANOVA with planned linear contrasts was conducted to examine the effect of reaction type on each of the dependent measures. Two mean comparisons were tested in the planned contrasts. First, to examine the differences between visible and non-visible disabilities, the physical (i.e., visible) disability condition to the mean of the psychiatric and cognitive (i.e., non-visible) disability conditions were compared. Second, the psychiatric and the cognitive disability conditions—the two non-visible disability conditions—were compared to each other.

Sociability

There was a significant effect of disability type on perceptions of sociability, $F(2, 113) = 5.45$, $p = .005$, $\eta^2 = 0.09$. Planned contrasts revealed that ratings of sociability were significantly higher in the physical disability condition (i.e., visible disability; $M = 3.49$, $SD = 0.74$) than in the psychiatric and cognitive disability conditions (i.e., non-visible disability), $t(113)2.82$, $p = .006$, but they did not differ significantly between the psychiatric disability condition ($M = 2.98$, $SD = 0.66$) and the cognitive disability condition *(*$M = 3.26$, $SD = 0.65$), $t(113) = 1.75$, $p = .084$.

Academic Ability

There was a significant effect of disability type on perceptions of academic ability, $F(2, 113) = 8.89$, $p < .001$, $\eta^2 = 0.14$. Ratings of academic ability were significantly higher in the physical disability condition ($M = 3.79$, $SD = 0.56$) than in the psychiatric and cognitive disability conditions, $t(113) = 4.14$, $p < .001$, but they did not differ between the psychiatric disability condition ($M = 3.24$, $SD = 0.64$) and the cognitive disability condition ($M = 3.36$, $SD = 0.63$), $t(113) = 0.86$, $p = .392$.

Expectations of Academic Performance

There was a significant effect of disability type on expectations of academic performance, $F(2, 113) = 3.66$, $p = .029$, $\eta^2 = 0.06$. Participants expected better academic performance for students with physical disability ($M = 3.89$, $SD = 0.60$) than for students with psychiatric and cognitive disabilities, $t(113) = 2.70$, $p = .008$. However, expectations of academic performance did not differ significantly between the psychiatric disability condition ($M = 3.50$ $SD = 0.57$) and the cognitive disability condition ($M = 3.54$, $SD = 0.93$), $t(113) = 0.24$, $p = .812$.

Given that ratings on this measure were made on a scale relative to non-disabled students, participants' expectations of disabled students' academic performance in relation to their expectations of non-disabled students' academic performance were also compared. For each disability type, a one-sample t-test comparing the mean of the group against the value four, the middle value of the scale, which indicated an expectation of academic performance equivalent to that of non-disabled students was conducted. The mean rating in the physical disability condition ($M = 3.89$, $SD = 0.60$) did not differ significantly from four, $t(40) = -1.15$, $p = .256$. However, the mean rating in the psychiatric disability condition ($M = 3.50$, $SD = 0.57$) was significantly lower than four, $t(36) = -5.36$, $p < .001$, as was the mean rating in the cognitive disability condition ($M = 3.54$; $SD = 0.93$), $t(37) = -3.06$, $p = .004$, indicating expectations of poorer academic performance among students with psychiatric and cognitive disabilities relative to non-disabled students.

Expectations of Disruptive Classroom Behaviors

There was a significant effect of disability type on expectations of disruptive classroom behaviors, $F(2, 113) = 5.21$, $p = .007$, $\eta^2 = 0.08$. Participants expected more disruptive behaviors from students with physical disability ($M = 4.37$, $SD = 0.69$) than from students with psychiatric or cognitive disabilities, $t(113) = 3.12$, $p = .002$. Expectations of disruptive classroom behaviors did not differ significantly between the psychiatric disability condition ($M = 3.86$, $SD = 0.69$) and the cognitive disability condition ($M = 4.01$, $SD = 0.79$), $t(113) = 0.86$, $p = .393$.

Participants' expectations of disabled students' disruptive classroom behaviors in relation to their expectations of non-disabled students' disruptive classroom behaviors were also compared. The mean of each disability type against the value four, the middle value of the scale, which indicated an expectation of disruptive classroom behaviors equivalent to that of non-disabled students was compared. The mean rating in the physical disability condition ($M = 4.37$, $SD = 0.69$) was significantly higher than four, $t(40) = 3.45$, $p = .001$, indicating expectations of more disruptive classroom behaviors from students with physical disabilities relative to students with no disabilities. The mean rating in the psychiatric disability condition ($M = 3.86$, $SD = 0.69$) did not differ significantly from four, $t(36) = -1.22$, $p = .230$. The mean

rating in the cognitive disability condition ($M = 4.01$; $SD = 0.79$) also did not differ significantly from four, $t(37) = 0.05$, $p = .964$.

Deservingness of Academic Accommodations

Overall, participants believed that SWDs are deserving of academic accommodations (physical disability condition, $M = 5.18$, $SD = 0.97$; psychiatric disability condition, $M = 5.35$, $SD = 0.88$; cognitive disability condition, $M = 5.23$, $SD = 1.10$). Ratings did not differ significantly among the three disability categories, $F(2, 113) = 0.30$, $p = .740$, $\eta^2 = 0.01$.

Deservingness of Specific Accommodations

Overall, participants slightly disagreed that SWDs were deserving of specific academic accommodations (physical disability condition, $M = 3.56$, $SD = 0.72$; psychiatric disability condition, $M = 3.30$, $SD = 0.94$; cognitive disability condition, $M = 3.79$, $SD = 1.11$). There was no significant effect of disability type on deservingness of specific accommodations, $F(2, 113) = 2.53$, $p = .084$, $\eta^2 = 0.04$. Ratings of deservingness for the specific accommodations did not differ significantly between the physical disability condition and the psychiatric and cognitive disability conditions, $t(113) = 0.08$, $p = .935$. However, participants rated students with psychiatric disabilities as less deserving of the specific accommodations than students with cognitive disabilities, $t(113) = 2.04$, $p = .045$.

Ability to Deal with Disability

There was no significant effect of disability type on ratings of disabled students' ability to deal with their disability, $F(2, 113) = 2.44$, $p = .092$, $\eta^2 = 0.04$. Ratings did not differ significantly between visible ($M = 5.83$, $SD = 1.30$) and non-visible disability conditions, $t(113) = 0.93$, $p = .356$, but they were higher in the psychiatric disability condition ($M = 6.35$, $SD = 1.09$) than in the cognitive disability condition ($M = 5.76$, $SD = 1.38$), $t(113) = 2.01$, $p = .047$.

Feelings of Warmth

Overall, participants reported feeling warmly toward SWDs (physical disability condition, $M = 82.27$, $SD = 15.38$; psychiatric disability condition, $M = 76.57$, $SD = 16.99$; cognitive disability condition, $M = 80.00$, $SD = 19.51$). However, there were no significant differences in ratings among the three groups, $F(2, 112) = 1.06$, $p = .349$, $\eta^2 = 0.02$.

Discussion

This study examined how university students' perceptions of SWDs differ based on disability type. It explored how perceptions of students with visible (i.e. physical) disabilities differ from perceptions of students with non-visible (i.e., psychiatric and cognitive) disabilities. In addition, whether perceptions of students with psychiatric disabilities differ from those of students with cognitive disabilities, given the differing nature of the two non-visible disability types was examined.

Participants perceived students with visible disabilities compared to students with non-visible disabilities as being more sociable, having better academic ability, and performing better academically, but they also perceived them as displaying more disruptive classroom behaviors compared to students with non-visible disability. In addition, students with visible disabilities would be rated as being more deserving of academic accommodations and less capable of dealing with their condition relative to students with non-visible disabilities (Upton & Harper, 2002) had been predicted. However, participants perceived students with the two types of disabilities as being equally deserving of accommodations and being equally capable of dealing with their condition was found. Furthermore, although it had predicted that participants would feel warmer toward students with visible compared to non-visible disabilities, participants felt equally warm toward students with both types of disabilities. This finding contradicts the disability hierarchy, which suggests that individuals with physical disabilities are stigmatized less than individuals with psychiatric or cognitive disabilities (Belch, 2011; Miller et al., 2009; Sniatecki et al., 2015; Thomas, 2000; Tringo, 1970; Wang et al., 2003; Werner, 2015).

It was originally predicted that students with psychiatric disabilities would be viewed as less sociable yet more academically capable than students with cognitive disabilities. However, participants perceived students with these two types of disabilities to be equally sociable and academically capable. They also and felt equally warm toward them and perceived them to be equally deserving of academic accommodations. However, participants thought that students with psychiatric disabilities should be better able to deal with their condition and that they are less deserving of the specific accommodations listed in the experiment such as having extended time on exams or a notetaker for class. Participants thought that students with the two non-visible disability types were equally deserving of academic accommodations in general, but that they were not equally deserving of

the specific accommodations. It is unclear why this discrepancy exists, but it could possibly be due to the specific accommodations provided in the measure. Perhaps participants thought that students with psychiatric disabilities deserve academic accommodations as much as students with cognitive disabilities, but the specific kinds of academic accommodations they deserve were not provided in our measure.

The Effects of Disability Type on Perceptions of Students with Disabilities

In the study, participants viewed students with visible disabilities compared to students with non-visible disabilities as more sociable and academically capable, and as performing better on academic tasks. One explanation for this finding may be that people are overly sympathetic toward individuals with physical disabilities (Cahill & Eggleston, 1995), and, as such, rated them more positively on social and academic dimensions. Another explanation may be that people generally tend to view individuals with non-visible disabilities—particularly those with psychiatric disabilities—negatively in general (Corrigan & Watson, 2002; Crisp et al., 2000; Hayward & Bright, 1997; Wood et al., 2014). However, participants reported feeling equally warm toward students with visible and non-visible disabilities, so they seem to view their abilities differently, even though they feel the same toward both groups.

Interestingly, participants thought that students with psychiatric disabilities should be better able to deal with their condition compared to students with cognitive disabilities and that they are less deserving of the specific accommodations listed in the study. In line with previous research, these findings indicate that people may believe that students with psychiatric disabilities have some amount of control over their condition or are otherwise somehow responsible for the impact of their disability (Corrigan & Watson, 2002; Crisp et al., 2000; Hayward & Bright, 1997; Upton & Harper, 2002). Because participants thought that students with psychiatric disabilities are better able to deal with their condition, they also may assume that these students' disabilities are controllable and somehow illegitimate. Consequently, participants also might have thought that students with psychiatric disabilities are less deserving of academic accommodations, or that academic accommodations give certain students an unfair advantage. These perceptions could lead students with psychiatric disability to avoid seeking help for their condition due to embarrassment and fear of the response from others upon disclosure of the disability; particularly, these students may avoid seeking help in order to avoid being perceived as being lazy and undeserving of academic support services (Belch, 2011; Rickerson et al., 2004; Stein, 2014). However, students with psychiatric disabilities were rated as less deserving only on the measure of specific accommodations, so it is possible that the observed difference could be attributed to the idiosyncratic features of the specific accommodations chosen for the study. More research is needed to determine whether deservingness of accommodations differs depending on the types of accommodations provided as well as disability type.

Implications for Academic Performance

It is important to better understand perceptions of SWDs because these perceptions form the basis for disability stereotypes which in turn can undermine academic performance. Some common disability stereotypes, for example, are that individuals with disability are more dependent, incompetent, unstable, vulnerable, emotionally unstable, and less outgoing and intelligent than non-disabled individuals (Crisp et al., 2000; Hayward & Bright, 1997; Kelly, Sedlacek, & Scales, 1994; Nario-Redman, 2010; Siperstein et al., 2003; Weinberg, 1976; Wood et al., 2014). Although faculty generally tend to have positive attitudes toward students with disabilities, some have less positive attitudes and doubts about the ability of students with disabilities to suceed at university. (Belch, 2011; Houck et al., 1992; Lyman et al., 2016; Sniatecki et al., 2015). Somewhat similarly, peers without disability may be doubtful of the legitimacy and fairness of academic accommodations for students with disabilitiy (Houck et al., 1992). Research by Lyman et al. (2016) showed that SWDs are in fact likely aware of these negative attitudes; they may question the legitimacy of their own disability and accommodations use, and fear being seen by peers as receiving unfairly-advantageous treatment. If SWDs are aware of the negative stereotypes their peers and instructors may have of SWDs, they may experience stereotype threat. Stereotype threat is the fear of confirming a negative stereotype about a group to which one belongs. This fear of confirming the negative stereotype can hinder achievement and lead to under-performance in the domain in which the group is stereotyped to perform poorly (Steele & Aronson, 1995). For instance, girls may perform worse than boys on a math task simply because they are aware of the stereotype that boys are better than girls at math (Niederle & Vesterlund, 2010). Similarly, if students with cognitive disabilities are aware of the stereotype that people with cognitive disabilities are less intelligent, they might consequently perform more poorly on exams or avoid academic leadership opportunities

such as heading a class group project for fear of potentially confirming the stereotype (Siperstein et al., 2003). In the present study, participants believed that students with physical disabilities are more disruptive in class than non-disabled students. If students with physical disabilities are aware of this belief, they may be less likely to ask questions in class for fear of appearing disruptive. The effects of stereotype threat also may extend beyond the classroom. If individuals with disabilities worry about confirming a negative stereotype, they may feel less self-integrity, experience more life stress, and participate less frequently in challenge-seeking activities (Silverman & Cohen, 2014).

Although non-visible disabilities are typically not evident to others, stereotyping may still occur. For instance, per university policy, a student wishing to use academic accommodations typically has to inform his or her professors of his or her disability status. This information is often relayed to class teaching assistants, tutors, and exam proctors, who may be students themselves. Thus, although a given student's disability may not be evident to others, the student may still experience disability-related stereotype threat. However, since visual disabilities are more evident than non-visible disabilities it is possible that teachers and non-disabled peers may more readily stereotype students with visible disabilities than students with non-visible disabilities.

Stereotypes also have important implications for interpersonal interactions with teachers and peers. For example, the self-fulfilling prophesy is the process by which a person's expectations about another individual elicit behaviors which confirm the original expectations (Merton, 1948). This process can play into social interactions with disabled students in a potentially detrimental way. For instance, if a teacher thinks that SWDs are less academically capable than non-disabled students, the teacher may be less attentive to those students. As a result, SWDs may become less capable because they are given fewer opportunities to improve—not necessarily because of the disability itself. Indeed, research by Rosenthal and Lenore (1968) showed that teachers' academic expectations of their students are positively related to students' success later in the academic term. If others expect that students with cognitive or psychiatric disabilities perform worse academically than non-disabled students, this expectation could adversely affect interactions between university students. As with instructor-student interactions, if non-disabled students believe that peers with psychiatric or cognitive disabilities perform worse academically than non-disabled students, this could lead them to interact with these SWDs in a way that confirms their lower academic expectations of SWDs—potentially resulting in the SWDs achieving less academically.

Limitations

One limitation of this study is that participants' perceptions of non-disabled students was not directly assessed (the exceptions were the measures that assessed expectations of academic performance and classroom behavior for which ratings were based on relative differences to non-disabled students). Although the perceptions of different types of disabilities relative to each other were compared, we were not able to gauge how these perceptions compare to those of non-disabled students on most measures. In future studies, it will be important to test how perceptions of disabled students specifically compare to those of non-disabled students, as doing so will help us better understand perceptions of disabled students relative to non-disabled students. This can provide clues about disabled and non-disabled peer interactions, which can offer insight into disabled students' higher education experiences in general. Another limitation is that the participant sample was collected at a single university, but perceptions of students with disabilities may differ across universities which vary based on geographic region, campus culture, and many other factors. The current study should be conducted in different settings in order to determine whether the results replicate with different samples of students.

Conclusion

This study examined how non-disabled university students' perceptions of students with disabilities differ based on visibility status. Results indicated that visibility status affects perceptions of disabled students' sociability, academic ability, and academic performance. Furthermore, non-disabled students' perceptions of the deservingness of academic accommodations and the ability to deal with the disability differed based on disability type. Perhaps most importantly, this study reveals a need for further research on perceptions of disability and how these perceptions impact students within higher education. For instance, it is important to study how university instructors and staff perceive students with disabilities, how students with disabilities perceive themselves, and how perceptions of students with disabilities shape real-world social interactions. Such information will likely help create a foundation for a more diverse and inclusive educational environment.

References

Allen, M., & Birse, E. (1991). Stigma and blindness [Abstract]. *Journal of Opthalmic Nursing Technology, 10*, 147-152.

American Psychiatric Association. (2013). *Intellectual disability.* American Psychiatric Association.

Bayes, M. A. (1972). Behavioral cues of interpersonal warmth. *Journal of Consulting and Clinical Psychology, 39*, 333-339.

Becker, M., Martin, L., Wajeeh, E., Ward, J., & Shern, D. (2002). Students with mental illnesses in a university setting: Faculty and student attitudes, beliefs, knowledge, and experiences. *Psychiatric Rehabilitation Journal, 25*, 359-368.

Belch, H. A. (2011). Understanding the experiences of students with psychiatric disabilities: A foundation for creating conditions of support and success. *New Directions for Student Services, 2011*(134), 73-94.

Cahill, S. E., & Eggleston, R. (1995). Reconsidering the stigma of physical disability: Wheelchair use and public kindness. *The Sociological Quarterly, 36*, 681-698.

"Chapter 5, psychiatric disabilities and the ADA." (n.d.). United States Commission on Civil Rights. Retrieved from http://www.usccr.gov/pubs/ada/ch5.htm.

Corrigan, P. W., & Watson, A. C. (2002). Understanding the impact of stigma on people with mental illness. *World Psychiatry, 1*, 16-20.

Crisp, A. H., Gelder, M. G., Rix, S., Meltzer, H. I., & Rowlands, O. J. (2000). Stigmatisation of people with mental illnesses. *The British Journal of Psychiatry, 177*, 4-7.

DeRoma, V. M., Leach, J., & Leverett, J. P. (2009). The relationship between depression and college academic performance. *College Student Journal, 43*, 325-334.

Fichten, C., & Amsel, R. (1986). Trait attributions about college students with a physical disability: Circumplex analyses and methodological issues. *Journal of Applied Social Psychology, 16*, 410-427.

Goffman, E. (1963). *Stigma: Notes on the management of spoiled identity*. Englewood Cliffs, NJ: Prentice-Hall.

Green, S. E. (2003). "What do you mean 'what's wrong with her?'": Stigma and the lives of families of children with disabilities. *Social Science & Medicine, 57*, 1361-1374.

Green, S., Davis, C., Karshmer, E., Marsh, P., & Straight, B. (2005). Living stigma: The impact of labeling, stereotyping, separation, status loss, and discrimination in the lives of individuals with disabilities and their families. *Sociological Inquiry, 75*, 197-215.

Hayward, P., & Bright, J. A. (1997). Stigma and mental illness: A review and critique. *Journal of Mental Health, 6*, 345-354.

Higher Education and Disability. (2009). *Education needs a coordinated approach to improve its assistance to schools in supporting students.* Washington, DC: United States Government Accountability Office.

Houck, C. K., Asselin, S. B., Troutman, G. C., & Arrington, J. M. (1992). Students with learning disabilities in the university environment: A study of faculty and student perceptions. *Journal of Learning Disabilities, 25*, 678-684.

Kelly, A. E., Sedlacek, W. E., & Scales, W. R. (1994). How college students with and without disabilities perceive themselves and each other. *Journal of Counseling & Development, 73*, 178-182.

Kleck, R. (1969). Physical stigma and task oriented interactions. *Human Relations, 22*, 53-60.

Lyman, M., Beecher, M. E., Griner, D., Brooks, M., Call, J., & Jackson, A. (2016). What keeps students with disabilities from using accommodations in postsecondary education? A qualitative review. *Journal of Postsecondary Education and Disability, 29*, 123-140.

Merton, R. K. (1948). The self-fulfilling prophecy. *The Antioch Review, 8*, 193-210.

Miller, E., Chen, R., Glover-Graf, N. M., & Kranz, P. (2009). Willingness to engage in personal relationships with persons with disabilities: Examining category and severity of disability. *Rehabilitation Counseling Bulletin, 52*, 211-224.

Nario-Redmond, M. (2010). Cultural stereotypes of disabled and non-disabled men and women: Consensus for global category representations and diagnostic domains. *British Journal of Social Psychology, 49*, 471-488.

Niederle, M., & Vesterlund, L. (2010). Explaining the gender gap in math test scores: The role of competition. *Journal of Economic Perspectives, 24*, 129-144.

Olney, M. F., & Kim, A. (2010). Beyond adjustment: Integration of cognitive disability into identity. *Disability & Society, 16*, 563-583.

O'Shea, A., & Meyer, R. H. (2016). A qualitative investigation of the motivation of college students with nonvisible disabilities to utilize disability services. *Journal of Postsecondary Education and Disability, 29*, 5-23.

Ragins, B. R. (2008). Disclosure and disconnects: Antecedents and consequences of disclosing invisible stigmas across life domains. *Academy of Management Review 33,* 194-215.

Rickerson, N., Souma, A., & Burgstahler. (2004). *Psychiatric disabilities in postsecondary education: Universal design, accommodations and supported education.* Unpublished manuscript, University of Washington, Seattle, WA; Seattle Central Community College, Seattle, WA.

Rosenthal, R., & Lenore, J. (1968). Selections from "Pygmalion in the classroom." In E. F. Provenze, Jr. (Ed.), *Critical issues in education: An anthology of readings* (pp. 248-251). Thousand Oaks, CA: Sage Publications, Inc.

Siperstein, G. N., Norins, J., Corbin, S., & Shriver, T. (2003). *Multinational study of attitudes toward individuals with intellectual disabilities*. Washington, DC: Special Olympics, Inc.

Siperstein, G. N., Parker, R. C., Bardon, J. N., & Widaman, K. F. (2007). A national study of youth attitudes toward the inclusion of students with intellectual disabilities. *Exceptional Children, 73*, 435-455.

Silverman, A. M., & Cohen, G. L. (2014). Stereotypes as stumbling-blocks: How coping with stereotype threat affects life outcomes for people with physical disabilities. *Personality and Social Psychology Bulletin, 40,* 1330-1340.

Sniatecki, J. L., Perry, H. B., & Snell, L. H. (2015). Faculty Attitudes and Knowledge Regarding College Students with Disabilities. *Journal of Postsecondary Education and Disability, 28*, 259-275.

Steele, C., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of African Americans. *Journal of Personality and Social Psychology, 69*, 797-811.

Stein, K. F. (2014). Experience of college students with psychological disabilities: The impact of perceptions of faculty characteristics on academic achievement. *International Journal of Teaching and Learning in Higher Education, 26*, 55-65.

Stone, D., & Colella, A. (1996). A model of factors affecting the treatment of disabled individuals in organizations. *Academy of Management Review, 12*, 352-401.

Susman, J. (1994). Disability, stigma and deviance. *Social Science & Medicine, 38*, 15-22.

Thomas, A. (2000). Stability of Tringo's hierarchy of preference toward disability groups: 30 years later. *Psychological Reports, 86*, 1155-1156.

Tringo, J. L. (1970). The hierarchy of preference toward disability groups. *Journal of Special Education, 4*, 295-306.

Upton, T., & Harper, D. C. (2002). Multidimensional disability attitudes and equitable evaluation of educational accommodations by college students without disabilities. *Journal of Postsecondary Education and Disability, 15*, 115-130.

Wahl, O. F. (1995). *Media madness: Public images of mental illness*. New Brunswick, NJ: Rutgers University Press.

Wahl, O. F. (1999). *Telling is risky business: Mental health consumers confront stigma.* New Brunswick, NJ: Rutgers University Press.

Wahl, O. F. (2012). Stigma as a barrier to recovery from mental illness. *Trends in Cognitive Sciences, 16*, 9-10.

Wang, M., Thomas, K. R., Chan, F., & Cheing, G. (2003). A conjoint analysis of factors influencing American and Taiwanese college students' preferences for people with disabilities. *Rehabilitation Psychology, 48*, 195-201.

Weinberg, N. (1976). Social stereotyping of the physically handicapped. *Rehabilitation Psychology, 23*, 115-124.

Werner, S. (2015). Public stigma and the perception of rights: Differences between intellectual and physical disabilities. *Research in Developmental Disabilities, 38*, 262-271.

Werner, S., Corrigan, P., Ditchman, N., & Sokol, K. (2011). Stigma and intellectual disability: A review of related measures and future directions. *Research in Developmental Disabilities, 3,*748-765.

West, M., Kregel, J., Getzel, E. E., Zhu, M., Ipsen, S. M., & Martin, E. D. (1993). Beyond Section 504: Satisfaction and empowerment of students with disabilities in higher education. *Exceptional Children, 59*, 456-467.

Wood, L., Birtel, M., Alsawy, S., Pyle, M., & Morrison, A. (2014). Public perceptions of stigmatowards people with schizophrenia, depression, and anxiety. *Psychiatry Research, 220*, 604-608.

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Table 1

Items Included in the Measure of Expectations of Disruptive Classroom Behaviors

1. Cheating on an exam
2. Asking too many questions in class
3. Slowing down lectures with questions and/or comment
4. Making distracting movements (e.g., finger tapping, foot jiggling, rocking back and forth, etc.)
5. Failing to take turns in class discussions
6. Being difficult to get along with in class
7. Displaying obsessive compulsive behaviors
8. Disrupting class with loud noises
9. Becoming frustrated easily in class

Table 2

Items Included in the Measure of Beliefs About the Deservingness of Academic Accommodations, With the Psychiatric Disability Condition Used as an Example

1. Students with psychiatric disabilities deserve to receive academic accommodations
2. Academic accommodations 'level the playing field' between students with psychiatric disabilities and students who don't have disabilities
3. Academic accommodations give students with psychiatric disabilities an unfair advantage
4. It is fair for students with psychiatric disabilities to receive academic accommodations
5. Without academic accommodations, it would be difficult for students with psychiatric disabilities to deal with their disability in a typical school day
6. Students with psychiatric disabilities don't need academic accommodations to perform as well on exams as students without disabilities
7. Students with psychiatric disabilities may fake their condition in order to receive accommodations

Returning to the Classroom Following Sport-Related Concussion: Perspectives of College Student Athletes

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Abstract

The purpose of this study was to examine student athletes' perspectives regarding return to learn following sport-related concussion. Data were collected through an online survey from student athletes; a subset of whom had a history of concussion. Student athletes who reported receiving education regarding the effects of concussion on classroom performance were more likely to report a concussion and receive accommodations. Also, student athletes experiencing specific symptoms reported certain accommodations to be more or less beneficial with returning to the classroom following concussion. However, the presence of a return to learn policy at colleges did not improve the odds that student athletes received education on the effects of concussion on academic performance or improve concussion reporting or receiving accommodations while recovering from symptoms of concussion. Returning to the classroom prior to symptom resolution following concussion can have adverse effects on symptom recovery, learning, grades, and ultimately the livelihood of the student athletes. Colleges need to provide education specifically on the effects of concussion on classroom performance to increase the odds of student athletes reporting a suspected concussion to a school official. Student athletes who report a concussion are also more likely to receive accommodations when returning to the classroom that will enhance recovery without exacerbating symptoms.

