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Theoretical Foundations: From the Editor

In his paper on theoretical constructs and applications, Daniel Udo-Akang (2012) discussed the importance of theory in research and how that theory should serve as the foundation for practice. It is important that disability services programs and services rest on a firm foundation that provides a theoretical underpinning for all that is done.

What are the philosophical bases upon which disability services rest? When is it appropriate to employ a social model, or universal design, as the foundation for our work? My academic discipline is the study of Higher Education, and in my work with students with disabilities I have often employed Vincent Tinto's (1993) Theory of Individual Departure from Institutions of Higher Education. He theorized the significance of academic and social integration in order for students to be successful in college. The philosophical underpinning for Tinto's work was Van Gennep's (1909, 1960) studies on assimilation; often one foundation builds upon another.

There are multiple theoretical foundations for disability services work. In the lead article of this fourth issue of volume 29 of the *Journal of Postsecondary Education and Disability*, **Katherine Aquino from Seaton Hall University** makes the case for a "new" theoretical model for disability services, the Disability-Diversity (Dis)Connect Model. It addresses disability as a multifaceted aspect of student diversity. This article is followed by a discussion of the perceptions of community college faculty and students pertaining to universal design. **Michael Gawronski from Orange County Community College, Linda Kuk from Colorado State University, and Allison Lombardi from the University of Connecticut** examine community college faculty members' and students' attitudes toward inclusive teaching practices.

Rinat Michael from Tel Aviv University discusses the perceived success of tutoring college students with learning disabilities. The author examines the contribution of tutoring- and tutee-related variables to the perceived success of a tutoring project. The authors of the fourth article in this issue examine the inclusive instructional and accommodative strategies instructors use to assist students with disabilities in their classes. **Elizabeth West, Daniel Novak, and Carlyn Mueller, all from the University of Washington**, found differences between instructors' attitudes and actions in two areas: scholastic accommodations to assignment due dates and individual reading loads, and physical accommodations, such as examining the classroom in advance to anticipate physical barriers for students with disabilities.

Elizabeth da Silva Cardoso (Hunter College, City University of New York), Brian Phillips, Kerry Thompson, Derek Ruiz, Timothy Tansey, and Fong Chan (all from the University of Wisconsin-Madison) address the experiences of minority college students with disabilities in science, engineering, technology, and mathematics (STEM). They sought to understand the experiences of these students in their pursuit of a degree and career in STEM and their experiences with a program designed to support the accomplishment of this goal. In the sixth article in the issue, the authors introduce the life experiences of college students with histories of mild traumatic brain injury (MTBI). **Carrie Childers, from Marshall University, and Karen Hux, from the University of Nebraska-Lincoln**, discuss these "invisible injuries" with college students with MTBI, their college experiences, factors mediating those experiences, and perceived similarities and differences between themselves and other college students with and without disabilities. The issue concludes with a discussion of Ehlers-Danlos Syndrome (EDS), a complex, often invisible, connective tissue disorder that has arguably profound psychosocial and academic impact on post-secondary students. **Catherine Giroux and Julie Corkett, from Nipissing University, and Lorraine Carter from McMaster University**, review the related literature to reveal factors that influence the academic experiences of post-secondary students with EDS.

The editorial team and review boards hope that the information shared in this issue of the *Journal of Postsecondary Education and Disability* encourages you to think about the theoretical underpinnings of your work, and how the outcomes of our daily activities should rest on reliable foundations.

Roger D. Wessel, Ph.D.
Executive Editor

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A New Theoretical Approach to Postsecondary Student Disability: Disability-Diversity (Dis)Connect Model

Katherine C. Aquino¹

Abstract

Disability is often viewed as an obstacle to postsecondary inclusion, but not a characteristic of student diversity. Additionally, current theoretical frameworks isolate disability from other student diversity characteristics. In response, a new conceptual framework, the Disability-Diversity (Dis)Connect Model (DDDM), was created to address disability as a multifaceted aspect of student diversity.

Keywords: Student diversity, disability in higher education, conceptual framework

According to the United States Department of Education National Center for Education Statistics (2013), approximately 11% of all students enrolled in postsecondary institutions have a self-identified disability. Although about one in ten college students have a documented disability affecting cognitive, physical, or psychological functioning, disability remains as a neglected component of the diversity spectrum (Davis, 2011; Olkin, 2002). As opposed to other areas of diversity, disability continues to be a haphazard, quasi-integrated characteristic of diversity within the higher education setting, often not accepted by other historically underrepresented minority groups (Gilson, DePoy, & MacDuffie, 2002). May and LaMont (2014) noted that, when establishing a framework to include learning disabilities within an understanding of diversity and multiculturalism, faculty perceived learning disabilities as a deficit and a negative characteristic of the student, rather than an accepted aspect of a student's overall identity. However, May (2012) found that students who enrolled in inclusive courses with students with an intellectual disability reported greater levels of acceptance towards various aspects of diversity, concluding that inclusion of student disability within the postsecondary setting "may foster positive attitudes about acceptance and diversity among students without such a disability" (p. 240).

Research has shown that stigmatization and discrimination can occur within the postsecondary setting for individuals with self-identifying disabilities (Holloway, 2001; Knis-Matthew, Bokara,

DeMeo, Lepore, & Mavus, 2007; Lechtenberger, Barnard-Brak, Sokolosky, & McCrary, 2012; Olney & Brockelman, 2003; Olney & Kim, 2001; Walker, 2008) and/or from historically underrepresented minority groups (Cabrera, 2012; Clayton, 2012; Hurtado, Alvarado, & Guillermo-Wann, 2015; Swift, 2013). However, disability is still frequently viewed as an identity of lesser value within a postsecondary diversity climate (Darling, 2013; Davis, 2011; Devlieger, Albrecht, & Hertz, 2007; Linton, 1998), with postsecondary experiences potentially varying for individuals depending of an individual's self-identified disability (e.g., apparent versus non-apparent). For instance, Haeger (2011) found that "the intersection of socioeconomic status and disability create an extreme form of stratification in college attendance for students with learning disabilities" (p. 8).

Enrollment and participation in higher education continues to increase for individuals with disabilities (Lovett & Lewandowski, 2006; Raue and Lewis, 2011; Wagner, Newman, Cameto, & Levine, 2005). Despite the growing presence in higher education, students with disabilities face additional challenges that other college students without disabilities may not encounter (Brockelman, Chadsey, & Loeb, 2006; Hadley, 2011; Hergenrather & Rhodes, 2007; May & Stone, 2010; Shackelford, 2009). The presence of a disability is traditionally viewed as a limitation for the individual with a self-identified disability (Barnes, 2006; Dudley-Marling, 2004; Quick, Lehmann &

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Deniston, 2003; Wax, 2014), and is often used as ground for discrimination and/or stigmatization (Green, 2007; Ryan, 2007; Trammell, 2009; Walker, 2008). The medical model of disability, which describes disability as an impairment and deficiency that must be fixed, has negatively impacted the perception of individuals with disabilities and has shaped public perception about disability (Artiles, 2013; Cole, 2009; Ong-Dean, 2005; Shaw, Chan, & McMahon, 2012; Watermeyer, 2013).

Establishing disability-diversity inclusion at the institutional level is key to fostering overall campus climate of acceptance and system-wide student inclusion. As noted in Wilson, Getzel, and Brown (2000), students with disabilities often do not feel welcome and supported in the postsecondary institutional climate. If students cannot fully feel accepted by the higher education community, and/or are not satisfied with their postsecondary experience, students with disabilities may not be able to experience full inclusion in this setting. Additionally, and similar to how other forms of diversity have been integrated and accepted within the postsecondary educational environment, student disability needs to be re-conceptualized as a form of student diversity rather than as impairment and a medical limitation.

A disconnect between disability and diversity is documented throughout the literature (Darling, 2013; Davis, 2011; Devlieger et al., 2007; King, 2009; Schlemper & Monk, 2011) and research has suggested that better inclusion and equity is needed for increased integration and success for students with disabilities in higher education (Garrison-Wade, 2012; Getzel, 2008; Grigal, Hart, & Weir, 2012; Huger, 2011; Kurth & Mellard, 2006). As noted by Berry (1997) when discussing the formation of acculturation, “integration can only be ‘freely’ chosen and successfully pursued by non-dominant groups when the dominant society is open and inclusive in its orientation towards cultural diversity” (p. 10). Similar to acculturation, students with disabilities must have the opportunity to incorporate the concept of disability within the diversity landscape, establishing the opportunity to bridge disability into diversity (Olkin, 2016). Although conceptualizations of complex, multifaceted influences on identity can be found in other fields (Hays, 2008; Sue, 2010), the lack of frameworks within postsecondary literature that approach disability as a component of diversity support the need to create a conceptual framework that redefines disability within the higher education environment.

Students’ Self-Perception of Disability Within the Postsecondary Setting

Possessing a disability does not assume all students will share the same postsecondary encounter. Whether it is the student’s specific type of disability, institutional environment, socio-academic inclusion, or overall self-identity, students with disabilities undergo various transitions within the higher education setting, influencing their academic achievement and overall experience. Limited social opportunities and underutilization of accommodations and support services contribute to a large percentage of students with disabilities not completing degree requirements and leaving college early (Quick et al., 2003).

To better understand students with disabilities and the potential stigma and exclusion they may face, it is vital to learn first-hand accounts of what they may endure. Troiano (2003) interviewed college-level students with learning disabilities regarding their postsecondary experiences and understanding of their diagnosis and found that the students interviewed had, over a period of time, established reactions to and opinions of their learning disability developed, in part, by their college experiences and noted that “students discovered that the more they understood about their learning disability and their individual needs, the easier it would be to communicate those needs to others” (Troiano, 2003, p. 408). One of the responses to potential stigmatization experienced directly related to the disability, highlighted how an individual may construct and identify various levels of one’s identity, with disability serving as a negative contribution:

Perhaps the most moving account of feeling stigmatized came from Shawna. She described her father’s initial reaction to her learning disability diagnosis: My father, he told me this and I believe it, that you should try not to let people put that label on you, that label of a learning disability. He said you already have a label as a woman, and then as a Black woman. Don’t let people put one more label on you that is going to hold you from succeeding and that is going to make people expect less from you. (Troiano, 2003, p. 413)

This case highlights that individuals with a disability, and those around them, can understand various components of their overall identity (e.g., gender, ethnicity, etc.), yet still conceptualize disability as a ‘lesser than’ aspect of who they are.

Promoting Impairment Instead of Ability: Medical Model of Disability

As currently defined by the World Health Organization's International Classification of Functioning, Disability, and Health (ICF), disability is understood as a term for "impairments, activity limitations and participation restrictions. Disability is the interaction between individuals with a health condition . . . and personal and environmental factors (e.g. negative attitudes, inaccessible transportation and public buildings, and limited social supports)" (World Health Organization, 2013, para. 1). Prior to the redefined interpretation of disability at the beginning of the 21st century, the World Health Organization (WHO) promoted their initial definition of disability. Created in 1980, the definition was medically-focused and viewed disability apart from a human experience. *In the International Classification of Impairments, Disabilities, and Handicaps*, the WHO (1980) established three influential interpretations of the concept of disability including, (1) impairment - "any loss or abnormality of psychological, physiological, or anatomical structure of function" (p. 27), (2) disability- "any restriction or lack (resulting from an impairment) of ability to perform an activity in the manner or within the range considered normal for a human being" (p. 28), and (3) handicap - "a disadvantage for a given individual, resulting from an impairment or a disability, that limits or prevents the fulfillment of a role that is normal (depending on age, sex, and social and cultural factors) for that individual" (p. 29).

For the past two decades, this widely accepted understanding of disability fails to distinguish between various types of disability, identify additional components to assist with accommodation supports, and frame disability as a mainstreamed, universal experience (Accessing Safety, 2010). The 1980 WHO definition served as the structure for the medical model of disability that was used in subsequent disability policy and initiative governance. The medical model of disability conceptualizes disability as a pathology, rooting disability within stigmatization (Cole, 2009; Shaw et al., 2012). According to Artiles (2013), "the medical model's defining characteristic is the assumption that disability is located in biological impairments . . . implicit in the 'damaged body' trope of the medical model are uninterrogated assumptions about the normal body" (p. 334). The model is driven by addressing an individual's disability as a mode for eventual change and improvement (Watermeyer, 2013), viewing

disability not as a component of one's overall identity but a problem to be remediated through supportive services. While the model provides a foundation for policies and overarching legalities, the medical model of disability establishes a distinct separation between disability and all other demographic factors (e.g., ethnicity, social class, gender, etc.), thus increasing the potential for disintegration between disability and other identity memberships (Artiles, 2013). This criticism serves as the impetus for redefining how disability is interpreted in the academic and professional sectors, and account for the current, stigmatized identity of disability (Ong-Dean, 2005).

Connecting Disability to Diversity: Theoretical Frameworks

A response to the medical model of disability and its focus on disability as a debilitating limitation in an individual's life, the social model of disability defines disability as a component of social construction, placing the idea of disability within society, not within the individual (Artiles, 2013). Viewing disability as a potentially excluded element of the social environment (i.e., social perception disabling the individual rather than the actual diagnosis), the social model of disability seeks to eliminate the current segregation between individuals with and without disabilities (Shakespeare, 2006). This social constructionist approach highlights how the current undermining of one's disability status stems from the medical management of disability, creating the deep-seated stigmatization of disability, the medical community assuming the need to "fix" or "cure" disability, and the inaccurate categorization and labeling of disability (Barnes, 1991; Oliver, 1990; Oliver & Barnes, 1993). This understanding of how disability is perceived (not as a limitation but a socially-produced mindset) increases the accountability of the environment around the individual with a disability and attempts to decrease the stigmatization of disability.

Similar to the social model of disability, the minority group model, a framework structured on the "sociopolitical definition of disability" (Hahn, 1996, p. 41), explains the current construct of disability as a stigmatizing and oppressive discriminatory characteristic. This stigmatization acts as the most significant, and impinging, component of an individual's disability (Hahn, 1985). Hahn (1986) structured the paradigm on three overarching postulates including that

individuals with disabilities experience the majority of disability-related obstacles through the negative perception of disability and how their functioning (or lack thereof) is viewed (even if their overall functionality is incorrectly assumed), that societal perception of disability is rooted in how policy conceptualizes and organizes disability within society, and that there is a cyclical effect between the social perception of disability and the creation and implementation of disability policy. Although public perception is influenced by enacted policies, societal views of disability prejudices how policy is structured and subsequently instituted (Hahn, 1986).

Acknowledging that the current lack of equity for individuals with disabilities promotes the idea of impairment instead of equality, this model calls for the need to improve rights for individuals with disabilities (Hahn, 1983; Hahn, 1987; Shapiro, 1993). Hahn (1996) noted that disability is stereotypically viewed as a limiting, sympathy-induced personal hardship, causing pity instead of empowerment (the latter often created through other minority-focused movements). However, the model lays a foundation for individuals with disabilities by framing disability as a unifying, minority-group community-building characteristic, and acknowledging disability as an oppressed minority group identity (Landsman, 2005). Although this framework highlights a vital component of disability (identity oppression creating a minority status), it does not consider how disability as a minority status is included within an academic environment.

Lastly, and of particular importance, the theory of intersectionality establishes the vital junctures needed in bridging disability within the diversity milieu, promoting the identification of multiple diversity memberships. Developed by Kimberle Crenshaw (1991), *intersectionality*, identifies the experiences of “subgroups without a larger identity category are marginalized, through understanding the cultural construction of identities within and across individuals, and uncovering how social, institutional, and political structures shape and reinforce identity formation, and influence identity salience across contexts” (Garcia & Ortiz, 2013, p. 37). The concept of intersectionality was originally created for, and applied to, critical scholarship focused on inequality and concerns related to gender and ethnicity. However, it has evolved into a more frequently used application, thoroughly exploring the function and dispersal of justice and equity for various groups and identities (Hancock, 2007). According to Cole (2009), intersectionality

makes meaning of the potential junctions and obstacles created by an individual’s membership and identification of multiple identities. Identity intersections may affect individuals uniquely, with the potential for increased discrimination due to the additional diversity identity components (memberships) they are identifying with (Purdie-Vaughns, & Eibach, 2008).

An individual may possess multiple identities (e.g., disability, specific racial/ethnic status, sexual orientation, etc.), allowing specific identities to be more salient than others (Erevelles & Minear, 2010). Moreover, Erevelles and Minear (2010) noted intersectionality can occur within three distinct framework categories: anticategorical (intersections are social constructs), intracategorical (intersections are due to layered stigmas), and constitutive (intersections are conditional and occur within specific contexts). Regardless of the specific lens of the intersectionality framework, the theoretical concept highlights the probability and frequency of establishing and identifying with multiple memberships.

Though it was not initially included, disability serves as a vital component of the intersectionality framework. Disability intersects with racial or ethnic background, gender, sexual orientation, and/or religious affiliation. However, disability has been considered to be a limiting, “lesser than” membership among other diversity characteristics (Hirschmann, 2013). Although numerous groups can experience similar marginalization, disability endures as one of the most significant and debilitating membership categories affected by discriminatory social perception (Stanley, Buenavista, Masequesmay, & Uba, 2013). As noted by Erevelles and Minear (2010), the “omission of disability . . . [in] intersectionality has disastrous and sometimes deadly consequences for disabled people of color caught at the violent interstices of multiple differences” (p. 128). Including disability is necessary to diminish the historical stigmatization faced by this population and assist in better integrating individuals with disabilities within the higher education environment.

Traditionally, diversity has been narrowly defined and has not fully applied to varying and multiple social identities (Artiles, 2003). Research focused on disability often focuses on outside support (e.g., role of family, community) and logistics (e.g., policy, service availability); however, there has been limited research investigating how multiple identities and institutional climate intersect with students’ disabilities and influence overall academic success (Garcia

& Ortiz, 2008). Additionally, other diversity memberships have diminished the connection and perceptual similarities between ethnicity, gender, and disability. As noted in Erevelles and Minear (2010), associating disability with ethnicity, specifically African Americanism, has been “detrimental” (p. 132) to individuals of color within the diversity landscape in the United States, thus promoting disability as a separate, medical abnormality. For other identity memberships, it has been perceived that associations with disability decrease the empowerment and increased equity fought for (Artiles, 2011). Exploring the impact of disability on Asian Americans through the use of the National Latino and Asian American Study dataset, Mereish (2012) found that Asian Americans with disabilities experience more discrimination, distress, and oppression than those not identifying with a disability. To note, of the 2,095 Asian Americans included within the sample, 15.8% identified as having a disability, which is reflective and proportionally appropriate to the 19% of U.S. civilian non-institutionalized population living with a disability (United States Census Bureau, 2010). Although the effect sizes of the author’s findings were small, this study highlights that despite the potential for stigmatization and oppression due to racial/ ethnic membership, the presence of a disability increases experienced stigmatization and discrimination.

The intersectionality framework provides an important and suitable foundation for exploring the connections and divergences occurring for individuals with disabilities and the complexities of possessing additional cultural-social identities (Mereish, 2012). When exploring the intersectionality of disability, age, gender, and ethnicity in harassment allegations, Shaw et al. (2012) found that possessing a behavioral disability and/or identifying with another minority status (e.g., female, racial minority background) increased individuals’ likelihood of experiencing disability harassment. Although Shaw et al.’s (2012) study explored disability harassment in the postsecondary employment setting, it can be inferred that presence of disability and impact of other identity memberships may yield similar experiences and potential harassment/ stigmatization occurrences within the higher education setting.