Keywords: concussion, return to learn, postsecondary, college

Concussion is major public health concern in the United States. According to the Centers for Disease Control & Prevention (CDC), "a concussion is a type of traumatic brain injury - or TBI- caused by a bump, blow, or jolt to the head or by a hit to the body that causes the head and brain to move rapidly back and forth. This sudden movement can cause the brain to bounce around or twist in the skull, stretching and damaging the brain cells, and creating chemical changes in the brain" (CDC, 2015b, para. 1). Sport-related concussion (SRC) is a subtype of mild traumatic brain injury (mTBI) that affects approximately 1.6 million to 3.8 million individuals each year (Langlois, Rutland-Brown & Wald, 2006).

Concussion can alter brain function and affect memory and orientation (Giza et al., 2013; Harmon et al., 2013; McCrory et al., 2013a; West & Marion, 2014). Students who experience a concussion can report a variety of symptoms, some of which interfere with learning. These symptoms may resolve quickly in a matter of days or can take weeks or months to recover (Wasserman, Bazarian, Mapstone, Block, & van Wijngaarden, 2016). Concussion symptoms that students experience can be classified into four categories: cognitive (e.g., thinking, memory, confusion, amnesia), physical (e.g., headache, dizziness, balance, sensory, nausea), emotional/mood (e.g., excess excitability or irritability, depression, anxiety), and sleep (e.g., insomnia, drowsiness; Brown, Elsass, Miller, Reed & Reneker, 2015; CDC, 2015a; Gessel, Fields, Collins, Dick, & Comstock, 2007).

Sport-related concussion has received a lot of attention over the last decade due to the public awareness campaigns and the long-term effects concussions can have on student athletes. Organizations such as the National Football League (NFL) and the National Collegiate Athletic Association (NCAA) have participated in the assessment, management, and prevention

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of SRC's, and also worked to increase awareness of the incidence and long-term effects of concussion (Bonds, Edwards, & Spradley, 2014). There continues to be inconsistencies across colleges and sport associations regarding best care approaches and management of student athletes who sustain a concussion as well as compliance with recommended approaches.

To promote best practice, the NCAA adopted a Concussion Policy and Legislation in 2010 that affects athletes who play in NCAA regulated sports at colleges (Baugh et al., 2014). Colleges sanctioned by the NCAA must implement a concussion management plan that includes education on the symptoms of concussion, a process for the evaluation and management for student athletes experiencing symptoms of a concussion, a return to play (RTP) protocol, and a medical clearance policy to return to athletics. In 2017, the "Interassociation Consensus: Diagnosis and Management of Sport-Related Concussion Guidelines" was released following the 2014 Safety in College Football Summit that expanded the list of requirements that colleges with students participating in NCAA sports must follow (NCAA Sport Science Institute, 2017, p. 3-4). These additional requirements include pre-participation baseline testing, procedures for reducing exposure, and education that includes a policy on return to learn (RTL).

Colleges have several opportunities for students to play a sport for either a varsity, club or intramural team. The most common sport associations for varsity include the NCAA, the National Junior College Athletic Association (NJCA), and the National Association of Intercollegiate Athletics (NAIA). The NCAA is the largest with approximately 1,200 institutions and 460,000 student athletes. The NJCA and the NAIA both cater to smaller schools with 2- and 4-year programs. Participation in club sports is quickly rising in popularity with an estimated two million college students playing some type of club sport (Pennington, 2008). Club sports are usually overseen by student activity associations which also oversee intramural sports on campus. Intramural or recreation leagues allow students to participate in a less organized team where students from the same institution play against each other. However, due to the lack of organization nationwide for club and intramural/recreation sports, concussion management guidelines are not always available, and these groups are not mandated to follow the concussion policy and management guidelines for students playing for varsity associations such as the NCAA.

A concussion management plan does not necessarily translate into adherence to the required components of that plan. Paddack and colleagues (2016) surveyed 55 head athletic trainers at colleges in California and found a 25% compliance with pre-participation assessment or baseline testing and a 34.5% compliance with management guidelines. Lynall, Laudner, Mihalik, and Stanek (2013) surveyed 1053 members of the National Athletic Trainer's Association and also found that less than half of the participants indicated using a variety of objective methods for baseline testing. In addition, only 20.8% of athletic trainers reported using return to participation guidelines, physician recommendations, and player self-report to determine when a student athlete could return to participation after concussion. Carson and colleagues (2014) completed a retrospective electronic chart review at an office-based physician's office to determine if symptoms got worse when a student athlete returned to learn or play. The charts reviewed included elementary, high school, and college aged student athletes with elementary students requiring fewer days of rest before returning to activity. Despite the available guidelines and education for an SRC, 43.5% of athletes return to their sport too early and 44.7% return to the classroom before symptoms subside (Carson et al., 2014).

There is limited evidence for effective approaches on the amount and type of education to provide student athletes on SRC due to the wide variability of delivery, content, and source at postsecondary institutions (Kroshus & Baugh, 2016; Kroshus, Daneshvar, Baugh, Nowinski, & Cantu, 2014). Kroshus and Baugh (2016) surveyed athletic trainers (n=490) and student athletes (n=318) participating in NCAA sport to evaluate the content, source, and delivery of education materials on concussion to collegiate athletes. The athletic trainers were asked questions regarding the type of content pertaining to concussion that was delivered to athletes. Seventy percent of the athletic trainers indicated providing education to the student athletes on the impact of playing with a concussion on athletic performance, but only 43.5% provided education on general cognitive decline. However, 86.1% of student athletes reported they would like education on the impact of concussion on academic performance.

Return to Learn

Return to learn (RTL) is a protocol or policy that guides reintroduction of a student gradually into the classroom after sustaining a concussion. Paddack and colleagues (2016) found that only 31% of the athletic trainers surveyed reported having an academic accommodation policy established for student athletes who sustain a concussion. Returning to the classroom while still experiencing symptoms can have

negative effects on the student's ability to perform at pre-injury status and can affect grades and eligibility for play. RTL following a concussion should be of primary concern because of increased risk for long-term impairments with learning that can ultimately affect the student athlete's lifelong opportunities of careers and livelihood (Makdissi et al., 2013; Selassie et al., 2013; Yi, Padalino, Chin, Montenegro, & Cantu, 2013).

Returning to the classroom can cause excessive strain on the processes of the brain. The student should be monitored while using cognitive rest and classroom accommodations to decrease the likelihood of symptoms worsening. Cognitive rest is usually recommended for the first 24-48 hours after injury when symptoms are most severe, but further research is needed to determine the duration and type of cognitive rest that is warranted after concussion to maximize recovery (Giza et al., 2013; Hall et al., 2015; Harmon et al., 2013; McCrory et al., 2013b). Avoiding activities that increase symptoms and getting plenty of sleep helps brain cells to heal (McAvoy, 2012). Those activities (e.g., computer, phone, tablet, video games, television, reading, schoolwork) that require attention, memory, processing speed, and cognitive flexibility initially should be restricted and reintroduced slowly as symptoms and tolerance improves (Hall et al., 2015; Master, Gioia, Leddy, & Grady, 2012; Scorza, Raleigh, & O'Connor, 2012). Students who miss class are at risk of getting further behind, and the added stress and anxiety of being away from peers and trying to catch up once returning to class can worsen and prolong symptoms (Gibson, Nigrovic, O'Brien, & Meehan, 2013).

A RTL policy provides a process by which a student athlete gradually returns to the classroom while recovering from symptoms of concussion. Currently, there is no consistent process for RTL in the college classroom like there is for RTP (Harmon et al., 2013; Makdissi et al., 2013; West & Marion, 2014). Suggested progression of activity for RTL is similar to RTP guidelines with no activity, gradual reintroduction of cognitive activity, homework before schoolwork, school re-entry, gradual reintegration into academics, and resumption of normal cognitive workloads (Hall et al., 2015; Master et al., 2012). Student athletes should continue some level of cognitive rest without symptoms worsening before moving on to the next phase of cognitive activity (Baker et al., 2014).

A gradual return to cognitive activity can be achieved by providing student athletes with temporary classroom accommodations that allow the student to attend class and participate as tolerable, while still obtaining all the material, and permit increased time to complete the assignments and exams. Possible accommodations include meetings with the instructor, excused absences from class, rest breaks, extension of assignment and test deadlines, extended testing time, accommodation for light and noise sensitivity (e.g., sunglasses, hats with visors, turn down lights, quiet location, limiting extra noises), removal from activities requiring physical participation, readers for assignments and tests, note taker and/or tutor, quiet exam rooms, and preferential seating (Hall et al., 2015; Halstead et al., 2013; Makdissi et al., 2013; McGrath, 2010; Moser, Glatts, & Schatz., 2012; Quinlin, Bates, & Angell 2012; Trammell & Hathaway, 2007). The amount and type of accommodations need to be flexible enough to ensure effectiveness (Hadley, 2005; Makdissi et al., 2013).

The accommodation process in place at most universities and colleges is not sufficient for concussion because symptoms typically resolve in a matter of weeks before the traditional accommodation can be completed. Because of the long timeline to implementation in the current accommodation process, students who want to receive accommodations for concussion must proceed without the support of disability services (Baker, Boland, & Nowik, 2012). If RTL policies are in place at colleges, academic professionals (e.g., academic supports/disability services, therapists, faculty, counselors), in conjunction with the physician, can assess the student athlete following concussion to develop a plan utilizing accommodations and services to optimize the student's classroom performance (Hadley, 2005). Short-term accommodations can be provided for the student to succeed immediately after the concussion until full recovery has occurred.

Rationale

The majority of the literature available on returning to activity following SRC is in the realm of returning to play (RTP) in comparison to returning to learn (RTL). While almost half of institutions indicate having a RTP policy at their institution, only 30% maintain that they follow the established concussion management policy at their institution for athletes following SRC (Paddack et al., 2016). The goal of a RTL policy is to establish a process the student athletes can follow and provide the tools (e.g., accommodations) necessary for resuming the role of student as compared to student athlete. In addition, there is limited evidence concerning the impact of SRC on academic performance and the use of accommodations to maximize performance. Student athletes requiring accommodations for school should not be allowed to

RTP (McAvoy, 2012) until they can fully return to cognitive activity.

The following research questions were addressed with an online survey completed by student athletes: (1) What are NCAA and non NCAA student athlete perspectives on current practices (e.g., RTL policy, education, baseline testing) with RTL following SRC; (2) What are student athletes' perspectives on returning to the classroom following an SRC; (3) Are student athletes who were aware of a RTL policy or who received education on the effects of concussion on academic performance more likely to report a concussion and receive accommodations while recovering from concussion symptoms; and (4) Are student athletes who experience a specific symptom as a result of an SRC more likely to report a particular accommodation as more or less important for returning to the classroom?

Methods

Survey Instrument

An online survey was developed to gain information from student athletes regarding RTL and the use of accommodations following concussion. The survey questions were based on previous studies that used similar types of questions and findings in the literature to increase reliability and validity. The survey included 16 multiple choice, two Likert type items, and two open-ended questions. The survey took approximately ten minutes to complete. Any participants who indicated they were not a student athlete were immediately exited from the survey. The survey consisted of three sections: demographics, current practices with RTL, and experiences of returning to the classroom following SRC. The RTL section was completed by all participants and contained questions on the presence of a RTL policy, education on effects of SRC on academic performance, and baseline testing. Only student athletes who reported sustaining a concussion completed the final section of the survey. This section included questions related to experiences of returning to the classroom (e.g., recovery time, missed class days, accommodations received).

Procedure

An IRB was submitted, and approval gained prior to selection of participants. The Carnegie Classification of Institutions of Higher Education is a framework for describing colleges in the United States in terms of diversity and identifying similarities or differences between institutions (The Carnegie Classification of Institutions of Higher Education, n.d.). Four hundred and seven colleges met the Carnegie Classification of Institutions of Higher Education with "very high undergraduate," "high undergraduate," or "majority undergraduate," and "four-year, full-time" and were selected to distribute the online survey to the student athletes at that college. These Carnegie Classifications were selected in order to maximize the number of undergraduates because the majority of student athletes participate at the undergraduate level (National Collegiate Athletic Association [NCAA], n.d.). Because the NCAA is the largest varsity sport association and is only available at four-year institutions, this was an important classification to consider for selection of postsecondary institutions. In addition, the NAIA is comprised of four-year colleges so including the NCAA and the NAIA should capture a majority of varsity sport athletes. However, club sports are more difficult to classify. Club sports can be found at any level of postsecondary institution and are governed by varying organizations across institutions. One similar characteristic between varsity and club sports is the requirement for academic eligibility. If a student performs poorly academically, they become ineligible to participate in sports. For this study, the guidelines used for NCAA sponsored sports was used to model the selection process of postsecondary institutions.

It is estimated that approximately 2.5 million student athletes participate in varsity and club sports at postsecondary institutions. This includes an estimated 460,000 NCAA students, 56,784 NAIA students, and 2 million club sport students that participate in sports at all postsecondary institutions annually. To maximize the potential of reaching a sample of student athletes at the selected postsecondary institutions, email addresses were gathered from the internet for athletic directors, club sports, and intramural/recreation leadership. The identified directors and leaders of the various sports were asked to send out the survey link and cover letter to student athletes at the institution. Reminder emails were sent twice following the initial contact.

Participants

A total of 237 college student athletes responded to an online survey. The records of 22 of the participants were removed due to not completing any additional questions after indicating they played a sport at the college level. One participant was eliminated due to not meeting the inclusion criteria. The remaining 214 participants met the inclusion criteria of being over the age of 18 and enrolled in a minimum of one credit hour at a college meeting the Carnegie Classification. The response rate was difficult to access due to the limited information available on the exact num-

ber of student athletes at each institution. Considering the number of institutions selected to participate and the number of student athletes completing the survey being less than the institutions, the response rate was considered to be lower than expected. Although the overall response rate was lower than expected, the student athletes with a history of concussion accounted for 15% of the overall response rate which is higher than the average concussion rate of 9% of NCAA student athletes.

Participants included 86 males and 128 females, and the ages ranged from 18 to 28 years of age with an average age of 20 years. The participants included freshman (*n*=45, 21.0%), sophomores (*n*=59, 27.6%), juniors (*n*=49, 22.9%), seniors (*n*=49; 22.9%), and graduate (*n*=12, 5.61%) students who participated in a sport (*n*=213) through either a club (*n*=99, 46.3%), NCAA (*n*=97, 45.3%), NAIA (*n*=12, 5.6%), or intramural/recreation sport (*n*=5, 2.3%). One student did not answer the question on sport association. The student athletes who reported sustaining a concussion (*n*=31), and who completed the survey, sustained one (*n*=19, 61.3%), two (*n*=5, 16.1%), or three or more (*n*=7, 22.6%) concussions while playing sports at the college level. These responses provided an avenue to investigate student athletes' perspectives on RTL guidelines, common symptoms experienced after SRC, and accommodations that may be important for returning to the classroom following an SRC.

Results

IBM SPSS 25 was used to analyze the data. Descriptive statistics and Fisher's Exact Test were calculated to investigate research question (1), what are NCAA and non-NCAA student athlete perspectives on current practices (e.g., RTL policy, education, baseline testing) with RTL following SCR? Student athletes (*n*=214) were surveyed and 78 (36.4%) were aware of an available RTL policy, 91 (42.5%) received education on the effects of SRC on academic performance, and 99 received baseline testing (46.3%). NCAA student athletes (*n*=97, 45.3%) were compared to non-NCAA (e.g., club, intramural/recreation, NAIA) sport athletes (*n*=116, 54.5%) to further describe current trends with RTL. An odds ratio was computed to determine the size of the effect of knowing or not knowing whether the postsecondary institution had a return to learn policy and whether the student did or did not report a concussion, receive education, and receive accommodations. For NCAA student athletes, the odds of reporting awareness of an RTL policy were 4 times (95%; CI: 2.21, 7.23) the odds of reporting awareness of receiving education on the effects of SRC on academic performance were 2.91 times (95%; CI: 1.66, 5.12), and the odds of reporting receiving baseline testing were 6.72 times (95%; CI: 3.68, 12.27) that of non-NCAA sport athletes.

The remaining research questions were assessed without comparison between sport associations due to the low response rate of student athletes reporting a history of concussion: NCAA (*n*=9, 29%), NAIA (*n*=1, 3.2%), club (*n*=19, 61.3%), intramural/recreation (*n*=2, 6.5%). Descriptive statistics were calculated to investigate research question (2), what are student athletes' perspectives on returning to the classroom following an SRC? The student athletes who indicated a history of concussion (*n*=31, 14.5%) were surveyed about reporting of concussion symptoms and receiving classroom accommodations. The highest percentage of physical symptoms experienced by student athletes following SRC included headaches (*n*=31, 100%), dizziness (*n*=27, 87.1%), sensitivity to light (*n*=25, 80.6%), and feeling slowed (*n*=24, 77.4%). Over 70% of the student athletes experienced symptoms in all areas of cognition including difficulty concentrating (*n*=25, 80.6%), mentally foggy (*n*=24, 77.4%), and difficulty remembering (*n*=22, 71%). Table 1 displays frequency and percentages of all symptoms reported by the participants following their most recent concussion and the median level of severity on a five-point scale.

Twenty-three (74%) student athletes with a history of concussion reported symptoms to at least one or more of the following individuals: coach (*n*=17, 54.8%), family (*n*=15, 48.4%), physician (*n*=15, 48.4%), athletic trainer (*n*=14, 45.2%), teammate (*n*=11, 35.5%), faculty (*n*=9, 29.0%), or academic support/disability office (*n*=1, 3.2%). Twenty-eight student athletes (90%) reported a recovery period of more than one day, but nineteen (61.3%) participants did not miss any days of class. Concerning accommodations, 48% of the student athletes reported using accommodations while recovering from concussion. The most common classroom accommodations used after SRC were excused absences (n=11, 35.5%) and extension of tests and assignments (n=9, 29%). See Table 2 for more details on reported recovery time, days missed from school, and the availability and types of accommodations provided during their recovery following concussion.

Fisher's Exact Tests and odds ratios were calculated to investigate research question (3), are student athletes who were aware of a RTL policy or received education on the effects of concussion on academic performance more likely to report a concussion and receive accommodations while recovering from concussion symptoms? A 2x2 contingency table was

used with all variables as "Yes" or "No" for each comparison. Fisher's Exact Test confirmed that students with a history of concussion who are aware of a RTL policy at their institution were not significantly (p>.05) more likely to be aware of receiving education on concussion, report a concussion, or receive accommodations than student athletes with a history of concussion who do not report having a RTL policy. However, further analyses on the education component of the RTL policy confirmed that students receiving education on the impact of concussion on academic performance prior to the start of the season were significantly (p<.05) more likely to report a concussion and receive accommodations than students who did not receive the same education. For student athletes with a history of concussion, the odds of receiving education on the impact of concussion on academic performance were 22.5 times (95%; CI: 2.32, 218.35) that of student athletes who did not receive education to use accommodations and 1.62 times (95%; CI: 1.16, 2.26) that of student athletes who did not receive education to report a concussion.

The Fisher's Exact Test and odds ratios were used to assess research question (4), are student athletes who experience a specific symptom as a result of an SRC more likely to report an accommodation as more or less important for returning to the classroom? As one might expect, odds ratios for statistically significant (p<.05) revealed that students who experienced fatigue were 7 times (95%; CI: 1.36, 35.93) that of student athletes who did not experience fatigue to report that a reader or note taker would be a valuable accommodation and student athletes reporting trouble falling asleep were 7.6 times (95%; CI: 1.07, 54.09) that of student athletes who did not experience trouble falling asleep to report preferential seating as an important accommodation for returning to the classroom. Conversely, students who experienced headaches were 1.4 times (95%; CI: 1.01, 1.95) that of student athletes who did not experience a headache to report an excused absence as not important as an accommodation to return to the classroom. Students with vision problems were 2.9 times (95%; CI: 1.70, 4.90) that of student athletes who did not experience vision problems to report rest breaks as not important as an accommodation to return to the classroom and students feeling more emotional were 9.5 times (95%; 1.27, 71.43) that of student athletes not experience feeling more emotional to report wearing sunglasses or decreasing lighting as not important as an accommodation to return to the classroom. Lastly, students sleeping more than usual were 1.4 times (95%; 0.21, 9.35) that of student athletes not experiencing sleeping more than usual to report preferential seating as not important for managing symptoms to return to the classroom following SRC.

Discussion

Despite the advances made in the assessment and management of SRC, there is limited research regarding student athletes' academic experiences during the recovery period. The purpose of this study was to examine student athletes' perspectives of RTL following SRC. Less than half of the student athletes surveyed reported awareness or knowledge of several key components of a concussion management policy. However, student athletes who participated in NCAA sanctioned sports were more likely to be aware of a RTL policy, receive education on the effects of concussion on academic performance, and participate in baseline testing. In addition, NCAA athletes were less likely to report history of a concussion than students who participated in a club sport. Further research is warranted to determine if the differences between NCAA and club athletes is due to the effectiveness of the NCAA's concussion management plan.

Despite the growing trend for colleges to adopt a RTL policy or classroom guidelines for learning after concussion, in this study only one-third of student athletes reported being aware of a RTL policy at their institution. This is consistent with the findings by Paddack and colleagues (2016), in which only 31% of athletic trainers surveyed had academic accommodation policies for SRC at the institutions they worked. This finding is problematic because many student athletes are attending colleges that may not have a RTL policy to follow after sustaining an SRC. Even if the college has a policy, student athletes may not be aware of the policy or may not be compliant with the recommendations in spite of their awareness.

Student athletes with a history of concussion who were aware of a RTL policy at their institution were not more likely than students who were not aware of a RTL policy to receive education on the impact of concussion on academic performance, report a concussion, or receive accommodations while recovering. Simply having a RTL policy that addresses returning to the classroom following concussion does not necessarily improve the knowledge or experiences of student athletes who sustain a concussion. Since 44.7% of student athletes with a concussion return to the classroom before symptoms subside (Carson et al., 2014), the goal should be to provide information on the existence and purpose of a RTL policy. This includes education on the impact of concussion on classroom performance and awareness of resources available following concussion.

A concussion management policy should include education for student athletes. Kroshus and Baugh (2016) found that 80% of students surveyed reported receiving some form of education on concussion in general from colleges. However, individual institutions determine the amount and content of the education material provided to student athletes. Institutions may or may not choose to cover content regarding the effects of concussion on academic performance. In this study, only 43% of student athletes reported receiving education specifically on the impact of SRC on academic performance. Kroshus and Baugh (2016) found that 86% of student athletes reported wanting more education on the impact of concussion on academic performance.

A RTL policy should specify how specific education on the effects of concussion on academic performance will be developed and implemented to improve awareness. Student athletes who indicated that they had received education on the effects of concussion on academic performance were more likely to report a concussion and more likely to receive accommodations. Findings from the current study support the benefits of equipping students with knowledge of the consequences of concussion on academic performance. A supportive environment and concussion knowledge for collegiate athletes may facilitate reporting symptoms to school professionals and requesting appropriate accommodations that can promote RTL.

Most of the literature available has focused on RTP, not on returning to the classroom following concussion. In this study, over 80% of the student athletes with a history of concussion reported a recovery time of less than 2 weeks. In addition, 61% of student athletes reported missing zero days of school. Student athletes may be returning to the classroom prior to their symptoms resolving. This could have negative effects on their ability to learn, their grades, and the length of recovery. The majority of student athletes in the current study indicated difficulty concentrating and remembering as a result of concussion. Even though students reported symptoms for weeks and still attended class, less than half received any accommodations.

A graduated plan with appropriate accommodations to return students to the classroom should promote recovery and provide opportunities for learning simultaneously. Accommodations need to be individualized to the student's specific needs based on the types of symptoms experienced during the recovery period and the type of college courses enrolled. The most common accommodations received by over 30% of student athletes in this study were excused absences and extensions for tests and assignments. This is consistent with Paddack and colleagues (2016), who found that the two most common accommodations provided by colleges were excused absences and extended learning time.

There are several recommended accommodations in the literature for student athletes returning to the classroom following an SRCs (Hall et al., 2015; Halstead et al., 2013; Makdissi et al., 2013; McGrath, 2010; Moser et al., 2012; Quinlin et al., 2012; Trammell & Hathaway, 2007). However, there is limited research on benefits or importance of these accommodations from college athletes' perspectives. In an ideal situation, students who report a specific symptom will then receive an accommodation that is beneficial for managing that symptom upon returning to the classroom.

Students reporting fatigue were more likely to perceive a reader or note taker as an important accommodation for returning to the classroom. The demands of returning to the classroom are complex and require students to be able to multitask (e.g., listen while taking notes). Engaging in multiple activities may increase fatigue and interfere with their ability to fully participate in school related activities (Birgitta & Lars, 2017) and the use of a notetaker or reader will decrease the amount of multitasking required of a student in the classroom setting.

Approximately 50% of student athletes with a history of concussion in this study reported having trouble falling asleep or sleeping more than usual. Sleep disturbances following SRC can have an impact on symptom reporting and cognitive functioning (Kostyun, Milewski, Hafeez, 2014; McClure, Zuckerman, Gregory, Kutscher, & Solomon, 2013; Mihalik et al., 2013). Sleep is often assessed through self-reporting of hours slept and quality of sleep. Sleep disturbances can increase symptom reporting as well as recovery time. Student athletes in this study who reported difficulties with sleeping perceived the accommodation of preferential seating as important for the symptom of having trouble falling asleep and unimportant for sleeping more than usual. Preferential seating (e.g., sitting closer to the instructor, sitting away from distractions; close/farther away sensory items in the room; Byrnes, 2008) may promote learning for students experiencing sleep disturbances.

Headaches are one of the most common symptoms of concussion and experienced by all student athletes in this study. Student athletes reported that excused absences were not an important accommodation for recovery of concussion, which is evident by the majority of students not missing any days. As one student reported, "It was hard to miss class

and have to catch up when coming back." Gibson and colleagues (2013) found that the fear of getting behind by missing class could worsen and prolong symptoms. As research on cognitive rest progresses, students may require education on the benefits of limited excused absences to manage symptoms.

Vision and emotion symptoms also affected a sizable portion of student athletes following an SRC in this study. There was an association between students reporting visual problems and the accommodation of rest breaks. Simply providing a rest break was reported as not an important accommodation for student athletes to return to the classroom. Also, students reporting more emotional distress after the concussion felt that lowering the lighting or wearing sunglasses would not be helpful for returning to the classroom. Students who experience emotional problems in combination with decreased visual memory may be more likely to use avoidance coping (Covassin, Elbin, Crutcher, Burkhart, & Kontos, 2013). Avoidance coping is when an individual tries to escape or ignore a problem or unwanted situation. However, in the long-term, avoidance coping is associated with higher levels of psychological distress and poor adjustment (Wood & Doughty, 2013). In this study, over 50% of participants indicated feeling more emotional after their concussion. There is little literature on specific accommodations that can be used to address visual and emotional symptoms in the classroom following SRC. Further research and analysis identifying appropriate accommodations for visual (e.g., inability to focus, double vision, visually alternate between or follow objects; Master et al., 2016) and emotional symptoms will allow students to engage in learning while maximizing performance without worsening symptoms.

Implications for Practice

There is a lack of awareness among many student athletes regarding RTL policies. The purpose of a RTL policy is to provide students with knowledge of what to do after experiencing an SRC, how and to whom to report an SRC, and how to seek assistance when returning to the classroom. The majority of student athletes in this study were unaware whether a RTL policy at their institution was available to help them navigate the process of recovering from concussion. Even when students were aware of a RTL policy, it appeared that the presence of such a policy had little effect on student behavior (e.g., reporting and pursuing appropriate accommodations) unless the policy included education on the impact of SRC on classroom performance. The NCAA's concussion management plan appears to be increasing awareness of policies and services available by student athletes. In addition, NCAA student athletes reported lower incidence of SRC than club sports. Sport associations that currently do not have RTL policy, either because they are not required to do so or are not in compliance, should consider developing and implementing RTL policy that includes education for student athletes about the effects of concussion on academic performance. Implementing RTL policy may decrease the effects that concussion has on learning, grades (e.g., lower GPA, failing), and future goals (e.g., unable to attend graduate school or professional program due to low GPA, inability to finish school due to failing a course).

Concussion education is significantly associated with students reporting and receiving accommodations following SRC. Colleges should provide concussion education prior to the beginning of the sport season to increase the odds of student athletes reporting a suspected concussion to a school official. Only when student athletes report a suspected concussion can academic professionals provide necessary services and supports that will enhance recovery from concussion. Student athletes in this study perceived several accommodations as important or not important for their returning to the classroom after experiencing a specific symptom of concussion. Obtaining classroom accommodations can be time intensive and complicated, resulting in accommodations not being available until after concussion symptoms have resolved. A process for obtaining short-term accommodations following a diagnosis of concussion should be implemented with a RTL policy at all colleges, as this would be helpful to both athletes and non-athletes.

College faculty and staff have an obligation to assist student athletes with understanding and following the institution's RTL policy. Collaboration is needed between the Office of Disability Services and other academic professionals (e.g., faculty, occupational therapist, advisor), who are experts in learning, to develop a checklist of symptoms that correspond to appropriate accommodations to simplify the process and ensure students are receiving only the accommodations that are essential for learning when returning to the classroom. School professionals would use the checklist when a student athlete reported a concussion to determine the appropriate accommodations to use for the gradual return to the classroom. More research is needed to inform the creation of this checklist.

To decrease the incidence of concussion, one would need a prevention plan in addition to a management plan. So, perhaps future research should focus on investigating concussion prevention and management plans. In addition, future research

should assess perceived benefits of accommodations for specific symptoms on a larger scale and with objective measures in addition to self-report of student athletes recovering from concussion. This will assist with the development of short-term accommodations that would be beneficial for returning to the classroom while managing continuing symptoms. Finally, future studies should assess the amount and types of education that should be provided to appropriate school officials on the symptoms of concussion and best practice approaches for management of SRC.

Limitations

Only student athletes representing colleges in the Carnegie Classification of Institutions of Higher Education with "very high undergraduate," "high undergraduate," or "majority undergraduate," and "four-year, full-time students" participated in this study. These institutions were selected because they enroll predominantly undergraduate students who are eligible to play sanctioned sports. However, this is a limitation because the results may not be generalizable to other classifications of postsecondary institutions. This study had a low response rate that may be due to the timing of the survey delivery (e.g., summer session, during busy times of semester) and lack of interest in participation by students and institutions (e.g., schools not wishing to participate due to topic, no time, too many survey requests, perceived legal risk). This study used self-report of student athletes rather than objective measures of performance (e.g., learning, grades) to evaluate accommodations assumed to be beneficial for returning to the classroom.

Conclusion

When student athletes return to the classroom too soon following concussion, they may experience any of a number of negative consequences. These include prolonged symptom recovery, difficulty learning, and lower grades. While there has been considerable attention on athletes RTP, there has been limited research regarding student athletes RTL following sports-related concussion. RTP and RTL policies following a diagnosis of concussion should include education on the effects of concussion. In the study reported here, education was found to be significantly related to the odds of reporting and using accommodations after concussion. Having only a policy on RTL that does not include education was not associated with the odds of reporting a concussion or using accommodations. A graduated plan for returning to the classroom following concussion can enhance student athletes' recovery and assist their academic performance. A major component of a graduated plan is provision of short-term accommodations during recovery. Short-term accommodations may include classroom modifications (e.g., accommodation for light and noise sensitivity, removal from activities requiring physical participation, quiet exam rooms, preferential seating), assistance from others (e.g., meetings with instructor, tutor, readers and note takers for tests and assignments), time extensions for testing and assignments, rest breaks, and excused absences (Hall et al., 2015; Halstead et al., 2013; Makdissi et al., 2013; McGrath, 2010; Moser et al., 2012; Quinlin et al., 2012; Trammell & Hathaway, 2007). A concussion can have negative effects on student athletes' learning and classroom success. Implementing policies that include graduated plans with accommodations that promote recovery is essential for student athletes to continue to learn and succeed in the classroom as symptoms subside.

References

Baker, J. G., Rieger, B. P., McAvoy, K, Leddy, J. J., Master, C. L., Lana, S. J., & Willer, B. S. (2014). Principles for return to learn after concussion. *International Journal of Clinical Practice, 68*,

Baker, K. Q., Boland, K., & Nowik, C. M. (2012). A campus survey of faculty and student perceptions of persons with disability. *Journal of Postsecondary Education and Disability, 25*, 309-329.

Baugh, C. M., Kroshus, E., Daneshvar, D. H., Filali, N. A., Hiscox, M. J., & Glantz, L. H. (2014). Concussion management in United States college sports: Compliance with National Collegiate Athletic Association concussion policy and areas for improvement. *The American Journal of Sports Medicine, 43*, 47-56.

Birgitta, J., & Lars, R. (2017). Assessment and treatment of mental fatigue after a traumatic brain injury. *Neuropsychological Rehabilitation, 27,* 1047-1055.

Bonds, G. B., Edwards, W. W., & Spradley, B. D. (2014). Advancements in concussion prevention, diagnosis, and treatment. *The Sport Journal, 19*.

Brown, D. A., Elsass, J. A., Miller, A. J., Reed, L. E., & Reneker, J. C. (2015). Differences in symptom reporting between males and females at baseline and after a sports-related concussion: A systematic review and meta-analysis. *Sports Medicine, 45*, 1027-1040.

Byrnes, M. (2008). Educators' interpretations of ambiguous accommodations. *Remedial and Special Education, 29*, 306-315.

Carson, J. D., Lawrence, D. W., Kraft, S. A., Garel, A., Snow, C. L., Chatterjee, A., … Frémont, P. (2014). Premature return to play and return to learn after a sport-related concussion. *Canadian Family Physician, 60*, 310-315.

Centers for Disease Control and Prevention. (2015a). *Injury prevention & control: Traumatic Brain Injury & Concussion.* Retrieved from http://www.cdc.gov/TraumaticBrainInjury/index.html

Centers for Disease Control and Prevention. (2015b). *Heads up*. Retrieved from www.cdc.gov/headsup/basics/concussion_whatis.html

Covassin, T., Elbin, R. J., Crutcher, B., Burkhart, S., & Kontos, A. (2013). The relationship between coping, neurocognitive performance, and concussion symptoms in high school and collegiate athletes. *The Sport Psychologist, 27*, 372-379.

Gessel, L. M., Fields, S. K., Collins, C. L., Dick, R. W., & Comstock, R. D. (2007). Concussion among United States high school and collegiate athletes. *Journal of Athletic Training, 42*, 495-503.

Gibson, S., Nigrovic, L. E., O'Brien, M., & Meehan, W. P. (2013). The effect of recommending cognitive rest on recovery from sports-related concussion. *Brain Injury, 27*, 839-842.

Giza, C. C., Kutcher, J. S., Ashwal, S., Barth, J., Getchius, T. S., Gioia, G. A., …Zafonte, R. (2013). Summary of evidence-based guideline update: Evaluation and management of concussion in sports: Report of the guideline development subcommittee of the American Academy of Neurology. *Neurology, 80*, 2250-2257.

Hadley, W. M. (2005). The importance of school choice for college-bound students with learning disabilities. *National Association for College Admission Counseling, 43*(2), 18-19.

Hall, E. E., Ketchum, C. J., Crenshaw, C. R., Baker, M. H., McConnell, J. M., & Patel, K. (2015). Concussion management in collegiate student-athletes: Return-to-academics recommendations. *Clinical Journal of Sports Medicine, 25*, 291-296.

Halstead, M. E., McAvoy, K., Devore, C. D., Carl, R., Lee, M., Logan, K., …& Council on School Health. (2013). Returning to learning following a concussion. *American Academy of Pediatrics, 132*, 948-957.

Harmon, K., Drezner, J., Gammons, J., Guskiewicz, K., Halstead, M., Herring, S., …Roberts, W. (2013). American Medical Society for Sports Medicine position statement: Concussion in sport. *Clinical Journal of Sports Medicine, 23*, 1-18.

Kostyun, R. O., Milewski, M. D., & Hafeez, I. (2014). Sleep disturbances and neurocognitive function during the recovery from a sport-related concussion in adolescents. *The American Journal of Sports Medicine, 43,* 633-640.

Kroshus, E., & Baugh, C. M. (2016). Concussion education in U.S. collegiate sports: What is happening and what do athletes want? *Health Education & Behavior, 43*, 182-190.

Kroshus, E., Daneshvar, D. H., Baugh, C. M., Nowinski, C. J., & Cantu, R. C. (2014). NCAA concussion education in ice hockey: An ineffective mandate. *British Journal of Sports Medicine, 48*, 135-140.

Langlois, J. A., Rutland-Brown, W., & Wald, M. M. (2006). The epidemiology and impact of traumatic brain injury: A brief overview. *Journal of Head Trauma Rehabilitation, 21*, 375-378.

Lynall, R. C., Laudner, K. G., Mihalik, J. P., & Stanek, J. M. (2013). Concussion-assessment and management techniques used by athletic trainers. *Journal of Athletic Training, 48*, 844-850.

Makdissi, M., Davis, G., Jordan, B., Patricios, J., Purcell, L., & Putukian, M. (2013). Revisiting the modifiers: How should the evaluation and management of acute concussions differ in specific groups? *British Journal of Sports Medicine, 47,* 314-320.

Master, C. L., Scheiman, M., Gallaway, M., Goodman, A., Robinson, R., Master, S., & Grady, M. (2016). Vision diagnoses are common after concussion in adolescents. *Sage Journals, 55,* 260-267.

Master, C. L., Gioia, G. A., Leddy, J. J., & Grady, M. F. (2012). Importance of 'return-to-learn' in pediatric and adolescent concussion. *Pediatric Annals, 41*(9), 1-6.

McAvoy, K. (2012, March/April). Return to learning: Going back to school following a concussion. *Communique, 40*(6), 1, 23-25.

McClure, D. J., Zuckerman, S. L., Kutscher, S. J., Gregory, A. J., & Solomon, G. S. (2013). Baseline neurocognitive testing in sports-related concussions: The importance of a prior night's sleep. *The American Journal of Sports Medicine, 42*, 472-478.

McCrory, P., Meeuwisse, W., Aubry, M., Cantu, B., Dvorak, J., Echemendia, R., …Turner, M. (2013a). Consensus statement on concussion in sport: The 4th International Conference on Concussion in Sport held in Zurich, November 2012. *British Journal of Sports Medicine, 47*, 250-258.

McCrory, P., Meeuwisse, W. H., Echemendia, R. J., Iverson, G. L., Dvorak, J., & Kutcher, J. S. (2013b). What is the lowest threshold to make a diagnosis of concussion? *British Journal of Sports Medicine, 47*, 268-271.

McGrath, N. (2010). Supporting the student-athlete's return to the classroom after a sport-relate*d concussion.* Journal of Athletic Training, 45, 492-498.

Mihalik, J. P., Lengas, E., Register-Mihalik, J. K., Oyama, S., Begalle, R. L., & Guskiewicz, K. M. (2013). The effects of sleep quality and sleep quantity on concussion baseline assessment. *Clinical Journal of Sport Medicine, 23,* 343-348.

Moser, R. S., Glatts, C., & Schatz, P. (2012). Efficacy of immediate and delayed cognitive and physical rest for treatment of sports-related concussion. *The Journal of Pediatrics, 161*, 922-926.

National Collegiate Athletic Association. (n.d.). *Eligibility timeline.* Retrieved from http://www.ncaa.org/student-athletes/current/transfer-terms

NCAA Sport Science Institute. (2017). *Interassociation consensus: Diagnosis and management of sport-related concussion best practices.* Retrieved on from http://www.ncaa.org/sites/default/files/SSI_ConcussionBestPractices_20170616.pdf.

Paddack, M., DeWolf, R., Covassin, T., & Kontos, A. (2016). Policies, procedures, and practices regarding sport-related concussion in community college athletes. *Journal of Athletic Training, 51,* 82-88.

Pennington, B. (2008, December 1). Rise of college club teams creates a whole new level of success. *The New York Times.*

Quinlin, M. M., Bates, B. R., & Angell, M. E. (2012). 'What can I do to help?': Postsecondary students with learning disabilities' perceptions of instructors' classroom accommodations. *Journal of Research in Special Education Needs, 12,* 224-233.

Scorza, K. A., Raleigh, M. F., & O'Connor, F. G. (2012). Current concepts in concussion: Evaluation and management. *American Family Physician, 85*, 123-132.

Selassie, A. W., Dulaney, A. W., Pickelsimer, E. E., Voronca, D. C., Williams, N. R., & Edwards, J. C. (2013). Incidence of sport-related traumatic brain injury and risk factors of severity: A population-based epidemiologic study. *Annals of Epidemiology, 23*, 750-756.

The Carnegie Classification of Institutions of Higher Education (n.d.). *About carnegie classification.* Retrieved from http://carnegieclassifications.iu.edu/.

Trammell, J., & Hathaway, M. (2007). Help-seeking patterns in college students with disabilities. *Journal of Postsecondary Education and Disability, 20*, 5-15.

Wasserman, E. B., Bazarian, J. J., Mapstone, M., Block, R., & van Wijngaarden (2016). Academic dysfunction after a concussion among US high school and college students. *American Journal of Public Health, 106*, 1247-1253.

West, T. A., & Marion, D. W. (2014). Current recommendations for the diagnosis and treatment of concussion in sport: A Comparison of three new guidelines. *Journal of Neurotrauma, 31*, 159-168.

Wood, R. L., & Doughty, C. (2013). Alexithymia and avoidance coping following traumatic brain injury. *Journal of Head Trauma Rehabilitation, 28,* 98-105.

Yi, J., Padalino, D. J., Chin, L. S., Montenegro, P., & Cantu, R. C. (2013). Chronic Traumatic Encephalopathy. *Current Sports Medicine Reports, 12,* 28-32.

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Table 1

Severity of Symptoms Reported by Participants Following SRC (n=31)

	Frequency	Percent	Median
Physical			
Headache	31	100	3
Dizziness	27	87	2
Sensitivity to Light	25	80	2
Feeling Slowed	24	77	2
Fatigue	22	71	3
Sensitivity to Noise	22	71	3
Balance Problems	20	64	1
Visual Problems	18	58	2
Nausea	17	54	2
Numbness/Tingling	11	35	1
Vomiting	8	25	1
Cognitive			
Difficulty	25	80	3
Mentally Foggy	24	77	3
Difficulty Remembering	22	71	2
Emotional			
Irritability	21	67	1
Sadness	17	54	1
Feeling More Emotion	17	54	2
Nervousness	15	48	1
Sleep			
Drowsiness	21	67	2
Trouble Falling Asleep	18	58	2
Sleeping More Than Usual	14	45	2
Sleeping Less Than Usual	12	38	1

Note. 0=did not experience symptom, 1=barely noticed symptom, 2=clearly noticed, but could behave normally, 3=symptom bad enough to make normal behavior difficult, 4=symptom bad enough to make normal behavior impossible; Symptoms based off the Post Concussion Symptom Scale.

Table 2

Student's Experiences of Returning to the Classroom Following Concussion (n=31)

	Frequency	Percent
Recovery Time		
1 day or less	3	10
2-5 days	10	32
5-6 days	6	19
1-2 weeks	8	26
3-4 weeks	2	7
More than 1 month	2	7
Missed Class		
0 days	19	61
1-3 days	8	26
4-6 days	2	7
1-2 weeks	2	7
3-4 weeks	0	0
More than 1 month	0	0
Accommodations Received		
Excused Absences	11	36
Rest Breaks	4	13
Extensions Tests/Assignments	9	29
Extended Time for Tests	1	3
Sunglasses/Reduced Lighting	1	3
Quiet Room	0	0
Reader/ Note Taker	1	3
Preferential Seating	0	0
Tutor	1	3

Note. Recovery Time=the number of days the student athlete reported before being symptom free following concussion; Missed Class=the number of days student athletes did not attend class due to the concussion; Accommodations Received=the type of accommodation the student athlete utilized while recovering from concussion.

Investigating Challenges and Preferred Instructional Strategies in STEM

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Abstract

In this mixed-methods study, undergraduate students identified with a learning disability indicated their preferred instructional approaches to learning in college-level STEM courses. The relationships between preferred instructional strategies and learner characteristics: (a) declared major; (b) learning disability; and (c) gender were examined. Participants (n= 48) completed a survey instrument regarding their perceptions and preferences of instructional strategies in their science classes as well as their challenges to learning. An additional focus group (n=8) was conducted to further explore how these students prefer to learn in science. The participants' self-reported challenges for learning science content included: (a) difficulty in interpreting complex texts; (b) trouble remembering or recalling content; and (c) content that was not connected to real-world applications. While the challenges faced by the participants did not correlate to the participants' identified learning disability or declared major, the identified challenges differed by gender. The study participants self-reported a preference for direct instruction with hands-on experiential learning opportunities taking place outside of the traditional classroom environment. The declared major and type of learning disability appeared to have no relationship to the most preferred or least preferred instructional method.

Keywords: science education, instruction, postsecondary education, instructional design, STEM

Undergraduates in higher education with an identified learning disability enroll at half the rate of those students without a learning disability. The eight-year completion rate for students with learning disabilities is 34% in comparison to 51% among students without learning disabilities (Cortiella & Horowitz, 2014). Reasons for the completion rate discrepancy range from not seeking accommodations or having access to accommodations, financial concerns, and instructional practices in difficult subject areas. Completing a degree in higher education necessitates coursework in science, technology, engineering, and math (STEM). For most students diagnosed with a learning disability, understanding and obtaining science knowledge has been recognized as a barrier to degree attainment (Brigham, Scruggs, & Mastropieri, 2011).

Internal and external influencers contribute both positively and negatively to learning and succeeding in STEM among higher education students identified with a learning disability. Students' disinterest in STEM (PCAST, 2010), taxing cognitive loads (Goldstein, Naglieri, Princiotta, & Otero, 2014), and affective influences such as lack of self-efficacy (one's self-belief to complete a task) are internal contributors to limited success in science (Osborne, Simon, & Collins, 2003). External barriers for students learning and succeeding in science include the methods and strategies used to teach science as well as the instructor's expertise in science instruction, especially as it relates to students with learning disabilities. Often, science teachers describe inquiry-driven and hands-on instruction as their teaching philosophy; however, instructional practices in the classroom may not match their philosophy of science education (Hofstein & Lunetta, 2004). Many science faculty members struggle with adopting new instructional methods into practice. The preferred and most commonly used option is the traditional lecture. The andragogical approaches and practices of professional scientists teaching non-science majors may be incompatible (passive

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lecturing to active learning or authentic experiential learning to reading text; Gogolin, & Swartz, 1992; Sproken-Smith, Walker, Batchelor, O'Steen, & Angelo, 2012; Udo, Ramsey, & Mallow, 2004). Further, complex texts (found in STEM) can be incompatible with some learning disabilities and does not demonstrate a clear connection between the presented content and the learners' personal experiences with science in the real-world (Scruggs & Mastropieri, 2007).

Androgogy refers to the art and science of teaching adults. Obstacles that faculty face when teaching science include limited andragogical knowledge, time to design and develop a new course, and existing beliefs about science (Sunal et al., 2001). In STEM, accommodations and instructional strategies to foster greater depth of knowledge among higher education students with an identified learning disability tend to be developed through instructor feedback rather than empirical evidence or literature support (Ofiesh, 2007). Studies focusing on the preferred instructional methods, beyond the use of accommodations, of students with a learning disability enrolled in higher education are limited. Studies examining instructional strategies for college science courses are limited (Sparks & Lovett, 2009). Closing the knowledge gap for faculty related to instructional methods and strategies in science for higher education students diagnosed with a learning disability may contribute to increased sustainability towards degree completion. The following study seeks to identify the preferred instructional approaches in science courses and challenges to learning among higher education students identified with a learning disability. The mixed methods study examined students' perceptions and preferences both through survey and a focus group discussion. The following literature review provides the foundation for the study based on the research, theory, and practice of STEM instruction.

Literature Review

Theory and Practice

Cognitive information processing references a theoretical perspective of learning that considers the human mind to process information similarly to the way a computer does (Driscoll, 1994). Information moves from input to long term memory and learning attainment through multiple processes. The encoding of information, organization, and classification of novel and previous knowledge differs from person to person. Cognitive information processing values multiple processes for memory attainment including rehearsal, chunking, encoding, attention, and retrieval.

The selection of instructional practices does not stem from a "one-size-fits-all" learning theory. Instead, individual learners engage with the material as a result of their previous experiences, the learning environment, and individual cognitive structures. The attainment of knowledge is not a single event; rather it occurs on a continuum. Strategies focusing on the utilization of memory, both long-term and short-term, are reported to effect academic performance and retention of material (St Clair-Thompson, Overton, & Botton, 2010). Time constraints on students during tasks with increasing cognitive complexity create greater performance deficits (Speirs, Rinehart, Robinson, Tonge, & Yelland, 2014).

In the field of inclusion education, it is critical to incorporate evidence-based practices to ensure student performance objectives are met. However, theoretical foundations for implementation are often missing or misinterpreted when put into practice. In some instances, the lack of administrative support for these practices does not develop the educator to fully understand the nature of the instructional practice employed (Zundans-Fraser & Auhl, 2016).

Instruction in Science Courses

Differing forms of instruction are necessary when conveying complex scientific theories, concepts, and vocabulary to students. Schroeder, Scott, Tolson, Huang, and Lee (2007) found repeating themes regarding the correlation of student achievement and instruction within science classrooms; for example, the highest gains in achievement came from lessons that connected the information and skills to real-world scenarios and situations. When the material becomes personally relevant to the student, it helps them make more meaningful connections. Curriculum can become more engaging when it has been intentionally designed to connect a student to recognizable, everyday applications of science leading to a positive increase in attitudes towards science and improvement in academic performance (Partin, Underwood, & Worch, 2013).

Learning experiences shaped by meaningful instruction contribute to high quality exposure to science (Gogolin, & Swartz, 1992). When students engage in experiential and/or inquiry-based learning, they are more likely to continue the action and engage in further independent learning (Spronken-Smith, et al., 2012). Singer, Nielsen, and Schweingruber (2012) purported that science courses focused on the traditional discipline-of-science regularly utilize an instruction-centered model; however, when students are engaged in active learning in a student-centered learning environment, the learning gains are significantly higher. When collaborative learning is used

in conjunction with lecture-oriented activities, it has been documented to be more effective in increasing student performance than traditional lectures alone (LoPresto & Slater, 2016).

During a science course, the laboratory component may have the greatest influence over a student's perception of the content delivered, the faculty's instruction, and their overall impression of the course. Activities that do not clearly align with the lecture material can convolute learning and may negatively reinforce the desired STEM skills or knowledge (Hofstein & Lunetta, 2004). Sometimes students in a laboratory/inquiry-based setting believe their goal is to follow directions to find the correct answer rather than using the scientific method to investigate a given situation in which there may or may not be a correct answer. Some inquiry-based activities have been identified as a barrier to graduation (Son, Narguizian, Beltz, & Desharnais, 2016).

Debriefing sessions at the end of class and quick reviews at the beginning of the next class aid in knowledge retention and have a direct positive impact on a student's confidence and satisfaction of course material (Stefaniak & Tracey, 2015). Conversely, enhancing or altering instructional materials results in the lowest gains in increasing student achievement. When designing instruction, educators and instructional designers need to understand the learner and their individual learning needs as they have been shaped by previous experiences and neuro-structures (Ertmer & Newby, 2013). With so many instructional approaches in STEM and specifically in science it was important to ascertain what instructional approaches students identified with a learning disability prefer when learning in STEM content.

STEM Education and Learning Disabilities

Inquiry-based learning has been linked to the highest levels of student achievement in science for students diagnosed with learning disabilities (Jarrett, 1999). In contrast, it is assumed that more structure rather than free-choice learning is needed for this student population (Therrien, Taylor, Hosp, Kaldenberg, & Gorsh, 2011). Swanson and Harris (2013) argued three critical instructional choices for teaching science to students with a learning disability which included direct instruction, cooperative learning, and utilizing curriculum-based measures. Each of these strategies has demonstrated improvement in academic performance.

Active learning, where students are actively engaged in their own learning rather being passive participants, contributes to higher student performance scores, in stark contrast to the traditional lecture (Freeman et al., 2014). Active learning has been associated with contributing to increasing memory about the content being taught (Cherney, 2008) and engaging thinking (Bonwell and Eison, 1991). Active learning can take place individually or collaboratively with other students, para-professionals, and teachers.

Students with a reading-centered learning disability face challenges to succeeding academically because of their ability level to interpret and evaluate written text (Schneps, O'Keeffe, Heffner-Wong, & Sonnert, 2010). Many college-level science courses rely on the interpretation of complex texts as a central component of the course activities. As a result, students with a language-oriented learning disability may feel less successful or prepared in class than a neurotypical counterpart. As instructors model reading skills and strategies, they provide and demonstrate tools for learner success. Structure within the instructional plan should also include visual models for the learner to replicate during reading rehearsals. In many courses, the recall of vocabulary is essential to successfully perform on assessments. When vocabulary recall is relied on in the course, faculty must include strategies on enhancing vocabulary recall using rehearsal and review skills (Grumbine & Alden, 2006).

One method for improving learning among students identified with a learning disability is to scaffold instruction. Scaffolding in education means providing supports for a learner as they build knowledge. The utilization of scaffolding in education is important at any level and within any content area; however, since science curriculum has been described as a linear progression, scaffolding understanding plays a critical role in the learner succeeding. As an instructor scaffolds instruction, they equip the learner abilities to engage in critical reflection and tasks involving metacognitive skills (Bybee, 2015). Scaffolding can: (a) increase student engagement with the content; and (b) encourage students to practice scientific skills related to questioning, experimentation, and collaboration with others.

Scaffolding slowly increases learner responsibility while diminishing the instructor's contributions. Scaffolding can be applied to a whole class or an individual learner. Scaffolding with advanced and adult learners requires the application of "fading." When instructing learners with a learning disability, fading occurs as the learner becomes more self-reliant as a direct result of applying academic strategies taught throughout the course. As the learner becomes more confident in utilization of academic strategies, they become responsible for their own learning in the science course (Bybee, 2015).

Fading is an effective instructional method in science courses (McNeill, Lizotte, Krajcik, & Marx,

2006). The use of fading correlates to increases on assessment scores; however, reasoning skills may still be lower than expected. These results are thought to be a direct result of the altered cognitive structures (patterns of thoughts) (McNeill, et al., 2006). As a result, it is important for science faculty to not only model skills and strategies, but other techniques related to knowledge acquisition as well. One suggested instructional approach for science faculty includes mirroring instructional strategies and philosophy of faculty teaching in the arts by including artistic expression to rehearse concepts presented in the course. The arts approach may scaffold learners to engage in abstract reasoning, which is often difficult for students with learning disabilities. In addition, the utilization of visual models or organizers developed either by the faculty member or the student can aid in the rehearsal and encoding of information into the long-term memory system (Hwang & Taylor, 2016).