Conceptual Framework: Disability-Diversity (Dis)Connect Model

Although disability, specifically within the academic environment, has been explored, little research has documented the importance of its inclusion in diversity literature. The Disability-Diversity (Dis) Connect Model (DDDM), a new conceptual framework, approaches disability as a multifaceted aspect of campus diversity. It is hypothesized that the current institutional climate is limited in its knowledge and understanding of student disability within a higher education setting due to minimal exposure and awareness of disability. This environment then perpetuates the continued lack of awareness and misunderstanding of student disability. Drawing upon theoretical underpinnings rooted in the social model of disability (Oliver, 1996), minority group model (Hahn, 1986), and intersectionality (Crenshaw, 1989; Hirschmann, 2013), in the DDDM, it is postulated that the role of postsecondary student disability is structured through the student’s own acknowledgement of disability. This understanding of disability can then enable students with disabilities to recognize past stigmatization, develop resiliency, and move toward a greater understanding of postsecondary student diversity.

Model Postulates

The DDDM framework is predicated on seven tenets related both to the experiences of students with disabilities as well as postsecondary community members’ perception of disability within the higher education environment. Disability is often a minimal aspect of postsecondary diversity with limited opportunities to increase student empowerment and campus-based awareness (Davis, 2011). Disability must not only be viewed as a component of diversity but also be acknowledged as unique student characteristic. Students with disabilities “cross all racial, gender, educational, socioeconomic, and organizational lines” (Disabled World, 2014, para. 1) and serve as the largest multicultural minority (Anderson, 2006).

The DDDM framework is grounded on the following tenets:

1. Disability is influenced by social constructs (Oliver, 1996; Shakespeare, 2006) the medical definition of disability (Artiles, 2013; Cole, 2009; Shaw et al., 2012), as well as the legal definition of disability. Within the postsecondary environment, this can be instru-

mental in guiding students' accommodation plan process and structure their postsecondary experience. Possessing a disability within the postsecondary educational environment can be viewed as a multifaceted component of diversity with socially, medically, and legally structured features, allowing the opportunity for disability to be a part of the student's identity.

2. Self-identification and accommodation plan development may create stigma within an education environment, with students and faculty not fully aware of what a disability truly means (Hadley, 2009; May & Stone, 2010; Milsom & Hartley, 2005). When a student self-identifies and establishes an accommodation plan, it is a voluntary commitment a student participates in. Despite this voluntary commitment for accommodation support, members of the postsecondary community should not discriminate or judge as they may also participate in voluntary commitments within the higher education environment similar to disability service support (i.e., scheduling coursework to accommodate personal needs).
3. Disability within a postsecondary dynamic is often indicative of student stigmatization (Holloway, 2001; Olney & Brockelman, 2003; Olney & Kim, 2001). Students with disabilities may experience social exclusion from their peers and/or feel unacknowledged in campus activity programming and diversity-based coursework. Because of this unique experience, disability could be considered a postsecondary minority status (Hahn, 1985; Hahn, 1996), similar to minority categories including ethnicity, thus an essential component of diversity.
4. Students with disabilities can identify as a member of their postsecondary student diversity system because of their disability or a combination of their disability and another diversity categorization (Hirschmann, 2013). "Disability-diversity" is the understanding of disability as an equal, non-stigmatized characteristic of student diversity and is created through understanding one's own disability and how perception of disability within the socio-academic environment plays in overall identity formation. Impact of disability with-

in a student's "disability-diversity" identity can vary among individuals.

5. The intersection of identities (e.g., presence of disability, gender, racial background, sexual orientation, etc.) is interpreted and understood uniquely by each individual (Crenshaw, 1991; Hirschmann, 2013). Interpretation of various memberships and their impact on a student's life can evolve with new life experiences (e.g., beginning college).
6. The idea of disability within the postsecondary environment continues to evolve (Shallish, 2015). Minimal exposure within a campus setting and frequent exclusion from diversity-based activities forces students with disabilities to perceive their disability as an unaccepted component of higher education diversity. As disability becomes a consistent, ongoing aspect of student diversity, students will view disability not so much as a medical impairment but as a vital and accepted component of higher education diversity.
7. Disability is not static and includes physical, emotional, intellectual disabilities or a combination of multiple disability categorizations. There are many types of disabilities that should not be viewed as a singular entity (Centers for Disease Control and Prevention, 2014; Raue & Lewis, 2011; World Health Organization, 2011). To be truly accepted as a component of diversity, disability must be understood as a multifaceted, multifunctioning concept contributing to the individual's overall identity. For example, level of functioning, type of disability, and the disability visibility (e.g., wheelchair use, use of adaptive technology) all contributes to understanding diversity within student disability as well.

Defining the Disability-Diversity (Dis)Connect Model

Considered a groundbreaking higher education-based theoretical framework, Tinto's (1975) model of students' persistence investigated the importance and impact of students' social integration within the campus environment on their retention and commitment to graduate. However, as noted in Hurtado and Carter (1997), the framework did not address students' sense of belonging within the higher education environment for student groups who are considered racially or ethnically diverse. When using the term 'integration,' negative connotations may be associat-

ed with the understanding of this term under Tinto's original theoretical framework and that "integration can mean something completely different to student groups who have been historically marginalized in higher education" (Hurtado & Carter, 1997, p. 326).

Research notes that, although not included in literature exploring the marginalization of student of diverse racial and ethnic backgrounds, students with disabilities also endure stigmatization and marginalization within the educational setting (Herrick, 2011; McCune, 2001; Wilson et al., 2000). Students with disabilities may have similarly unique postsecondary integration experiences as students from diverse racial and ethnic backgrounds and, therefore, the use of 'integration' can be argued as a justified term for this model and can be considered what Hurtado and Carter (1997) termed "a subjective sense of integration" (p. 341). Therefore, the DDDM will use the terms "inclusion" and "integration" interchangeably, where both encapsulate students' sense of belonging, peer interactions, and acceptance in social and academic experiences in a higher education setting and is aware of the critique made of the original idea of student integration and will present evidence that students with disabilities are also within the marginalized interpretation of integration as well.

Miller, Parker, and Fillinson (2004) argued that a new, overarching label could assist in diminishing stigma associated with disability. However, current frameworks and social perception of disability make this a challenging task (Waterstone & Stein, 2008). As indicated in Figure 1, student disability is frequently influenced by the medical model of disability and the traditional understanding of student diversity, negatively impacting disabled students' opportunity to integrate without stigmatization from others (Artiles, 2011; Artiles, 2013; Davis, 2011; Linton, 1998). The DDDM framework serves as a foundation in restructuring the role of student disability within a postsecondary setting. Including disability into the postsecondary diversity is multifaceted and students, faculty, and staff must all contribute to realigning the disability-diversity disconnect. The amalgamation of social and medical theoretical concepts and the incorporation of resiliency and identity development allow for holistic and positive approach to student disability. The crux of the DDDM framework is rooted in the advocacy of equal acceptance and inclusion in a diverse college setting. Jones and McEwen (2000) noted the importance of an individual's understanding oneself as possessing multiple identities, transcending

identity development beyond a single component of "self." If individuals understand disability as an equal component of diversity, increased inclusion of students with disabilities within the postsecondary environment can occur.

Within the Disability-Diversity (Dis)Connect Model, two modes of disability – diversity emerge in college environments, presenting the ability, or inability, for students with disabilities to be included and confront similar issues as students identifying with other diversity memberships. Each disability – diversity experience relates to both the students' perception of the role their disability plays in their life and the postsecondary environment.

The two student disability transitional types within the Disability-Diversity (Dis)Connect Model include:

- *Disability-Diversity Disconnect:* The student with a disability does not have the desire to fully (or intentionally) participate within the postsecondary environment and does not integrate due to difficulty incorporating disability into postsecondary environment and possessing dissimilar experiences from students identifying with other diversity memberships. Students within this type have negative experiences integrating within the higher education environment. The student does not view the college environment accepting of disability, specifically as a component of student diversity. The disability-diversity disconnect remains.
- *Disability-Diversity Connect:* The student with a disability perceives his/her disability as one of the many components within his/her overall identity and role within a postsecondary setting. Additionally, disability within the postsecondary environment may be viewed as a component of postsecondary diversity. The student believes that disability is fully incorporated into student diversity and an equally important characteristic within the postsecondary diversity milieu. Feelings of disability–diversity inclusion occur through positive experiences of self-development, desire to participate within the postsecondary community, and achievement of socioacademic goals. The disability – diversity disconnect no longer remains.

As cited in Clark, Middleton, Nguyen, and Zwick (2014), institutional integration “refers to a student’s ability to adapt to and assimilate into educational environments (p. 31) and organized into two specific types – academic integration and social integration (Tinto, 1975; Pascarella & Terenzini, 1980; Astin, 1975). Although academic and social integration both occur within the same postsecondary environment, academic integration focuses on students’ academic performance, ability to endure educational demands, and achieve academic goals and social integration is students’ involvement with activities and developing social interactions and networks (Pascarella & Terenzini, 1980; Astin, 1975, 1993). Although they are unique entities, research indicates a potential positive relationship between the two forms of integration that may impact the successful completion of postsecondary requirements (Pan, Guo, Alikonis, & Bai., 2008; Tinto, 1975; Ullah & Wilson, 2007).

Illustrated in Figure 2, students with disabilities can perceive their postsecondary experiences, and the construct of disability, is either positive and included (“Disability-Diversity Connect”) or negative and disconnected (“Disability-Diversity Disconnect”). At the point of enrollment, each student possesses specific characteristics that may lead to his or her postsecondary experience, including demographic characteristics (e.g., ethnicity, gender, disability type, etc.). In addition to one’s demographic features, a student’s choice of higher education institution (e.g., public/private, two-year/four-year, level of selectivity, etc.) may affect his or her overall experience of higher education. The unique combination of demographic and institutional characteristics lead to the overall diversity of the student and the postsecondary environment. Moreover, these characteristics may lead to students’ future academic and social opportunities within the higher education environment. Increased access to academic and social experiences within the postsecondary setting may impact the perceived level of academic and social integration (postsecondary inclusion) for students with disabilities; however, and most importantly, students with disabilities must perceive that disability is an included and accepted component of student diversity to perceive they are truly connected to their institutional setting.

The DDDM:

Bridging the Missing Link in Student Diversity

The DDDM introduces a new approach to understanding student disability within a higher education setting. Historically, student disability has been viewed under theoretical mindsets with a focus on impairment, stigma, and oppression. The DDDM establishes the importance for inclusion of disability within student diversity for greater student acceptance and inclusion within a higher education dynamic. Students with disabilities can have varying experiences that are influenced by their disability and its impact on their postsecondary experience. In order to redefine student diversity, students with disabilities and higher education institutions must begin to incorporate disability within diversity for better inclusion and overall acceptance. Additionally, for a student to understand disability as an important and equal component of his or her identity, intersecting with other identity characteristics, their perception of the disability and their understood role within the postsecondary education must be positive. When a student participates in academic and social environments on campus, his or her feelings of acceptance and perceived inclusion have a greater likelihood of occurrence. When a student feels accepted and integrated, he or she has a greater opportunity to understand the disability as another component of one’s identity and, therefore, blends more seamlessly with other diversity characteristics. This is when disability can truly intersect within diversity.

The significance of this new conceptual framework is to underscore the need for improved inclusion of disability within the diversity spectrum. Little research includes equal importance of disability within student diversity. Moreover, research does not always address the multidimensional construct of disability. Olney and Brockelman (2005) found that students with disabilities often interpret their disability differently depending on their gender and type of disability they possess. The DDDM framework lays a foundation for future research on the integration of student disability within the postsecondary diversity dynamic and the importance of personal interpretation of disability in relation to others in overall identity development. Reimagining the social and medical influences contributing to the current perception of disability in higher education can assist in identifying the current cyclical relationship between the stigmatization of student disability at the postsecondary level, student awareness of disability, and the socio-academic experiences of students with disabilities.

Hurtado, Milem, Clayton-Pedersen, and Allen (1998) noted that although the higher education environment cannot reverse historical exclusion of minority groups of specific racial backgrounds, it is vital to assess the current postsecondary landscape to ensure there are no longer segregating components of student diversity. Similar to historical assimilation and desegregation of other diversity categories (e.g., ethnicity, gender) within the postsecondary environment, disability must be reassessed for its importance of inclusion as part of the student diversity landscape. Confluence of the medical model of disability, social perception and confusion as to what constitutes disability and how it applies to the postsecondary setting continues to perpetuate ongoing stigmatization and results in the exclusion from its identification as a positive component of diversity membership. As noted earlier, research has shown that level of inclusion and postsecondary expectations may contribute to the understanding of student disability within a higher education environment. However, much more work needs to be done to better cognize if students identifying with other diversity memberships parallel similar experiences, creating comparable postsecondary experiences related to the overarching contribution of diversity within the higher education milieu. If disability remains disintegrated within the postsecondary setting, it can be assumed that the disability–diversity disconnect is present and perpetuated at a postsecondary level. Additionally, further investigation is required to establish if students identifying with both a disability and another diversity membership, exhibit more negative socio-academic experiences due to the presence of a disability than just with the other diversity membership alone.

Implications for the Field

Exploring the existence of a potential disability-diversity “disconnect” is critical to elucidating the current perception of whether or not disability is accepted as a part of student diversity in the higher education setting. Although the DDDM is theoretically based, higher education administrators can incorporate the model within institutional initiatives to ensure that students, faculty, and staff have a better awareness of disability as a form of diversity and increase accessibility and acceptance for students with disabilities in academic and social opportunities afforded to other diverse student populations. Additionally, accessibility specialists and disability support

staff may use the model to develop student activities and workshops rooted in expanding the current perception of student diversity to include all types of disabilities. Although federal policy calls for increased access for and prohibits discrimination against students with disabilities, disability within the higher education environment serves as the “last frontier” of student equality and inclusion. Due to the current perception of student disability as a form of impairment at the postsecondary level, rather than as a part of student diversity, understanding the role of disability in the campus climate and including students with disabilities into academic and social settings may be a challenging task for fellow students, faculty, and administrators; however, the DDDM may provide the foundation to expand the current postsecondary understanding of student diversity to include students with disabilities as well.

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Figure 1. Elements Influencing Student Disability Identity Development Within Higher Education. (Aquino, 2016)

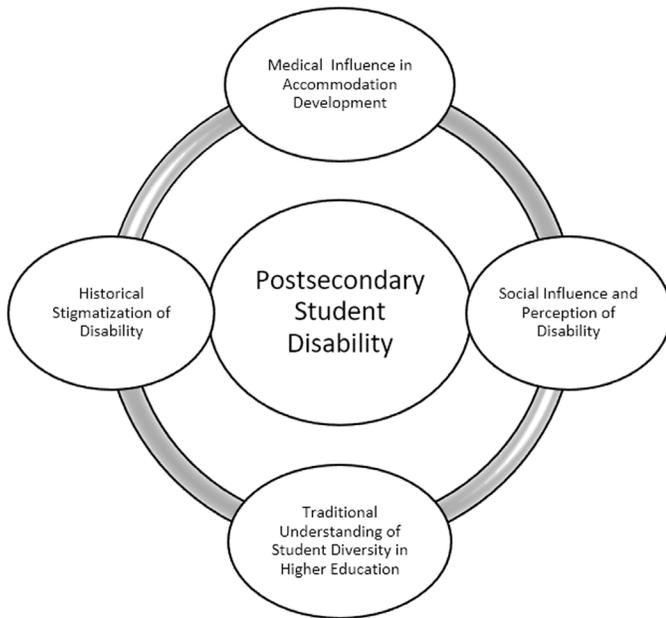
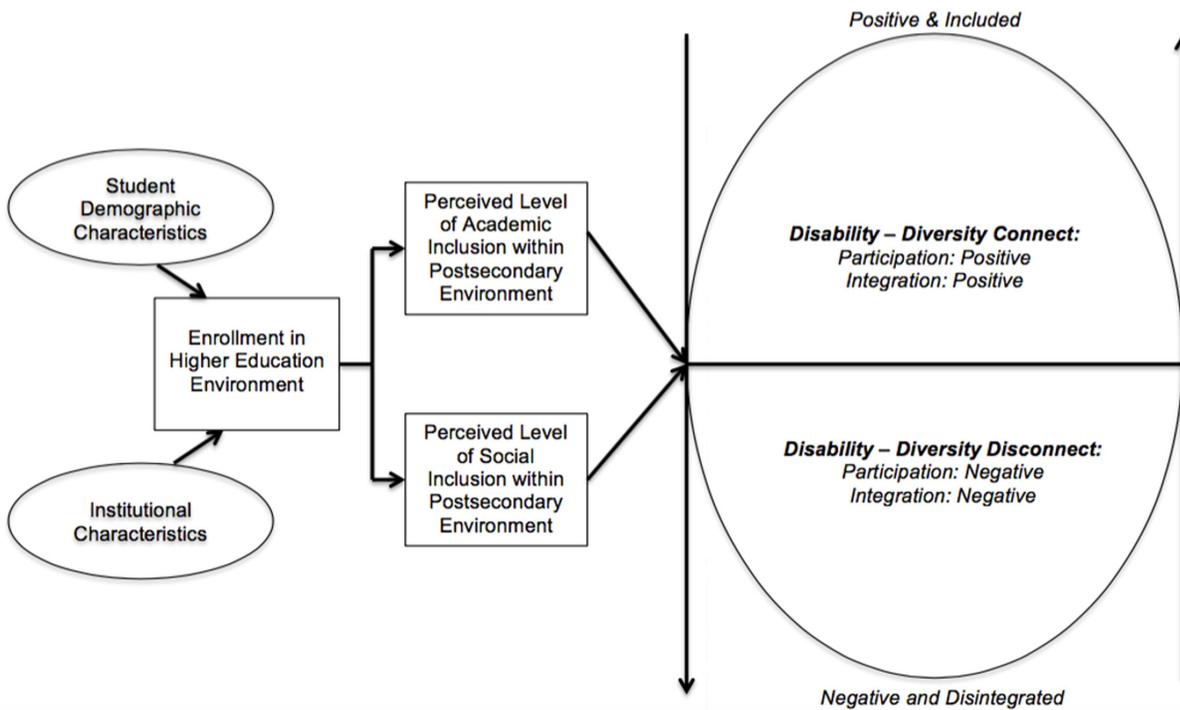


Figure 2. The Disability-Diversity (Dis)Connect Model. (Aquino, 2016)



Inclusive Instruction: Perceptions of Community College Faculty and Students Pertaining to Universal Design

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Abstract

This study examined community college faculty ($n = 179$) and student ($n = 449$) attitudes and actions toward inclusive teaching practices based on tenets of Universal Design. Two online surveys, the Inclusive Teaching Strategies Inventory (ITSI) and the Inclusive Teaching Strategies Inventory-Student (ITSI-S), were administered at a medium-sized Northeastern public community college. Results showed significant differences among faculty in overall action scale scores based on age and ethnicity. However, similar analyses conducted on students were not significant. Results from the study provide insights regarding attitudes toward inclusive instruction in the community college environment. Implications of these findings and recommendations for future research and disability service providers are discussed.