Universal design of instruction has been documented to produce positive performance outcomes in science courses for all students, even those with a learning disability (CAST, 2016; Rappolt-Schlichtmann, Daley, & Rose, 2012). Universal design refers to designing for accessibility for everyone. In education, one instructional universal design strategy includes intensifying the curriculum. In this approach, the number of curricular topics presented to the students is lessened in favor of each topic being explored in-depth. Lessons are more hands-on and encourage the student to rehearse skills related to designing and implementing a scientific investigation (Cawley, Foley, & Miller, 2003). In this study, students were asked to identify the challenges they faced in learning science as well as their preferred instructional strategies to learn science. By providing data on student perceptions related to STEM instructional approaches, it is anticipated that educators and instructional designers will have evidence for promising practices when designing instruction for higher education students with learning disabilities.

Research Questions

In the current mixed methods study, the quantitative data (survey) informed the design of the focus group (focus group). The combination of the survey instrument and focus group allowed for the exploration of the following themes: self-report of preferred instructional strategies, identification of trends among higher education students diagnosed with learning disabilities, identification of trends amongst students performing at an overall academic level, and differences between declared majors. The research questions included:

1. What are the self-reported learning challenges for students in higher education with an identified learning disability when learning STEM/science content?
2. Which science-specific instructional strategies are preferred by students?
3. Are there differences in preferred instructional strategies in students who have declared a science major versus those who have not?
4. Are there differences in preferred instructional strategies based upon diagnosed learning disability?

Methods

Participants

The inclusion criteria for the study are: (a) undergraduate students enrolled in college full-time; (b) over the age of 18; and (c) a diagnosed learning disability. Inclusion criteria remained consistent with those described by Weis, Erickson, and Till (2016). In the spring of 2017, over 300 students at a learning-disability-serving institution were enrolled in science courses (N=306). Fifty-eight percent of these students are male. Twenty-eight percent of students have declared a STEM-related major. Approximately 16% of eligible students fully participated in the electronic survey (n=48). Of these participants, 17% elected to participate in a focus group (n=8).

A recruitment email was sent to the 306 students. Seventy-three (N=73) participants indicated their desire to participate in the research study. Forty-eight (n=48) of the students fully participated in the survey (66% completion rate) and additional three (n=3) students partially participated in the survey. The remaining 22 students consented to research activity, but did not advance past the consent stage of the electronic survey. Sixty-one percent of students provided demographic information (n=29); 50% identified as female (n=24) and 38% identified as male (n=18). Almost all participants were under the age of 30 (n=40); 58% stated they were 18-23 years old (n=28) and 25% stated they were 24-29 years old (n=12). Only 79% of the respondents self-identified their primary learning disability (see Table 1). However, it should be noted that all students in attendance at the study location did have a learning disability.

Instrumentation

There were two instruments utilized in the study: a survey and a focus group questionnaire. Both the survey and the focus group questionnaire were developed after a review of the literature by author two in consultation with other professors who taught the

participants. Then the questions from both the survey and the focus group questionnaire were reviewed and revised in consultation with three professors with expertise in STEM education and educational psychology, adult learning education, and special education. The variety of data collection tools were designed to elicit participants' perceptions regarding instruction in college science courses.

The electronic survey was delivered to participants via email as this was the preferred and expected mode of communication among the participants. The electronic survey comprised of six questions, one rating scale question with Likert scale response option, three open-ended responses, and one ranking question. In addition, the electronic survey included four demographic questions regarding the participant's age, gender, declared major, and primary diagnosed learning disability. The electronic survey questions included a closed rating scale as well as open-ended questions to gather ordinal and nominal data. The question structure of the focus group questionnaire was delivered orally. It did not have a written component. These questionnaires consisted of seven open-ended questions with four planned follow-up questions and the participants' declared major.

Procedure

One week prior to the survey being distributed, potential participants were sent an introductory email containing the purpose of the study and invite participation. An electronic survey was distributed to the student body using the college email system which was available for responses for a total of 18 days. Throughout the 18-day period, three reminder emails were delivered to encourage participation in the survey. After the end of the open window period to take the electronic survey, survey participants were recruited to participate in a focus group.

Focus Groups

To accommodate the students' schedule, two semi-structured focus groups were conducted. The focus groups lasted for approximately 35 minutes and each included eight participants. Criteria for participation in the focus group included full participation in the electronic survey and the completion of a college science course. Students who were currently enrolled in a course taught by the researcher were avoided. The focus group was conducted on the college campus in one of the science lab spaces. The facilitator led the semi-structured focus groups by asking the preplanned questions and follow-up probes to encourage group dialogue. The focus groups were recorded and the notes were transcribed for analysis.

Analysis

Analysis techniques for each question in the survey and questionnaire were determined based on the response type and the technique most suited to answer each research question effectively. Responses from the electronic survey were analyzed using descriptive statistics finding the mean and standard deviation. Additionally, chi square tests of independence were used to identify potential relationships between variables and provided responses. Open-ended responses were coded using a multi-stage coding procedure described by Moustakas (1994).

Focus group recordings were transcribed and coded using the procedure described by Moustakas (1994). A preliminary stage of coding was completed in order to gather a general outline of participant responses and the themes presented in the dialogue. Next, a more detailed stage of coding was completed, which divided participant responses into multiple segments based on participant backgrounds and attitudes towards college science courses. An emphasis was placed onto self-identified challenges to learning science at the college level. In the third stage of coding, information provided by participants regarding helpful strategies to learn science was identified. During the final stage of coding, key themes which connected participant responses in the focus group as well as the responses from the electronic survey to published literature were identified. Data from each focus group session was analyzed separately following the identical procedure.

Results

When asked how they would rate their overall impression of their college science courses, 67% of participants (n=32) rated their impression as Very Good or above. Only one participant rated their impression as Poor. The mean score on a five-point Likert scale for the overall impression of a college science course is 3.83 (±0.96, n=48). Overall impression of a participant's college science course was not influenced by learning disability, X^2 (24, n=48) = 21.522, p=.141, or by gender, X^2 (12, n=48) = 13.654, p=.323. Additionally, overall impression of science courses in college was not influenced by learning disability, X^2 (28, n=48) = 36.079, p=.323. There were significant differences in the self-identified learning disability and the participant's gender, $X2$ (18, n=48) = 31.697, p=.024. There were significant differences between learning disability and the major declared, $X2$ (42, n=48) = 60.843, p=.030.

Research Question One: Challenges to Learning Science Content

Research question 1 was: What are the self-reported learning challenges for students in higher education with an identified learning disability when learning STEM/science content? Participants were asked to select their three primary challenges to learning science at the college level. The top three challenges identified by participants were (1) "textbook is too hard or difficult to understand" (52%); (2) "the content was difficult to remember or understand" (50%); and (3) the "content does not create real-world connections" (45%). Additionally, 33% of students stated lectures make it difficult to be engaged.

There appears to be no relationship between the challenges faced by learners and their declared major, X^2 (147, n=48) = 149.331, p=.431 or to learning disability, X^2 (126, n=48) = 133.799, p=.301. However, the challenges faced by students to learn science appear to be different between male and female students. When the two groups were compared, there was a significant difference in the challenges selected by each group, X^2 (63, n=48) = 90.771, p=.013.

The biggest challenge described by male students centered on the material connecting to their life, whereas female students reported having difficulty in reading or interpreting course text. Closely following challenges associated with reading, female students noted the content being difficult to understand or remember as well as the traditional lecture not being engaging. Conversely, male students indicated having difficulty in reading and interpreting text as well as remembering or understanding. However, the feeling of learning not connecting to life was a greater challenge to learning according to the male participants in the study (see Table 2).

There were three themes related to challenges when learning science content. They include text, anxiety, and collaborative learning (see Table 3). These findings were captured through the open-ended questions and focus group prompts.

Research Question 2: Instructional Strategies Preference

Research Question 2 was: "Which science-specific instructional strategies are preferred by students?" Participants were asked to order eleven different instructional methods from favorite (#1) to least favorite (#11). These methods were chosen based on instructional strategies utilized in science and STEM education. The most popular choice for favorite method was no exams (n=11) followed by learning outdoors (n=7). The instructional method most commonly identified as the least preferred was writing a final paper in stages or in chunks throughout the semester (n=19) and the standard lecture (n=13). Focus group participants repeatedly disclosed a dislike for the traditional lecture. One focus group participant stated, "in lectures I space out and I can't grasp [the material], I have trouble grasping what you're saying."

When participants were asked to describe why they ordered the instructional methods in the manner they did, 11 participants provided a detailed response explaining these teaching strategies aided in the reduction of stress and anxiety created by learning science. Sources of stress and anxiety included (a) difficulty reading/interpreting text (n=4); (b) working with others (n=2); and exams (n=3). There is no relationship between gender and preferred instructional method, X^2 (33, n=48) = 29.481, p=.643.

None of the participants placed hands-on activities or lessons as their least preferred instructional method. When participants were asked to describe their ideal science course, a total of 18 participants stated the course would be hands-on. All focus group participants (n=8) stated the utilization of hands-on activities or experiential learning guided by the instructor is the preferred manner to learn science in a college level course. In total, hands-on learning was mentioned 32 times as it related to a beneficial or helpful instructional process during the focus group sessions. During the focus group, nearly all of the participants were able to effectively recall a memory from their science course involving a hands-on or experiential learning lesson. Information provided included specific details about the lesson or the procedure and more importantly what the participant learned from the specific activity.

Research Question 3: Preferred Instructional Strategies by Major

Research Question 3 was: "Are there differences in preferred instructional strategies in students who have declared a science/STEM major versus those who have not?" When asked to rearrange a list of instructional methods commonly used by the science faculty, participants in the same major did not select similar preferred instructional methods. The declared major appeared to have no relationship to the preferred instructional method, $X2$ (77, n=48) = 82.881, p=.303. Participants provided further explanations of their rationale for ordering the instructional methods. Nearly half of the groupings included a statement describing hands-on learning as the preferred way to learn. In multiple open-response opportunities in the electronic survey, participants who have declared a major in computer information systems did indicate a preference to learn indoors rather than outdoors.

Research Question 4: Preferred Instructional Method

Research Question 4 was: "Are there differences in preferred instructional strategies based upon diagnosed learning disability?" When asked to rearrange a list of instructional methods commonly used by the science faculty, participants with a similar learning disability did not select similar preferred instructional methods. The instructional method preferred by students did not demonstrate a relationship between the instructional method and the participant's learning disability, $X2$ (66, n=48) = 69.544, p=.359. Similarly, the least preferred instructional method did not demonstrate a relationship with learning disability, $X2$ (63, n=48) = 75.963, p=.188.

When participants were asked how their ideal science course would be instructed, hands-on and experiential instruction were mentioned by each learning disability. Hands on instruction was mentioned by five out of six participants with dyslexia, by all participants with dyscalculia (n=3) as well as language processing disorder (n=2), and by four out of nine participants with auditory processing disorder.

Discussion

Participants in this study self-reported their top three challenges to learning science at the college level as (1) text is too hard or difficult to understand, (2) content is difficult to remember or understand, and (3) content instruction does not create real-world connections. While these challenges faced by students do not appear to have a relationship with their learning disability or declared major, there were noticeable differences between male and female participants. Keri (2002) suggested that gender differences may relate to male students' preference for an applied and experiential learning approach in contrast to female students' preference for a conceptual approach to learning. These differences in cognitive processing of information by gender may influence performance in college STEM courses. To enhance gender inclusivity, practitioners could consider these findings when designing STEM activities.

While both genders described the difficulty of reading and interpreting text, it was reportedly a bigger challenge for female students. The utilization of complex texts is often the curricular foundation for science and STEM courses. Since both genders reported this as a challenge as well as having difficulty in remembering course content, the difficulty in reading (which could potentially be disability related) may serve as a barrier for rehearsal and encoding of information. These findings echo the findings of Schneps, et al. (2010), which have identified the ability to interpret, rehearse, and properly store the information conveyed in complex texts as a barrier for the successful completion of college courses by students in higher education.

Student in this study preferred to learn science through hands-on activities and lessons. The findings of the present study are similar to findings by Black, Weinberg, and Brodwin (2015). Students with a learning disability self-report a preference of visual and hands-on learning more frequently than the students without a learning disability. Kirschner, Sweller, and Clark (2006) argued that this form of instruction is vital to ensure student success in college level science courses, even though this method of instruction it is underemployed by faculty. Additionally, the findings from Black, et al. (2015) indicated that students with a learning disability described group discussions and alternative textbooks as a preferred instructional method.

The preference for a hands-on learning approach included discussions about individually realized direct benefits to the learner. Each of the focus group participants (n=8) were able to recall a specific lesson and the information presented when direct instruction was associated with hands-on, experiential learning activities. Instructional designers and educators should consider placing a greater emphasis on the purposeful inclusion of opportunities for students to engage in hands-on active learning through movement, utilization of artifacts, creation of models, manipulatives, and investigations involving props and/or equipment. Etkina and Mestre (2004) noted that when direct instructional strategies are employed, it allowed for the learner to engage with novel skills and experiences. The rehearsal period provided by these experiences is critical to the cognitive process. Once the learner has demonstrated mastery of the skill or concept, assessment practices could mirror instruction so the learner may demonstrate the rehearsed skill or concept in an applied manner. Instructors in higher education need to consider ways to provide more practice opportunities to learners identified with disabilities prior to assessments.

While collaborative or cooperative learning appears to be an unfavorable experience for students, it is an important instructional method for this student population. Evidence from the literature supported collaborative and/or cooperative learning as an approach to increasing academic performance among students with diagnosed learning disabilities (McMaster & Fuchs, 2002). Cognitive processing of information is aided through multiple rehearsals created by conversing with peers. The process of explain-

ing information to someone else aids in the ability to retrieve and store information beyond the working memory (Slavin, Hurley, & Chamberlain, 2003). Additionally, collaborative and cooperative learning approaches appeared to have a positive impact on the student's resilience and the ability to work with peers (Jenkins, Antil, Wayne, & Vadasy, 2003). Therefore, it may be important to scaffold collaborative learning experiences to make them more meaningful and productive when working with learners who have an identified learning disability.

While the survey did not document a relationship between learning disability and higher education students' instructional preferences to learn, the focus group participants preferred visual learning tools and strategies like watching a video to reinforce a lecture. Heiman (2006) demonstrated there is a significant difference between the preferred method of learning between students with a learning disability and their neurotypical peers. Students with a learning disability often incorporate more visual and oral learning strategies compared to their neurotypical peers (Heiman & Precel, 2003). Therefore, a concerted effort should be made to include more visuals when instructing students identified with a learning disability.

A limitation of the current study pertains to the selective sample and accordingly the study's generalizability. The student population was from a higher education institution dedicated to solely serving students diagnosed with a learning disability. The student population in the study was not reflective of most higher education classrooms. Future research could include replicating the study in other types of institutions. The participants in the study had a variety of learning disabilities that further restricts the generalizability of the study to specific learning disabilities. Another limitation of the study included the types of science courses that the participants had taken prior to the study. The participants had only taken environmental and life sciences higher education classes. If their prior course experiences included physics, chemistry, engineering, or math the findings may have been different. A final limitation of the study included researcher bias. Many of the participants were familiar and may have had an attachment with one the researchers/authors. However, due to the size of the faculty and student population, familiarity with the students could not be avoided. Participants were cautioned to respond authentically.

Conclusion

Vaughn and Linan-Thompson (2003) contended that students with a learning disability should be provided the same curriculum as their neurotypical counterparts; however, the instruction should be altered. The findings in this study confirmed that participants in this study preferred altered and varied instructional methods and approaches to learning STEM content. The need for direct instruction augmented by hands-on learning opportunities, modeling of strategies, and teaching in small, collaborative groups were described to yield best results in student performance. Grumbine and Alden (2006) echoed this conclusion by stating science instruction for students with a learning disability must be centered on methods inclusive of direct instruction. For instructors, combining multiple instructional approaches benefits students identified with a learning disability.

Ultimately, for information to be stored properly in the long-term memory, faculty and instructional designers could design instruction so the learner can depict information in multiple forms, solve complex problems, and repeat operations multiple times (Sarasin, 2006). According to Grumbine and Alden (2006), strategies involving rehearsal of complex vocabulary and phrases allowed students with a learning disability to properly store and retrieve information. Implications from the difficulty to read and comprehend text findings include incorporating modeling skills and strategies necessary to successfully interpret the text so it may be properly rehearsed.

Participants in this study ranked their inability to connect course material to their own life as a major challenge to learning science content. When designing instructions for students with learning disabilities, consideration to providing concrete examples may aid students with a learning disability. Lattuca and Stark (2009) argued an observed disconnect between faculty knowledge of instruction and selected methods for instruction.

Instructors' andragogical knowledge may have a direct impact on the student. There is an observed inability for faculty to select the appropriate instructional method for a given learning task or outcome. The participants in this study, consistently heralded the benefits of hands-on instruction for retention of knowledge; however, the participants noted that their STEM instructors relied on "extensive lecturing" as their primary instructional method. While purposeful design of active learning has been demonstrated to be successful in increasing academic performance in students, with and without learning disabilities, there have been documented barriers to including these

strategies in the college classroom. Primary barriers include: (a) available time to design instruction; (b) faculty's willingness to be inclusive of all learners; and (c) the lack of knowledge of curriculum and instruction design principles (Moriarty, 2007). The gap in andragogy and instruction of how to teach students with identified learning disabilities may be attributed to the lack of training available for STEM faculty in the areas of instructional design and andragogy.

Finally, the students in this study indicated their preference for active over passive approaches to learning STEM content. Challenges and barriers to learning and course completion in STEM courses included: (a) heavy emphasis on reading dense texts without instructor scaffolds and supports; (b) limited real-world connections to the content; and (c) trouble remembering content. Educators and disability service providers may want to consider multiple approaches to teaching STEM content to overcome the challenges and barriesr to learning for students identified with a learning disability. Educators need more opportunities to learn how to provide a learning environment that can foster the success of students identified with a learning disability.

References

Bonwell, C.C. & Eison, J.A. (1991). Active learning: Creating excitement in the classroom. *ASHE ERIC Higher Education Report, No. 1*. Washington, DC: George Washington University.

Black, D. R., Weinberg, L. A., & Brodwin, M. G. (2015). Universal design for learning and instruction: Perspectives of students with disabilities in higher education. *Exceptionality Education International, 25*(2), 1-26.

Brigham, F. J., Scruggs, T. E., & Mastropieri, M. A. (2011). Science education and students with learning disabilities. *Learning Disabilities Research & Practice, 26*, 223-232.

Bybee, R. (2015). Scientific literacy. In R. Gunstone (Ed.), *Encyclopedia of Science Education* (pp. 944-947).

CAST. (2016). About universal design for learning. Retrieved from http://www.cast.org/our-work/about-udl.html#.Vs4M_ZMrKqk.

Cawley, J. F., Foley, T. E., & Miller, J. (2003). Science and students with mild disabilities: Principles of universal design. I*ntervention in School and Clinic, 38*(3), 160-171.

Cherney, I. D. (2008). The effects of active learning on students' memories for course content. *Active Learning in Higher Education 9*, 152–71.

Cortiella, C., & Horowitz, S. H. (2014). *The state of learning disabilities*. New York, NY: National Center for Learning Disabilities.

Driscoll, M. P. (1994). *Psychology of learning for instruction*. Boston: Allyn and Bacon.

Ertmer, P. A., & Newby, T. J. (2013). Behaviorism, cognitivism, constructivism: Comparing critical features from an instructional design perspective. Performance Improvement *Quarterly, 26*(2), 43-71.

Etkina, E., & Mestre, J. P. (2004). *Implications of learning research for teaching science to non-science majors* (SENCER Backgrounder for Discussion at SSI-2004). Retrieved from http://serc.carleton.edu/files/sencer/backgrounders/sencer_implications.pdf

Freeman, S., Eddy, S. L., McDonough, M., Smith, M. K., Okoroafor, N., Jordt, H., & Wenderoth, M. P. (2014). Active learning increases student performance in science, engineering, and mathematics. *Proceedings of the National Academy of Sciences, 111*, 8410-8415.

Gogolin, L., & Swartz, F. (1992). A quantitative and qualitative inquiry into the attitudes toward science of nonscience college students. *Journal of Research in Science Teaching, 29*, 487-504.

Goldstein, S., Naglieri, J. A., Princiotta, D., & Otero, T. M. (2014). Introduction: A history of executive functioning as a theoretical and clinical construct. In S. Goldstein, & J. A. Naglieri (Eds.), *Handbook of executive functioning* (pp. 3-12). New York, NY: Springer New York.

Grumbine, R., & Alden, P. B. (2006). Teaching science to students with learning disabilities. *The Science Teacher, 73*(3), 26-31.

Heiman, T. (2006). Assessing learning styles among students with and without learning disabilities at a distance-learning university. *Learning Disability Quarterly, 29*, 55-63.

Heiman, T., & Precel, K. (2003). Students with learning disabilities in higher education academic strategies profile. *Journal of learning disabilities, 36*, 248-258.

Hofstein, A., & Lunetta, V. (2004). The laboratory in science education: Foundations for the twenty-first century. *Science Education, 88*, 28-54.

Hwang, J., & Taylor, J. C. (2016). Stemming on STEM: A STEM education framework for students with disabilities. *Journal of Science Education for Students with Disabilities, 19*, 39-49.

Jarrett, D. (1999). *The inclusive classroom: Mathematics and science instruction for students with learning disabilities. It's just good teaching.* Portland, OR: Northwest Regional Educational Lab Mathematics and Science Education Center. (ERIC Document Reproduction Service No. ED 433 647)

Jenkins, J. R., Antil, L. R., Wayne, S. K., & Vadasy, P. F. (2003). How cooperative learning works for special education and remedial students. *Exceptional Children, 69*, 279-292.

Keri, G. (2002). Male and female college students' learning styles differ: An opportunity for instructional diversification. *College Student Journal, 36*(3), 433-442.

Kirschner, P. A., Sweller, J., & Clark, R. E. (2006). Why minimal guidance during instruction does not work: An analysis of the failure of constructivist, discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist, 41*(2), 75-86.

Lattuca, L. R., & Stark, J. S. (2009). *Shaping the college curriculum: Academic plans in context* (2nd ed.). San Francisco, CA: Jossey-Bass.

LoPresto, M. C., & Slater, T. F. (2016). A new comparison of active learning strategies to traditional lectures for teaching college astronomy. *Journal of Astronomy & Earth Sciences Education, 3*(1), 59-76.

McMaster, K. N., & Fuchs, D. (2002). Effects of cooperative learning on the academic achievement of students with learning disabilities: An update of Tateyama Sniezek's review. *Learning Disabilities Research & Practice, 17*, 107-117.

McNeill, K. L., Lizotte, D. J., Krajcik, J., & Marx, R. W. (2006). Supporting students' construction of scientific explanations by fading scaffolds in instructional materials. *The Journal of the Learning Sciences, 15*, 153-191.

Moriarty, M. A. (2007). Inclusive pedagogy: Teaching methodologies to reach diverse learners in science instruction. *Equity & Excellence in Education, 40*, 252-265.

Moustakas, C. (1994). *Phenomenological research methods.* Thousand Oaks, CA: Sage.

Ofiesh, N. S. (2007). Math, science, and foreign language: Evidence-based accommodation decision making at the postsecondary level. *Learning Disabilities Research & Practice, 22*, 237-245.

Osborne, J., Simon, S., & Collins, S. (2003). Attitudes towards science: A review of the literature and its implications. *International Journal of Science Education, 25*, 1049-1079.

Partin, M. L., Underwood, E. M., & Worch, E. A. (2013). Factors related to college students' understanding of the nature of science: comparison of science majors and nonscience majors. *Journal of College Science Teaching, 42*, 89-99.

PCAST (President's Council of Advisors on Science and Technology). (2010). *Prepare and inspire: K-12 education in STEM (science, technology, engineering and math) for America's future.* Retrieved from https://nsf.gov/attachments/117803/public/2a--Prepare_and_Inspire--PCAST.pdf

Rappolt-Schlichtmann, G., Daley, S. G., & Rose, L.T., Eds. (2012). *A research reader in universal design for learning.* Cambridge, MA: Harvard Education Press.

Sarasin, L.C. (2006). *Learning styles perspectives: Impact in the classroom*. Madison, WI: Atwood Publishing.

Schneps, M. M, O'Keeffe, J. K., Heffner-Wong, A., & Sonnert, G. (2010). Using Technology to Support STEM Reading. *Journal of Special Education Technology, 25*(3), 21-33.

Schroeder, C. M., Scott, T. P., Tolson, H., Huang, T. Y., & Lee, Y. H. (2007). A meta-analysis of national research: Effects of teaching strategies on student achievement in science in the United States. *Journal of Research in Science Teaching, 44*, 1436-1460.

Scruggs, T. E., & Mastropieri, M. A. (2007). Science learning in special education: The case for constructed versus instructed learning. *Exceptionality, 15*, 57-74.

Singer, S. R., Nielsen, N. R., & Schweingruber, H. A. (Eds.). (2012). *Discipline-based education research: Understanding and improving learning in undergraduate science and engineering.* Washington, DC: The National Academies Press.

Slavin, R., Hurley, R., Chamberlain, A. (2003). Cooperative learning and achievement: Theory and research. In Reynolds & Miller (Eds.), *Handbook of psychology volume 7, educational psychology* (pp. 177-198). Hoboken, NJ: John Wiley & Sons, Inc.

Son, J. Y., Narguizian, P., Beltz, D., & Desharnais, R. A. (2016). Comparing physical, virtual, and hybrid flipped labs for general education biology. *Online Learning, 20*(3).

Sparks, R. L., & Lovett, B. J. (2009). College students with learning disability diagnoses: Who are they and how do they perform? *Journal of Learning Disabilities, 42*, 494-510.

Speirs, S. J., Rinehart, N. J., Robinson, S. R., Tonge, B. J., & Yelland, G. W. (2014). Efficacy of cognitive processes in young people with high-functioning autism spectrum disorder using a novel visual information-processing task. *Journal of Autism and Developmental Disorders, 44*, 2809-2819.

Spronken-Smith, R., Walker, R., Batchelor, J., O'Steen, B., & Angelo, T. (2012) Evaluating student perceptions of learning processes and intended learning outcomes under inquiry approaches. *Assessment & Evaluation in Higher Education, 37*, 57-72.

St Clair-Thompson, H., Overton, T., & Botton, C. (2010). Information processing: A Review of implications of Johnstone's model for science education. *Research in Science & Technological Education, 28*, 131-148.

Stefaniak, J. E., & Tracey, M. W. (2015). An exploration of student experiences with learner-centered instructional strategies. *Contemporary Educational Technology, 6,* 95-112.

Sunal, D., Hodges, J., Sunal, C., Whitaker, K., Freeman, M., Edwards, L., Johnston, R., & Odell, M. (2001). Teaching science in higher education: Faculty professional development and barriers to change. *School Science and Mathematics, 101,* 246-257.

Swanson, H. L., & Harris, K. R. (Eds.). (2013). *Handbook of learning disabilities*. Guilford Press: New York, NY.

Therrien, W. J., Taylor, J. C., Hosp, J. L., Kaldenberg, E. R., & Gorsh, J. (2011). Science instruction for students with learning disabilities: A meta-analysis. *Learning Disabilities Research & Practice, 26*(4), 188-203.