Keywords: Universal design, community college, college faculty, college students, inclusive instruction, diversity, college students with disabilities

Inclusive instruction based on the tenets of Universal Design (UD) shows great promise for reducing barriers in postsecondary education for an increasingly diverse student body regardless of age, gender, ethnicity, socioeconomic status, level of preparedness, and most importantly, severity of disability. The UD framework has existed for over two decades (Rao, Ok, & Bryant, 2014), providing increased opportunities for student success, however, existing research studies are focused on faculty and students at 4-year colleges and universities (Lombardi, Murray, & Dallas, 2013; Lombardi, Gerdes, & Murray, 2011). Very little, if any, research exists on supporting inclusive teaching practices in the community college environment.

College campuses report a rapid and sustained increase in student diversity, especially in the number of students requesting academic accommodations and related services (Davies, Schelly, & Spooner, 2013; Lombardi et al., 2013; McEwan, & Downie, 2013; Roberts, Park, Brown, & Cook, 2011; Stodden, Brown, & Roberts, 2011). This increasingly varied student body presents diverse needs often not addressed through mandated accommodations and services or traditional instruction (Roberts et al., 2011).

Inclusive teaching practices based on tenets of UD take a holistic approach to the design of materials and instructional methods that are usable by a wide range of students in postsecondary educational environments. Using the principles of inclusive instruction in community colleges provides opportunities to reduce barriers, increase student participation and success without extensive accommodations, and benefit the learning styles and needs of all learners.

Today, community colleges enroll more than half the nation's undergraduates, the majority of which are increasingly diverse in every respect, including age, ethnicity, socioeconomic status, level of preparedness, learning English, working full time, supporting a family, and degree of disability (Boggs, 2010; Desai, 2012). Many community college students lack basic skills in reading, writing, and mathematics and are required to successfully complete remedial coursework prior to enrolling in regular college classes (Bok, 2013). Community colleges enroll the highest percentage of students with disabilities among all public postsecondary institutions (American Association of Community Colleges, 2013). Approximately 12% of community college

¹ Orange County Community College; ² Colorado State University; ³ University of Connecticut

students report having a disability (American Association of Community Colleges, 2013).

One of the major challenges for community colleges is promoting inclusion by reducing barriers and supporting the needs of an increasingly diverse student body (Edyburn, 2010; Zeff, 2007). As a result of the Americans with Disabilities Act (1990) (ADA) and Section 504 (1973) and 508 (1998) of the Rehabilitation Act, accommodations are guaranteed to students with verified disabilities. The manner in which these services are offered is up to each individual institution. Most colleges put the responsibility on the student with the disability to self-identify and request academic accommodations (Izzo, Murray, Priest, & McArrell, 2011). For a variety of reasons, students with disabilities choose not to identify as having a disability and therefore go without individual accommodations (Ketterlin-Geller & Johnstone, 2006).

While the increase in students with disabilities enrolling in postsecondary education is encouraging, the graduation rates are not (Shepler, & Woosley, 2012). Federal data show that 29% of students with disabilities who enroll in college receive a degree as compared to 42% of their peers without disabilities (Sanford et al., 2011). According to Izzo, Murray, and Novak (2008) students with disabilities in postsecondary education continue to face barriers in terms of participation, retention, and degree completion.

Potentially, solutions for the continually growing number of diverse students lie within the design of the curriculum and the instructional strategies and materials (Center for Applied Special Technology [CAST], 2011). Thus, there is a need to fix the curriculum rather than the learner. The application of inclusive teaching practices based on tenets of UD may allow faculty to address the learning styles of a wide variety of students, reduce the need for individual accommodations, and create inclusive classrooms that support access and participation for all learners (Meyer & Rose, 2005; Rose & Meyer, 2002). Inclusive instruction is one approach that addresses the primary barrier to education for all students, a one-size-fits-all curriculum (CAST, 2011). Learners with disabilities are most vulnerable to such barriers, but many students without disabilities also find that curricula are poorly designed to meet their learning needs. Inclusive instruction emphasizes the need for a curriculum that can adapt to student needs rather than requiring learners to adapt to an inflexible curriculum (Meyer & Rose, 2005). However, little is known of the benefits of inclusive

teaching practices in postsecondary education, especially in community college environments.

Recognizing the importance of inclusive teaching practices, recent federal policy changes indicate that UD is becoming more widely accepted as an educational framework within the national policy landscape. In 2008, the U.S. Congress recognized the importance of UD where it is defined as a “scientifically valid framework for guiding educational practice” SEC. 762 (G) (SEC. 103 (C)). The HEOA also included several provisions encouraging postsecondary institutions and teacher preparation programs to incorporate the principles of UD into their teaching practices.

Although inclusive teaching practices based on UD in education have become increasingly popular in the past decade, the research base supporting its efficacy is still emerging. For example, inclusive instruction has been studied in postsecondary education environments, yet the primary focus has been on faculty and students at 4-year colleges and universities. Few, if any, studies exist that examine inclusive teaching practices based on UD in a community college environment.

In order to meet the current challenge in community colleges today, administration and faculty will need to focus their attention on positive changes in retention, success, and completion using research-based instructional practices and teaching strategies that can improve access to course content and materials for all students (McGuire, Scott, & Shaw, 2006; Orr & Hammig, 2009; Ouellett, 2004; Schelly, Davies, & Spooner, 2011). The more faculty members are able to expand their repertoire of research-based instructional strategies that meet a wide variety of student needs, the greater impact they could have on student achievement (Schelly et al., 2011). Approximately 40% of college students who received special education services seek accommodations in higher education settings (Newman, Wagner, Cameto, & Knokey, 2009). Inclusive teaching practices based on UD could benefit the learning styles and needs of all learners and may lessen the need for individual accommodations and perhaps lead to more positive student outcomes, especially for students with disabilities (Lombardi et al., 2011; Schelly et al., 2011).

By examining inclusive instruction from the perspective of faculty and students, we can gain a better understanding of the community college context. With the growing diversity of community college students, inclusive instruction is a way to improve equity and access for students who may otherwise be less

successful in the college environment (Engleman & Schmidt, 2007). Thus, the primary objective in the current study was to develop further understanding about community college faculty and student perceptions of inclusive teaching practices based on tenets of UD.

A framework derived from the field of architecture, UD originally focused on removing physical and environmental barriers that prevent access for individuals with disabilities (Lombardi et al., 2011; Roberts et al., 2011). The concept of UD evolved from one of removing physical barriers to meet the needs of individuals with disabilities to considering as many individuals as possible with designs that do not require retrofitting (Roberts et al., 2011). Recent efforts have extended UD beyond the physical environment to include educational access (Edyburn, 2010; Lombardi et al., 2011; Orr & Hammig, 2009; Roberts et al., 2011). It is important to note that several established UD frameworks exist such as Universal Design for Instruction (UDI; Burgstahler, 2009; Scott, McGuire, & Shaw, 2003), Universal Instruction Design (UID; Goff & Higbee, 2008) and Universal Design for Learning (UDL; Center for Universal Design for Learning, 2008; Rose, Harbour, Johnston, Daley, & Abarbanell, 2006). Although there are descriptive differences between the models listed above, they all seek to apply the original UD principles to the learning environment. Inclusive teaching strategies based on UD can be applied to curriculum and instruction at many levels, from lesson objectives and materials to instructional methods and assessments (Hall, Meyer, & Rose, 2012). The major frameworks provide guidelines for building in support and flexibility during the planning process and for proactively designing instruction with the objective of including the greatest number of learners possible (King-Sears, 2014). In this article, the term *inclusive instruction* will be used to encompass multiple themes that span across the major UD based frameworks. Inclusive instruction combines best teaching practices for engaging students and challenging them to meet existing expectations through a variety of instructional modalities, formats, and technologies (CAST, 2011; Izzo, 2012; Meyer & Rose, 2000).

Research Examining Students

Research on inclusive instruction and its application to postsecondary education continues to grow (Burgstahler, 2009; Edyburn, 2010; Orr & Hammig, 2009); however, to date, there have been few empirical studies to measure the perceptions of college students towards inclusive instruction (Lombardi et

al., 2011; McGuire & Scott, 2003; Rao & Tanners, 2011; Schelly et al., 2011, 2013; Spooner, Baker, Harris, Ahlgrim-Delzell, & Browder, 2007). Although findings suggest that students' perceptions of their instructors' implementation of inclusive instruction are positive, results may be considered inconclusive due to differences in research design, methodology, survey instrument, and setting. Moreover, very little, if any, research on inclusive instruction has been conducted at community colleges. As student diversity increases in colleges and universities, especially community colleges, a better understanding of how student perceptions vary across institutional settings becomes even more important.

Prior efforts to understand students' perceptions towards instructional methods and strategies that promote learning, and barriers experienced in college instruction were explored through focus group research (McGuire & Scott, 2003). Findings revealed that instructor teaching methods such as establishing clear expectations, providing outlines of notes, reading guides, presenting information in multiple formats, giving frequent informative feedback, and using diverse assessment strategies as well as creating a welcoming classroom climate were effective and helpful to student learning (McGuire & Scott, 2003). In addition, these authors made connections between many of the faculty attributes and teaching methods that were found to be positive by students were also found to be similar to the principles of UD.

Recent efforts, in a response to educators calling for evidence of the benefits of inclusive instruction with regards to student learning, performance, persistence, and retention, measured the effectiveness of instructor training, as perceived by students (Schelly et al., 2011). Results from this study indicated that students reported a significant increase in the use of inclusive instruction teaching strategies by their faculty after training.

Davies et al. (2013) continued their previous research on examining the effectiveness of instructor training (Schelly et al., 2011) by comparing student perceptions about an intervention group of instructors who received inclusive instruction training to student perceptions from a control group of instructors who did not receive inclusive instruction training as measured by a revised survey instrument. Results of this study suggest that inclusive instruction training had a significant effect on students' perceptions of instruction in university courses as measured by student perceptions on the questionnaire. The strategies

that were most significantly impacted by the training, according to student report, included (a) presenting material in multiple formats, (b) relating key concepts to the larger objectives of the course, (c) providing an outline at the beginning of each lecture, (d) summarizing material throughout each class session, (e) highlighting key points of an instructional video, (f) using instructional videos, and (g) using well-organized and accessible materials (Davies et al., 2013).

Research Examining Faculty

LaRocco and Wilken (2013) conducted a faculty action-research project and found that faculty indicated they were at a stage of concern that was self-centered. Similarly, faculty overwhelmingly reported that they did not implement inclusive instruction with the majority at an orientation level of use for each principle. In other words, study participants were generally not applying the principles of inclusive instruction based on UD in their classes.

Lombardi, Murray, and Gerdes (2011) continued to examine faculty attitudes and actions with the development of the Inclusive Teaching Strategies Inventory (ITSI). Validity evidence for the attitude subscales had been previously established (Lombardi & Murray, 2011; Murray, Lombardi, & Wren, 2011). The ITSI measures six constructs with two response categories where faculty could indicate their attitudes as well as in-class actions. The subscales included: (a) Multiple Means of Presentation, (b) Inclusive Lecture Strategies, (c) Accommodations, (d) Campus Resources, (e) Inclusive Assessment, and (f) Accessible Course Materials. Validity evidence for the attitude subscales had been previously established through exploratory factor analysis. The overall reliability on all items ($\alpha = 0.88$) was adequate (Murray et al., 2011). The ITSI is also the only survey known to incorporate principles from the major UD frameworks (e.g., UDI, UDL; Lombardi et al., 2011). Lombardi, et al., (2013) utilized the ITSI to examine participation in prior disability-related training and training intensity and the implementation of inclusive instruction at two four-year institutions.

Sprong, Dallas, and Upton (2014) measured faculty attitudes toward UD and academic accommodations as measured by the Multiple Means of Presentation, the Inclusive Lecture Strategies, and the Accommodations subscales of the ITSI survey. The survey gathered faculty demographic information, amount of experience with people with disabilities, amount of prior disability-related training, and then asked faculty to

express their attitudes toward items on three subscales. On average, all respondents had favorable attitudes toward Multiple Means of Presentation, Inclusive Lecture Strategies, and Accommodations subscales of the ITSI survey.

As researchers note, on college and university campuses, results of the studies that examined student perceptions reported increased student engagement and found that instructor training on inclusive instruction based on UD resulted in changes and improvements in instruction from a student perspective (Parker, Robinson, & Hannafin, 2007; Rao & Tanners, 2011; Schelly et al., 2011, 2013). However, to date, there are little, if any studies in the literature about the use of inclusive instruction and perceptions of community college students. Moreover, research remains limited in understanding community college faculty attitudes toward and use of inclusive instructional practices.

The purpose of this study was to measure faculty and student attitudes toward and actions associated with inclusive instruction based on UD principles and practices on a community college campus. The following research questions guided the study.

1. What are the differences in faculty self-reported attitudes toward and actions associated with inclusive instruction based upon age, gender, ethnicity, position type, academic discipline, academic rank, and amount of teaching experience?
2. What are the differences in students' attitudes toward and perceptions of faculty actions associated with inclusive instruction based upon gender, disability status, ethnicity, and age?
3. To what degree are there differences in faculty and students' attitudes and actions pertaining to inclusive instruction?

Methods

Participants

Participants in this study consisted of faculty (full-time and part-time) and students enrolled in credit courses at a medium-sized, public, community college located in the Northeast.

Faculty characteristics. Descriptive information of faculty members by ethnicity, position type, academic department, academic rank, and teaching experience is provided in Table 1. Overall, a total of 179 participants' data were analyzed. Of those, 121

(68%) were female faculty members and 55 (31%) were male faculty members. Three faculty members did not indicate gender. Faculty members in this study ranged in age from 26 to 75 ($M = 52$; $SD = 11.82$).

Student characteristics. Descriptive information of students by ethnicity, disability status, contact with the office of accessibility services, and diagnosed disability is provided in Table 2. Overall, a total of 449 participants' data were analyzed. Of those, 348 (77%) were female students and 97 (22%) were male students. Overall, at this institution, 3,432 (60%) were female students and 2,337 (40%) were male students. Four students did not indicate gender. In the sample, students ranged in age from 18 to 65 ($M = 27$; $SD = 10.73$).

Instrument

Two separate survey questionnaires were utilized in this study: the Inclusive Teaching Strategies Inventory (ITSI), which was administered to full-time and part-time faculty (Lombardi et al., 2011), and an adapted student version, the Inclusive Teaching Strategies Inventory, Student (ITSI-S), which was administered to full-time and part-time students.

Inclusive Teaching Strategies Inventory (ITSI). The ITSI is a self-report survey that measures faculty attitudes and actions with regard to inclusive teaching strategies based on UD (Lombardi & Murray, 2011). The ITSI has undergone multiple development phases and validation studies (Lombardi & Murray, 2011; Lombardi, et al., 2011; Lombardi, et al., 2013). In a recent study, Lombardi et al. (2013) examined the reliability of the ITSI subscales with Cronbach's alpha. The values ranged from .70 to .87. All values met acceptable .70 or higher criteria and indicate that the items form a scale that has good internal consistency reliability (Gliner, Morgan, & Leech, 2009). Additionally, findings from a cross-validation study using exploratory and confirmatory factor analysis confirmed the ITSI's seven-factor structure (Lombardi & Sala-Bars, 2013). Researchers also found evidence of content, convergent, and discriminant validity (Lombardi & Murray, 2011).

The ITSI measures six constructs regarding inclusive instructional practices based on the tenets of UD across several frameworks. For each item, faculty are asked to report (a) their attitudes/beliefs and (b) actions/behaviors. To preserve the item text, only the item stem was changed between the attitudes/beliefs and actions/behaviors response categories. For example, the attitude/belief item "*I believe it's important to*

post electronic versions of course handouts" was also presented as an action/behavior item "*In the classroom, I post electronic versions of course handouts.*" The response options for the attitudes/beliefs scale range from 1 (*strongly disagree*) to 7 (*strongly agree*). The response options for the actions/behaviors scale range from 1 (*no opportunity*) to 5 (*always*).

The first construct, Accommodations, contains eight items specific to accommodation requests from students (e.g., "provide copies of my lecture notes or outlines to students with disabilities" and "arrange extended time on exams for students who have documented disabilities"). The second construct, Accessible Course Materials, contains four items relevant to the use of a course website (e.g., "post electronic versions of course handouts: and "put lecture notes online for all students"). The third construct, Course Modifications, contains four items related to major changes in course assignments or requirements (e.g., "allow a student with a documented disability to complete extra credit assignments" and "allow any student to complete extra credit assignments"). The fourth construct, Inclusive Lecture Strategies, contains four items that measure teaching strategies specific to a typical postsecondary lecture-style class (e.g., "summarize key points throughout each class session" and "begin each class session with an outline/agenda of the topics that will be covered"). The fifth construct, Inclusive Classroom, contains nine items related to the presentation of course content with a particular emphasis on flexibility, use of technology, and various instructional formats (e.g., "use interactive technology to facilitate class communication and participation" and "present course information in multiple formats"). The sixth construct, Inclusive Assessment, contains four items pertaining to flexible response options on exams (e.g., "allow students to express comprehension in multiple ways" and "all flexible response options on exams"). Along with the survey, faculty were asked to report demographic characteristics, including age, gender, ethnicity, position type, academic discipline, academic rank, and amount of teaching experience.

Inclusive Teaching Strategies-Student (ITSI-S). The Inclusive Teaching Strategies Inventory-Student (ITSI-S), an adapted student version of the ITSI, was administered to examine students' attitudes and perceptions of faculty implementation of inclusive instruction. Adaptations to the faculty version of the ITSI included: (a) adjustments to the item stems; (b) addition of student demographics and disability

information; (c) adjustment to the action response scale; and (d) minor grammatical adjustments. For each item, students are asked to report (a) their attitudes/beliefs and (b) perceptions of faculty' actions/behaviors. To preserve the item text, only the item stem was changed between the attitudes/beliefs and actions/behaviors response categories. For example, the attitude/belief item "*I believe it's important for my instructor to put his/her lecture notes online for all students*" was also presented as an action/behavior item "*My instructor puts his/her lecture notes online for all students.*" The response options for the attitudes/beliefs scale range from 1 (*strongly disagree*) to 7 (*strongly agree*). The response options for the actions/behaviors scale range from 1 (*I don't know*) to 5 (*always*).

The ITSIS was piloted with a purposive sample of community college students to examine preliminary reliability using Cronbach's α . Responses were received from 74 participants. The response rate was 34% and is comparable to response rates of similar attitudinal studies (Lombardi & Murray, 2011; Lombardi et al., 2011). Cronbach's α for the overall instrument was good, $\alpha = .83$. Similarly, the subscales ranged from excellent "Accommodations" ($\alpha = .95$) and "Multiple Means of Presentation" (0.90) to questionable "Course Modifications" ($\alpha = .66$) and "Inclusive Assessment" (0.68). Further, the subscales "Course Modifications" and "Inclusive Assessment" had questionable internal consistency reliability. It is important to note that due to the nature and design of this study, no alternate forms or test-retest design were appropriate to further establish reliability.

In the pilot study, content validity was established in several ways: (a) all of the items were drawn from a pre-existing instrument that showed good evidence of reliability and validity (Lombardi et al., 2011); and (b) the content is consistent with major frameworks represented in the literature related to universal design in postsecondary education (Lombardi et al., 2011; Orr & Hammig, 2009). In addition, the items were reviewed by content experts in the field, including the original author of the instrument to ensure clarity and fit with the construct and intended audience being measured.

Along with the survey, students were asked to report demographic and disability related information. Demographic characteristics were gender, ethnicity, and age. Disability related information were disability status (student with a disability, yes/no), contacted initiated with the disability services office

and provided documentation of disability (yes/no), and type of disability.

Procedures

Data collection in this study consisted of two on-line survey questionnaires that were emailed to faculty and students to gather faculty members' and students' demographic information and their perceptions of the provision of inclusive teaching practices in a community college setting. In order to attain the largest sample size possible, procedures were based on Dillman's (2011) recommendation of multiple separate contacts with potential participants. Participants responded to the survey items online through Qualtrics.com. A recruitment email containing a brief introduction to the study, the purpose, researcher and IRB contact information was sent as a pre-notice to faculty and students explaining that they would receive a link for the survey in the next couple of days. Two days after the recruitment email, an email was sent to potential participants that included a link to the survey and notice of informed consent. Following, additional email reminders were sent to faculty and students spaced approximately one week apart. The survey for faculty and students were closed after six weeks of administration.

In addition, several strategies were implemented to maximize the response rate. First, prospective respondents were informed that there was a drawing to win one of 10 ten-dollar-e-cards. Second, the survey was created with a "save and continue" option that allowed respondents to return to the survey if they desired to finish the survey at a later time. Finally, potential respondents were provided multiple reminders to participate in the survey. At the conclusion of data collection, all data were exported into SPSS 22 for analysis.

Data Analysis

This study utilized a quantitative, cross-sectional online survey research design. Data analysis for each research question consisted of descriptive and inferential statistics. For each research question, a series of Multivariate Analyses of Variances (MANOVA's) were conducted. We selected a series of MANOVA's in order to measure faculty and student attitudes toward and actions associated with inclusive instruction based on UD from a global perspective.

The independent variables for faculty were age, gender, ethnicity, position type, academic discipline, academic rank, and amount of teaching experience. The independent variables for students were age, gender, ethnicity, and disability status. A new independent variable “academic status” (i.e., faculty, student) was determined based the new data set. The two overall attitude and action scale scores were again used as dependent variables for this analysis.

Results

The data consisted of responses to the ITSI and ITSI-S distributed to a total sample of 500 faculty members and 5,796 students. Overall, 197 faculty members and 588 students responded to their respective surveys. Participants leaving large portions of the survey incomplete (over 80%) were removed from the analysis. Therefore, 18 faculty participants’ and 139 student participants’ responses were removed from the analysis. Thus, 179 faculty and 449 student surveys were used in the data analysis with a response rate of 36 % and 7% respectively.

Missing data were treated with imputation using the expectation-maximization (EM) algorithm (Dempster, Laird, & Rubin, 1977). Because violations of the missing completely at random assumption do not change experimental results in many settings and because the percentage of missing data was relatively small, data were analyzed using imputed values. Data were checked for normality and all variables were approximately normally distributed with no items or variables markedly skewed.

Reliability

To assess whether the constructs from the ITSI and ITSI-S formed reliable overall scale scores, Cronbach’s α were calculated. For the ITSI, the overall α for attitude subscales (6 subscales, 33 items) was .88, which indicates that the average associations among overall attitude scores have good internal reliability. The α for action subscales (6 subscales, 33 items) was .90, which indicates that the average associations among overall action scores have good internal reliability. The overall internal consistency for the entire ITSI (66 items) was .92. These α were consistent with previous studies of faculty attitudes and inclusive instruction (Lombardi et al., 2013; Lombardi & Murray, 2011).

For the ITSI-S, the overall α for attitude subscales (6 subscales, 33 items) was .75, and the α for action

subscales (6 subscales, 33 items) was .79. Both α values of indicate good internal reliability. The internal consistency for the entire ITSI (66 items) was .84. These alphas were consistent with the pilot study previously conducted, with the overall instrument ($\alpha = .83$), and subscales ranging from excellent “Accommodations” ($\alpha = .95$) and “Multiple Means of Presentation” (0.90) to questionable “Course Modifications” ($\alpha = .66$) and “Inclusive Assessment” (0.68).

Faculty Results

The results below outline faculty self-reported attitudes toward and actions associated with inclusive instruction based upon age, gender, ethnicity, position type, academic discipline, academic rank, and amount of teaching experience regarding mean scores on the overall scale score for attitudes and actions consisting of the six attitude subscale scores (i.e., accommodations, accessible course materials, course modifications, inclusive lecture strategies, multiple means of presentation, inclusive assessment).

Due to insufficient sample size in some independent variables, age, ethnicity, academic department, and teaching experience were regrouped. The variable age was regrouped from a continuous item into three groups (i.e., 18-24, 25-34, 35-44+). The variable ethnicity was regrouped from 8 options into two groups (i.e., people of European descent and people of color). The variable academic department was regrouped from 21 items into three academic divisions (i.e., Business, Math, Science, Health Professions, Liberal Arts). The variable teaching experience was regrouped from a continuous item into three groups (i.e., 0-9, 10-19, and 20+). In order to check whether the assumptions of MANOVA were met, preliminary assumption testing for normality, linearity, univariate and multivariate outliers, homogeneity of variance/covariance were conducted. No significant violation was found. There was a statistically significant difference found between age and ethnicity on the combined dependent variables, $F(6, 322) = 2.15, p = .047$, Wilks’ $\lambda = .924$, multivariate = .04.

When the results for the dependent variables were considered separately, the only difference to reach statistical significance, using a Bonferroni adjusted alpha level of .025, was overall action scale score for $F(9, 162) = 3.41, p = .019$. An inspection of the mean scores indicated that white 35-44 year old faculty members reported slightly higher levels of action ($M = 3.77, SD = .719$) than non-white ($M = 2.63, SD = 1.71$).

Student Results

The results below outline students' attitudes toward and perceptions of faculty actions associated with inclusive instruction based upon gender, disability status, ethnicity, and age regarding mean scores on the overall scale score for attitudes and actions consisting of the six attitude subscale scores (i.e., accommodations, accessible course materials, course modifications, inclusive lecture strategies, multiple means of presentation, inclusive assessment). Similar to faculty variables, due to insufficient sample size, age and ethnicity were regrouped. The variable age was regrouped from continuous item into three groups (i.e., 18-24, 25-34, 35+). The variable ethnicity was regrouped from 8 items into two groups (i.e., people of European descent and people of color).

In order to check whether the assumptions of MANOVA were met, preliminary assumption testing for normality, linearity, univariate and multivariate outliers, homogeneity of variance/covariance were conducted. No significant violations were found. There were no statistically significant differences between the results.

Faculty and Student Results

The results below outline the differences in faculty and students' attitudes and actions pertaining to inclusive instruction. The overall attitude and action scale scores for faculty and students were again used as dependent variables for this analysis. In order to check whether the assumptions of MANOVA were met, preliminary assumption testing for normality, linearity, univariate and multivariate outliers, homogeneity of variance/covariance were conducted. No significant violations were found. There were no statistically significant differences between the results.

Further, there was an examination of faculty and students' attitudes towards inclusive instruction and whether they differed from their actions. Since items on the attitude and action scores were scaled differently, the attitude and action responses were recoded to resemble No/Maybe/Yes categories. For the attitude response scale, responses were coded 1 (*strongly disagree*) and 2 (*somewhat disagree*) as 1 (*no*) responses. Responses 3 (*somewhat disagree*) and 4 (*somewhat agree*) were coded as 2 (*maybe*), and responses 5 (*agree*) and 6 (*strongly agree*) were coded as 3 (*yes*). For the action response scale, responses 1 (*I don't know*) to 2 (*never*) were coded as 1 (*no*) because these responses indicated that students did know if the instructor carried out the specific ac-

tion represented by the item. Response 3 (*sometimes*) was coded as 2 (*maybe*), and responses 4 (*most of the time*) and 5 (*always*) were coded as 3 (*yes*). This variable coding is consistent with a previous study with similar objectives (see Lombardi et al., 2011). Table 3 and 4 shows the frequencies and percentage of faculty and students' attitude and action responses on *ITSI* and *ITSI-S* subscales and results of chi-square analysis response category.

Discussion

The current study was the first to examine community college faculty and student attitudes toward and actions associated with inclusive teaching to determine whether discrepancies exist and whether certain demographic characteristics were significant predictors. The results showed a statistically significant difference in overall action scale scores based on faculty age and ethnicity. Participants who reported as 35-44 years old and of European decent had slightly higher overall action scale scores than faculty members of color. These findings suggest that faculty demographic characteristics, specifically age and ethnicity, play a small role in predicting faculty actions in the classroom regarding inclusive instruction at this institution. These findings are not reflected in previous research on four-year college faculty (Lombardi et al., 2013; Lombardi et al., 2011; Lombardi & Murray, 2011).

Non-significant findings on faculty attitudes and actions toward inclusive instructional practices at this institution showed obvious disagreement. For example, faculty reported more favorable attitudes that inclusive instruction was important yet reported they rarely carry out these practices in the classroom. Potentially, faculty members believe these practices are important, yet they lack the knowledge and practical skills necessary to implement inclusive teaching practices in the classroom. Furthermore, there is no specific explanation why these results differed from previous studies (Lombardi et al., 2013; Lombardi et al., 2011; Lombardi & Murray, 2011) except to consider the different environmental context (two-year vs. four-year college) as a major factor in influencing faculty actions towards inclusive instruction. This finding suggests the importance of further inquiry as to the specific barriers faculty might encounter and if and when they attempt to carry out actions related to inclusive instruction, and confirm whether or not these barriers differ in two- and four-year college settings.

This study demonstrated that the ITSI-S can be used as a tool for examining students' attitudes and perceptions of faculty actions associated with inclusive instruction. Most importantly, this is the first study to use the ITSI-S to examine community college students' attitudes toward and perceptions of faculty actions associated with inclusive instruction. Previous research on comparing student perceptions of instructor teaching methods report that undergraduate students at a large research university located in the Midwest reported a positive change in instructors' use of inclusive teaching strategies after five hours of instruction on the use of UD principles and strategies (Schelly et. al., 2011, 2013). This study demonstrated the first step towards examining students' attitudes and perceptions towards inclusive instruction on a community college campus. Such assessment can lead to new understanding and targeted interventions that will enhance overall quality of education received by all students, including those with diverse learning needs, especially those with disabilities.

There were no statistically significant differences in overall attitude and action scale scores based on academic status. Consistent with previous findings, results showed a discrepancy between overall attitude and action scale scores toward inclusive instructional practices. For example, faculty and students' positively endorsed or agreed that inclusive instruction was important yet reported they only sometimes implement these practices in the classroom. Further comparison of subscale scores showed consistent results for attitudes and actions on Accommodations, Accessible Course Materials, Inclusive Lecture Strategies, and Multiple Means of Presentation. This suggests that many faculty and students believe these practices are both important and implemented in the classroom. A different pattern emerged from the Course Modifications and Inclusive Assessment subscales. Results showed that many faculty reported they did not believe these practices were important yet many students' reported the opposite view. Both faculty and students reported these practices were not carried out in the classroom. This result may be due to the fact that Inclusive Assessment subscale included items that faculty may perceive as more challenging to integrate into their teaching practices. For example, Inclusive Assessment items asked about alternate exam formats, an area where faculty may feel that the standards of their course would be compromised. These findings are consistent with previous studies on faculty attitudes toward inclusive instruction and ac-

commodations (Lombardi & Murray, 2011; Lombardi et. al., 2011) that found faculty were resistant to carry out actions related to inclusive assessment.

This study is the first to utilize the ITSI and ITSI-S to compare faculty and students perceived the importance of and specific behaviors related to inclusive instruction. While findings were limited, further research of this nature is needed on these two different major stakeholder groups. Because research on community college faculty and students is so limited in the area this study provides a platform for future research and discussions.

Implications for Practice

The results of this study have a variety of implications for postsecondary education environments, especially community colleges. Results add to the literature and discussion of inclusive instruction in postsecondary education. Using these instruments to examine community college faculty and students could be useful to other researchers interested in examining the overall feel for the campus climate, and attitudes and actions toward inclusive instruction at their own institutions. Regardless of 2-year or 4-year institutions, this study was the first of its kind in comparing the overall faculty and students' attitudes and actions toward inclusive instruction. Furthermore, results could be used to share with disability services providers who are largely responsible for faculty development and training. In this study, the ITSI was administered across all departments and the data were analyzed using overall attitude and action subscale scores. However, the survey could easily be administered at the academic division or departmental level in college settings, which may be useful for disability services providers who wish to assess departments in order to better target outreach efforts in promoting inclusive instruction through collaborative efforts with faculty. Educating faculty in not only the implementation of inclusive teaching techniques but also assessment of learning is essential.

Postsecondary stakeholders, such as Deans and Administrators, in an era of budget cuts and reduced public funding for postsecondary education, must make practical decisions when allocating resources for faculty training. Information from the survey instruments may be helpful when proceeding with targeted faculty on inclusive instruction, especially community colleges. The type of targeted training to increase faculty knowledge and promote inclusive practices can take various formats, such as on-campus

workshops, online self-paced courses, webinars, video tutorials and local or national conferences.

Limitations

Although there are many promising findings to consider, this study had several limitations. First, the survey instruments used for the study were distributed one time, electronically, at one specific community college located in the northeast of the United States. Therefore, results may not be generalizable to other community colleges. Second, the ITSI and ITSI-S are self-report surveys, which allow for the potential of response bias or even dishonest responses. Thus, faculty and students may have misunderstood or chosen to misrepresent their beliefs or actions, even if it was not the most honest response. Third, unlike previous research on faculty perceptions of inclusive instruction (Lombardi et al., 2011; Lombardi et al., 2013; Sprong et al., 2014) this study did not report subscale scores but rather regrouped them into overall attitude and action scale scores. Although the results provided a global sense of faculty and students' attitudes and perceptions toward inclusive instruction, much of the detail of this information was outside of the scope of this study. A fourth limitation is the use of a new quantitative instrument, the ITSI-S, of which psychometric properties have not been established. The ITSI-S was developed to measure student attitudes and perceptions toward inclusive instruction. Thus, like the ITSI, the ITSI-S should undergo similar evaluation of its psychometric characteristics. A fifth limitation is the low response rates for both faculty and students. Future research in a broader number of community colleges and strategies for increasing the response rates of faculty and students are needed. Finally, this study did not have the capacity to match faculty to the students in their classrooms. Efforts to address such challenges were beyond the scope of this study.

Recommendations for Future Research

It is hoped that the current study will stimulate future research. Further research is recommended in order to further understand the potential benefit of inclusive instruction to all students across postsecondary education, especially community colleges. Due to the lack of research on faculty and student beliefs and behaviors in community college environments, replication of the current study is recommended at other community colleges. Similar studies could include comparisons of faculty and students at different institutions (i.e., rural, suburban; public, private). Al-

though not examined in this study, future research in community college environments could match faculty with the students they are currently teaching.

While the literature reviewed seems to support the idea that faculty has favorable attitudes towards UD principles, there is not much research on whether this translates into action in the classroom. In the study mentioned on faculty attitudes versus actions, the results indicated that they do not follow through (Lombardi, Murray, & Gerdes, 2011). There is a need for more research on whether favorable attitudes translate into action.

Examining differences between faculty and student groups, as well as comparing faculty and student perceptions may lead to new findings regarding effectiveness of inclusive instruction for improving outcomes for all postsecondary students, including those with diverse learning needs and disabilities. Moreover, by examining community college classroom instructional environments from the perspective of students, we can gain a better understanding of the benefits of inclusive instruction on student outcomes.

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Table 1

Number and Percentage of Faculty Characteristics

Faculty Characteristics	Population		Sample	
	N	%	N	%
Ethnicity				
African American/Black (non-Hispanic)	30	6	2	1
Asian	10	2	1	0.6
Caucasian/White (non-Hispanic)	420	84	167	94
Hispanic/Latino	30	6	4	2
Multi-ethnic	10	2	2	1
Other, please specify	5	1	1	0.6
Position Type				
Full-time	275	55	91	51
Part-time	225	45	88	49
Academic Department				
Applied Technologies	*		4	2
Arts and Communication	*		7	4
Behavioral Science	*		12	7
Biology	*		13	7
Business	*		14	8
Criminal Justice	*		7	4
Dental Hygiene	*		3	2
Diagnostic Imaging	*		5	2
Education	*		4	2
English	*		30	17
Global Studies	*		4	3
Laboratory Technology	*		2	1
Mathematics	*		16	9
Movement Science	*		9	5
Nursing	*		24	14
Occupational Therapy Assistant	*		7	4
Other, please specify	*		5	3
Academic Rank				
Assistant Professor	*		49	28
Associate Professor	*		20	11
Instructor	*		69	39
Professor	*		21	12
Other, please specify	*		19	10

Teaching Experience

0 – 4 yrs.	*	26	15
5 – 9 yrs.	*	42	24
10 – 14 yrs.	*	34	19
15 – 19 yrs.	*	10	6
20 – 24 yrs.	*	13	7
25 + yrs.	*	52	29

Note. For ethnicity, “Other” respondent indicated South Asian/Indian Subcontinent; Two respondents did not indicate ethnicity; For academic department, “Other” respondents indicated: Library and Academic Advising; Thirteen respondents did not indicate academic department; For academic rank, “Other” respondents indicated: Adjunct, Coordinator, Administrator, Librarian, Technical Lab Assistant, and Professor Emeriti; One respondent did not indicate academic rank; Two respondents did not indicate teaching experience.

* data is incomplete or missing at this institution.

Table 2

Number and Percentage of Students Characteristics

Student Characteristics	Population		Sample	
	N	%	N	%
Ethnicity				
African American/Black (non-Hispanic)	687	34	43	10
American Indian/Alaskan Native	20	1	2	0.4
Asian	146	7	11	2
Native Hawaiian/Pacific Islander	9	0.45	1	0.2
Caucasian/White (non-Hispanic)	3,347	167	264	59
Hispanic/Latino	1,379	69	79	18
Multi-ethnic	158	8	36	8
Other, Please specify	35	2	13	3
Disability Status				
I am a student with a disability	*		59	13
I am a student without a disability	*		386	86
Contact with OAS				
Yes, I have contacted the OAS and submitted the appropriate documentation	*		29	14
Yes, I have contacted the OAS but have not submitted the appropriate documentation	*		6	3
No, I have not contacted the OAS	*		180	84
Diagnosed Disability				
ADD, ADHD	*		20	32
Chronic Health Impairment	*		4	6
Developmental Disability	*		1	2
Learning Disability	*		23	37
Psychiatric Disability	*		7	11
Visual Impairment, Blind	*		1	2
Other, please specify	*		7	11

Note. For ethnicity, “Other” respondents indicated Caribbean American, Persian, West Indian, Irish American, Pakistan, Unknown, Caucasian and Hispanic, Native American and Caucasian; Four participants did not indicate disability status; 234 respondents did not indicate contacting the OAS; For diagnosed disability, “Other” respondents indicated Anxiety, Asperger’s, Asthmatic/Hypothyroidism, PDD with Autistic Tendencies, GAD, and never tested due to no insurance; 386 respondents did not indicate diagnoses of a disability. * data is incomplete or missing at this institution.