Udo, M. K., Ramsey, G. P., & Mallow, J. V. (2004). Science anxiety and gender in students taking general education science courses. *Journal of Science Education and Technology, 13*, 435-446.

Vaughn, S., & Linan-Thompson, S. (2003). What is special about special education for students with learning disabilities?. *The Journal of Special Education, 37*, 140-147.

Weis, R., Erickson, C. P., & Till, C. H. (2016). When average is not good enough: Students with learning disabilities at selective, private colleges. *Journal of Learning Disabilities, 50*, 1-17.

Zundans-Fraser, L., & Auhl, G. (2016). A theory-driven approach to subject design in teacher education. *Australian Journal of Teacher Education, 41*(3) 140-157.

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Table 1

Breakdown of Participant's Primary Learning Disability

Primary Learning Disability	**Percentage of Students Self-Reporting**	**Male (*n*=11)**	**Female (*n*=22)**	**Did Not Disclose Gender (*n*=5)**
Dyslexia	24	6	3	0
Dysgraphia	3	1	0	0
Dyscalculia	18	1	5	1
Auditory Processing Disorder	34	2	7	4
Language Processing Disorder	10	1	3	0
Visual Processing Disorder	10	0	4	5

Table 2

Challenges to Learning STEM/Science Content Reported by Gender

Which of the following have been the biggest challenges for you to do well in a science course? (Select up to three)	**Male**	**Female**	**I Do Not Wish to Disclose**	**Total**
Textbook is too hard to read or understand	6	14	0	20
What we learn does not relate to my life	11	7	0	18
Lectures make it hard to be engaged	3	10	0	13
Lectures do not teach me how I prefer to be taught	2	2	2	6
What we do in lab is not connected to what we learn in lecture	1	1	1	3
What we learn is difficult to understand or remember	6	13	1	20

Table 3

Thematic Categories of Challenges to Learning Science from Open-Ended Responses

Theme	**Key Term**	**Characteristic Response**
Text	Textbook or Readings	"how [textbook] was written...makes it hard for me to read." "can't focus with a book"
Anxiety	Overwhelming or Anxiety or Stress	"I find the lab part of the class overwhelming." "knowing there are no tests takes a lot of stress of me." "I get very anxious with exams and quizzes, although I know the material I blank out when it comes to exam time."
Collaborative Learning	Group or Team	"team based learning is the worst"

Learning Strategy Instruction for College Students with Disabilities: A Systematic Review of the Literature

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Abstract

The growing number of individuals with disabilities in higher education is a sign of significant progress toward improving outcomes and equity as intended by federal legislation. However, to successfully meet the demands of the postsecondary environment, students must act as self-regulated, independent learners. Thus, instruction for students with disabilities in learning strategies may be necessary to actualize improved outcomes. The current systematic review analyzes a subset of 21 empirical articles on learning strategy instruction in higher education for students with disabilities spanning 1955-2015 as organized by the PASS Taxonomy (Dukes, Madaus, Faggella-Luby, Lombardi, & Gelbar, 2017). Results confirm there is a paucity of research, as we identified only 21 intervention studies examining learning strategies (11 single case and 10 group-design studies) in higher education during the period studied. Findings are presented related to characteristics of the study corpus, types of learning strategies emphasized, instructional delivery context, settings, interventionist, fidelity, measures, and outcomes. Special emphasis is placed on group design studies.

Keywords: learning strategy, postsecondary education, disability, strategy instruction, systematic literature review

Over thirty years ago, experts in postsecondary disability services recognized that college students with learning disabilities (LD) lacked a comprehensive set of learning strategies that would allow them to independently complete academic tasks (Shaw, Byron, Norlander, McGuire, & Anderson, 1988). Additionally, postsecondary education and disability pundits stated that instruction in learning strategies was more effective than tutorial assistance (Brinckerhoff, 1991). Indeed, evidence of the value of learning strategy instruction is seemingly ubiquitous. McGuire, Hall, and Litt (1991) established a taxonomy for academic and learning strategy needs in which time management, test-taking, notetaking, and study strategies were all substantial needs of participating students with LD. In a series of studies, Butler (1998) determined college students with LD who apply strategic approaches to academic tasks exhibit improved academic performance. College students with disabilities have also acknowledged the value of the application of strategies to manage their learning challenges (Skinner, 2004). In the Skinner study, students pointed to practices such as goal-setting, self-advocacy, and recall strategies as being of particular importance.

Centers for Students with Disabilities (CSD) professionals, the primary personnel charged with overseeing services provided to college students with documented disabilities, have an arguably complex position regarding the provision of learning strategies instruction in higher education. McGuire et al. (1991) conducted a study examining student use of strategies in an LD support program at a four-year institution in the Northeast and concluded that that there is a significant need for strategy instruction. In fact, among the services provided by the program was training in the use of an array of learning strategies. Program data consistently demonstrated that students with LD enrolled in the program had graduation rates

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on par with students without disabilities at the university (McGuire, 2002). However, despite research literature supporting learning strategies as a practice of possible merit, their use has been less noteworthy in actual day-to-day professional activity.

For example, when a representative sample of CSD professionals were tasked with identifying CSD Program Standards and Performance Indicators, a set of guidelines designed to be applicable to programs across the U.S. and Canada, advocacy for *learning strategies* was among the practices not rated as an essential CSD responsibility (Shaw & Dukes, 2006). Specifically, the proposed Standard, "Advocate for the availability of instruction in learning strategies (e.g., attention and memory strategies, time management, organization) for students with disabilities" (Dukes, 2006, p. 11) was rated "not essential." Readers should bear in mind the intent of the Program Standards, which is to "… facilitate *equal* access to postsecondary education for students with disabilities …" (emphasis added; Dukes 2006, p. 6). Thus, a rating of "not essential" was not a mandate opposing the value of strategy instruction, rather it was a stance intended to define the parameters of CSD responsibility.

Even so, numerous colleges and universities are providing training in learning strategies as well as other supports. The Strategic Alternative Learning Techniques (SALT) program at the University of Arizona, the Program for Advanced Learning (PAL) at Curry College, the Bentsen Learning Center at Mitchell College and the Beyond Access Program at the University of Connecticut are four current examples. These programs, as well as others, provide training in skills such as self-advocacy, study skills, time management, goal setting, and reading and writing strategies, thus indicating a recognition of their role in the potential success of college students with disabilities. One important caveat is that many services of this nature are provided to students with disabilities for an additional fee over and above the fees charged for typical college attendance.

Recent evidence indicates that, taken together, the professional literature on the population lacks any demonstrative conclusions regarding evidence-based practices that may improve postsecondary academic outcomes for college students regardless of disability type (Madaus et al., 2016; Peña, 2014). Moreover, the evidence that does exist has often been derived from studies with questionable methodological rigor (Madaus et al., 2016). Given the circumstances, there are now calls for both scientifically validated practices that promote college matriculation for students with disabilities and inform service delivery by CSD professionals (Dukes et al., 2017) as well as concomitant research guidelines intended to result in rigorously designed research regarding the development, study, and application of evidence-based practices in higher education.

Postsecondary Student Profile of Learning Strategy Use

Several descriptive studies have compared the use of learning strategies by students with and without disabilities at the postsecondary level, which yielded a complex and contradictory pattern of results. Kirby, Silvestri, Allingham, Parilla, and LaFave (2008) compared students with and without dyslexia. The two groups did not differ on either the deep or surface strategy subscales of the Study Process Questionnaire-Revised (Biggs, Kember, & Leung, 2001). On the Learning and Study Strategy Inventory ([LASSI-II], Weinstein, Palmer, & Shulte, 2002), students with dyslexia had higher scores, indicating better performance, on the selecting main ideas and test-taking strategies subscales. Kovach and Wilgosh (1999) conducted a similar study, but uncovered a different pattern. Students with LD had lower scores (versus the standardization sample) on the test-taking strategies, self-testing, selecting main ideas, and motivation subscales but higher scores on attitudes towards success and anxiety subscales of the LASSI-II. Abreu-Ellis and colleagues (2009) replicated this study and found a similar pattern of differences between students with LD and the LASSI-II standardization sample. Another study compared students with LD, Attention Deficit Hyperactivity Disorder (ADHD), and a control group without disabilities (Corkett, Parrilla, & Hein, 2006). Students with LD had higher scores on the concentration, selecting main ideas, study aids, test-taking strategies, and time management subscales of the LASSI-II than students with ADHD and had higher scores on the study aids subscales versus the control group.

Two recent studies have explored the impact of learning strategy use on college grade point average (GPA) in students with a history of reading difficulties versus students without such a history. In the first study, metacognitive reading strategies (as measured by the MRSQ; Taraban, Ryanearson, & Kerr, 2000) and the study aids subscale of the LASSI-II were the only significant predictors of college GPA in students with a history of reading difficulties (Chevalier, Parrilla, Ritchie, & Deacon, 2017). In the second study which utilized larger samples of both groups, none of the subscales of the aforementioned measures were significant predictors of GPA for students with a history of reading difficulties (Bergey, Deacon, & Parrila, 2017). Thus, it is currently unclear whether college

students with a history of reading difficulties use of different learning strategies is linked to academic achievement. The authors note "commonly used study strategy inventories have limited value in predicting their academic success" (Bergey et al., p. 81).

Rationale for the Present Study

In contrast to the postsecondary literature, a robust body of research on learning strategies for adolescent students with disabilities in secondary settings exists in four major areas: reading comprehension, writing, mathematics, and peer collaboration (Scheuermann et al., 2009) and researchers have comprehensively and transparently defined and documented evidence of school-based instructional practices that have evidence of effectiveness. The What Works Clearinghouse (WWC) and the National Technical Assistance Center on Transition (NTACT) are two such organizations charged with compiling evidence regarding scientifically valid practices. NTACT, for example, based upon a strictly defined set of expectations, has determined that there is strong evidence for the use of learning strategies in an array of secondary-level academic courses (Test et al., 2009). Secondary-level students who engage in self-regulated learning, which includes the employment of various learning strategies, have better achievement outcomes than students who do not apply these methods (Schunk & Zimmerman, 2007; Zimmerman, 2008). Moreover, students can be taught to apply self-regulated learning strategies, subsequently resulting in improved academic achievement (Labuhn, Zimmerman, & Hasselhorn, 2010). There has been a similar call for the use of evidence-based practices for students with disabilities in college settings (Madaus et al., 2016). Given that the demands of higher education require independent and self-regulated learners, instruction in these skills is of paramount importance in order to promote student success.

However, there are several limitations to the existing literature base in regard to learning strategies and postsecondary students with disabilities. First, it has focused predominantly on students with LD. Second, it may have been impacted by the use of measures that may not be reflective of new technologies that can aid studying (e.g., apps for notecards, online cloud-based note taking systems) and also may lack the sensitivity to differences in learning strategy use. In addition, as previously noted, while learning strategies have been proven to be effective at the secondary level, and there have been calls for their use at the postsecondary level, no one has yet synthesized the literature to guide practice. Therefore, the purpose of the present study was to systematically review the literature on interventions related to learning strategy instruction and use at the postsecondary level and, specifically, to examine the types of research methods used, the settings, populations and specific strategies studied.

Method

In order to understand the state of the literature regarding learning strategy instruction for students with disabilities at the postsecondary level, a systematic review was conducted. Two sources were employed to gather relevant literature. First, a database of articles was collected as part of a systematic review of the corpus of literature about college students with disabilities (Madaus et al., 2016). A detailed account of the procedures used to assemble this database is available elsewhere (Madaus et al., 2016). Second, a replication of the previous search procedure for articles published between 2012 and 2015 was completed to update the literature missing from the first database.

Published Articles – Database

The systematic review resulted in 1,036 peer-reviewed journal articles published prior to December 31, 2012. In order to conduct the review, the following Boolean search was completed using Academic Search Premier, ERIC, PsycINFO, and Medline: (search terms: "college student" or "university student" or "postsecondary education" or college or university or "college admission" or "higher education" or "student affairs" or "student services" or "student personnel") AND (disability or "hearing impair*" or deaf or disabled or handicap or ADHD or ADD or dyslex* or blind or disabilities or accommodation or "mental illness" or "mobility impairment" or "visual impairment"). This was supplemented by a hand search of 25 higher education and student affairs journals. These journals included: *College Teaching, Journal of College Student Development, Journal of Student Affairs Research and Practice, Higher Education,* and *NACADA Journal* as well as every article published in the *Journal of Postsecondary Education and Disability* (and its previous iterations).

A two-step procedure was utilized to determine if publications met the criteria for inclusion (see below). First, members of the research team screened the titles and abstracts to determine if they met the inclusion criteria (described below). Second, the full text of articles that remained was screened using a coding sheet in which information concerning the characteristics of each publication was noted (e.g., article methodology, study demographics). Article topics were coded according to the PASS Taxonomy (citation masked for peer-review). The PASS Tax-

onomy required that publications be categorized into domains and concomitant subdomains. Two members of the research team screened the full text of articles comprising the student-focused and concept and systems development domains to determine if they were primarily about learning strategy instruction. Following this review, coder agreement for inclusion was 83%. Coding teams met to discuss disagreements, resulting in 100% consensus. Upon completion of this process, 61 articles were determined to be primarily about learning strategy instruction.

Published Articles – 2012-2015

The second source of articles was a replication of the previous search procedure for articles published between 2012 and 2015. The decision was made to overlap the two searches for the year 2012 to gage the reliability of the second search.

An identical Boolean search was conducted using the original search criteria. However, given this study's purpose, one additional condition was included in order to elicit articles focused solely on learning strategy instruction. Thus, the following search terms were added: AND ("learning strategy" or "study strategy" or "learning skill" or "academic skill" or "academic strategy" or "reading strategy" or "writing strategy" or "test taking strategy" or "math strategy" or "strategy instruction" or mnemonic or "cognitive strategy" or "assistive technology" or "word processing"). A hand search of articles was also conducted of the five most cited journals from the original systematic review: *Journal of Postsecondary Education and Disability, Journal of Learning Disabilities, Journal of College Student Development, College Student Journal, Disability & Society,* and *Journal of Vocational Rehabilitation.*

This search resulted in an additional 125 articles. Some publication overlap did result as a function of the dual search process. An article database was employed to eliminate a number of articles published in 2012 and some gathered during the hand search that had been included in both search processes. Following the removal of duplicates, 83 discrete articles remained. As before, two research team members screened the titles and abstracts of the articles to determine if they met inclusion criteria. This resulted in 81% agreement. Following previous protocol, the coders met to reach consensus on any disagreements. Subsequently, an additional 21 articles were included as a function of the second search.

Inclusion Criteria

As mentioned, a set of criteria was used to determine eligibility for inclusion. First the article had to be published in English in a peer-reviewed journal. Secondly, the article had to be published before December 31, 2015. Third, the article had to be focused on college students with disabilities who had sought or were seeking degrees. Included publications had to be about students, faculty, disability services, or any service delivery/assessment process for students with disabilities. With regard to students, articles were included if she or he had earned college acceptance (e.g., summer transition program), were currently enrolled, withdrawn from, or were college graduates. Articles were not included if they were about students who were transitioning to college, but had not yet been accepted.

The final criterion was that the article had to focus on learning strategy instruction, which was defined as instruction provided to students to improve their ability to use a specific strategy during studying/reading and/or to help them manage their time more effectively. Zimmerman's seminal definition of self-regulated learning strategies (1989) is "actions and processes directed at acquiring information or skill that involve agency, purpose, and instrumentality perceptions by learners" (p. 329) and it was used to determine the working definition for the current examination. It is important to note that strategies used by instructors to facilitate learning (e.g., guided notes) were not included as they primarily reflect instructor behavior rather than skills designed for independent use by students. Therefore, articles were included if the action of the instructor, or assistive technology, was intended to result in independent student use of a strategy.

Coding Process

As previously indicated, the research team examined the characteristics of articles that met the inclusion criteria after the full-text review. A description of the original coding sheet is available elsewhere (Madaus et al., 2016). Germane to both the previous and current examination, data were collected on whether the article presented original data and if so, the methodology of data collection (e.g., qualitative, descriptive quantitative, or empirical). In addition, a supplementary coding procedure was developed to gather evidence about the nature of the learning strategy instruction. Specifically, the duration and frequency of instructional session, the session setting, and type of interventionist (e.g., research team member) were coded.

Finally two types of data about the learning strategy were collected. First, based upon a taxonomy developed by Deshler and Schumaker (2006), each was recorded as an acquisition, storage, or expression strategy. Executive functioning was also included

given the postsecondary context. Second, open coding of strategy descriptions was collapsed into four unique categories representing word-level, reading comprehension, test taking, or other strategies. The coding tool employed is available upon request from the first author. Two research team members coded all articles that met inclusion criteria and met regarding any disagreements.

Results

Study Corpus

Characteristics. The publication search (i.e., original database, published prior to December 31, 2012) included 61 articles and the second search (published between January 1, 2012 and December 31, 2015) included 21 additional articles for a total of 82. Sixty-one articles did not investigate the use of an intervention to improve the learning and study strategies of individuals with disabilities and were not included the subsequent analyses. Thus, a total of 21 articles investigated interventions using either group (n = 10) or single case (n = 11) designs (see Table 1 for number of studies by study type). Sixty-two unique authors contributed to the 21 manuscripts with only two authors listed on two articles (D. L. Butler; J. W. Madaus). The articles were published in 16 journals with only one journal publishing more than one article: *Journal of Postsecondary Education and Disability* (n = 6). A total of 550 individuals participated in the studies with 504 participating in the group-design studies.

Single-case design studies. Single case studies employed a variety of research designs, with few research designs matching the recommendations for high quality as set forth in the literature (Horner, Carr, Halle, McGee, Odom, & Wolery, 2005). For example, only three used an alternating treatment design with four employing a multiple baseline to show repeated effects. Of the four multiple baseline studies half (n = 2) used a multiple probe design, which is less than ideal (Horner et al., 2005). Of the remaining four studies, two used A-B design and one each employed a B-C and ABAC design (see Table 1 for more and Table 2 for a list of citations).

Context and population. As shown in Table 3, the empirical literature is overwhelmingly based on studies conducted in postsecondary institutions in the U.S. (n = 15). Additionally, the largest group of participants attended 4-year colleges or universities (n = 12). The descriptions of the demographic characteristics of the sample were poor (see Table 3), with disability and gender being the most commonly reported demographics.

Type of learning strategy. Of particular interest in the current investigation is the type of learning strategy (see Table 4). Strategies were coded for focus on acquisition, storage, expression, or executive functioning. The most common strategies addressed teaching students' acquisition skills (n = 15), such as word-level reading interventions, and expression (n=12) focused predominantly on writing interventions and some test taking.

Empirical Group Studies

An additional component of the current analysis involved isolating the empirical group design studies for examination due to the poor research designs used in the single case studies (see Table 5 for a depiction of the group studies included in this analysis). Nine group design studies were included in the analysis. A tenth (Ghesquiere, Laurijssen, Ruijssenaars, & Onghena, 1999) was not further examined as it provided data from an international exploratory study of the listening (auditory) skills in comparison to the tactile skills of students who are visually impaired compared to their typically sighted peers. This study utilized group statistics and a comparison group, but did not test an intervention.

Study Designs. Of the group design studies, only two were randomized control trials (Field, Parker, Sawilowsky, & Rolands, 2013; Gaddy, Bakken, & Fulk, 2008), as defined by the WWC (U.S. Department of Education, 2014) and as depicted in Table 4. Of the remaining eight studies, three included a one-group pretest-posttest measure of growth, two used a static group comparison, two used a one group with counterbalanced instruction, and, finally, one descriptive case study (see goo.gl/W0v53N for the taxonomy utilized to categorize articles).

Among the group design studies, eight used either standardized norm-referenced assessments to measure outcomes or a combination of standardized and researcher-developed measures. Additionally, eight studies employed a comparison group to discern any differences between conditions. However, of the group design studies only three established baseline or pretest equivalence between groups. Further, only three studies included non-disabled peers for comparison purposes.

Learning strategies emphasized. There are a variety of learning strategies designed to support acquisition, storage, and expression of information but the manner in which these have been studied varies considerably. Three studies isolated acquisition strategies in (a) phonics instruction via the Orton-Gillingham approach (Guyer & Sabatino, 1989); (b) assistive technology via the Kurzweil software for reading

(Hecker, Burns, Elkind, Elkind, & Katz, 2002); and (c) a text structure strategy for reading expository science content (Gaddy et al., 2008). Alternatively, three studies examined courses designed to provide a variety of foundational skills related to success in higher education courses including note taking, reading textbooks or articles, organizing thoughts prior to writing, time management, and test taking (Burchard & Swerdzewski, 2009; Mytkowicz, Goss, & Steinberg, 2014). One of the courses also addressed psychosocial skills for first year students (Reed, Kennett, Lewis, & Lund-Lucas, 2011). Another study examined assessment strategies in order to prevent procrastination and deal with test anxiety (Kovach, Wilgosh, & Stewin, 1998). Finally, two studies examined coaching models. The first involved peer-based coaching to address self-efficacy and study skills (Zwart & Kallemeyn, 2001) and the second trained experienced coaches (minimum of two years) to support student executive functioning skills and well being (Field et al., 2013).

Instructional delivery context. Strategy instruction was delivered along a continuum from explicit to implicit with dosage varying from short episodes to instruction lasting longer than six months. Variations in instructional dosage, even when separated from specific outcomes, are of significant practical importance for implementation. In the study corpus, eight of the nine studies provided weekly interactions (Mytkowicz et al., 2014 was unclear regarding delivery frequency).

The duration of courses varied considerably. Only one study occurred over a single week (5 days) with 30 minutes each during the first two days and then immediate, elapsed, and delayed testing respectively on the final three days of the study (Gaddy et al., 2008). Two studies occurred over five-week intervals (Guyer & Sabatino, 1989; Zwart & Kallemeyn, 2001). Zwart and Kallemeyn (2001) specifically involved two to ten coaching sessions for one hour per week. Four studies occurred for at least one semester. Two of these studies provided courses for credit (Burchard & Swerdzewski, 2009; Reed et al., 2011) whereas another provided one to three hours of training plus five additional components of learning spread throughout a semester (Hecker et al., 2002).

The final two studies occurred for more than six months. The first study employed a two hour intake followed by one half hour session per week by phone for 24 weeks (six months; Field et al., 2013). The second provided one-hour sessions totaling 8.5 hours over seven-months (Kovach et al., 1998).

Instructional setting. All nine studies used a person-to-person point of contact for intervention though this was not always face-to-face. Specifically, in all but one study, there was a face-to-face interaction via either a clinic or classroom setting. The lone exception was the Field et al. (2013) study in which coaches followed up with students weekly by phone.

Interventionist and fidelity. Researchers, or members hired by the research team from outside the instructional setting, provided the intervention instruction in six of the nine studies. The three exceptions included a special course instructor in a clinic setting (Guyer & Sabatino, 1989), two types of trained coaches and peers (Zwart & Kallemeyn, 2001), and professionals (Field et al., 2013). No studies mentioned the use of fidelity or treatment integrity measures to ensure quality or adherence to implementation.

Outcome measures. Measuring instructional outcomes, whether distally or proximally to the specific strategy, provides critical information about the efficacy of pedagogy as well as the potential for using common measures across studies to compare outcomes amongst studies. Only three of the group design studies utilized researcher developed measures including a survey of participant reflections on learned strategies (Kovach, et al., 1998), an immediate and delayed retell measure (Gaddy et al., 2008), and a revised version of the Levine "canceled mind trips" assessment (Hecker et al., 2002). Across the remaining studies, there were few common standardized measures. Two studies used Weinstein and colleagues' (1987) Learning and Study Strategies Inventory (LASSI; Zwart & Kallemeyn, 2001; Field et al., 2013) and two studies employed Schraw and Dennison's (1994) Metacognitive Awareness Inventory (MAI; Burchard & Swerdzewski, 2009; Mytkowicz et al., 2014). Finally, we note that a meta-analysis is currently not possible due to a lack of consistent instructional and achievement measures, and more importantly several studies with incomplete information.

Distal academic outcomes were measured in five of the nine studies. Two studies used different, but standardized measures of reading. The first study used a standardized reading measure, the WRAT-R, to show growth pre- to post-based on an Orton-Gillingham phonics instruction, but no differences between groups were found (Guyer & Sabatino, 1989). In the second study, the Nelson-Denny Reading Test revealed the treatment group improved significantly more on reading rate, but there were no differences in comprehension gain between the groups (Hecker, et al., 2002). A final study involving reading instruction used retell measures in which outcomes favored experimental group in immediate and delayed assessments, but this varied by passage type indicating an

effect for text structure to explain outcomes (Gaddy et al., 2008). Further, only 40% of students could accurately identify the specific text structure for assessment passages indicating an inability to effectively apply the specific expository text structure strategy.

Using a more global measure, two studies used grade point average (GPA) as a distal measure for strategy learning. GPA showed no differences over eight months between groups (Kovach, et al., 1998), but GPA was correlated with several subprocesses of the Metacognitive Awareness Inventory ([MAI]; Mytkowicz et al., 2014). The remaining four studies did not measure distal academic outcomes, instead measuring self-efficacy, metacognition, or perceptions of strategy knowledge/use (Burchard & Swerdzewski, 2009; Field et al., 2013; Reed et al., 2011; Zwart & Kallemeyn, 2001).

Disaggregated findings by disability. Disaggregated findings by disability, especially in group studies, allow for examination of the differential impact of the interventions on specific groups of students. Fortunately, five studies did provide more isolated findings as three studies included only students with LD (Gaddy et al., 2008; Guyer & Sabatino, 1989; Reed et al., 2011) and two studies included only students with ADHD (Field et al., 2013; Hecker et al., 2002) as a primary diagnosis. However, as these are generally considered to be heterogeneous populations, such a generic description as LD/ADHD provides little to guide practitioners when assessing the fit of the intervention to their particular situation. Finally, four of the nine studies did not disaggregate the data across disabilities thus making it difficult to determine specific outcomes for individual disability diagnoses.

Discussion

The current synthesis of literature involving students with disabilities in postsecondary education is a further refined examination of our team's work to examine the higher education literature corpus for this population. As growing numbers of students enroll in higher education, it is imperative to synthesize the specific practices, in this case, learning strategies, which may promote the development of independent, self-regulated learners.

Of more than 2,000 reviewed articles, only 82 met the four study criteria thus resulting in further examination. Of these, only 21 articles empirically investigated a learning strategy intervention, including nine group designs (1 group design study in the original ten was not an intervention but rather an exploratory study) and 11 single case designs. Given the wide range of disability diagnoses common in college settings, the body of literature concerning learning strategy instruction is deficient, to say the least. Such a dearth indicates the nine group studies (participant $n = 504$) bear a significant burden when attempting to draw conclusions of efficacy.

Sixty-two unique authors contributed to the 21 intervention articles and this is significant for at least two reasons: (1) The field's literature base has been published in an array of journals by an array of authors including doctoral students and higher education administrators. Due to the paucity of empirically derived research on learning strategies in postsecondary education, the potential value of each contribution is magnified. Second, and perhaps most significantly, there do not appear to be any scholars that have carved out a meaningful programmatic line of research on the topic. It is reasonable to conclude that there is both a need and opportunity for researchers to conduct empirically driven studies regarding strategy use in higher education, particularly given that they are, seemingly, practices that improve student outcomes. The need for intervention-based studies cannot be overstated as the quality and efficacy of practice depends upon a body of scholarship that both defines and drives learning strategy techniques. For example, researchers should consider partnering with specific campus programs (e.g., academic support centers and CSD) to examine and publish research results, utilizing group design procedures with the goal of demonstrating improved outcomes (both proximal and distal) for students with disabilities.