Table 3

Frequencies and Percentages of Faculty and Students Attitude Responses on ITSI and ITSI-S Subscales and Results of Chi Square Analysis.

Subscale	Faculty Attitudes			Student Attitudes			χ^2
	No	Maybe	Yes	No	Maybe	Yes	
Accommodations	78 (44%)	13 (7%)	88 (49%)	131 (29%)	43 (10%)	275 (61%)	11.98*
Accessible Course Materials	40 (22%)	14 (8%)	125 (70%)	51 (11%)	28 (6%)	370 (83%)	13.71**
Course Modifications	91 (51%)	11 (6%)	77 (43%)	35 (8%)	28 (6%)	386 (86%)	150.20**
Inclusive Lecture Strategies	1 (<1%)	2 (1%)	176 (98%)	10 (2%)	30 (7%)	409 (91%)	10.52*
Multiple Means of Presentation	4 (2%)	8 (5%)	167 (93%)	24 (5%)	34 (8%)	391 (87%)	5.17
Inclusive Assessment	93 (52%)	22 (12%)	64 (36%)	91 (20%)	61 (13%)	297 (66%)	64.59**

Note. $df=2$ for all chi-square tests ; * $p < .05$, ** $p < .001$.

Table 4

Frequencies and Percentages of Faculty and Students Action Responses on ITSI and ITSI-S Subscales and Results of Chi Square Analysis.

Subscale	Faculty Attitudes			Student Attitudes			χ^2
	No	Maybe	Yes	No	Maybe	Yes	
Accommodations	100 (56%)	25 (14%)	54 (30%)	303 (68%)	54 (12%)	92 (20%)	8.23*
Accessible Course Materials	40 (22%)	55 (30%)	83 (46%)	110 (25%)	149 (33%)	190 (42%)	.986
Course Modifications	77 (43%)	54 (30%)	48 (26%)	201 (45%)	115 (26%)	133 (29%)	1.42*
Inclusive Lecture Strategies	3 (2%)	19 (11%)	157 (88%)	40 (9%)	132 (29%)	277 (62%)	41.09**
Multiple Means of Presentation	12 (7%)	38 (21%)	129 (72%)	70 (16%)	127 (28%)	252 (56%)	15.52**
Inclusive Assessment	121 (68%)	32 (18%)	26 (14%)	253 (56%)	127 (21%)	103 (23%)	7.65*

Note. $df=2$ for all chi-square tests ; * $p < .05$, ** $p < .001$.

The Perceived Success of Tutoring Students with Learning Disabilities: Relations to Tutee and Tutoring Variables

Rinat Michael¹

Abstract

The current study examined the contribution of two types of variables to the perceived success of a tutoring project for college students with learning disabilities (LD): tutoring-related variables (the degree of engagement in different tutoring activities and difficulties encountered during tutoring), and tutee-related variables (learning difficulties and academic self-efficacy). One hundred and ninety college students with LD who were engaged in a tutoring project completed a questionnaire measuring tutoring and tutee-related variables as well as the perceived success of the tutoring process. Only the tutoring-related variables were significant predictors of tutees' perceptions regarding the success of the tutoring project. Implications for research and practice are discussed.

Keywords: Tutoring, college students, learning disabilities

Students with learning disabilities (LD) face difficulties on university and college campuses. A summary of the difficulties encountered (e.g., Skinner & Lindstrom, 2003) includes (a) deficits in study skills, such as test preparation, note-taking, and listening comprehension; (b) problems with organizational skills; (c) difficulties with social interaction; (d) deficits in specific academic areas, with reading and written composition being the most frequent; (e) low self-esteem; and (f) higher dropout rates. The growth in the number of college students with LD (e.g., Parker & Boutelle, 2009), and the recognition that these students experience various difficulties (e.g., Connor, 2012), have led to an increase in the support services offered in institutions of higher learning (e.g., Getzel & McManus, 2005). In addition to providing legally required accommodations, an increasing number of colleges now offer a variety of optional support programs for students with disabilities (Getzel & McManus, 2005; Rath & Royer, 2002). These programs provide services, such as specialized academic advising, personal counseling, training in time-management and study skills, and individualized academic programs (Mull, Sitlington, & Alper, 2001). One service commonly provided in support centers is peer assistance in the form of tutoring (Stodden, Whelley, Chang, & Harding, 2001).

This article will present results from a survey that evaluated the PERACH peer tutoring project for students with LD at 29 universities, regional colleges, and teacher training colleges in Israel. The purpose of the study was to identify variables which may influence the perceived success of the tutoring project for college students with LD.

Peer Tutoring Students with LD

Peer tutoring can be defined as "a class of practices and strategies that employ peers as one-on-one teachers to provide individualized instruction, practice, repetition, and clarification of concepts" (Utley & Mortweet, 1997, p. 9). This type of support exists in a wide range of settings, such as classrooms (Lo & Cartledge, 2004) and the home (Mayfield & Vollmer, 2007), and includes cross-age individual tutoring (Topping, Peter, Stephen, & Whale, 2004), small group (Maheady, Sacca, & Harper, 1987), and class-wide (Ayvazo & Aljadeff-Abergel, 2014; Greenwood, Terry, Arreaga-Mayer, & Finney, 1992) configurations. Studies have shown that moderate to large academic benefits can be attributed to peer tutoring in general, as well as in relation to students with LD (Bowman-Perrott, Davis, Vannest, Williams, Greenwood, & Parker, 2013; Calhoon, 2005; McMaster, Fuchs, & Fuchs, 2006; Scruggs, Mastropieri, & Marshak, 2012).

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Despite its prevalence, the effectiveness of peer tutoring in general and tutoring college students with LD in particular has not been thoroughly examined. Past research has suggested that since typically there are fewer differences in age and status, more mutuality of interaction, and relationships of a longer duration (Kram & Isabella, 1985), peer relationships may serve in a supportive capacity related to both career advancement and psychosocial functioning. As for tutoring college students with LD, Zwart and Kallemeyn (2001) found that participation in a peer tutoring program contributed to a general feeling of efficacy and to a greater use of learning strategies and skills. Gimblett (2000) reported an improvement in self-image and a smooth transition to college life among the tutees. Vogel, Fresko, and Wertheim (2007) found that both tutees and tutors perceived tutoring as very beneficial to the tutees, and the level of satisfaction with the tutoring program for both groups was high. However, not much is known regarding the variables which contribute to the success of the tutoring process.

The purpose of this study was to identify variables which may influence the perceived success of the tutoring project to college students with LD. Specifically, two types of variables were examined: tutoring-related (the degree of engagement in different tutoring activities and difficulties encountered during tutoring), and tutee-related (learning difficulties and academic self-efficacy).

Antecedents of Tutoring Success for Students with LD

According to Daiute and Dalton (1993), what permits development in peer tutoring settings is the very fact of having a companion with whom to talk and exchange points of view. This claim is in accordance with that propounded by Rhodes and DuBois (2006) who suggested a model connecting various characteristics of the mentor–mentee relationship to mentoring success. Since mentoring is in many ways similar to tutoring (both can involve students from colleges and universities helping other students on a sustained and systematic basis under direction and supervision), it is plausible that Rhodes and Dubois's model is also relevant to the tutoring process. Specifically, the model mentioned attributes such as companionship, genuine caring and support, and the provision of enrichment activities. Nonetheless, it should be noted that whereas mentoring tends to focus on life skills and often is held outside the academic setting, tutoring generally

focuses on academic learning and is usually held in the educational institution (Goodlad, 1995). Consequently, the contribution of tutoring-related variables to the success of the tutoring process needs further examination.

Daiute and Dalton (1993) as well as Rhodes and DuBois (2006) emphasized only one aspect of the mentoring/tutoring process, the aspect of relationships. They did not take into account other possible influences such as tutee's characteristics. This may be especially important when the tutees are students with disabilities.

When considering students with LD, one should keep in mind that these students continuously confront academic challenges. Many of them have significant deficiencies in reading, writing and/or mathematics, as well as in memory, time management, and organization (Heiman, 2006). In the academic realm, where students are expected to learn largely via lecture format and to read a great amount of literature, these demands are magnified for students with LD. Furthermore, some students with LD face greater difficulties than their non-disabled counterparts in concentrating on the task at hand, determining the salience of information presented in class, and applying test strategies, all potentially contributing to higher levels of anxiety and lower grade point average (GPA) scores (Proctor, Prevatt, Adams, Hurst, & Petscher, 2006).

The various challenges encountered by students with LD may impact their self-efficacy, especially in the academic domain. As suggested by Bandura (1986, 1995), efficacy expectations are hypothesized to be acquired and modified via four types of sources of information: past performance accomplishment, exposure to and identification with efficacious role models (vicarious learning), access to verbal persuasion and support from others, and experience of emotional or physiological arousal in the context of task performance. Students with LD may be expected, as a group, to have lower self-efficacy than students without disabilities, at least partially because of less access to sources of efficacy information. When repeated failure becomes internalized, beliefs about one's ability to achieve in the academic domain are likely to suffer. This weakened sense of efficacy in turn may limit the level of future performance these students are willing to try to achieve as well as their persistence under stressful conditions. Low perceptions of ability, thereby, become reinforced by experience.

Self-efficacy studies indicate that, when compared to peers without LD, students with LD have lower academic self-efficacy, as well as decreased academic competence (Frederickson & Jacobs, 2001; Hen & Goroshit, 2014). In addition, surveys (Klassen, 2002a, 2002b) examining self-efficacy beliefs of students with LD have revealed that self-efficacy was found to play a primary role in predicting academic achievement, although several studies found that students with LD tend to overestimate their efficacy (e.g., Klassen, 2008). Furthermore, individuals with strong efficacy beliefs are more likely to exert effort in the face of difficulty and to persist in working at tasks when they believe that they have the requisite skills (Linnenbrink & Pintrich, 2003; Pietsch, Walker, & Chapman, 2003). Students feel differently about themselves and cope differently with challenges depending on what they believe they are capable of, and what they hope they will be able to achieve (Folkman & Moskowitz, 2004).

It should be noted that most studies on students with LD focused on younger students rather than on college students. Nonetheless, in light of the findings, the research assumption in the present study was that similar results will be found among this group as well. Specifically, hypotheses were that college students' difficulties will be related to their academic self-efficacy and that this sense of efficacy will predict the degree to which they perceive tutoring to be beneficial to them, alongside other variables related to the tutoring process such as tutoring activities and difficulties encountered during tutoring sessions.

In sum, this study addressed three research questions: (a) What are the characteristics of tutoring college students with LD in terms of tutees' difficulties, tutoring activities, difficulties encountered during tutoring, and the perceived success of the tutoring process? (b) Are tutees' difficulties related to their academic self-efficacy? (c) Do tutees' self-efficacy, engagement in different tutoring activities, and difficulties encountered during tutoring sessions contribute to their perceptions regarding the success of the tutoring process?

Method

Research Context

The present study focused on a peer tutoring project for students with LD at universities and colleges in Israel. This project is part of a nationwide program named PERACH through which Israeli students in

higher education work mainly with disadvantaged students in elementary schools. Over the years, PERACH has expanded to include other activities in which college students serve the community. Peer tutoring of students with LD at institutions of higher education is one of them. Although the major emphasis of the tutoring is academic, there is an implicit assumption in PERACH that through the tutoring relationship, some social and emotional needs of the tutees will indirectly be addressed (Vogel et al., 2007).

Tutors are expected to work individually with the students on a regular basis (usually twice weekly in two-hour sessions) throughout an entire academic year and, in return, they receive a partial tuition rebate. The project is operated in conjunction with local support services at the colleges and universities, which select tutees and match them to PERACH tutors following interviews with both tutors and tutees. Both tutors and tutees can seek advice from consultants affiliated with the project. Tutors attend a number of group workshops, and several of the institutions also schedule either workshops for tutees or joint workshops. The location of tutoring sessions is determined by the participants themselves (Vogel et al., 2007).

Participants

During the 2012–2013 academic year, approximately 500 students with LD at 29 Israeli universities and colleges received tutoring services through PERACH. Tutees were identified by their institutions as having LD, and PERACH supplied the tutors. Institutions require students with LD to submit recent evaluations before granting accommodations and support services. A special unit at each institution reviews the evaluations and looks for evidence of average-range intellectual abilities and evidence of below average achievement scores and deficits in cognitive processes, in keeping with the definition of the National Joint Committee on Learning Disabilities (1998) in the United States. At the time this study was conducted, institutions required either a combination of psychological and psychoeducational tests or a battery of only psychoeducational tests. The intelligence test used in Israel is the Wechsler Adult Intelligence Scale ([WAIS-IV]; Wechsler, 2008), and students must attain an average or above-average score. A variety of psychoeducational tests are used that test academic skills, such as letter-word identification, reading, arithmetic, spelling and writing fluency, short term memory, and attention span. A score one standard deviation below the peer mean is required to be eligible for tutoring. As the stu-

dents in this study were tested at different centers, they did not necessarily take the same battery of tests. However, all were recognized by their own institutions as having LD and were granted support services.

Research questionnaires were distributed to all tutees, and responses were received from 190 (38%). The gender of the tutees in the sample was fairly evenly distributed, although the number of women ($n = 99$) was slightly higher than that of men ($n = 91$). Most of the tutees (95%) in the sample were Jewish. The highest percentage of tutees (44%) was first year students. Many of the tutees (37%) reported having received tutoring services sometime in the past, whereas others were being tutored for the first time.

Instruments

Tutees' difficulties. A measure was used that was developed by Vogel et al. (2007). Participants are asked to rate the extent to which they cope with difficulties in 12 different domains. These domains are divided into three sub-groups: general study skills (attention and concentration, studying for exams, use of time, memory, and mathematics), language-related skills (reading materials in English, writing papers, summarizing articles, finding information, and reading materials in Hebrew), and nonacademic skills (emotional areas and social areas). Possible answers range from 1 ("very difficult") to 5 ("no problem"). Vogel and colleagues (2007) did not report Cronbach's alphas, however in the current study they were .73 for the general study skills and .82 for the language-related skills. A significant positive correlation was found between the two items which comprised the nonacademic skills domain ($r = .73$, $p < .001$).

Academic self-efficacy. A five-item measure based on Bong's (2001) subject-level academic self-efficacy scale was administered. Instead of mentioning a particular subject area (such as mathematics), as in the original questionnaire, general statements were used. For example, the item "I can master even the hardest material in [a specific subject] if I try" was rephrased as "I can master even the hardest material in my studies if I try". Participants are asked to rate each item on a response scale ranging from 1 ("not at all true") to 5 ("very true"). Cronbach's alphas ranged between .86 and .91 in the original study (depending on the subject matter), and in the current study $\alpha = .86$.

Engagement in tutoring activities. A list of eight different tasks was developed by Vogel and colleagues (2007). Participants are asked to rate the ex-

tent to which each task was dealt with during the tutoring sessions. Possible answers range from 1 ("not at all") to 5 ("very much"). Varimax factor analysis of the data in the current study revealed three distinct factors: general academic activities (four items, e.g., "reading articles"), review of material (two items, e.g., "studying for exams"), and nonacademic activities (two items, e.g., "discussion of personal matters"). Cronbach's alphas were .73 for the general academic activities and .80 for the whole list. Significant positive correlations emerged between the two review of material activities items ($r = .62$, $p < .001$) and the two nonacademic activities items ($r = .77$, $p < .001$).

Difficulties encountered during tutoring. This measure was also developed by Vogel and colleagues (2007). Participants are asked to rate the extent to which seven different situations occurred during the tutoring period that hindered tutoring (e.g., "Sessions were ineffective"). Possible answers range from 1 ("not at all") to 5 ("very much"). Varimax factor analysis of the data in the current study revealed only one factor with an internal consistency of .84.

Perceived success of tutoring. A scale was developed specifically for the present study on the basis of a literature review, prior research questionnaires used in the evaluation of the PERACH program, in-depth knowledge of tutoring in the context of PERACH, and several consultations with colleagues in the field of tutoring. The scale includes six items measuring tutees' perceptions regarding the contribution of the tutoring process to their academic functioning, including improvement in grades, in preparation and organization before lectures, in participation during lectures, in writing papers and doing exercises, in studying for exams, and in learning habits (e.g., "The tutoring program helped me improve my grades"). Participants are asked to rate the extent to which each statement is true for them on a scale ranging from 1 ("not at all") to 5 ("very much"). Varimax factor analysis of the data revealed only one factor. Cronbach's alpha was .88.

Demographic questionnaire. Data were collected on gender, year of study, field of study, and prior tutoring experience.

Procedure

Participants received the questionnaires towards the end of the academic year from the support centers at their academic institution. They completed the questionnaires individually and voluntarily on their own free time and returned them to the centers after com-

pletion. There were no time limits, and no incentives were offered. The questionnaires were anonymous.

Results

Data analyses included two parts: (a) descriptive statistics of the characteristics of the tutoring process, and (b) an examination of the relationships among different research variables.

Descriptive Statistics

Table 1 presents means, standard deviations, and inter-correlations of the main research variables. As can be seen from Table 1 participants reported relatively high levels of nonacademic skills (4.15 on a scale of 1-5) and relatively low levels of general study and language-related skills. A repeated measures MANOVA which was conducted revealed a significant Wilk's Lambda effect [$F(2,188)=171.65$, $p<.001$, Partial $\mu^2=.65$]. Bonferroni post hoc tests showed that the differences between all three types of skills were significant.

Participants also reported a moderate-high level of both academic self-efficacy (an average score of 3.68 on a 1-5 scale) and the extent to which tutoring included different activities. A repeated measures MANOVA which was conducted with the three types of tutoring activities as one factor revealed a significant Wilk's Lambda effect [$F(2,187)=21.07$, $p<.001$, Partial $\mu^2=.19$]. Bonferroni post hoc tests showed that review of material activities received significantly higher scores followed by general academic and non-academic activities. In addition, participants reported relatively low levels of difficulties during tutoring activities (an average of 1.52 on a 1-5 scale) and relatively high levels of contribution (an average of 4.08 on a 1-5 scale).

A further examination of the specific skills of tutees (the different items which comprised the general study skills, the language-related skills, and the nonacademic skills) showed that all the general study skills and three out of the five language-related skills received relatively low scores (less than 3 on a scale of 1-5), as shown in Table 2. Only *finding information* and *reading materials* in Hebrew received scores higher than 3. A repeated measures MANOVA which was conducted with the 12 skill items as one factor revealed a significant Wilk's Lambda effect [$F(11,172)=61.20$, $p<.001$, Partial $\mu^2=.81$]. Bonferroni post hoc tests showed that tutees' social skills received significantly the highest score compared to all

other skills followed by emotional skills, and reading materials in Hebrew. The other items differed significantly only in relation to some items.

In order to explore which activities most characterized tutoring, means and standard deviations of the items which comprised the tutoring activities variables (general academic activities, review of material activities, and nonacademic activities) were calculated as well.

As can be seen from Table 3, all tutoring activities were engaged in at a medium to high level, average scores being around 3 and above. A repeated measures MANOVA which was conducted with the activity items as one factor revealed a significant Wilk's Lambda effect ($F(7, 184)=17.75$, $p<.001$, Partial $\mu^2=.41$). Bonferroni post hoc tests showed that the activities of reviewing class material and writing papers received significantly higher scores than the other tutoring activities, and that the activity of reading articles received significantly the lowest score except in relation to discussion of personal matters and other various topics.

The items which measure difficulties encountered in tutoring were also calculated in terms of their means and standard deviation in order to better understand the specific types of difficulties that characterized tutoring from the viewpoint of the tutee. Results are presented in Table 4.

All types of difficulties received relatively low scores (less than 2 on a scale of 1-5), meaning that in general there were no major difficulties during the tutoring process as reported by the tutees. A repeated measures MANOVA which was conducted revealed a significant Wilk's Lambda effect [$F(6,176)=8.25$, $p<.001$, Partial $\mu^2=.22$]. Bonferroni post hoc tests showed that difficulty to establish a relationship received a significantly lower score compared to the other difficulties that were mentioned in the questionnaire.

As for the perceived success of the tutoring process, means and standard deviations of the items which comprised the tutoring success variable (see Table 5) revealed that all items received relatively high scores (above 3 on a scale of 1-5). A repeated measures MANOVA conducted with the success items as one factor revealed a significant Wilk's Lambda effect ($F(5, 186)=31.12$, $p<.001$, Partial $\mu^2=.46$). Bonferroni post hoc tests showed that the tutoring project contributed the most to tutees' performance on academic assignments, followed by their grades and preparation for exams, organization and preparation for lectures and study habits, and finally - levels of participation in class.

Relationships Among Variables

In general, tutees' skills were positively correlated with their academic self-efficacy. As can be seen in Table 1, correlations ranged between .37 and .47, meaning that between 13% and 22% of the variance of academic self-efficacy was explained by participants' evaluation of their skills, with general study skills explaining the highest percentage and nonacademic skills explaining the lowest percentage. The degree of engagement in tutoring activities was negatively correlated with difficulties encountered during tutoring and positively correlated with the reported success of tutoring.

In order to investigate the contribution of participants' self-efficacy, degree of engagement in tutoring activities, and difficulties encountered during tutoring to tutoring perceived success, a hierarchical linear regression analysis was conducted in the following way: Academic self-efficacy was entered first, the engagement in different tutoring activities (general academic activities, review of material, and nonacademic activities) was entered second, and difficulties encountered during tutoring was entered third. A significant result emerged [$F(5,184)=28.91, p<.001$] explaining 45% of the variance of reported tutoring success.

Whereas tutees' academic self-efficacy explained only 10% of the variance, the degree of engagement in tutoring activities explained 28% and not encountering difficulties explained an additional seven percent. Engagement in general academic activities ($\beta=.26, p<.001$), review of material ($\beta=.34, p<.001$), and tutoring difficulties ($\beta=-.27, p<.001$) were significant predictors of perceived tutoring success.

Discussion

Although different studies have examined empirically how formally assigned peer tutors provide support to tutees in general, relatively few of them have examined tutees with LD, and not much is known regarding the variables which contribute to the success of their tutoring process. The present study examined the characteristics of a tutoring project for college students with LD and the contribution of tutee-related and tutoring-related variables to the perceived academic functioning of the tutees. Specifically, the relationship between tutees' skills and their academic self-efficacy were examined, as well as the contribution of academic self-efficacy, engagement in different tutoring activities, and difficulties encountered

during tutoring to the perceived success of the tutoring process.

Several studies have identified learning and cognitive issues as more common than emotional and social difficulties for students with LD in higher education (Blake & Rust, 2002; Hall, Spruill, & Webster, 2002). Thus, the fact that participants reported relatively low levels of general study and language-related skills as opposed to relatively high levels of nonacademic skills is not surprising. In addition, the finding that reading Hebrew (native language) materials was generally rated as a less severe problem than other skills, including reading English (second language) materials, may indicate that the problem in reading was connected more to foreign language learning than to general reading comprehension. A similar result was found in Vogel and colleagues' study (2007).

According to tutees' reports, tutoring sessions included a variety of activities, since seven out of the eight activities which were mentioned in the questionnaire received average scores above 3 on a 1-5 scale. Nonetheless, reviewing class materials and writing papers were the most frequent activities. As services that improve more generalized skills have been found to be more beneficial to the overall achievement of students with LD than services aimed at supporting specific courses (García-Sánchez, & Fidalgo-Redondo, 2006; Keim, McWhirter, & Bernstein, 1996), tutors in this project should be encouraged to strengthen their emphasis on organizational skills and learning strategies, while providing tutees with a sense that their specific, course-related needs are being met.

In general, the research findings suggest that there were no major difficulties during the tutoring process, since all types of difficulties received relatively low scores (less than 2 on a scale of 1-5). Difficulty to establish a relationship received the lowest score. These findings are encouraging especially in light of the claims regarding the importance of the tutor-tutee relationship to the success of the tutoring process (e.g., Daiute & Dalton, 1993). They may also explain why tutees perceived tutoring as relatively beneficial to them.

Specifically, tutees perceived the tutoring process as contributing the most to their performance on academic assignments and the least to their participation in class. This may mean that although the tutoring process included a variety of activities, it was more instrumental in nature, focusing on specific tasks.

In general, results indicate that the tutoring project was successful since participants reported rela-

tively low levels of difficulty during tutoring and relatively high levels of perceived success of tutoring. This finding follows previous studies which reported positive outcomes of peer-tutoring projects in general (e.g., Leung, 2015; Rohrbeck, Ginsburg-Block, Fantuzzo, & Miller, 2003) and for students with LD in particular (e.g., Zwart & Kallemeyn, 2001). It should be noted, however, that the participants of the current study were college students. This means that they represent a more skillful sector of persons with LD, at least academically speaking, since they have succeeded in entering higher education despite their LD. Consequently, it may be easier to tutor them than other individuals with LD.

As hypothesized, participants' skills were positively correlated with their academic self-efficacy, with general study skills explaining the highest percentage of self-efficacy and nonacademic skills explaining the lowest percentage. This means that tutees who believe that they have better skills, are more confident in their ability to succeed in the academic domain. This finding is in accordance with Bandura's (1986, 1995) claim regarding past performance as one of the main sources which may impact feelings of self-efficacy. Thus, it is suggested that in order to enhance tutees' academic self-efficacy, tutors need to focus on the academic domain while providing opportunities for success in this field.

Interestingly, only the tutoring-related variables—degree of engagement in tutoring activities and difficulties encountered during tutoring—were significant predictors of the perceived success of the tutoring project. In contrast, academic self-efficacy did not predict the perceived success of tutoring. This finding is indeed encouraging since it suggests that college students with LD may be assisted and contributed by tutoring projects regardless of the extent of their disabilities and sense of efficacy. Nevertheless, it is recommended that future studies should examine the effect of other tutee-related variables, such as motivation and proactivity. They should also explore other indications of tutoring success, including more objective ones, such as tutees' actual grades and dropout rates.

The study's results have some practical implications. First, they suggest that tutoring college students with LD is a successful tool for the advancement of these students, at least from their perspective. Thus, such projects should continue. Second, they may imply that good guidance and preparation of tutors are a key factor in the success of tutoring students with LD,

since tutoring-related variables may contribute more to the success of the tutoring than tutee-related variables. This guidance should focus on aspects such as strengthening the tutor-tutee relationship, using diverse activities during tutoring (and not focusing mainly on instrumental assistance), and enhancing tutees' self-efficacy through the provision of successful experiences.

Despite its importance, the current study is limited in scope insofar as it focused on a particular project in one country. Moreover, findings are based on the self-reports of participants which constitute a little more than a third of the tutees in the specific tutoring project. Although it is considered a reasonable response rate in the social sciences, it may limit the ability to generalize from the results. Future studies should examine other tutoring projects and use direct observations as well as concrete measures of successful tutoring.

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Table 1

Means, Standard Deviations, and Inter-Correlations of Main Study Variables (N=190)

Variables	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. General study skills of tutee	2.69	0.94								
2. Language-related skills of tutee	2.92	0.94	.41***							
3. Nonacademic skills of tutee	4.15	1.04	.35***	.36***						
4. Academic self-efficacy of tutee	3.68	0.85	.47***	.40***	.37***					
5. General academic activities in tutoring	3.55	1.01	.07	-.12	-.07	.01				
6. Review of material in tutoring	3.97	1.11	.07	.02	.15*	.05	.38***			
7. Nonacademic activities in tutoring	3.33	1.26	-.03	-.06	-.05	.07	.45***	.33***		
8. Difficulties encountered during tutoring	1.52	0.68	-.11	-.10	-.09	.01	-.20**	-.27***	-.15*	
9. Perceived success of tutoring	4.08	0.87	-.03	-.05	-.05	-.07	.47***	.54***	.33***	-.42***

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 2

Means and Standard Deviations of Perceptions of Tutee Skills (scale 1-5)

Skill	<i>M</i>	<i>SD</i>
General study skills		
Attention and concentration	2.23	1.29
Studying for exams	2.77	1.18
Use of time	2.69	1.45
Memory	2.79	1.32
Mathematics	2.97	1.34
Language-related skills		
Reading materials in English	2.53	1.36
Writing papers	2.55	1.11
Summarizing articles	2.60	1.18
Finding information	3.18	1.21
Reading materials in Hebrew		
Nonacademic skills	3.73	1.27
Emotional areas	4.29	1.07
Social areas	4.02	1.16

Table 3

Means and Standard Deviations of Degree to Which Activities Were Engaged in During Tutoring Sessions (scale 1-5)

Activity	<i>M</i>	<i>SD</i>
General academic activities		
Working on learning strategies	3.67	1.27
Organization	3.55	1.41
Writing papers	4.04	1.17
Reading articles	2.96	1.59
Review of material activities		
Reviewing class material	4.11	1.16
Studying for exams	3.84	1.30
Nonacademic activities		
Discussion of personal matters	3.32	1.36
Discussion of various topics	3.33	1.31

Table 4

Means and Standard Deviations of Degree to which Difficulties Interfered with the Tutoring Process (scale 1-5)

Interfering situation	<i>M</i>	<i>SD</i>
Tutor was not sufficiently well versed in the content area	1.67	1.15
Tutor lacked skills to deal with tutee's difficulties	1.65	1.10
Tutor had no one to turn to for guidance	1.55	0.97
Sessions were not always effective	1.62	1.03
Tutee could not explain his or her needs	1.48	0.93
The tutor did not have the time needed for tutoring	1.43	0.91
Establishing a relationship was difficult	1.23	0.71

Table 5

Means and Standard Deviations of Items Measuring Perceived Tutoring Success (scale 1-5)

Type of Success	<i>M</i>	<i>SD</i>
Improved grades	4.32	0.88
More organized and better prepared for lectures	3.87	1.17
Higher levels of participation in class	3.47	1.35
Better performance on academic assignments	4.55	0.79
More prepared for exams	4.24	1.12
Improved study habits	4.04	1.18

Table 6

Linear Regression Predicting Perceived Tutoring Success (N=190)

Variable	<i>B</i>	<i>SE B</i>	β	<i>R</i> ²
Step 1:				.01
Academic self-efficacy	-.09	.08	-.08	
Step 2:				.38
Academic self-efficacy	-.11	.06	-.11	
General academic activities in tutoring	.25	.06	.29***	
Review of material in tutoring	.31	.05	.40***	
Nonacademic activities in tutoring	.05	.05	.07	
Step 3:				.45
Academic self-efficacy	-.10	.06	-.10	
General academic activities in tutoring	.23	.06	.26***	
Review of material in tutoring	.27	.05	.34***	
Nonacademic activities in tutoring	.04	.04	.06	
Difficulties encountered during tutoring	-.34	.07	-.27***	

Inclusive Instructional Practices Used and Their Perceived Importance by Instructors

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Abstract

This research examines the inclusive instructional and accommodative strategies instructors use to assist students with disabilities in their classes, and what faculty perceives as most important for student success. The survey included demographic questions (gender, role in the college, and experience) and response items from the Inclusive Teaching Strategies Inventory ([ITSI] Lombardi, Murray, & Gerdes, 2011). The ITSI is a self-report survey that asks participants about their attitudes towards inclusive teaching strategies, as well as how they act on these strategies. Responses were collected from 52 instructors in the College of Education at a large university in the Pacific Northwest. Respondents included a mixture of tenure-track faculty, adjunct faculty, and course instructors. Findings from the analysis suggest differences between instructors' attitudes and actions in two areas: (1) Scholastic Accommodations to assignment due dates and individual reading loads, and (2) Physical Accommodations, such as examining the classroom in advance to anticipate physical barriers for students with disabilities. Findings also suggest that instructors lacked confidence in their knowledge of Universal Design for Learning, legal definitions of disability, the Americans with Disabilities Act, and Section 504 compliance. The implications of these findings for instructor professional development and student self-advocacy are presented.

Keywords: Postsecondary education, disability, universal design for learning, inclusive practices

The percent of students with disabilities entering institutions of higher education has steadily grown over the past few decades (Newman, Wagner, Cameo, Knokey, & Shaver, 2010). This growth has generated considerable interest in research on accessibility of higher education for students with disabilities. Eleven percent of undergraduates in both 2007-2008 and 2011-2012 reported having a disability (National Center for Education Statistics [NCES], 2015). In 2011-2012, some 44% of undergraduates with disabilities were male and 56% were female, about the same percentages as for undergraduates without disabilities. However, not all students who have been identified with a disability disclose their disability upon entering the university.

One study, requested by the Office of Special Education and Rehabilitative Services (OSERS) in the U.S. Department of Education, collected information from postsecondary institutions in the United States on the enrollment of students with disabilities, services and accommodations provided, documentation accepted as

verification of a disability, educational and accessibility materials and activities provided, and universal design (Raue & Lewis, 2011). This report provides national data collected from degree-granting postsecondary institutions about students with disabilities, the services and accommodations provided to these students, and various aspects of institutional accessibility. The estimates presented in the report are based on a survey of two-year and four-year degree-granting postsecondary institutions conducted during the 2009-2010 academic year. A large percentage of institutions that enrolled students with disabilities during the 12-month 2008-2009 academic year reported enrolling students with specific learning disabilities (86%), Attention Deficit Disorder (ADD) or Attention Deficit Hyperactivity Disorder (ADHD) (79%), mobility limitations or orthopedic impairments (76%), or mental illness/psychological or psychiatric conditions (76%). Among institutions that enrolled students with disabilities during the 2008-2009 academic year 93% provided additional

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exam time as an accommodation to students with disabilities. Large percentages of institutions also provided classroom note takers (77%), faculty-provided written course notes or assignments (72%), help with learning strategies or study skills (72%), alternative exam formats (71%), and adaptive equipment and technology (70%).

Although the data demonstrate a steady increase of students with disabilities enrolled in two-year and four-year colleges, it has been found that faculty often have limited knowledge regarding the laws associated with serving students with disabilities in higher education (i.e., ADA and Section 504 mandates), the services offered at their university, and effective teaching strategies for use with students with disabilities (Leyser & Greenberger, 2008). The National Center for Education Statistics (2009) identified that only 62% of postsecondary institutions provided instructors with handbooks designed to assist them in working with learners with disabilities, and only 64% of those institutions provided instructors with information and resources to increase their knowledge of working with learners with disabilities in higher education.

Students with disabilities in postsecondary education need faculty support. The National Council on Disability ([NCD], 2003) identified a lack of support from faculty one of the primary challenges for students with disabilities in postsecondary education. Access to appropriate support and accommodations as well as the presence of positive attitudes among faculty are directly related to the success and retention of learners with disabilities in a postsecondary environment (Rao, 2004; Stodden, Jones, & Chang, 2002). Faculty have more challenges than ever to plan, implement, and assess instruction for a greater number of students who require accommodations (Lombardi, Murray, & Dallas, 2013). Faculty may not have the knowledge to provide appropriate support or accommodations.

Universal Design

To address the increasing student diversity, many have argued for the application of a Universal Design (UD) framework. UD is “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” (Connell, et al., 1997, About UDL section, para.1). When individuals apply UD principles, their products and environments meet the needs of potential users with a variety of character-

istics. Disability is just one of many characteristics that an individual might possess. The use of UD in postsecondary settings has been supported by legislation including the Reauthorization of the Higher Education Opportunity Act, 2008, where UD is referred to 18 times (Roberts, Park, Brown & Cook, 2011). UD is written into the Higher Education Opportunity Act where it is described as a “scientifically valid framework for guiding educational practice” (SEC. 762 [G], SEC. 103 [C]). It is applied to educational contexts through two major frameworks, sometimes in combination: universal design of instruction and universal design for learning.

Universal design of instruction (UDI). UDI is a framework for applying UD to learning environments with a goal towards greater accessibility. The goal of UDI is to maximize learning with a wide range of characteristics by applying UD principles to all aspects of instruction (e.g., delivery methods, physical spaces, information resources, technology, personal interactions, and assessments). The nine UDI principles include strategies for instruction that focus on broad commitments and beliefs that underlie planning and delivery of instruction. These principles include a commitment to instruction as being useful and accessible to all learners, with a tolerance and anticipation of variance in individual student learning, and an instructional climate that is welcoming and inclusive (Scott, McGuire & Shaw, 2001).

Universal design for learning (UDL). UDL focuses primarily on three “categories” of instructional practices that, similarly to UDI, shape instruction and classroom design. UDL calls for the integration of presenting multiple means of representation, engagement, and expression into course curriculum (CAST, 2011; National Center on Universal Design for Learning, 2014). Providing multiple means of engagement requires instructional strategies that develop self-regulation, persistence and self-sustained effort, and individual choice and autonomy. Engagement instructional strategies, which target the “why” of learning, might include student self-assessments, mastery-oriented feedback, or a focus on relevance and value of subject matter to students. Meanwhile, providing multiple means of representation focuses attention on the “what” of learning: the options students are provided for comprehension, language and mathematical expressions, and perception of information. Instructionally, this includes clarification on vocabulary, syntax and structure, alternatives for auditory and visual information, and attention towards maximizing transfer and

generalization. Finally, multiple means of action and expression is directed towards the “how” of learning, and targets executive functioning, physical action, and options for expression of knowledge. These strategies include supporting planning and strategy development, using multiple media for communication, and varying methods for student response.

While UDI and UDL have slightly different frameworks for understanding issues related to UD’s application in the classroom, they share a commitment to anticipating, planning for, and embracing diversity of student needs. As UDI is most frequently applied to higher education instructional settings, the term is used in this paper to signify a combined framework of both UDL and UDI principles.

Several institutes of higher education (IHE) have designed various models and types of professional development for faculty to increase their knowledge of both UDL and UDI. For example, the University of Hawaii - Teaching All Students Reaching All Learners Professional Development Training Program - includes the topics of: UDL, assistive technology (AT), hidden disabilities, and rights and responsibilities. This program was designed to support postsecondary faculty and staff by providing information on ways to improve postsecondary education outcomes for all students, including those with disabilities (see <http://www.ist.hawaii.edu/>). Another example comes from The Ohio State University where staff developed the Faculty and Administrator Modules in Higher Education (FAME), an online self-paced series of modules that could be utilized by faculty, staff, or teaching assistants (Izzo, Murray & Novak, 2008). The content was designed around effective teaching and learning practices and includes an introduction to UDI as well as modules investigating the “rights and responsibilities in the accommodations process” and “web accessibility” (p. 65). San Francisco State University (SFSU) has also developed online modules and web resources to facilitate instructor knowledge of UDI. The University of Northern Colorado’s “Universal Design for Learning: Presuming Competence by Design” tutorial offers individualized and differentiated trainings based on instructor knowledge level (Moore, 2007). Finally, the DO-IT program at the University of Washington houses case studies, PowerPoint presentations, and promising practices literature geared specifically towards faculty in its “Faculty Room” online resource (Burghstaler, 2015).