Further, criteria for performing quality research should be employed. For example, the What Works Clearinghouse (WWC) randomized controlled trial designation spells out stringent expectations for the completion of group design studies. Of the 9 group studies included in the current examination, only two studies (Field et al., 2013; Gaddy et al., 2008) may have met the WWC criteria as a function of research design. While challenging to conceive and perform, it is essential that more studies of this nature be conducted in order to broach claims of efficacy or generalization.

Alternatively, seven of the nine group design intervention studies utilized standardized measures and this should be considered a strength. However, one limitation of the literature is that very few studies used the *same* standardized measures, thus making comparisons across studies all but impossible. Other limitations of the group design studies include: a failure in all but three studies to determine baseline or pretest equivalence between groups, and a failure to include comparison groups of non-disabled peers to determine the relative impact of an intervention to

close the achievement gap between students with and without disabilities. These limitations are likely markers of a fledgling field and point to the need for further research employing alternative research designs with the goal of generating sufficient data to support intervention selection and as well as implementation guidance.

With regard to measurement, it is also noteworthy that only five of the nine studies measured academic outcomes directly. Whether specific to reading skills or more global measures of learning such as GPA, appraisals of this nature are necessary to judge the overall impact of an intervention on learning. If students with disabilities are truly to become independent, self-regulated learners, both proximal and distal measures are critical. One potential option is to proximally measure both learning strategy knowledge and use (as in Faggella-Luby, Schumaker, & Deshler, 2007) in addition to content and distal measures of learning. Subsequently, the academic outcomes might be utilized by faculty and student support services for instructional, data-driven decision making to guide intervention implementation, coaching, and program design. Additionally, very little is currently known about whether outcomes are mediated or moderated by demographic factors such as class standing, gender, or disability category. Future research must endeavor to deliver a clearer picture of study participants as well as disaggregation of findings.

As noted, two-thirds of the group design studies used researchers or members hired by the research team from outside the instructional setting to deliver intervention instruction. That matter, along with the lack of fidelity measures across the group design studies examined, raise significant questions about the plausibility of intervention implementation. Moreover, interventions are neither documented as having been implemented as designed, nor is data provided to indicate what is plausible or efficacious when others (i.e., non-researchers) attempt to implement the selected practice.

Single case design research has proven especially valuable in early intervention studies for both secondary and postsecondary studies concerning students with disabilities (Maggin & Chafouleas, 2013). However, in the current analysis, very little can be gleaned from the single case research as the designs demonstrated limited repeated affects and employed less-than-ideal multiple probe designs (e.g., Horner et al., 2005). Given the limited number of students with specific disabilities on any single campus (e.g., visual impairments, autism, intellectual disabilities) we recommend utilizing the single case design following the procedures outlined by Horner and colleagues (2005).

Notably, of the learning strategy studies examined, almost half ($n = 7$) taught students word-level decoding strategies rather than emphasizing fluency or reading comprehension strategies. This may reflect findings by Hock and colleagues (2009) in which struggling adolescent readers were found to have a reading profile statistically significantly below proficient peers in word-level reading including fluency, vocabulary, and comprehension (Hock et al., 2009). However, given the limited demographic and reading profiles in the literature base, we speculate that intervention in topical areas beyond word recognition may be a critical feature missing from current service delivery, as it is certainly absent from the research literature. Finally, given the focus of strategies in three main areas only (i.e., acquisition, storage, and expression) it may be illuminating to conduct a more thorough needs analysis of the match between the demands of the curriculum and skills of postsecondary students with disabilities. Such an analysis may necessitate more sensitive instruments to measure actual strategy use over merely self-reported strategy surveys.

With growing numbers of students attending postsecondary institutions, research on the efficacy of different modes of service delivery are essential for program design, delivery, and success. In the current examination, consistent contact was a component of eight of the nine studies which included weekly interactions and all nine providing person-to-person interaction. However, the overall dosage of these studies was varied ranging from half-hour to multi-hour sessions, compressed to within a week, or extended to more than a semester. Notably, the results of the two extended duration intervention periods of more than a semester did not demonstrate improvements on academic outcomes. Further, the current literature provides little in scalable solutions with 15 studies instructing less than nine persons at a time, and two-thirds ($n = 10$) receiving individualized instruction. Although secondary-level IDEA protections and IEPs result in resources and legal protections for individualized learning strategy instruction, postsecondary institutions do not have the same obligation. Thus, it may be more likely that group design studies, and specifically, courses in which learning strategy instruction is emphasized with regular follow up for maintenance may be employed. As noted, with the group design studies of courses only measuring outcomes in five studies, little can be said to support this claim without further research.

Limitations

The coding system utilized for the literature review process required training for researchers and

graduate students across three universities. To allow time for coding, to ensure sufficient inter-rater reliability, and appropriate analysis, a full year was needed to bring about the conclusion of the examination. Therefore, ongoing analysis of the literature, including articles published since the end of 2015 may be warranted to test the merits of the conclusions drawn here.

Implications for Practice

Recently, there has been a call for the use of proven practices for students with disabilities, such as instruction in the use of learning strategies, in college settings (Dukes et al., 2017). Indeed, strategy instruction has become a common and critical component of the academic success of students with disabilities in K-12 school settings (Kamil et al., 2008) and a significant body of evidence exists to support their value (Test et al., 2009). While this review confirms there is less evidence of their effectiveness in the postsecondary environment, the dearth of evidence may simply be due to longstanding philosophical beliefs about the role of higher education personnel with regard to their instructional obligations and expectations about student preparation prior to college entry. Certainly, these stances appear to be under scrutiny, not only in the higher education and disability literature (Lombardi, et al., 2016), but even legislatively. According to Dukes et al. (2017),

> Given the current focus in higher education on accountability metrics tied to institutional funding that include improving institutional graduation rates, timeliness to graduation, and, in some cases, average earned salaries by recent graduates, personnel campus-wide have a responsibility in assisting all students in meeting their college objectives. (p. 116)

Such accountability measures are intended to reflect the performance of all students at an institution, regardless of disability status. Thus, CSD personnel are in a unique position to promote the value of their practices for both students with and without disabilities.

In the postsecondary milieu, there are numerous opportunities to both promote and disseminate knowledge about the value of the instruction, use, and empirical study of learning strategies. Perhaps, most salient are student academic assistance settings, which are now a common component of an array of student supports offered at college campuses. CSD personnel have an opportunity to serve collaboratively, both as a resource for students seeking academic assistance, but also as a resource to campus personnel charged with the development of academic assistance programming. Indeed, in a recent study, students that employed learning strategies were associated with being 2.4 more times likely to earn a college degree than students with disabilities that did not utilize learning strategies in college settings (O'Neill, Markward, & French , 2012). Bear in mind that collaboration of this nature need not be limited to a student academic assistance center, but can also include serving as a resource for summer programs for incoming freshman or as part of a team developing or revising curriculum for first-year student success courses now offered at many postsecondary institutions.

As further evidence emerges to support instruction of learning strategies, collaborative opportunities may extend beyond services focused directly on student academic support. With professional development opportunities for instructional faculty becoming more commonplace, CSD professionals possess a range of knowledge that may inform improved teaching practices. Such professional development can be offered through an array of campus media. It can, of course, be offered in a typical face-to-face professional development session, but it might also be provided as part of annual or semi-annual faculty-wide gathering, as part of a campus speaker series, as a webinar, or as an online tutorial. For example, YouTube pages are now employed to provide an array of institutional information. In such a circumstance, CSD in collaboration with other campus academic support personnel could include information on the instruction and use of learning strategies in video format for both campus personnel and students alike. Secondly, collaborative research opportunities exist at many postsecondary institutions. The value of these options should not be overlooked. CSD staff are in a position to serve as part of a research team and, for example, help develop and organize the administration of a measurable strategy intervention, assist with arranging for student research participants, and collaborate on a publication spelling out study outcomes. Regardless of how CSD professionals become involved, we hope that as the research base for learning strategies in postsecondary settings increases, the field will come to recognize the "essential" nature of these instructional practices. In sum, it is worth noting that practices of this nature are well aligned with inclusive instructional practices such as universal design approaches that have been embraced by the CSD professional community. In fact, The Association on Higher Education and Disability's (AHEAD) Program Standard 2.2 highlights the use of universal design in instructional settings, which is intended to promote curricular access for all students, not just students with disabilities (Shaw & Dukes, 2006).

The current authors would be remiss if we did not specifically point to the few strategy methods that appear to have some level of efficacy. Speaking globally, there is some research-based support for strategy instruction generally (e.g., word-level reading and expression), as well as strategic content learning instruction, and for instruction in the use of guided notes (see Lalor, Lombardi, Madaus, Kowitt, & Dukes, 2014). Additionally, there are at least two coaching models examining peer-led coaching and another investigating student executive functioning skills that may have efficacy (Field et al., 2013; Zwart & Kallemeyn, 2001). Examination of these strategies and practices is beyond the scope of the current publication. In sum, it is well worth noting that the AHEAD Program Standards and Performance Indicators allude to, we believe, the value of strategic instruction with regard to student independence and, thusly, postsecondary academic success. Standard 5.1 notes, the CSD should "Use a service delivery model that encourages students with disabilities to develop independence" (Shaw & Dukes, 2006, p. 20). Indeed the development and use of academically-focused learning strategies is expressly intended to result in student-led, self-regulated learning and, subsequently, successful college completion.

Conclusion

The overall goal of education, especially higher education, is for students to develop into independent, self-regulated learners. Learning strategy instruction is a potential approach for facilitating this goal, especially for students with disabilities. Based on this systematic review, providing explicit instruction in learning strategy instruction in college can be viewed only as a potentially promising practice for this population. Establishing evidence-based approaches for assisting students with disabilities in becoming self-regulated learners is an essential progression for the field of postsecondary education and disability.

References

Abreu-Ellis, C., Ellis, J., & Hayes, R. (2009). College preparedness and time of learning disability identification. *Journal of Developmental Education, 32*(3), 28-38.

Bergey, B. W., Deacon, S. H., & Parrila, R. K. (2017). Metacognitive reading and study strategies and academic achievement of university students with and without a history of reading difficulties. *Journal of Learning Disabilities, 50*, 81-94.

Biggs, J., Kember, D., & Leung, D. Y. P. (2001). The revised two factor Study Process Questionnaire: R-SPQ-2F. *British Journal of Educational Psychology, 71*, 133–149.

Brinckerhoff, L. C. (1991). Establishing learning disability support services with minimal resources. *Journal of Postsecondary Education and Disability, 9*, 184–196.

*Burchard, M. S., & Swerdzewski, P. (2009). Learning effectiveness of a strategic learning course. *Journal of College Reading and Learning, 40*, 14-34.

*Butler, D. L. (1998). The strategic content learning approach to promoting self-regulated learning: A report of three studies. *Journal of Educational Psychology, 90*, 682-697.

*Butler, D. L., Elaschuk, C. L., & Poole, S. (2000). Promoting strategic writing by postsecondary students with learning disabilities: A report of three case studies. *Learning Disability Quarterly, 23*(3), 196-213.

Chevalier, T. M., Parrila, R., Ritchie, K. C., & Deacon, S. H. (2017). The role of metacognitive reading strategies, metacognitive study and learning strategies, and behavioral study and learning strategies in predicting academic success in students with and without a history of reading difficulties. *Journal of Learning Disabilities, 50*, 34-48.

College Board. (2010). Education pays 2010. Retrieved from http://trends.collegeboard.org/education-pays

*Cooper, J. T., Lingo, A. S., Whitney, T., & Slaton, D. B. (2011). The effects of instruction in a paired associates learning strategy as an intervention for college students with learning disabilities. *Journal of Postsecondary Education and Disability, 24*(2), 138-154.

Corkett, J. K., Parrila, R., & Hein, S. F. (2006). Learning and study strategies of university students who report a significant history of reading difficulties. *Developmental Disabilities Bulletin, 34*(1&2), 57-79.

Deshler, D. D., & Schumaker, J. (Eds.). (2006). *Teaching adolescents with disabilities: Accessing the general education curriculum.* Thousand Oaks, CA: Corwin Press.

Dukes III, L. L. (2006). The process: The development of the revised AHEAD program standards and performance indicators. *Journal of Postsecondary Education and Disability 19*, 5-15.

Dukes, III, L. L., Madaus, J. W., Faggella-Luby, M., Lombardi, A., & Gelbar, N. (2017). PASSing College: A taxonomy for students with disabilities in postsecondary education. *Journal of Postsecondary Education and Disability, 30,* 113-129.

Dukes III, L. L., Waring, S., & Koorland, M. A. (2006). The blended course delivery model: The not so distant education. *Journal of Computing in Teacher Education, 22*, 153-158.

Edmonds, M.S., Vaughn, S., Wexler, J., Reutebuch, C., Cable, A., Klingler Tackett, K., & Wick Schnakenberg, J. (2009). A synthesis of reading interventions and effects on reading comprehension outcomes for older struggling readers. *Review of Educational Research, 79*, 262-300.

Faggella-Luby, M., Graner, P., Deshler, D., & Drew, S. S. (2012). Building a house on sand: Why disciplinary specific strategies are not sufficient to replace general strategies for adolescent learners who struggle with reading and writing. *Topics in Language Disorders, 32*, 69-84.

Faggella-Luby, M., Schumaker, J. S., & Deshler, D. D. (2007). Embedded learning strategy instruction: Story-structure pedagogy in heterogeneous secondary literature classes. *Learning Disability Quarterly, 30*, 131-147.

*Field, S., Parker, D. R., Sawilowsky, S., & Rolands, L. (2013). Assessing the impact of ADHD coaching services on university students' learning skills, self-regulation, and well-being. *Journal of Postsecondary Education and Disability, 26,* 67-81.

*Floyd, K. K., & Judge, S. L. (2012). The efficacy of assistive technology on reading comprehension for postsecondary students with learning disabilities. *Assistive Technology Outcomes And Benefits, 8*(1), 48-64.

*Gaddy, S. A., Bakken, J. P., & Fulk, B. M. (2008). The effects of teaching text-structure strategies to postsecondary students with learning disabilities to improve their reading comprehension on expository science text passages. *Journal of Postsecondary Education and Disability, 20*, 100-119.

*Ghesquiere, P., Laurijssen, J., Ruijssenaars, W., & Onghena, P. (1999). The significance of auditory study to university students who are blind. *Journal of Visual Impairment & Blindness, 93*, 40-45.

Graham, S., & Perin, D. (2007). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology, 99*, 445-476.

Graner, P.S., Faggella-Luby, M., & Fritschmann, N. S. (2005). An overview of responsiveness to intervention: What practitioners ought to know. *Topics in Language Disorders, 25*, 93-105.

*Guyer, B. P., & Sabatino, D. (1989). The effectiveness of a multisensory alphabetic phonetic approach with college students who are learning disabled. *Journal of Learning Disabilities, 22,* 430-434.

*Hecker, L., Burns, L., Katz, L., Elkind, J., & Elkind, K. (2002). Benefits of assistive reading software for students with attention disorders. *Annals of Dyslexia, 52*, 243-272.

Henderson, C. (1999). *College freshmen with disabilities: Statistical year 1998.* Washington, DC: American Council on Education.

Hock, M. F., Brasseur, I. F., Deshler, D. D., Catts, H. W., Marquis, J. G., Mark, C. A., & Stribling, J. W. (2009). What is the reading component skill profile of adolescent struggling readers in urban schools? *Learning Disability Quarterly, 32,* 21-38.

*Holzer, M. L., Madaus, J. W., Bray, M. A., & Kehle, T. J. (2009). The test-taking strategy intervention for college students with learning disabilities. *Learning Disabilities Research and Practice, 24*(1), 44-56.

Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children, 71*, 165-179.

Kamil, M. L., Borman, G. D., Dole, J., Kral, C. C., Salinger, T., & Torgesen, J. (2008). *Improving adolescent literacy: Effective classroom and intervention practices: A practice guide* (NCEE #2008-4027). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education.

*Killu, K., Weber, K. P., & McLaughlin, T. F. (2001). An evaluation of repeated readings across various counting periods of see to think, think to say, and think to write channels with a university student with learning disabilities. J*ournal of Precision Teaching & Celeration, 17,* 39-57.

Kirby, J. R., Silvestri, R., Allingham, B. H., Parrila, R., & La Fave, C. B. (2008). Learning strategies and study approaches of postsecondary students with dyslexia. *Journal of Learning Disability, 41,* 85-96.

Kovach, K., & Wilgosh, L. R. (1999). Learning and study strategies and performance anxiety in postsecondary students with learning disabilities: A preliminary study. *Developmental Disabilities Bulletin, 27*, 46-57.

*Kovach, K., Wilgosh, L. R., & Stewin, L. L. (1998). Dealing with test anxiety and underachievement in postsecondary students with learning disabilities. *Developmental Disabilities Bulletin, 26*, 63-76.

Labuhn, A. S., Zimmerman, B. J., & Hasselhorn, M. (2010). Enhancing students' self- regulation and mathematics performance: The influence of feedback and self- evaluative standards *Metacognition and Learning, 5*, 173-194.

Lalor, A., Lombardi, A., Madaus, J.W., Kowitt, J.S., & Dukes III, L.L. (2014, November). *From infancy to adolescence: Research on disability and higher education*. 2014 Division on Career Development and Transition Conference, Cleveland, OH.

Lombardi, A., Gelbar, N., Dukes III, L. L., Kowitt, J., Wei, Y., Madaus, J. W., Lalor, A., & Faggella-Luby, M. N. (2016, June 23). Assessment instruments designed for students, faculty, and staff related to higher education and disability: A systematic review. *Journal of Diversity Higher Education*. Advance online publication. http://dx.doi.org/10.1037/dhe0000027

Madaus J. W. (2006). Employment outcomes of university graduates with learning disabilities. *Learning Disability Quarterly, 29*, 19–31.

Madaus, J. W., Gelbar, N., Dukes III, L. L., Lalor, A. R., Lombardi, A., Kowitt, J., & Faggella-Luby, M. N. (2016, September 15). Literature on postsecondary disability services: A call for research guidelines. *Journal of Diversity in Higher Education*. Advance online publication. http://dx.doi.org/10.1037/dhe0000045

Maggin, D. M., & Chafouleas, S. M. (2013). Introduction to the special series: Issues and advances of synthesizing single-case research. *Remedial & Special Education, 34,* 3-8.

McGuire, J. M. (2002). Policies, procedures, and programmatic considerations. In L. C. Brinkerhoff, J. M. McGuire, & S. F. Shaw, (Eds.). *Postsecondary education and transition for students with learning disabilities* (2nd ed.; pp. 247-293). Austin, TX: Pro-Ed.

McGuire, J. M., Hall, D., & Litt, A. V. (1991). A field-based study of the direct service needs of college students with learning disabilities. *Journal of College Student Development, 32,* 101-108.

*Millar, D. C., McNaughton, D. B., & Light, J. C. (2005). A comparison of accuracy and rate of transcription by adults with learning disabilities using a continuous speech recognition system and a traditional computer keyboard. *Journal of Postsecondary Education and Disability. 18,* 1-16.

*Mytkowicz, P., Goss, D., & Steinberg, B. (2014). Assessing metacognition as a learning outcome in a postsecondary strategic learning course. *Journal of Postsecondary Education and Disability, 27,* 51-62.

Newman, L., Wagner M., Cameto R., & Knokey A. M. (2009). *The post–high school outcomes of youth with disabilities up to 4 years after high school. A report of findings from the National Longitudinal Transition Study-2* (NLTS2) (NCSER 2009-3017). Menlo Park, CA: SRI International.

Newman, L., Wagner, M., Knokey, A. -M., Marder, C., Nagle, K., Shaver, D., Wei, X., with Cameto, R., Contreras, E., Ferguson, K., Greene, S., & Schwarting, M. (2011). *The post-high school outcomes of young adults with disabilities up to 8 years after high school. A report from the National Longitudinal Transition Study-2* (NLTS2) (NCSER 2011-3005). Menlo Park, CA: SRI International.

O'Neill, L. N. P., Markward, M. J., French, J. P. (2012). Predictors of graduation among college students with disabilities. *Journal of Postsecondary Education and Disability, 25*(1), 21–36.

*Patwa, S. S., Chafouleas, S. M., & Madaus, J. W. (2005). The effects of the paired associates strategy (pas) on the recall of factual information by postsecondary students with learning disabilities. *School Psychology Review, 34*, 556-570.

Peña, E. V. (2014). Marginalization of published scholarship on students with disabilities in higher education journals. *Journal of College Student Development, 55*, 30–40.

*Reed, M. J., Kennett, D. J., Lewis, T., & Lund-Lucas, E. (2011). The relative benefits found for students with and without learning disabilities taking a first-year university preparation course. *Active Learning in Higher Education, 12*, 133-142.

Rehabilitation Act of 1973, Section 504, P. L. 93–112, 29 U.S. C. §794 (1977).

Rogers, L. A., & Graham, S. (2008). A meta-analysis of single subject design writing intervention research. *Journal of Educational Psychology, 100*, 879–906.

Scheuermann, A. M., Harris, M. L., Faggella-Luby, M. N., Fritschmann, N. S., Graner, P. G., & Deshler, D. D. (2009). Closing the performance gap: Learning strategies instruction for adolescents with learning disabilities. In G. Sideridis & T. Citro (Eds.) *Classroom strategies for struggling learners* (pp.49-78). Weston, MA: Learning Disabilities Worldwide.

*Schmitt, A. J., McCallum, E., Hennessey, J., Lovelace, T., & Hawkins, R. O. (2012). Use of reading pen assistive technology to accommodate post-secondary students with reading disabilities. *Assistive Technology, 24*, 229-239.

Schraw, G., & Dennison, R. S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology, 19*, 460-475.

Schumaker, J. B., & Deshler, D. D. (1992). Validation of learning strategy interventions for students with learning disabilities: Results of a programmatic research effort. In B. Y. L. Wong (Ed.), *Contemporary intervention research in learning disabilities: An international perspective.* New York: Springer-Verlag.

Schunk, D., & Zimmerman, B. (2007). Influencing children's self-efficacy and self- regulation of reading and writing through modeling. *Reading & Writing Quarterly, 23*, 7-25.

Shaw, S. A., Byron, J., Norlander, K. A., McGuire, J. M., & Anderson, P. L. (1988). Preparing learning disabled students for college. In L. Weinger (Ed.), *Issues in college learning centers*, *6*, 2-14.

Shaw, S. F., & Dukes III, L. L. (2006). Postsecondary disability program standards and performance indicators: Minimum essentials for the office for students with disabilities. *Journal of Postsecondary Education and Disability, 19*, 16–26.

Shaw, S. F., & Dukes III, L. L. (2013). Transition to postsecondary education: A call for evidence-based practice. *Career Development and Transition for Exceptional Individuals, 36*, 51-57.

Shaw, S. F., Madaus, J. W., & Dukes III, L. L. (Eds.). (2010). *Preparing students with disabilities for college: A practical guide for transition planning.* Baltimore: Paul E. Brookes Publishing.

Skinner, M. E. (2004). College students with learning disabilities speak out: What it takes to be successful in postsecondary education. *Journal of Postsecondary Education and Disability, 17*, 91–104.

*Tanners, A., McDougall, D., Skouge, J., & Narkon, D. (2012). Comprehension and Time Expended for a Doctoral Student with a Learning Disability when Reading with and without an Accommodation. *Learning Disabilities: A Multidisciplinary Journal, 18*, 3-10.

Taraban, R., Rynearson, K., & Kerr, M. (2000). College students' academic performance and self-reports of comprehension strategy use. *Reading Psychology, 21*, 283–308.

Test, D. W., Fowler, C. H., Richter, S. M., Mazzotti, V., White, J., Walker, A. R., Kohler, P., & Kortering, L. (2009). Evidence-based practices in secondary transition. *Career Development for Exceptional Individuals, 32*, 155-128.

*Tuncer, A., & Altunay, B. (2006). The Effect of a Summarization-Based Cumulative Retelling Strategy on Listening Comprehension of College Students with Visual Impairments. *Journal of Visual Impairment & Blindness, 100*, 353-365.

U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse. (2014, March). *What works clearinghouse: procedures and standards handbook* (Version 3.0). Retrieved from http://whatworks.ed.gov.

U.S. Department of Education, National Center for Education Statistics. (2015). *Digest of Education Statistics, 2013* (2015– 011). Retrieved from https://nces.ed.gov/fastfacts/display.asp?id60

Wagner, M., Newman L., Cameto, R., Levine P., & Marder, C. (2007). *Perceptions and expectations of youth with disabilities. A special topic report of findings from the National Longitudinal Transition Study-2* (NLTS2) (NCSER 2007-3006). Washington, DC: National Center for Special Education Research.

Wanzek, J., Wexler, J., Vaughn, S., & Ciullo, S. (2010). Reading interventions for struggling readers in the upper elementary grades: A synthesis of 20 years of research. *Reading and Writing: An Interdisciplinary Journal, 23*, 889–912.

Weinstein, C. E., Palmer, D. R., & Shulte, A. C. (2002). *LASSI user's manual* (2nd ed.). Clearwater, FL: H & H.

Weinstein, C. E., Schutte, A. C., & Palmer, D. P. (1987). *Learning and Study Strategies Inventory,* (LASSI). Clearwater, FL: H & H Publishing.

Zimmerman, B. J. (1989). A social cognitive view of self-regulated academic learning. *Journal of Educational Psychology, 81*, 329-339.

Zimmerman, B. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal, 45,* 166-183.

*Zwart, L. M., & Kallemeyn, L. M. (2001). Peer-based coaching for college students with ADHD and learning disabilities. *Journal of Postsecondary Education and Disability, 15*, 1-15.

* indicates articles reviewed as empirical studies in this review (group or single case design).

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Table 1

Number of Studies by Study Type

Characteristic	***n***
Group	10
One group counterbalanced	2
One shot case study	1
One group pre/post	3
Static group comparison	2
RCT	2
Characteristic	
Only researcher developed measures	2
Comparison group	8
Established baseline equivalence	3
Included non-disabled peers	3
Single Subject	11
A-B	2
B-C	1
ABAC	1
Alternating treatments	3
Multiple baseline	4
With probes	2

Table 2

Since Case Design Studies

Butler, D. L. (1998). The strategic content learning approach to promoting self-regulated learning: A report of three studies. *Journal of Educational Psychology, 90*, 682-697.

Butler, D. L., Elaschuk, C. L., & Poole, S. (2000). Promoting strategic writing by postsecondary students with learning disabilities: A report of three case studies. *Learning Disability Quarterly, 23*, 196-213.

Cooper, J. T., Lingo, A. S., Whitney, T., & Slaton, D. B. (2011). The effects of instruction in a paired associates learning strategy as an intervention for college students with learning disabilities. *Journal of Postsecondary Education and Disability, 24*, 138-154.

Floyd, K. K., & Judge, S. L. (2012). The efficacy of assistive technology on reading comprehension for postsecondary students with learning disabilities. *Assistive Technology Outcomes And Benefits, 8*, 48-64.