Some IHEs have made an effort to offer (mostly online) resources to faculty related to training and

knowledge building about UDI, full implementation at the university level is not widespread. Several barriers, cited by institutions as hindering implementation of UD related to disability to a moderate or major extent, include limited staff resources to provide faculty and staff training on accessibility issues (52%), costs associated with purchasing appropriate technology (46%), and other institutional priorities (45%) (Raue & Lewis, 2011). Instead, institutions reported what could be thought of as more of a “reactive” approach to implementing UD principles and supporting students with disabilities: the majority of institutions (92%) reported providing one-on-one discussions to support faculty and staff in working with students with disabilities, as requested. Additionally, three quarters of institutions reported distributing materials “designed to encourage students with disabilities to identify themselves to the institution” (p. 4). These policies and procedures, considered together, put the onus on both the individual faculty member and student to reach out before they receive training, assistance, or accommodations. Students with disabilities, then, are required to almost immediately become strong self-advocates in brand new educational contexts in order to receive the necessary accommodations and supports they need. Faculty must also be self-advocates and take the initiative to connect with disability resources personnel, and obtain resources or assistance for their courses. Faculty may find themselves in a scenario where they need to obtain training but do not have the time or have limited resources to access.

Measuring Instructor Attitudes and Actions Toward UDI in a College of Education

The purpose of this study was to determine the accommodative strategies that faculty have used and those they believe are important for inclusive instruction including accommodations for students with documented disabilities in their university classes. This research examined the accommodations and inclusive instructional strategies faculty have used in their university classes and of these, what they perceive as being most important in helping students with disabilities be successful in their classes. Examining what instructors identify as being used and most important will help to inform the university. As a result, meaningful, supportive resources can be developed and shared with instructors generally and in the College of Education (COE) to help students with disabilities be successful in their classes.

Our research was guided by several questions:

- What practices and accommodative strategies are being used by instructors and which ones do they perceive as being important in helping students with disabilities be successful in their classes?
- How confident are faculty in their knowledge of ADA, 504, and universal design?

Method

Context

Instructors taught within a COE at a four-year public research university located in the Pacific Northwest. Across all undergraduate and graduate programs, the COE has 33 students who have disclosed disabilities out of a total enrollment in the college of 1,514, or approximately three percent of the total population of students in the College (B. Callahan, personal communication, July 30, 2015). The authors believe that the number of students with disabilities is much higher but data do not reflect it as some students have not disclosed their disability. Participants were chosen from the COE given recent discussions amongst faculty and students related to a potential lack of knowledge regarding how to effectively support students with disabilities. The authors found these discussions troubling given the emphasis on UDL/UDI principles in public school settings, where many instructors worked in a variety of capacities.

The university localizes all services for all undergraduate and graduate students into one office on campus, Disability Resources for Students (DRS), which manages 1,619 individual student cases university-wide to provide a range of services including both classroom accommodations and campus access. Common accommodations for COE students coordinated through DRS comprise two major categories: alternative testing and “general classroom setting.” Alternative testing accommodations include extra time on assessments, reduced distraction environments, and utilizing a computer for short answer and essay questions. “General classroom setting” accommodations include: copies of PowerPoints and displayed materials, extra time on timed in-class assignments, permission to audio record lectures, note-taking assistance, disability related absence authorization, and accessible textbooks, course packs, and articles (B. Callahan, personal communication, February 2,

2015). Other less commonly requested accommodations coordinated by DRS for students in the College include interpreters, classroom relocation (into accessible rooms and campus buildings), accessible campus shuttle transportation, and accessible parking.

Existing Training within the COE

There is no required ADA training for instructors at the University or within the COE. DRS personnel often provide basic or advanced trainings on ADA to individual departments and faculty on a case by case basis, and an online training is in development (B. Callahan, personal communication, July 30, 2015). DRS partners with the University’s Center for Teaching and Learning to provide information about disability accommodations during a summer training for fellows and research and teaching assistants.

At the University and within the COE, faculty are informed about their responsibilities to students who have disclosed their disabilities primarily through one document, referred to as the “DRS Faculty Notification Letter.” Each College within the University is assigned a DRS counselor, who serves as a direct contact for faculty, staff, and students related to accommodations. At the beginning of each quarter, as directed and scheduled by students, counselors meet individually with students in order to discuss potential accommodations and needs for that academic period. Following this meeting, called an Access Planning Meeting, the student is approved for particular accommodations and notified of those accommodations electronically. The student, using a website managed by DRS, has the responsibility to select classes in which they would like to use their accommodations. When a student selects a particular set of accommodations for a course, a *Faculty Notification Letter* is generated and distributed via email to the instructor of the course. This letter provides the instructor with information related to accommodations a student enrolled in their course may need which may impact instruction, classroom structure, or scheduling. Students are also encouraged to individually contact instructors to notify them of any accommodations that might be relevant to the course, or to discuss specific details that may be important for implementing those accommodations.

DRS has created an additional resource as a source of information for faculty, the “Flyer for Faculty,” which is designed to address issues of access, equity, and inclusion for both students and faculty with disabilities. The flyer notes six major responsi-

bilities of faculty in providing academic accommodations. Those responsibilities include providing the accommodations identified in the *Faculty Notification Letter*, contacting DRS for questions or concerns related to making accommodations for students or to refer students, ensuring instructional materials are accessible, and confidentiality is maintained. Two additional responsibilities of faculty noted on the flyer and relevant to the discussion of UDI are that faculty “should not lower course expectations or fundamentally alter the nature of the course at the request of the student with a disability,” and that best practices in teaching are implemented to reach “a diversity of learners” (University of Washington, 2015, Faculty responsibilities section, para. 5).

Measure

The online survey included items from the Inclusive Teaching Strategies Inventory (ITSI) (Lombardi, Murray, & Gerdes, 2011). The ITSI has undergone multiple development phases and validation studies (Lombardi & Murray, 2011; Lombardi et al., 2011). An international cross validation study, comparing the U.S. and Spain, using exploratory and confirmatory factor analysis led to the development of a seven-factor structure (Lombardi & Sala-Bars, 2013). For our study purposes and research questions, the authors chose to use the prior format where items were divided across two dimensions and six subscales. This survey has 34 items related to inclusive instructional strategies, accommodations, and disability laws and concepts. There are also general items related to campus resources. The first dimension, Attitude, asks respondents to use a one-four Likert scale to rate how highly they value a specific practice using the stem “I believe that it is important to...” The second dimension, Action, uses a one-four Likert scale to ask the respondents how strongly they enact those same practices using the stem “I do...” A final six-item sequence asks more specific questions about respondents’ knowledge of their specific disability laws. As a whole, these items provide a rich window into the beliefs, practices, and knowledge of higher education faculty.

The ITSI has established validity and reliability (Lombardi & Murray, 2011, Lombardi, et al., 2011). Lombardi and Murray (2011) indicated that the ITSI “can be used as tool for assessing university faculty attitudes and perceptions of disabilities” (p. 52) and can be used to focus professional development activities on areas of importance to faculty (Lombardi & Murray, 2011; Lombardi et al., 2011).

Participants

Researchers sent the ITSI survey to 200 members of the COE who directly serve graduate and undergraduate students, including tenure-track faculty (52% of respondents), teaching associates (17%), research professors (6%), teaching assistants (10%), lecturers, and adjunct faculty. Of those included in the frame, 52 (26%) responded over a three-week period. Forty-three (83%) of the respondents were female and nine (17%) were male, which generally reflected the gender dynamics of the COE. In terms of years in higher education teaching, 31% of respondents reported less than five years of experience, 29% reported five to ten years, and 40% reported more than 10 years. Further demographic data was unavailable due to concerns about anonymity.

Data Analysis Procedures

Following from Lombardi et al. (2011), the researchers ran a statistical analysis of the descriptive statistics of each subscale in the ITSI instrument, followed by an analysis of the subscale-level responses. This two-stage analysis provides an aggregated view of all responses to all of the “Attitudes-Action” scale items in the ITSI, followed by a closer examination of the underlying trends. Table 2 presents the mean (M), standard deviation (SD), and Chronbach’s Alpha (A) of each subscale. The left three columns indicate the statistics related to participants Attitudes towards the subscale items, and the right columns indicate their self-reported answers related to their own Actions, as described in Lombardi et al. (2011).

Arraying the statistics in this format allowed researchers to identify the large scale trends in respondent data, and helped to guide further investigation at the item level. The following sections provide a brief summary of findings that may be inferred from the data in Table 2.

Results

Findings at the Subscale Level

Low means in accommodations. The Accommodations subscale had the lowest overall means in both Attitudes (3.17) and Actions (3.13). This indicates a low level of agreement on the importance of this construct. However, these low means are likely attributable to divergent interpretations of two key items discussed in the next section.

High standard deviations in multiple means of presentation and accommodations. Two of the sub-

scales—Multiple Means of Presentation and Accommodations—showed more variance in their responses, as illustrated by the higher Standard Deviation values in their aggregated Attitudes and Beliefs scores. The researchers believe that the high degree of variance in the scores relate to two or three controversial items in the subscales that created some disagreement amongst respondents. This is viewed as an instrument error, and has been reported to the researchers who composed the ITSI survey.

Effect Sizes of Cronbach's Alpha Between Attitudes and Actions

To provide a comparison of the consistency of users responses to the items in each scale and across the Attitude/Action items, Liu and Weng (2009) proposed using a simple effect size calculation that is similar to Cohen's D. The Liu and Weng D calculation is designed to compare the effect sizes of two Cronbach's Alpha calculations that have the same number of items and respondents, as is the case in the ITSI. In Table 3, Cronbach's Alpha is presented for each subscale's Attitude/Action component, followed by a calculation of the effect sizes using the modified Cohen's D. A negative number indicates a stronger orientation towards Attitudes over Actions, with a positive indicating a stronger orientation towards taking those Actions. In essence, the Cohen's D effect size is used as a proxy for the gap between the respondents' strength of belief in the importance each construct in the scale and their self-reported beliefs about their own activity in that subscale.

In the aggregate, respondents demonstrated a strong orientation towards Action on Inclusive Lecture Strategies ($d=.21$) and Accessible Course Materials ($d=.20$). Conversely, in the aggregate, respondents were more inclined to believe in the importance of Multiple Means of Presentation ($d=-.19$), Accommodations ($d=-.14$), and Inclusive Assessment ($d=-.40$) than they were to report that they have enacted those beliefs in their teaching. The gaps represented by these results indicate that faculty could use further development in these areas to improve their capacity to put their values into action.

Findings at the Item Level

In order to provide a deeper view of the responses, researchers used the subscale findings above to identify specific items that may account for the observed values in Table 3. The researchers drilled down to the item levels to look for the underlying

causes of the shifts in means, standard deviations, and alphas presented earlier. At the item level, researchers selected findings from the Accommodations subscale, the Campus Resources subscale, and examined items from questions specific to disability law and policy knowledge.

Mixed reactions to accommodations for extra credit and reduced reading load. When asked whether they believe that it is important to allow students with a documented disability to complete extra credit assignments, researchers found that a majority of respondents were open to this option. However, 43% of participants indicate that they believe that it is 'unimportant' or 'very unimportant' to alter their reading load for students with a documented disability. These are very similar to the responses to the 'I do' form of the item (Chi-Square: $p<.001$, $df=9$).

Similarly, researchers observed that some faculty did not consider it important to change the overall course-reading load for a student with a documented disability even if they would not do so for other students (64% affirmative, 36% negative). Respondents gave similar responses when asked the Actions form of the question (Chi-Square: $p<.001$, $df=9$).

The similarity of the responses in Accommodations to extra credit and reading load may indicate that instructors and faculty are under the impression that changing reading load or completing extra credit responses may compromise the intellectual rigor of their course, or that such accommodations might increase their teaching workload. However, training or partnerships with University staff may provide them with insight into how to improve their capacity to accommodate student disabilities in these two areas without compromising the perceived integrity of their teaching.

Checking for physical barriers. When asked if they believed that it was important to survey their classroom for physical barriers for students, 86% of respondents agreed or strongly agreed. However, when researchers asked whether they currently look for physical barriers in their classrooms, only 64% agreed. Chi-square analysis ($p<.001$, $df=9$) of the item verifies that 22% of respondents responded with a lower response on the Actions version of the question compared with the Attitudes version of the question. This is an example of a clear gap between some respondents' Attitudes and Actions, indicating that training or a reminder to check for classroom barriers could have a beneficial effect on closing the gap.

Confidence in Disability Laws and Policies: Knowledge and Practice

In addition to the ITSI's six constructs, the survey contains six questions related to the respondents' confidence related to two aspects of disability. Four of the questions relate directly to knowledge of aspects of disability law (including the ADA act, Section 504, Universal Design for Learning, and the legal definitions of disability) and two relate to the respondents' understanding of their own role and knowledge in enacting these laws. Table 4 illustrates their overall responses to the items.

In their aggregate form, the responses above indicate an unusual pattern: Respondents as a whole were very confident in their responsibilities (82% responded yes) and knowledge (72% responded yes) related to disability laws. Yet a substantial number of respondents in at least two categories (ADA law: 47%; Section 504 law: 58%) did not report feeling confident in their knowledge of these laws. This presents a quandary: How can respondents simultaneously have confidence in their ability to serve students if they do not understand the laws and policies that guide this service?

Researchers posited that there were deeper underlying relationships in these responses. To determine whether there is a relationship between respondents' confidence in their knowledge of disability law constructs (ADA/504/UDL/Legal Definitions) and the sense of their responsibilities and knowledge in making accommodations for their students (Items 2 and 3 in this cluster), researchers conducted a cross-tabulation of these responses in SPSS using a Chi-Square test on the responses for each question. Due to the binary nature of the response (Yes-No) and small sample size, the researchers used Fisher's Exact (one-sided) computation to determine the statistical relationships between each individual's set of responses to the knowledge question and their self-perceptions of their understanding of their responsibilities as faculty. Table 5 displays the p-values for each Chi-Square test, where the first column displays the significance of the tests internal consistency between Item 2 (confidence in responsibilities to students) and each of the four legal-knowledge constructs. The second column indicates the results for Item 3 (confidence in knowledge to make adequate accommodations) and each of the legal constructs.

The Chi-Square values indicate significant relationships exist between individuals' responses to their confidence in their responsibilities to students, their

confidence in their knowledge of making accommodations for students, and their confidence in their knowledge of the laws themselves (except in the case of Section 504 and Responsibilities). Surveyed respondents who were confident in their knowledge of the policies were significantly more likely to be confident in their roles and responsibilities. This may be evidence of the importance of a respondent's general knowledge of disability policies and laws which may promote a greater sense of confidence in their responsibilities and their perceptions of their own knowledge.

Discussion

The data provides a picture of what inclusive instructional strategies and accommodations faculty within a College of Education use to assist students in their classes and what they perceive as most important. The strong relationships between knowledge of specific disability laws, a sense of confidence in one's responsibilities to students, and one's confidence in their knowledge indicates that some exposure to disability training may improve instructors' willingness to provide these crucial services to students. This data provides tentative evidence for the proposition that instructors and faculty who learn about these laws may better understand why they exist, and are more likely to value the practices and responsibilities that come with supporting students with disabilities. An immediate benefit to the participants is that the ITSI contains items that identify specific accommodations and inclusive instructional strategies (Lombardi et al., 2011). By reading and responding to these items, participants may have identified accommodative and inclusive instructional methods that are new and/or of interest to them.

Researchers had the opportunity to present these findings at two events. First, we presented the findings at a brown-bag session for DRS and the Disability Studies program at the University, where feedback was solicited. Most attendees identified as a student with a disability and others identified as instructors. Feedback on results was obtained with students identifying the need to separate the terms and content related to UDL and accommodations. This feedback supports a distinction between accommodations mandated by law for students with disabilities accessing postsecondary education, which were hard won by disability activists (for example, extra time on exams), and the kinds of strategies that can be imple-

mented in classrooms (for example, multiple means of representation) that benefit all students regardless of disability. While students felt that UDL was an important and valid set of strategies that would benefit their educational experiences in significant ways, they also felt the need to emphasize the importance of legally regulated requirements for postsecondary institutions that include a grievance process.

Students also supported the need to provide training at a departmental level and identify advisors that could serve as a liaison to DRS within each academic unit.

Second, the first author informally presented findings to a group of high-school students with disabilities who were attending a summer program at the University. These students discussed the shift from high-school, where support is readily provided, to a postsecondary context where they needed to have strong self-advocacy skills. Conversation centered on the use of role-play to facilitate advocacy skills as they practice how to talk with instructors about accommodations. One individual stated “I didn’t realize that I may be the one that has to educate the instructor about my disability and what I need to be successful.”

These results have implications for disability services providers as our findings suggest practical strategies for the development of resources, instructor professional development and student self-advocacy which may assist to eliminate institutional barriers. First, providers must develop a positive, collaborative relationship with instructors where they are made aware of available resources and supports. This can be as simple as disseminating a brochure detailing points of contact on campus. The development of a DRS resource library to provide clear, updated information for faculty as well as students could also be beneficial. Second, technology can be utilized, such as online modules or video, to provide training in critical content areas. Third, disability service providers can promote self-advocacy by assisting students with disabilities to understand the nature of their disabilities, their rights, and their accommodation needs. Students shift from a secondary setting where they are automatically provided with supports and services to a higher-education context where they have to self-advocate and discuss their needs with faculty at the beginning of each new term. Disability service personnel can assist by providing information on the differences between high-school and postsecondary settings. Further, providers can serve to mediate the

transition as they can provide information related to what services are available and can actively teach students with disabilities to self-advocate. These activities may assist students to become more comfortable with and confident in asking for the supports available to help them succeed. Further, use of role-play or coaching may be beneficial as students can practice how to describe their disability to faculty and can work to clearly identify what types of accommodations they will need.

There are several important limitations to consider in this study. First, this study’s findings are most likely strongly indicative of attitudes and behaviors in the sampled faculty of the COE. Second, Lombardi et al. (2011) have shown that more detailed demographics can illustrate much finer relationships between educators and their scores on the ITSI. We did not collect department or subject area information due to concerns about identifying respondents based on their submission. Third, we believe this sample represents a best-case scenario. One of the authors is a faculty member within Special Education and, given the topic and affiliation, special education faculty may have increased participation. Faculty within a special education program are known to value and enact inclusive practices, as these ways of teaching are a part of their disciplinary knowledge. In addition, educators most likely have had some exposure to UDL/UDI in public school settings. Last, a Likert Scale might have yielded more precise results regarding the difference between faculty’s confidence in their responsibilities versus their understanding of the laws. “Yes” and “no” questions did not provide the faculty with much opportunity to express their perceived level of knowledge in these areas. Future iterations of this study will grow to include research that can act as a comparison, in order to isolate underlying variables that affect faculty attitudes and behaviors.