Holzer, M. L., Madaus, J. W., Bray, M. A., & Kehle, T. J. (2009). The test-taking strategy intervention for college students with learning disabilities. *Learning Disabilities Research and Practice, 24*, 44-56.

Killu, K., Weber, K. P., & McLaughlin, T. F. (2001). An evaluation of repeated readings across various counting periods of see to think, think to say, and think to write channels with a university student with learning disabilities. *Journal of Precision Teaching & Celebration, 17*, 39-57.

Millar, D. C., McNaughton, D. B., & Light, J. C. (2005). A comparison of accuracy and rate of transcription by adults with learning disabilities using a continuous speech recognition system and a traditional computer keyboard. *Journal of Postsecondary Education and Disability, 18*, 1-16.

Patwa, S. S., Chafouleas, S. M., & Madaus, J. W. (2005). The effects of the Paired Associates Strategy (PAS) on the recall of factual information by postsecondary students with learning disabilities. *School Psychology Review, 34*, 556-570.

Schmitt, A. J., McCallum, E., Hennessey, J., Lovelace, T., & Hawkins, R. O. (2012). Use of reading pen assistive technology to accommodate post-secondary students with reading disabilities. *Assistive Technology, 24*, 229-239.

Tanners, A., McDougall, D., Skouge, J., & Narkon, D. (2012). Comprehension and time expended for a doctoral student with a learning disability when reading with and without an accommodation. *Learning Disabilities: A Multidisciplinary Journal, 18*, 3-10.

Tuncer, A., & Altunay, B. (2006). The effect of a summarization-based cumulative retelling strategy on listening comprehension of college students with visual impairments. *Journal of Visual Impairment & Blindness, 100*, 353-365.

Table 3

Demographic Characteristics by Study Type

Location	**Single Subject**	**Group**	**Total**
U.S.	8	7	15
Canada	2	2	4
Other international	1	1	2
Setting			
4-year college or university	7	5	12
Graduate program	1	0	1
2-year college or university	0	3	3
International institution	3	3	6
Demographics present			
Race/ethnicity	2	2	4
Disability category	11	8	19
Learning disability	10	5	15
ADHD	1	3	4
Visual impairment	0	1	1
Multiple disabilities	1	0	1
Other	0	1	1
Without disabilities	0	3	3
Class standing	6	3	9
Gender	10	5	15

Table 4

Intervention and Pedagogical Variables by Type of Research

Characteristic	Single subject (n)	Group (n)	Total (n)
Type of strategy			
Acquisition	7	8	15
Storage	3	6	9
Expression	5	7	12
Process	2	3	5
Mechanics	1	1	2
Genre	0	3	3
Test-taking	2	2	4
Executive function coaching	0	1	1
Intervention			
Word-level reading	5	2	7
Learning strategy course	0	3	3
Coaching	0	2	2
Reading strategy instruction	1	1	2
Metacognitive strategies	2	0	2
Mnemonics	2	0	2
Test preparation	1	1	2
Listening	0	1	1
Number of students per instructor			
1:1	6	4	10
1:2-9	3	2	5
1:10+	2	0	2
Not clear	2	2	4
Setting			
Face to face	9	10	19
Phone	0	1	1
Online	1	0	1
Not described	1	0	1

Table 5

Empirical Studies with Group Design

Citation	Location	Control/ Comparison Group	Intervention	Students per Instructor Ratio	Team Member	n	Researcher-Developed Measures
Burchand & Swerdzewski, 2009	U.S.	Yes	Orton-Gillingham	10:1	No	30	No
Field, Parker, Sawilowsky, & Rolands, 2013	U.S.	Yes*	Study skills	1:1 or small groups	Yes	33	Yes
Gaddy, Bakken, & Fulk, 2008	U.S.	Yes*	Auditory vs tactile strategies	3:1	Yes	12	No
Ghesquiere & Laurijssen, 1999	Belgium	Yes	Peer-based Coaching	1:1	No	42	No
Guyer & Sabatino, 1989	U.S.	No	Text to speech software	1-4:1	Yes	20	No
Hecker, Burns, Elkind, Elkind, & Katz, 2002	U.S.	Yes	Text-structure strategies	1:1	Yes	40	Yes
Kovach, Wilgosh, & Stewin, 1998	Canada	Yes	Strategic learning course	16-27:1	Yes	78	No
Mytkowicz, Goss, & Steinberg, 2014	U.S.	Yes	University first year course	Not clear	Yes	41	No
Reed, Kennett, Lewis, & Lund-Lucas, 2011	Canada	No	Strategic learning course	Not clear	Yes	48	No
Zwart & Kallemeyn, 2001	U.S.	Yes	Executive function coaching	1: 1	Yes	160	No

Note. *Utilized a RCT design

The Effects of Completing PREP Academy: A University-Based Transition Project for Students with Disabilities (Practice Brief)

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Abstract

This practice brief provides an overview of a project designed to support students with disabilities considering postsecondary education. Postsecondary Rewarding Education is Possible (PREP) Academy was developed by individuals from a state vocational rehabilitation agency and a public research university. PREP Academy is a campus-based, weeklong experience in which students participate in activities designed to mirror the "college experience." In an evaluation of the project's second year, a total of 23 students and six parents/guardians completed a pre- and post-survey to examine how attending the project affected students' perceptions related to students attending college. Interview data from three student and parent/guardian pairs were collected to further explore students' perceptions and to learn what components of the project were most beneficial. Results provided evidence both students and parents/guardians believe students are better prepared to attend college after participating. An emerging theme related to increasing the project's emphasis on mirroring aspects of college was identified.

Keywords: secondary transition, postsecondary education, workplace readiness, job exploration, self-advocacy, students with disabilities

The 1990 reauthorization of the Individuals with Disabilities Education Act (IDEA) included an emphasis on postsecondary education for students with disabilities (SWDs), including language regarding transition services (IDEA, 2014). In addition, the Americans with Disabilities Act of the same year sought to increase access for SWDs in higher education as well. Since this time many improvements relevant to SWDs and their pursuit of postsecondary education have been observed. For example, students with intellectual and developmental disabilities have seen a significant increase in their opportunity to obtain access to postsecondary education (Think College, 2016). Thus, as of 2016, SWDs make up 11% of students enrolled in higher education (Snyder, de Brey, & Dillow, 2016). Despite such encouraging progress, like their peers without disabilities, SWDs typically confront issues surrounding roommates, deadlines, study habits, and navigating campus during the transition from high school to postsecondary education (Hewitt, 2011). However, SWDs are at higher risk for experiencing academic, behavioral, and emotional demands that can impede postsecondary education success compared to their peers without disabilities (Hendrickson, Woods-Groves, Rodgers, & Datchuk, 2017).

Further, post-school outcomes for SWDs are typically less than ideal (Newman et al., 2011). Indeed, SWDs often struggle socially and academically in college, and graduation rates for such students are about half the rate of students without disabilities (Gregg, 2009). Moreover, while 85% of individuals with a disability reported to be productively engaged in their community six years after high school in the National Longitudinal Transition Study-2 ([NLTS-2]; Wagner, Newman, Cameto, Garza, & Levine, 2005), 95% of their peers without disabilities reported the same. In addition, 36% of individuals with disabilities also reported to be living independently six years after high school, while 44% of their peers without disabilities reported as such.

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However, there is evidence many college graduates with learning disabilities – the largest category of disability noted for students attending a two- or four-year college or university (Snyder et al., 2016) – have similar levels of full-time employment and salary earnings compared to peers without disabilities (Madaus, 2006). In addition, appropriate supports in the postsecondary setting have been shown to be beneficial for SWDs who may have been underprepared to handle the transition to postsecondary education (Smith, Dillahunt-Aspillaga, & Kenney 2017). As such, it is vital to provide appropriate transition services.

The Workforce Innovation and Opportunity Act ([WIOA], 2014) is legislation designed to improve outcomes for individuals with disabilities by focusing specifically on activities related to the transition to postsecondary education and employment. The WIOA amended the Rehabilitation Act of 1973, requiring vocational rehabilitation (VR) agencies to allocate 15% of their federal funds to provide pre-employment transition services (Pre-ETS) to individuals with disabilities eligible, or potentially eligible, for obtaining VR services. Required Pre-ETS include: Workplace readiness, job exploration counseling, instruction in self-advocacy, work-based learning experiences, and counseling on opportunities for enrollment in comprehensive transition or postsecondary educational programs. This evaluation focuses on the first three of these services, with workplace readiness including an emphasis on college readiness, given the nature of the project.

Depiction of the Problem

To address less than desired postsecondary outcomes for SWDs, the WIOA (2014) called for collaboration across agencies. Such an approach is supported by research suggesting interagency collaboration has the potential to improve educational and employment outcomes for SWDs (Test et al., 2009). The project described below is the result of collaboration between a Northwest state's Division of Vocational Rehabilitation (DVR) and a public research university. This collaboration resulted in the development of a weeklong, university-based transition project called Postsecondary Rewarding Education is Possible (PREP) Academy.

Students with disabilities too often come to campus unprepared to meet the expectations of being a college student – in particular for meeting such expectations given their unique learning needs. Although much of the above review of the literature could be seen as a depiction of a problem (i.e., less than desired postsecondary outcomes for SWDs), it important to define a problem in context of expectations. That is, while many of the statistics noted above are troublesome for those interested in the lives of those with disabilities, it can be argued that such statistics are not the problem but, rather, simply evidence of a certain phenomenon at this moment in time. Instead of defining a problem as a troublesome, or an undesired, outcome another approach is often used in education. This approach defines a problem as a discrepancy between an expectation and a current observed outcome (Deno, 2016).

Thus, the problem PREP Academy seeks to address is the difference between how prepared one needs to be to be successful in college compared to the level of preparation of many SWDs when they arrive on campus their first semester. Considering this, and keeping in mind the idea that "experience is the best teacher," PREP Academy was developed to mirror college life in order to give SWDs an example of attending college.

Participant Demographics

Two cohorts of students attended PREP Academy in the summer of 2017; each cohort attended for one week. Cohort A consisted of 17 students (female = 10) with an average age of 17.7 years (*SD* = .78). Cohort B consisted of 14 students (female = 7) with an average age of 17.6 years (*SD* = 1.17). Of these 31 students, 23 consented to participate in our evaluation (Cohort A = 15, female = 6; Cohort B = 8, female = 3). While some students or parents/guardians chose to provide information related to students' disability status when applying to PREP Academy, and some students disclosed such information during the week, this specific information was not available to PREP Academy staff due to privacy restrictions. Examples of self-reported disabilities included: Autism, learning disabilities, attention-deficit hyperactivity disorder, and mental health disorders (e.g., anxiety, depression). All PREP Academy parents/guardians were also invited to participate in the evaluation as well.

Description of Practice

Individuals are able to participate in PREP Academy at no cost, but they must be nominated by their DVR case worker as a person for whom postsecondary education is an appropriate option. Given the experience is designed to reflect components of college life, students live in a dormitory, eat in a cafeteria, go to classes, and experience campus-like social life. During the week (see Figure 1), students attend classes in which they learn more about the logistics of and training for desired careers, create a presen-

tation on what they have discovered, and learn more about financial literacy. Classes focused on workplace readiness and job exploration are taught by a lecturer in the Department of Early and Special Education at the university involved, and the self-advocacy class (focused on financial literacy) is taught by undergraduate students in the university's accounting department using materials developed by Pricewaterhouse Coopers (https://www.pwc.com/us/en/about-us/corporate-responsibility/access-your-potential/financial-literacy-curriculum.html).

Students participate in activities alongside undergraduate student mentors. Mentors' primary responsibility was to serve as a peer to students, modeling appropriate behavior in class and on-campus in general (e.g., getting from building to building, interacting with professors, etc.) An important secondary responsibility of mentors includes providing appropriate supervision to students under the age of 18 years old and those from more vulnerable populations (e.g., students with mild intellectual disabilities). In turn, mentors are supervised both by a local Master's-level special education teacher and the first author, who serves as the project's director.

Evaluation of Observed Outcomes

To learn more about students' and parent/guardian perceptions of PREP Academy's effects on preparedness for postsecondary education, parents/guardians were given a pre-/post-survey that was administered electronically and students were given a similar survey (wording changed from "my student" to "me/I") in paper/pencil format. After analyzing the survey data, three parent/guardian-student pairs were interviewed to allow for expansion on their perspectives on PREP Academy. This 16-question survey focused on issues of career readiness, job exploration, and self-advocacy in addition to evaluation questions about PREP Academy and its activities (items can be reviewed in Tables 1 and 2). All 23 students completed pre- and post- surveys; six parent/guardians completed both the pre- and post-surveys; there were an additional four parent/guardians who completed only the post-survey.

One week after PREP Academy concluded, eight parent/guardian-child pairs (N=3 female students) were contacted for interviews. These pairs were chosen on the basis of complete or nearly-complete data sets (i.e., pre- and post-surveys completed by both student and parent/guardian). Of these eight pairs, three consented for interviews (N=1 female student). Interviews were conducted by the second author and focused on the student's goals for postsecondary education, the logistics of achieving those goals, and questions about activities during PREP Academy.

On the surveys, both students and parents/guardians were asked to rate how confident they were the student would be successful in their chosen postsecondary plan (e.g., two- or four-year college, military, etc.). There was a significant difference in both students' and parents'/guardians' pre-survey compared to their post-survey responses in favor of having greater confidence after attending. What follows next delves into more detail as to the areas that may have contributed to this increased confidence. See Tables 1 and 2 for complete results for students and parents/guardians, respectively.

Students' responses to all four items associated with workplace readiness were observed to be significantly different pre- and post-survey. Qualitative data indicates that students saw PREP Academy demystifying the college experience and providing more clarity related to college financial logistics. Students frequently made comments about how helpful it was to have a taste of college life and learn more about how it might differ from high school. In addition, students stated they learned about the cost of, and how to save for, attending college.

Parents'/guardians' responses to two items associated with workplace readiness were observed to be significantly different pre- and post-survey. Similar to student feedback about PREP Academy being a taste of college life, most parents viewed PREP Academy in terms of a 'trial run' in a safe space to see if students could handle the independence and different structures that come with attending college. Simple things, such as walking to different buildings for class, speaking to instructors, managing their own schedule (to a degree), and still doing homework, were often mentioned as concrete opportunities for students to try out college life.

Students' responses to all four items associated with job exploration were also significantly different between the pre- and post-survey. Students generally reported that they were able to learn more about what different careers entailed and what they needed to do to prepare for that career. Parents'/guardians' responses to two items associated with job exploration were observed to be significantly different pre- and post-survey. Similar to the students, many parents/guardians made general comments that as a result of their work in PREP Academy, their student had learned more details about desired career paths and requirements.

Students' responses to all four items associated with self-advocacy were also significantly different between the pre- and post-survey. Students' respons-

es focused on new realizations related to college and students with disabilities, learning about how colleges can assist with accommodations more generally, and how they need to advocate for themselves in terms of specific accommodations. No items associated with self-advocacy were observed to be significantly different when comparing pre- and post-survey responses from parents/guardians.

A theme emerged from the qualitative data that is worthy of mention, aptly described by a parent as "Take it up a notch." Most closely related to the workplace readiness theme of demystifying the college experience, both students and parents seemed to want more college experiences within PREP Academy. These requested experiences included sitting in a real college lecture with hundreds of students in a large lecture hall, learning how to use a college online course system (e.g., Blackboard), having more unchaperoned free time, and practicing doing laundry. Each comment that was made in this vein related to the idea that students wanted to have the most authentic experience possible that would prepare them for college life.

Implications and Portability

Overall, findings are promising in terms of students' and parents'/guardians' perspectives of the PREP Academy experience; findings also indicate specific actions that could be taken to improve the project. To begin, it seems the most significant benefit of attending PREP Academy is its attempt at mirroring college life in a low-risk environment. Responses indicate participants wanted the student to have a more concrete understanding of what college life might be like on a daily basis. Students and parents commented that taking away the fear of the unknown was incredibly beneficial; not only could the student have this concrete experience, but this experience could then be used as a basis for further conversation.

Next, while participants perceived the whole variety of activities provided by PREP Academy to be useful, the area of job exploration appears to be an area that allowed students to think about next steps in a tangible way. For example, students were able to articulate what courses they would need to take, or what types of experiences they should have in order to pursue their career path. These findings warrant expansion on this point and including opportunities in PREP Academy to break down next steps into concrete intermediate steps that students and parents/guardians could enact. In addition, these findings indicate a need to strengthen PREP Academy's partnership with DVR by sharing students' career goals with them so DVR may better target future supports for those students.

A final implication for PREP Academy is to increase attention to financial literacy. Participants appreciated the opportunity to learn more about financial aid, scholarships, and associated applications but, in the spirit of supporting self-advocacy, increasing attention to non-college-related finances would be beneficial. Further exploring scams, credit card debt, emergency funds, and long-term financial planning may be topics that would better position SWDs to handle financial issues that can arise during college and early-adult years.

In addition to these implications, these findings indicate that the development of PREP Academy has helped motivate further collaborations between DVR and other state Institutions of Higher Education to offer similar summer "academy" programs as well. Given the results we have obtained from evaluating our most recent efforts, we believe states that do not offer on campus experiences for SWDs should explore cross agency collaborations in order to do so.

References

Deno, S. L. (2016). Data-based decision-making. In S. R. Jimerson, M. K. Burns, & A. M. VanDerHeyden (Eds.). *Handbook of response to intervention* (2nd ed.). (pp. 9-28). New York: Springer.

Gregg, N. (2009). *Adolescents and adults with learning disabilities and ADHD: Assessment and accommodation.* New York, NY: Guilford.

Hendrickson, J. M., Woods-Groves, S., Rodgers, D. B., & Datchuk, S. D. (2017). Perceptions of students with autism and their parents: The college experience. *Education and Treatment of Children, 40*. 571-596.

Hewitt, L. E. (2011). Perspectives on support needs of individuals with autism spectrum disorders: Transition to college. *Topics in Language Disorders, 31*, 273-285.

Individuals with Disabilities Education Improvement Act of 2004. P.L. 108-446, 108th Congress.

Madaus, J. W. (2006). Employment outcomes of university graduates with learning disabilities. *Learning Disability Quarterly, 29*, 19-31.

Newman, L., Wagner, M., Knokey, A. M., Marder, C., Nagle, K., Shaver, D., Wei, X. (2011). *The post-high school outcomes of young adults with disabilities up to 8 years after high school. A report from the National Longitudinal Transition Study-2* (NLTS2) (NCSER 2011-3005). Menlo Park, CA: SRI International.

Smith, T. J., Dillahunt-Aspillaga, C. J., & Kenney, R. M. (2017). Implementation of customized employment provisions of the workforce innovation and opportunity act within vocational rehabilitation systems. *Journal of Disability Policy Studies, 27*, 195-202.

Snyder, T. D., de Brey, C., & Dillow, S. A. (2016). *Digest of Education Statistics 2015, NCES 2016-014*. National Center for Education Statistics.

Test, D. W., Mazzotti, V. L., Mustian, A. L., Fowler, C. H., Kortering, L., & Kohler, P. (2009). Evidence-based secondary transition predictors for improving postschool outcomes for students with disabilities. *Career Development for Exceptional Individuals, 32*, 160-181.

Think College. (2016). *Think college databases.* Retrieved from https://thinkcollege.net/college-search

Wagner, M., Newman, L., Cameto, R., Garza, N., & Levine, P. (2005). *After high school: A first look at the postschool experiences of youth with disabilities. A report from the National Longitudinal Transition Study-2* (NLTS2). Menlo Park, CA: SRI International.

Workforce Innovation and Opportunity Act (2014). PL 113128.

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Table 1

Student Survey Paired Sample t-tests Results for Goal Associated Items

Theme	Item	Mean Difference	*SD*	*SE*	95% CI Lower	95% CI Upper	*t*	*df*	*Sig. (2-tailed)*
Workplace Readiness	I have the skills and knowledge I will need for college-level classes.	0.83	1.1929	.2487	.3103	1.3419	3.321	22	.003**
	I know the steps I need to take to apply to college.	0.96	1.4295	.2981	.3384	1.5747	3.209	22	.004**
	I know the steps I need to take to financially plan for college.	1.04	1.8210	.3797	.2560	1.8310	2.748	22	.012*
	I know the steps I need to take to be successful in college.	0.77	.9351	.1994	.3127	1.1419	3.648	22	.002**
Job Exploration	I know what I would like to do for a career.	0.48	1.2800	.2700	-.0700	1.0300	1.800	22	0.086^
	I know what sort of training/ schooling I need for my chosen career.	0.83	1.3022	.2715	.2630	1.3892	3.042	22	.006**
	I understand what people in my chosen career do on a daily basis.	0.82	1.2458	.2656	.3113	1.4160	3.252	22	.004**
	I know where people with my chosen career work.	0.65	1.5553	.3243	-.0204	1.3247	2.011	22	.057^
Self-Advocacy	I can list and discuss the academic accommodations I need to be successful in school.	0.65	1.2652	.2638	.1051	1.1993	2.472	22	.022*
	I can list and discuss the support services I need to be successful in a job.	0.48	1.1627	.2424	-.0245	0.9810	1.973	22	.061^
	I can list and discuss my rights for reasonable accommodations under the law.	1.00	1.3143	.2740	.4317	1.5683	3.649	22	.001**
	I know what I need to do to take care of myself financially.	0.87	1.1795	.2460	.3595	1.3796	3.536	22	.002**

Note. $N = 23$; ^ $p < .10$; * $p < .05$; ** $p < .01$.

Table 2

Parent Survey Paired Sample t-tests Results for Goal Associated Items

Theme	Item	Mean Difference	*SD*	*SE*	95% CI Lower	95% CI Upper	*t*	*df*	*Sig. (2-tailed)*
Workplace Readiness	My child has the skills and knowledge they will need for college-level classes.	.5000	1.3784	.5627	-.9465	1.9465	0.889	5	.415
	My child knows the steps they need to take to apply to college.	.5000	1.0488	.4282	-.6007	1.6007	1.168	5	.296
	My child knows the steps they need to take to financially plan for college.	1.5000	1.3784	.5627	.0535	2.9465	2.666	5	.045*
	My child knows the steps they need to take to be successful in college.	1.3333	1.5055	.6146	-.2466	2.9133	2.169	5	.082^
Job Exploration	My child knows what they would like to do for a career.	.5000	1.2247	.5000	-.7853	1.7853	1.000	5	.363
	My child knows what sorts of training/schooling they need for their chosen career.	1.3333	0.8165	.3333	.4765	2.1902	4.000	5	.010**
	My child knows what people in their chosen career do on a daily basis.	1.3333	1.3663	.5578	-.1005	2.7671	2.390	5	.062^
	My child knows where people with their chosen career work.	.6667	0.8165	.3333	-.1902	1.5235	2.000	5	.102
Self-Advocacy	My child can list and discuss the academic accommodations they need to be successful in school.	1.0000	1.7889	.7303	-.8773	2.8773	1.369	5	.229
	My child can list and discuss the support services they need to be successful in a job.	1.0000	1.7889	.7303	-.8773	2.8773	1.369	5	.229
	My child can list and discuss their rights for reasonable accommodations under the law.	1.0000	1.4142	.5774	-.4841	2.4841	1.732	5	.144
	My child knows what they need to do to take care of themselves financially.	.6667	1.6330	.6667	-1.0471	2.3804	1.000	5	.363

Note. $N = 6$; ^ $p < .10$; * $p < .05$; ** $p < .01$.

Day	Activity	Time
Sunday	Check-in	3:00 to 3:30 pm
	Orientation and student surveys	4:00 to 5:00 pm
	Campus tour led by mentors	5:00 to 6:00 pm
	Pizza and social time with mentors	6:00 to 8:00 pm
	Unstructured time	8:00 to 10:00 pm
	In room / Lights out	10:00 / 10:30 pm
Monday-Thursday	Breakfast	8:00 to 9:00 am
	Morning Activity • Disability Services Office presentation • Science, Technology, Engineering, and Math Activity • University football center / library tours (in groups of two) • Division of Vocational Rehabilitation presentation	9:30 to 10:30 am
	Workplace readiness class	11:00 to 12:00 pm
	Lunch / Unstructured time	12:00 to 1:30 pm
	Job exploration class	1:45 to 2:45 pm
	Study Table	3:00 to 4:00 pm
	Self-advocacy class	4:30 to 5:15 pm
	Dinner	5:30 to 6:00 pm
	Evening Activity • Campus Games Center • Students with Disabilities Roundtable • University Recreation Center • Dorm movie night	6:30 to 7:30 pm
	Unstructured time	7:30 to 10:00 pm
	In room / Lights out	10:00 / 10:30 pm
Friday	Breakfast & Pack-up	8:00 to 9:00 am
	Free (presentation prep, sleep)	9:00 to 10:30 am
	Self-advocacy class	10:30 to 11:15 am
	Unstructured time and Lunch	11:15 to 12:15 pm
	Science Lecture	12:15 to 1:00 pm
	Break	1:00 to 1:15 pm
	Opening remarks / Students present	1:15 to 3:00 pm
	Closing remarks / Student surveys	3:00 to 3:30 pm
	Check-out	4:00 pm

Figure 1. Schedule for PREP Academy 2017.

Promoting an Accessible Learning Environment for Students with Disabilities via Faculty Development (Practice Brief)

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Abstract

Faculty members' positive attitudes, active engagement, and receptiveness to inclusive instructional practices may contribute to the retention and success of students with disabilities (SWDs). However, most faculty members are not adequately prepared to effectively implement inclusive instruction, and many remain uninformed regarding the functional impact of specific disabilities on academic performance. This practice brief describes a sustainable, year-long, five-module faculty development program that includes universal design of instruction, characteristics of diverse learners, accessible online learning, disability-related laws and regulations, a panel dialogue with SWDs, and a final project that involved disseminating, integrating, and applying knowledge and skills learned during the program. Results from pre- and post-training questionnaires indicated significant improvements in faculty members' willingness to accommodate SWDs, provide accessible materials, and cultivate inclusive classroom environments, as well as in their understanding of disability law and concepts and of the accessibility of campus resources.

Keywords: accessible learning, faculty development, disability, postsecondary education

According to the U.S. National Center for Education Statistics (Snyder, de Brey, & Dillow, 2016), students with disabilities (SWDs) account for 11% of all students in higher education, a percentage that has grown to nearly double the 6% reported in 1999. SWDs typically demonstrate less educational attainment than students without disabilities (Ryan & Bauman, 2016). As Jensen, Petri, Day, Truman, and Duffy (2011) have found, the retention of SWDs relates directly to how well accommodations meet their specific needs and assist them in fulfilling the expectations of their academic activities. Unlike students at the K–12 level, SWDs in higher education are required to self-identify as having disabilities to a designated campus unit to request accommodations. However, among youth who received special education services in high school and pursued postsecondary education, only 28% reported to their universities' disability services offices and received accommodations (Newman et al., 2011). Perceived resistance from faculty members to provide accommodations and a lack of skills in explaining functional limitations caused by a disability and how it can affect academic performance are two factors behind these students' reluctance toward self-disclosure and accommodation requests (Barnard–Brak, Sulak, Tate, & Lechtenberger, 2010; Marshak, Wieren, Ferrell, Swiss, & Dugan, 2010). Since students who choose not to disclose their disabilities do not receive accommodations from disability services offices, their academic success depends solely on their own efforts, as well as the ability and willingness of faculty members to meet their needs through inclusive teaching practices.

At a number of universities, professional training programs have been developed and implemented with the aims of enhancing faculty members' awareness, attitudes, and competence in employing strategies to ensure equal access for SWDs in classrooms (Burgstahler, 2007; Cook et al., 2006; Murray, Lombardi, Seeley, & Gerdes, 2014; Murray, Wren,

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Stevens, & Keys, 2009; Park, Roberts, & Stodden, 2012; Rodesiler & McGuire, 2015; Rohland et al., 2003). The formats of these training programs can be differentiated by program duration (e.g., number of hours, days, weeks, and semesters), frequency (e.g., single workshops and series of training sessions offered over extended periods), type of delivery method used (e.g., in-person training, synchronous or asynchronous online instruction, and blended offerings), and type of instructional activities involved (e.g.., didactic, interactive and experiential activities, collaborative learning, and reflective discussions). Reviews of these training programs have suggested outcomes of immediate and long-term impacts on faculty members' disability awareness (e.g., knowledge of characteristics of SWDs), willingness to provide accommodations, and quality of interaction with SWDs. They have also underscored improvements in faculty members' knowledge of resources, legal obligations, effective accommodation strategies, and assistive technology, as well as their self-efficacy in applying specific inclusive instructional methods, including the use of learning management systems (LMS) and the adoption of universal design practices.

Depiction of the Problem

Research findings have suggested that faculty members' positive attitudes, active engagement, and receptiveness to inclusive instructional practices may contribute to the retention and success of students with disabilities (Park et al., 2012). However, many faculty members begin to consider issues related to accessibility only when SWDs enroll in their courses. Consequently, they often lack adequate preparation to effectively implement inclusive instruction, are uninformed in regard to the functional impact of specific disabilities on academic performance, and are unsure about strategies for maintaining academic standards while providing reasonable accommodations. Although the results of existing professional training programs have indicated a positive impact on faculty members' disability awareness and their readiness to provide an accessible learning environment for SWDs, common barriers to faculty enrollment and participation in such training programs include: time constraints, scheduling issues, a lack of perceived urgency, and few incentives (Getzel, Briel, & McManus, 2003). To overcome these barriers, Reder, Mooney, Holmgren, and Kuerbis (2009) proposed three strategies: (1) emphasizing faculty ownership by understanding their needs and interests and involving local faculty members with interest and relevant expertise in program leadership and management; (2) encouraging collegiality, community, and shared responsibility by creating collaborative systems within institutions; and (3) providing recognition and awards, including reduced workload, improved opportunities for promotion and tenure, and financial remuneration. In addition, given the increased number of SWDs on university campuses, the types of disabilities represented in a complex array of academic disciplines, and the limited resources available from disability services offices, it might also be helpful to empower faculty members to serve as trainers and academic unit liaisons (Murray et al., 2014; Rohland et al., 2003).

Participant Demographics and Institutional Partners/Resources

This practice brief describes a faculty development program—namely, Building a Team to Reach All Learners: Promoting an Accessible Learning Environment for Students with Disabilities—initiated by three faculty members from the Departments of Arts, Engineering, and Special Education. The program was funded by the Strategic Educational Excellence Development of a midsized private university with three campuses on the West Coast that is committed to student-centered learning. The university's Office of Disability Support Services (DSS) operates within the Division of Student Life, and during the academic year 2016/2017, it served approximately 514 SWDs, roughly 10% of the university's total student population. Predominant primary diagnoses reported by the students were psychological or mental health conditions (57%), physical disabilities (24%), specific learning disabilities (14%), and autism spectrum disorders (5%).

Faculty members were recruited via email invitations and electronic flyers that outlined a yearlong, five-module training program addressing disability awareness and inclusive instructional practices and offered a $1,500 stipend for each participant. The 25 participating faculty members represented various university units, including the College of Liberal Arts, the Schools of Business, Education, Engineering, Health Sciences, and Music, and the Dental and Law Schools volunteered to participate. These included 7 men and 18 women, who together had an average of 13.83 years (SD = 8.63) of teaching experience, ranging between three and thirty-six years. Only three faculty members had previously participated in related training either in short-lecture form or programs irrelevant to higher education. Table 1 presents the characteristics of the participants. Of the 25 faculty members who registered for the program, 19 completed all five modules.

The training and support offered through the program emerged from evidence-based practices developed as an initiative promoting the universal design of instruction hosted by the Disabilities, Opportunities, Internetworking, and Technology (DO-IT) Center at the University of Washington (https://www.washington.edu/doit/) and from cross-campus collaborations involving various units at the host university with support from the DSS and the Center for Teaching and Learning (CTL). The program encouraged team building through dialogue among faculty members, administrators, support service providers, and SWDs.

Description of Practice

The aims of the training program were to enhance faculty members' competence in inclusive instructional practices and to ensure the program's sustainability by having faculty members become trainers and liaisons in their home academic units. Three specific objectives of the program were: (1) to enhance faculty members' knowledge and skills to meet the diverse needs of SWDs; (2) to establish ongoing collaborative partnerships and support networks for mentoring SWDs and support for faculty members; and (3) to promote positive attitudes toward SWDs as valued learners with the aim of improving the culture of the university.

To maximize faculty members' participation and to accommodate various learning styles and teaching schedules, the training program delivered content in various formats, including live streaming via WebEx and LMS engagement using Canvas, supplemented by Internet-based resources and individualized support. To increase faculty members' perseverance in completing all modules of the program, a stipend was provided upon completion of all modules. Faculty members participated in an intensive two-day external expert-led workshop, a month-long online course, live presentations and group discussions conducted by the director of DSS and faculty leaders, and a student panel of SWDs. Table 2 outlines the modules of the program. As an integral part of the program, student-panel participants identified factors of their successful academic performance, including the attitudes of faculty members, course policies and guidelines, and the effective use of technology. Table 3 describes the themes and content of the insights of the student panel.

Upon completing the training program, participants completed projects that involved disseminating, integrating, and applying knowledge and skills developed through the program. Each project involved an introduction to the discipline and overall requirements, a list of required academic activities associated with major learning outcomes, potential or anticipated challenges for SWDs, examples of accommodations for each activity, and a common format of assessment. These newly-trained faculty became liaisons and trainers in their home academic unit. They collected information from colleagues regarding the discipline-specific needs of SWDs and proposed accommodations for specific scenarios and cases.

Evaluation of Observed Outcomes

The Inclusive Teaching Strategies Inventory (Lombardi, Murray, & Gerdes, 2011) was used to evaluate the immediate effectiveness of the faculty training by measuring changes in participating faculty members' perceptions of, attitudes toward, and knowledge about accommodations and inclusive instruction. Based on a 6-point scale (1 = strongly disagree, 6 = strongly agree), results from pre- and post-training questionnaires indicated significant improvement in the faculty members' willingness to accommodate SWDs, provide accessible materials, and cultivate inclusive classroom environments, as well as in their understanding of disability law and concepts and of the accessibility of campus resources. Table 4 presents a summary of the group-based data. No significant differences were found between gender groups and years of teaching experiences (fewer or more than ten years).

In addition, pre- and post-training interviews were conducted with participants to understand their needs and concerns, as well as to allow them to contribute ideas and provide feedback and reflections on the training. In pre-training interviews, participants identified four areas of need: (1) knowledge about various types of disabilities, (2) specific strategies for accommodating SWDs and applying inclusive instructional practices, (3) access to resources, and (4) availability of support services. Complementing the results of the Inclusive Teaching Strategies Inventory, post-training interviews indicated that the program adequately addressed those areas, and participants reported achieving the most growth in (1) their knowledge of disability-related legislation and legal issues, (2) their knowledge of characteristics of students with various types of disability and reasonable accommodations, (3) their ability to use technology to accommodate SWDs, (4) their awareness of specific strategies and instructional methods, and (5) their understanding of the perspectives of SWDs.

Thematic analyses revealed that the perceptions and attitudes of participating faculty members improved with respect to their (1) flexibility and open-mindedness toward accommodating SWDs, (2)

belief that SWDs have the potential to achieve success in postsecondary education; (3) understanding of responsibilities of schools, the DSS, and faculty members and the shift from reactive to proactive approaches; and (4) understanding that inclusive instruction can benefit all students in the classroom.

Implications and Portability

This faculty training model highlighted the significance of faculty initiation and active involvement, as well as partnerships and collaboration among external experts, faculty members, service providers, and SWDs. The leadership and engagement of faculty leaders and directors of the CTL and the DSS facilitated the integration and implementation of effective strategies within the university and the promotion of positive attitudes toward SWDs as valued learners. The various formats for delivering training modules aligned with the principles of universal design by accommodating the typically hectic and diverse schedules of faculty members and keeping them engaged in live presentations, comprehensive workshops, panel discussions, online courses via the LMS, and the use of Internet-based resources. The integration of the LMS allowed participants to experience the online learning environment firsthand through a module that taught about and modeled inclusive design of online learning.

In final projects, participants disseminated the results of training in conversations with their colleagues. They also facilitated discussions about academic standards, the assessment of learning outcomes, potential or anticipated challenges for students with various disabilities to achieve those outcomes, and examples of accommodations for scenarios unique to their disciplines. Most importantly, the faculty members have continued to serve as liaisons and mentors of new faculty members, graduate assistants, and students interested in serving as peer mentors for SWDs.

By following the distributed learning format over a one-year period, the program nurtured a learning community of enthusiastic faculty members committed to meeting the diverse needs of SWDs, and the CTL helped to establish that community upon the completion of the program. In the community, faculty members of various departments have continued to collaborate, reflect on teaching, provide critical feedback on the implementation and practices of inclusive instruction in courses, and support the development and integration of innovative strategies for improving students' success.

The most compelling part of the program, as reported by most participants, was their development of an understanding of the perspectives of SWDs, which made participants aware that SWDs can achieve success and aware of the ways in which they approach instruction and plan for classes. During the student panel, faculty members received direct insights into the characteristics of diverse learners and effective instructional and accommodation strategies, which generated dialogues among students, faculty members, and service providers.

This faculty development program is sustainable and ready for future replication; all training modules have been recorded, and the videos and resources, many available and regularly updated and enhanced by the DO-IT Center, are available from the websites of the CTL (LibGuide) and the DSS (Faculty Resources). The CTL has also replicated an online-accessible learning course for Teach 101, which targets instructors new to teaching. The program can serve as a template for continuous faculty development in providing inclusive, effective learning environments for SWDs.

Challenges

The primary challenge of implementing the training program was maintaining the engagement of faculty members at satellite campuses throughout all five modules. Factors that contributed to attrition included scheduling conflicts and time constraints due to conflicting teaching schedules and work demands, as well as a lack of familiarity with the LMS. Although a technician at the CTL supported training during the program, technical difficulties occurred; the synchronous WebEx delivery did not effectively engage off-campus participants, and the quality of the first two WebEx recordings was unsatisfactory. Although incorporating technology for online access provided an alternative means of participation, faculty members reported preferring face-to-face encounters due to their learning preferences and lack of computer literacy. Ways to strengthen the effectiveness of online delivery and increase the comfort level of faculty members with technology should be addressed in future offerings of the program.

Consistent with the findings of other research (Dallas, Upton, & Sprong, 2014; Levey, 2014; Lombardi et al., 2011), results from the Inclusive Teaching Strategies Inventory indicated that the reluctance of participants to provide accommodations that would require significant modifications to classroom practices did not change. Possible factors of such resistance include the misconceptions that such modifications give SWDs unfair advantages and diminish academic standards, feelings of unpreparedness to provide major accommodations, time constraints,

increased workload without compensation, and lack of support from the university administration. Future training programs should therefore address the topic of resistance among faculty members.

Recommendations for Future Research

Future scholarship can further support the effectiveness of the faculty development program by focusing on the sustainable outcomes of SWDs. A particularly important question to answer is whether training faculty members affords SWDs better support in their learning. In response to that question, (1) focus group interviews, case studies, or academic record analyses for SWDs who receive instruction from program-trained faculty members could be collected and analyzed; (2) course evaluations with feedback related to instructional design could be solicited and reviewed; (3) program-specific policies detailing actions that improve the retention and success of SWDs could be explored; and (4) online surveys of students with and without disabilities who receive instruction from participating and nonparticipating faculty members could be undertaken.

References

Barnard–Brak, L., Sulak, T., Tate, A., & Lechtenberger, D. (2010). Measuring college students' attitudes toward requesting accommodations: A national multi-institutional study. *Assessment for Effective Intervention, 35*, 141–147.

Burgstahler, S. (2007). Lessons learned in the faculty room. *Journal on Excellence in College Teaching, 18*, 103–128.

Cook, B. G., Rumrill, P. D., Camarata, J., Mitchell, P. R., Newman, S., Sebaly, K. P.,…Hennessey, M. L. (2006). The impact of a professional development institute on faculty members' interactions with college students with learning disabilities. *Journal of Postsecondary Education and Disability, 14*, 67–76.

Dallas, B. K., Upton, T. D., & Sprong, M. E. (2014). Post-secondary faculty attitudes toward inclusive teaching strategies. *Journal of Rehabilitation, 80*, 12–20.

Getzel, E. E., Briel, L. W., & McManus, S. (2003). Strategies for implementing professional development activities on college campuses: Findings from the OPE founded project sites (1999–2002). *Journal of Postsecondary Education and Disability, 17*, 5978.

Jensen, R. J., Petri, A. N., Day, A. D., Truman, K. Z., & Duffy, K. (2011). Perceptions of self-efficacy among STEM students with disabilities. *Journal of Postsecondary Education and Disability, 24*, 269–283.

Levey, J. T. (2014). Attitudes of nursing faculty towards nursing students with disabilities: An integrative review. *Journal of Postsecondary Education and Disability, 27*, 321–332.

Lombardi, A. R., Murray, C., & Gerdes, H. (2011). College faculty and inclusive instruction: Self-reported attitudes and actions pertaining to universal design. *Journal of Diversity in Higher Education, 4*, 250–261.

Marshak, L., Wieren, T. V., Ferrell, D. R., Swiss, L., & Dugan, C. (2010). Exploring barriers to college student use of disability services and accommodations. *Journal of Postsecondary Education and Disability, 22*, 151–165.

Murray, C., Lombardi, A., Seeley, J., & Gerdes, H. (2014). Effects of an intensive disability focused training experience on university faculty self-efficacy. *Journal of Postsecondary Education and Disability, 27,* 179–193.

Murray, C., Wren, C. T., Stevens, E., & Keys, C. (2009). Promoting university faculty and staff awareness of students with learning disabilities: An overview of the Productive Learning u Strategies (PLuS) Project. *Journal of Postsecondary Education and Disability, 22*, 117–129.

Newman, L., Wagner, M., Knokey, A.-M., Marder, C., Nagle, K., Shaver, D.,…Schwarting, M. (2011). *The post-high school outcomes of young adults with disabilities up to 8 years after high school. A report from the National Longitudinal Transition Study-2* (NLTS2) (NCSER 2011-3005). Menlo Park, CA: SRI International.

Park, H. J., Roberts, K. D., & Stodden, R. (2012). Faculty perspectives on professional development to improve efficacy when teaching students with disabilities. *Journal of Postsecondary Education and Disability, 25*, 377–383.

Reder, M., Mooney, K. M., Holmgren, R., & Kuerbis, P. (2009). Starting and sustaining successful faculty development programs at small colleges. In L. Nilson & J. Miller (Eds.), *To improve the academy: Vol. 27. Resources for faculty, instructional, and organizational development* (pp. 267–286). San Francisco, CA: Jossey–Bass.

Rodesiler, C., & McGuire, J. (2015). Ideas in practice: Professional development to promote universal design for instruction. *Journal of Developmental Education, 38*, 24–31.

Rohland, P., Erickson, B., Mathews, D., Roush, S. E., Quinlan, K., Smith, A. D. (2003). Changing the Culture (CTC): A collaborative training model to create systemic change. *Journal of Postsecondary Education and Disability, 17*, 49–58.

Ryan C. L., & Bauman, K. (2016). *Educational attainment in the United States: 2015*. Washington, DC: Census Bureau.

Snyder, T. D., de Brey, C., & Dillow, S. A. (2016). *Digest of Education Statistics 2015 (NCES 2016-014)*. Washington, DC: National Center for Education Statistics, U.S. Department of Education.

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Table 1

Demographic Characteristics of Participants

ID	Gender	Academic Discipline	Teaching Experience (in years)	Previous Training
1	W	Accounting	15	No
2	M	Communication	28	No
3	W	Computer science	15	No
4	M	Computer science	7	No
5	W	Dentistry	9	No
6	W	Dentistry	3	No
7	W	Economics	10	Yes
8	W	Education	36	No
9	W	Education	9	Yes
10	W	Education	20	Yes
11	M	Engineering	3	No
12	W	English	27	No
13	W	General education	9	No
14	W	General education	11	No
15	M	Heath science	22	No
16	W	Modern language & literature	20	No
17	W	Law	5	No
18	W	Law	5	No
19	W	Math	20	No
20	W	Music history	10	No
21	M	Music performance	19	No
22	W	Pharmacy practice	8	No
23	M	Political science	15	No
24	M	Sport sciences	9	No
25	W	Sport sciences	7	No

Table 2

Outline of the Faculty Development Training Program

Module 1. UDI : The DO-IT Model: A 2-day workshop led by an external expert

- An overview of UDI and a review of the evolution of responses to disability
- Differences in legislation and support for K–12 and postsecondary students
- Accommodations and UDI-based approaches to making educational products and environments welcoming and accessible
- The universal design and legal challenges of physical spaces, technology, services, and onsite and online instruction
- Departmental and campus-wide resources available for use by faculty members

Module 2. Laws and Regulations and the Accessibility of Campus Resources: A 2-hour workshop led by the director of the Office of Disability Support Services (DSS)

- Implications of laws and regulations
- The roles and rights of faculty members
- The rights and responsibilities of students
- The role of the DSS
- Accommodation processes
- What constitutes reasonable accommodations

Module 3. Characteristics of Diverse Learners and Accommodation Strategies: Student panel

- Challenges and successes during experiences with accommodation and accessibility in higher education
- Effective strategies to overcome barriers
- Suggestions for faculty members to create inclusive classroom environments

Module 4. Accessible Online Learning: A month-long online course administered via the learning management system delivered by an external expert

- Diversity, accommodations, universal design and technology, civil rights, legislation, and standards
- The accessible and usable design of online content
- Resources available to faculty members

Module 5. Celebrations, Reflections, and Moving Forward: A 2-hour focus-group discussion conducted by a faculty leader

- Information learned from the program
- How participants' perceptions and attitudes had changed as a result of participating in the program
- Specific actions that participants could take to apply what they had learned
- Examples of discipline-specific academic accommodations
- Feedback and recommendations for future training programs

Note. UDI = Universal design for instruction; DO-IT = Disabilities, Opportunities, Internetworking, and Technology Center at the University of Washington

Table 3

Factors of Academic Success: Insights from the Student Panel

Theme	Description
Faculty members' attitude	• Confidence in the abilities of SWDs to succeed • Awareness of and attentiveness to the different needs of SWDs • Willingness to reach out and listen • Flexibility • Supportiveness
Course policies and guidelines	• Consistency and structure in classes regarding due dates for assignments and tests • Clearly stated expectations • Provision of examples of grading criteria and rubrics for all assignments
Group projects	• Provision of guidelines that define the roles of group members • Options to complete projects individually
Presentation of course content	• Highlighting of important content in class (e.g., via fill-in-the-blank PowerPoint slides or summaries at the end of each section)
Technology	• The effective use of technology (e.g., the Learning Management System) to provide course materials, issue reminders, and post due dates of assignments and test dates on the course calendar

Note. SWDs = students with disabilities.

Table 4

Results of Pre- and Post-Training Questionnaires

Items	Pre-Training *M*	Post-Training M	*t*
Willingness to accommodate students with disabilities	4.78	5.14	-1.82*
Willingness to provide inclusive instruction			
Accessible course materials	4.54	5.18	-1.88*
Course modifications	2.85	2.77	0.42
Inclusive lecture strategies	5.13	5.17	-4.26
Inclusive classroom environments	4.86	5.21	-2.0*
Inclusive assessments	4.11	4.38	-0.94
Confidence with disability laws and concepts	3.50	4.65	-3.47**
Confidence with the accessibility of campus resources	4.68	5.32	-4.082***

JPED Author Guidelines

Manuscripts must be submitted electronically as attachments via email to jped@ahead.org.

Content

Manuscripts should demonstrate scholarly excellence in at least one of the following categories:

- Research: Reports original quantitative, qualitative, or mixed-method research.
- Integration: Integrates research of others in a meaningful way; compares or contrasts theories; critiques results; and/or provides context for future exploration.
- Innovation: Proposes innovation of theory, approach, or process of service delivery based on reviews of the literature and research.
- Policy Analysis: Provides analysis, critique and implications of public policy, statutes, regulation, and litigation.

Format

All manuscripts must be prepared according to APA format as described in the current edition of *The Publication Manual, American Psychological Association.* For responses to frequently asked questions about APA style, consult the APA web site at http://apastyle.org/faqs.html

- All components of the manuscript (i.e., cover page, abstract, body, and appendices) should be submitted as ONE complete Word document (.doc or.docx).
- Provide a separate cover letter asking that the manuscript be reviewed for publication consideration and stating that it has not been published or is being reviewed for publication elsewhere.
- Manuscripts should be double-spaced and range in length between 25 and 35 pages including all figures, tables, and references. Exceptions may be made depending upon topic and content but, generally, a manuscript's total length should not exceed 35 pages.
- Write sentences using active voice.
- Authors should use terminology that emphasizes the individual first and the disability second (see pages 71 - 76 of APA Manual). Authors should also avoid the use of sexist language and the generic masculine pronoun.
- Manuscripts should have a title page that provides the names and affiliations of all authors and the address of the principal author. Please include this in the ONE Word document (manuscript) that is submitted.
- Include an abstract that does not exceed 250 words. Abstracts must be double-spaced and located on page 2 (following the title page). Include three to five keywords below the abstract.
- Tables and figures must conform to APA standards and must be in black and white only. All tables and figures should be vertical and fit on the page; no landscape format. If Tables and/or Figures are submitted in image format (JPEG, PDF, etc.), an editable format must also be submitted along with a text description of the information depicted in the Table/Figure. This will be provided as alt format in the electronic version of JPED, making Tables/Figures accessible for screen readers.

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- Attach to the email:
  - Your complete manuscript, prepared as directed above.
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You will receive an email reply from Richard Allegra (Managing Editor of JPED) to confirm receipt of your submission within 5-7 business days.

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For manuscripts that are accepted for publication, Valerie Spears (JPED Editorial Assistant) will contact the lead author to request:

- A 40-50 word bibliographic description for each author, and a signed copyright transfer form (Valerie will send templates for both).
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Practice Brief Manuscripts

JPED invites practitioners and/or researchers to submit Practice Briefs that can inform readers of innovative practices that could, in time, become the basis of an empirical study. Practice Briefs will describe new or expanded programs, services, or practices that support postsecondary students with disabilities. Practice Briefs are not research articles. Manuscripts that involve data analysis beyond the reporting of basic demographic data or evaluative feedback should be submitted as research articles. The overall length of a Practice Brief will be limited to 12 double-spaced pages, which includes separate title page, abstract, and references pages. Tables and/or figures may be submitted, too, above and beyond the 12 page limit.

Please submit all components of a Practice Brief (i.e., cover page, abstract, body, appendices) as a single Word document. These manuscripts should use the following headers/sections:

- **Title Page:** Title not to exceed 12 words. Identify each author and his/her campus or agency affiliation. State in your email cover note that the work has not been published elsewhere and that it is not currently under review by another publication.
- **Abstract:** The abstract needs to answer this question: "What is this paper about and why is it important?" The abstract should not exceed 150 words.
- **Summary of Relevant Literature:** Provide a succinct summary of the most relevant literature that provides a clear context for what is already known about your practice/program. If possible, describe similar practices on other campuses. Priority should be given to current literature published within the past 10 years unless an older, seminal source is still the best treatment of a particular topic/finding.
- **Depiction of the Problem:** In addition to a clear statement of the problem being addressed, consider the following questions when stating the purpose of the article: What outcome, trend, or problem might improve if your practice/program works? What gaps or problems or issues might persist or arise if this practice/program did not exist?
- **Participant Demographics and Institutional Partners/Resources:** Maintain the anonymity of the students, colleagues, and campus(es) discussed in the article but provide a clear demographic description of participants (e.g., number of students, disability type, gender, race and/or ethnicity whenever possible, age range if relevant) and the types of offices or agencies that were collaborative partners (if relevant).
- **Description of Practice:** Briefly and clearly describe your innovative practice/program and how it has been implemented to date. Tables and figures are encouraged to provide specific details you are comfortable sharing. They condense information and enhance replication of your practice/program on other campuses.
- **Evaluation of observed outcomes:** Whenever possible, summarize formative or summative data you have collected to evaluate the efficacy of your practice/program. This can be anecdotal, qualitative, and/or quantitative data. Support any claims or conclusions you state (e.g., "Our program greatly enhanced students' ability to self-advocate during their transition to college") with objective facts and/or behavioral observations to support these claims.
- **Implications and Portability:** Discuss what you have learned thus far and how you could further develop this practice/program in the future. Be honest about any challenges you may have encountered. This transparency enhances the rigor of your reporting. What would you do differently next time to achieve stronger outcomes? Provide a clear description of how and why disability service providers on other campuses should consider adapting your practice/program. Finally, how could your practice be studied by researchers? Identify possible research questions, hypotheses, or potential outcomes that could be studied if you and/or colleagues could expand the practice/program into a research investigation.
- **References:** Use the current APA guidelines to format and proofread your paper prior to submitting it. This includes the proper use of spelling, punctuation and grammar, appropriate use of headers, correct formatting in listing references, and formatting any tables or figures appropriately.

Upon Acceptance for Publication

For Practice Briefs that are accepted for publication, Valerie Spears (JPED Editorial Assistant) will contact the lead author to request:

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JPED publishes one special issue per year (normally Issue 3, published in the fall). Special issues feature a series of articles on a particular topic. JPED welcomes ideas for special topical issues related to the field of postsecondary education and disability. The issue can be formatted as a collection of articles related to a particular topic or as a central position paper followed by a series of commentaries (a modified point/counter point). Authors who wish to prepare a special issue should first contact the JPED Executive Editor at jped@ahead.org.

The authors should describe the topic and proposed authors. If the series appears to be valuable to the readership of the JPED, the Executive Editor will share an Agreement Form to be completed and returned by the Guest Editor. The Executive Editor may provide suggestions for modification to content or format. The Guest Editor will inform authors of due dates and coordinate all communications with the contributing authors. Each special edition manuscript will be reviewed by members of the JPED editorial board members. The Guest Editor and the Executive Editor will be responsible for final editing decisions about accepted manuscripts.

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Content and Format

In general, the book review should present:

- An overview of the book, providing the book's stated purpose, the author's viewpoint, and a general summary of the content.
- An evaluation of the book, elaborating on the author's objectives and how well those objectives were achieved, the strengths and weaknesses of the book along with the criteria you used for making that assessment, and the organization and presentation of the book. Recommendations should specify to whom you would recommend the book, why, and how you would suggest the book be used, and address its potential contribution to our field.
- Citations within the book review should follow the current edition of the American Psychological Association (APA) style manual.

At the end of the review, please list your name and institutional affiliation.

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