Ultimately, the results of this study will be used to inform faculty and can have an impact at the student level as faculty provide appropriate accommodations. Resources will be developed or found that can be made accessible to faculty if they need more information about disabilities, an accommodation, or instructional practice. Similar studies can be conducted at other universities which can include their university faculty in determining what their participants perceive to be important regarding accommodations and inclusive instructional practices. This may help to inform their faculty and provide discussion about supporting the increasing number of stu-

dents with disabilities. As demonstrated in this paper, a deeper understanding of disability knowledge will lead to faculty showing a greater confidence in their responsibilities to students. Researchers may wish to more carefully index the kinds of knowledge and perceptions of disability that are held by faculty, and identify the kinds of content, pedagogy, and modalities that will engage faculty in this important work. This study examined only the scores from the COE, where knowledge of accessibility is part of the disciplinary knowledge. Future research should examine broader sources of input, such as faculty from colleges of Business, Engineering, and Medicine. Researchers believe that faculty in these colleges, where disability knowledge is not necessarily part of the discipline, may hold very different beliefs about their roles in maintaining accessible learning environments for all students.

Development of a more extensive research base on the use of UDI in postsecondary educational settings, which moves beyond initial concerns regarding definition and theory to intervention research that examines the impact of UDI on objective measures of student outcomes is needed.

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Table 1

Survey Demographics (N=52)

Item	<i>N (%)</i>
Gender	
Female	43 (83%)
Male	9 (17%)
Role	
Faculty (Adjunct to Full Professor)	36 (69%)
Teaching Assistants	5 (10%)
Other	11 (20%)
Years Teaching	
Less than 5 years	16 (31%)
5 to 10 years	15 (29%)
More than 10 years	21 (40%)

Table 2

Attitudes and Actions Toward Subscales

Subscale	Attitudes Toward Subscale			Actions Toward Subscale		
	<i>Mean</i>	<i>SD</i>	<i>α</i>	<i>Mean</i>	<i>SD</i>	<i>α</i>
Multiple Means of Presentation	3.39	2.67	.61	3.52	2.31	.48
Inclusive Lecture Strategies	3.60	1.42	.53	3.58	1.6	.67
Accommodations	3.17	2.97	.71	3.13	2.93	.64
Campus Resources	3.64	1.47	.56	3.46	1.96	.59
Inclusive Assessment	3.48	1.89	.71	3.45	1.63	.44
Accessible Course Materials	3.84	1.36	.71	3.67	1.97	.79

Table 3

Effect Size of Attitude-Action Gap by Subscale

Subscale	α (Attitudes)	α (Actions)	Cohen's <i>D</i>
Multiple Means of Presentation	.61	.48	-.19
Inclusive Lecture Strategies	.53	.67	.21
Accommodations	.71	.64	-.14
Campus Resources	.56	.59	.04
Inclusive Assessment	.71	.44	-.40
Accessible Course Materials	.71	.79	.20

Table 4

Confidence in Knowledge and Responsibilities Related to Disability

"I am confident in..."	Total Responses	"Yes" Response	"No" Response
My understanding of the Americans with Disabilities Act	51 (98%)	27 (53%)	24 (47%)
My responsibilities as an instructor to provide or facilitate disability related accommodations	51 (98%)	42 (82%)	9 (18%)
My knowledge to make adequate accommodations for students with disabilities in my courses	50 (96%)	36 (72%)	14 (28%)
My understanding of Section 504 of the Rehabilitation Act of 1973	50 (96%)	21 (42%)	29 (58%)
My understanding of Universal Design	51 (98%)	29 (57%)	22 (43%)
My understanding of the legal definition of disability	51 (98%)	30 (59%)	21 (41%)

Table 5

Chi-Square significance (Fisher's Exact One-Sided) of Consistency of Responses

	Item 2: Responsibilities (p)	Item 3: Knowledge (p)
Item 1: ADA	.01*	.04*
Item 4: 504	.17	.05*
Item 5: UDL	.03*	.05*
Item 6: Definition	.00*	.00*

Experiences of Minority College Students with Disabilities in STEM

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Abstract

Despite recent growth in the number of college students majoring in Science, Technology, Engineering, and Mathematics (STEM), there is a disparity in participation for students from racial and ethnic minority backgrounds with disabilities. This issue has received little attention in the research literature. We sought to gain a better understanding of the experiences of minority students with disabilities in their pursuits of a degree and career in STEM and their experiences with a program designed to support the accomplishment of this goal—the **Minority-Disability Alliance in Science, Technology, Engineering, and Mathematics (MIND Alliance)**. We used the Consensual Qualitative Research (CQR) approach to address the research questions with six former or current STEM students who received MIND Alliance services and supports. Results provide insights into the experiences of STEM students from racial and ethnic minority backgrounds with disabilities, and the influence of the MIND Alliance program on their academic success. Findings emphasize the importance of social supports from peers, family, and the university, as well as the proper handling of accommodations. Participants were generally satisfied with MIND Alliance services and reported positive influences on academic and career goals and on social aspects of college success.

Keywords: Postsecondary education, disability services, social supports, STEM

The science, technology, engineering, and mathematics (STEM) workforce plays a critical role in advancing innovation, enhancing national security, and maintaining overall competitiveness in the labor market (National Science Board [NSB], 2015; Street et al., 2012). The STEM workforce represents a set of fields that are diverse in tasks, employment rates, compensation, and predicted growth. Many of these fields provide relatively high-paying, high-growth employment opportunities (Carnevale & Cheah, 2015; NSB, 2015; U.S. Joint Congress Economic Committee, 2012). Further, growth in some STEM fields has outpaced the supply of qualified workers such that producing enough college graduates prepared for STEM occupations in the United States has become a national priority (Chen, 2013; U.S. Department of Labor, 2007).

Disparities have frequently been cited in STEM education and employment. Women, racial and ethnic

minorities, people with disabilities, military veterans, and people from lower socioeconomic backgrounds have all traditionally been underrepresented in STEM fields (NSB, 2015; National Student Clearinghouse Research Center [NSCRC], 2015; Slovacek et al., 2011; The Leadership Conference Educational Fund, 2015). Even when individuals from these groups obtain STEM degrees they have been reported as being less likely to enter a STEM occupation (Beede et al., 2011; McAllister McAllister -Crumb, King, Grodsky, & Muller, 2012; Sevo, 2011). Thus, one solution for increasing the supply of qualified workers is to broaden and deepen the pool of potential STEM employees. Reducing disparities in STEM education and employment provides a pathway to independence for individuals while also increasing the talent pool for organizations seeking qualified employees and the overall competitiveness of the labor market.

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The focus of this research is on students from racial and ethnic minority backgrounds with disabilities. We briefly review the literature for students from racial and ethnic minority backgrounds and for students with disabilities in STEM before describing a program implemented to support minority students with disabilities in their pursuits of a degree and career in STEM—the **Minority-Disability Alliance in Science, Technology, Engineering, and Mathematics (MIND Alliance)**.

People from minority racial or ethnic backgrounds were reported as represented only 6% of the general STEM workforce at a time when they represented approximately 30% of the general population (Strayhorn, 2010). Potential reasons for these disparities include the social climate of STEM educational and employment settings, negative perceptions and stereotypes, a lack of same-race peers in classes and labs, a lack of role models, and negative interactions in the classroom (Beasley & Fisher, 2012; Ong, Wright, Espinosa, & Orfield, 2011; Strayhorn, 2010). Given these barriers to STEM education and employment, it is not surprising that faculty from minority racial or ethnic backgrounds are greatly underrepresented in the STEM fields (Flowers, 2012). Recommendations for supporting STEM education include providing support systems that offer academic, social and professional opportunities in a way that supports minority status (Stolle-McAllister, Domingo, & Carrillo, 2011; Strayhorn, 2010) and increasing the number of faculty from minority racial or ethnic backgrounds across STEM disciplines to serve as mentors and role models and to provide encouragement for minority students (Flowers, 2012).

Limited research has been done to consider disparities for students and employees with disabilities in STEM, a notable exception being the special issue in the 2011 *Journal of Postsecondary Education and Disability* focused entirely on this topic (Burgstahler, 2011). In this issue, barriers were identified as including financial, social, and systemic barriers, such as professor attitudes and beliefs and an underrepresentation of students with disabilities (Jenson, Petri, Day, & Truman, 2011). Multifaceted intervention strategies may be necessary to enhance the experience of students with disabilities in STEM fields (Martin et al., 2011; Moon, Utschig, Todd, & Bozzorg, 2011). Promising practices for current STEM students included the use of student learning communities, which was correlated with enhanced self-advocacy and career development skills (Izzo, Murray, Priest, & McArrell, 2011), and asyn-

chronous access to instructional content, which was found to enhance learning of STEM content (Graves, Asunda, Plant, & Goad, 2011).

As might be expected, people with multiple minority statuses experience greater disparities in STEM education and employment than those with a single minority status (Beasley & Fisher, 2012; Riegle-Crumb & King 2010). Greatest research attention has been placed on women from minority racial or ethnic backgrounds. Ong and colleagues (2011) concluded, after reviewing nearly 40 years of research on women from minority racial or ethnic backgrounds, that this population was grossly underrepresented in STEM fields. Much less is known about the experiences of college students in STEM whose multiple minority statuses include racial and ethnic minority backgrounds and disability. The research students with disabilities in STEM and the research on students from racial and ethnic minority backgrounds suggests the existence of multiple potential barriers in pursuing STEM degrees for students with disabilities from racial and ethnic minority backgrounds.

The MIND Alliance project was implemented at two minority institutions of higher education, Hunter College, City University of New York in affiliation with Southern University, Baton Rouge, Louisiana. The goal of the project was to increase the quality and quantity of minority students with disabilities in STEM. The MIND Alliance project “brings together expertise, experience, and considerable institutional, programmatic, and personnel resources of two institutions of higher education to provide best practice educational and career development services to minority students with disabilities” (Hawley, Cardoso, & McMahan, 2013, p. 193). These multifaceted strategies and services to support students include (a) a summer institute; (b) tutoring, mentoring, and role modeling; (c) career assessment, planning, and counseling; (d) science literacy training/field trips; (e) school counselor and teacher workshops; and (f) research opportunities and internship programs. More on this National Science Foundation funded project (grant no. 083392) can be found at www.mystem.org and in Hawley et al. (2013).

The Workforce Innovation and Opportunity Act (2014) that was recently signed into law allows state vocational rehabilitation agencies to support advanced training in STEM professions. The demand for STEM workers combined with a new emphasis on public funding provide a great opportunity for students with disabilities from racial and ethnic mi-

norities. Therefore, it is important for those involved in the development of higher education policy making or service provision understand the potential as well as the needs and concerns of minority college students with disabilities who are interested in earning degrees in the STEM fields. The purpose of this study was to take an in-depth, qualitative look at the postsecondary education experiences in STEM fields for minority college students with disabilities. We gave particular attention to the influence of the MIND Alliance program on student postsecondary experiences. Qualitative interviews were conducted and analyzed using a consensual qualitative research approach (CQR) developed and updated by Hill and colleagues (Hill, 2012; Hill et al., 2005; Hill, Thomson, & Williams, 1997; Spangler, Liu, & Hill, 2012). An inductive, qualitative approach was appropriate given the limited research for this population of college students in STEM. The following research questions are addressed in this study:

1. What factors influence postsecondary success for minority students with disabilities majoring in STEM?
2. What influence did the MIND Alliance project have on postsecondary success for minority students with disabilities majoring in STEM?

Method

We used CQR to interview, analyze, and report the data. This research method has become a widely used qualitative method in counseling, social sciences, and rehabilitation counseling research (Fleming, Phillips, Kaseroff, & Huck, 2014; Huck, Fleming, Phillips, & Kaseroff, 2014; Kaseroff, Fleming, Huck, & Phillips, 2015; Phillips, Kaseroff, Fleming & Huck, 2014; Ponterotto, 2005). This approach allows for the exploration and understanding of esoteric information while addressing some of the limitations inherent in qualitative research, such as threats to validity from researcher bias and interpretation and lack of structured methods for coding and analysis (Hill, 2012). The approach is based largely on grounded theory. However, CQR and grounded theory differ in that (a) CQR researchers use the same semi-structured interview protocol across all participants (allowing for probing questions) while grounded theory researchers often use a more unstructured, evolving interview protocol, (b) CQR uses multiple judges and auditors to analyze the data while grounded theory often uses only one judge,

(c) CQR researchers quantify the representativeness of main ideas while grounded theory researchers do not attempt to specify the proportion of participants who shared an idea, and (d) the CQR method of data analysis is relatively fixed while the grounded theory method is more flexible.

Participants

Participants were six college students who received MIND Alliance services and supports while receiving postsecondary education in a STEM related field. All participants were underrepresented minority students with disabilities, and all had completed undergraduate programs or were in process of completing their educations in STEM or a related field. Gender representation was even with three females and three males. Participants presented with the following self-reported disabilities: (a) three individuals with a psychiatric disorder (one with schizophrenia, one with anxiety disorder, and the other with bipolar disorder); (b) one with attention deficit/hyperactivity disorder (ADHD), cognitive delay, and depression; (c) one with a musculoskeletal condition affecting the upper body; (d) and another with Tourette's syndrome and ADHD. All participants managed a disability during the pursuit of an undergraduate degree. Two of the six participants were receiving social security benefits at the time of the interviews.

Participants were at various stages of education and work. One participant was in the process of completing an undergraduate degree while also applying for graduate school, one had completed an undergraduate degree and was deciding next steps, two others had completed undergraduate programs and were currently in graduate training, and the final two had completed graduate school. Of the two who had completed graduate school, one was looking for work in STEM and the other was working as a speech teacher while completing an additional certification in STEM.

Measure

The semi-structured interview was derived from a combination of the literature and personal experience. Interview questions covered areas of K-12 education, postsecondary education, and MIND Alliance services specifically. The CQR interview consists of open-ended questions that provide a framework for responses. These questions were based on a review of the literature about the barriers and facilitators to postsecondary education as well as the experience and observations of the researchers. Structured ques-

tions included, “What did you do to persist and graduate with a degree in STEM?” and “What were some of the barriers you experienced while obtaining your degree?” Follow-up questions are used to encourage elaboration of ideas rather than direct or influence the response. Because participants were in different places with their education and employment, questions varied slightly from interview to interview accordingly.

Researchers

Team members reflected on potential biases they might have in connection with the study topic before conducting any data analysis to increase awareness and reduce undue influence of bias on the results. All four researchers involved in the coding and analysis process reported viewing access to STEM education as being critically important for the population. Researcher biases were more mixed in beliefs about the factors that would influence goal persistence or serve as barriers to achievement.

Procedure

Recruitment of participants. Participants were recruited for interviews as part of exiting from the MIND Alliance program. Participants were recruited by email. The 12 students who had completed the MIND Alliance project were sent an invite for voluntary participation. Six of the 12 who received an invite chose to participate in the study. Interviews were conducted by the first author and lasted approximately 45 minutes to an hour. Four interviews were conducted in person and two over the phone to accommodate for disabilities. The interviews were recorded and then transcribed verbatim through a paid service.

Data analysis. The analysis team consisted of three coders and one auditor, as specified in CQR. Coding of transcripts began with each member of the coding team individually attempting to create domains from the six interviews for participants through an iterative process of identifying and extracting meaningful data units (i.e. phrases, sentences, paragraphs). Coders then met to gain consensus on these initial domains. The next step generally involves the creation of core ideas, which involves summarizing the main points from each data unit. However, this step was not completed for this study. Coders instead chose to work from the raw interview data for the creation of categories within each domain. This process resulted in some alterations in the initial domains, and coding continued until stable domains and categories had been obtained.

An auditor reviewed the final domains and categories upon completion. This auditor was familiar with the project but did not assist with the coding. The auditor provided suggested changes, additions, and deletions to the coding team. The coding team revised the coding in line with several of the recommendations by the auditor, including refining the domain names and recoding categories for some of the data.

The CQR protocol was followed for translating frequency of participant comments to a standard measure of representativeness for each category in the sample. A category consisting of data from all participants was considered general. A category consisting of data from fewer than all but more than half (4-5 participants in this sample) was considered *typical*. A category consisting of only a few (2-3 in this sample) participants was considered *rare*. The variant category often used in CQR research was not employed because of the relatively small sample size.

Results

The six participants in this study spoke of many factors influencing the pursuit of STEM education and employment captured in domains and categories. Four domains emerged from the data: interpersonal factors, accommodations, individual factors, and the MIND Alliance. We proceed by presenting the domains and categories as a means of addressing the two research questions regarding factors that influence postsecondary success and the influence of the MIND Alliance on individuals from racial and ethnic minority backgrounds with disabilities pursuing STEM degrees.

Interpersonal Factors

The interpersonal factors domain consisted of five categories that emerged from participant interviews. The results that follow are presented in order of representativeness from general (Family, Peers, and Faculty and Staff), to typical (Others), to rare (Teachers and Staff).

General. Categories were considered general when they included comments from all participants. The categories of family, peers, and faculty and staff were identified as general categories. The *Family* category focused on barriers or supports from family. These barriers or supports could be emotional, physical, or financial in nature. Four participants reported family only as a support to their postsecondary goals while the remaining two expressed family as provid-

ing a combination of barriers and supports. One participant whose parents moved to the U.S. primarily so that the participant and her siblings could gain an education described family support as follows,

That was their hopes and dreams that I go to college, and now that I'm going for my master's they're even more excited and more happy that I'm continuing to pursue an even higher education as well, so they just encourage it and they support it 100%.

Another participant described emotional, informational, and financial supports received from family in saying,

They send me a bunch of stuff. I actually found out my dad is moonlighting as me online sending inquiries to medical schools, telling them that I want information. I'm also married, so my spouse, he's also in STEM, so that also always helps. And, you know, just sending words of encouragement. There's also financial support because sometimes STEM education can add up, and if you have to pay rent and bills but you're still in school and you don't have time to work a full-time job and be in school, financial support is always important, so they've been helping with that as well.

The two participants who stated family as both supports and barriers to their postsecondary education spoke about unmet expectations for support. It was apparent that family influences could be as detrimental when negative as they were helpful when positive. When asked what barriers were experienced in pursuing a degree, one participant responded, "I would say family, one of the biggest ones."

The next general category, *Peers*, describes the experiences with peers that acted as supports or barriers to participants' postsecondary success. Three participants reported peers only as a support to their postsecondary goals while the remaining three described peers as providing a combination of barriers and supports. One participant who described peers exclusively in a positive light stated,

On campus, sad to say, the people who help you are not your faculty, they're not the people. Even your advisors aren't there for you like that. If you're lucky, you might get a good one. The peo-

ple who are there for you are the seniors or the ones who are around you. Getting to know your year, your class year, they'll be the ones to make sure, like, oh, you should take this class this time, you should try doing this.

Another participant spoke of peers in relation to the competitiveness of STEM education. The participant suggested that they had success in working with peers in some classes but, "trying to do that in chemistry didn't work because the type of students that take chemistry, the engineering, the medical . . . they don't want any teamwork. They want you to fail as well." Peer support was reported as being complicated at times by peers not fully understanding the needs or the approach to take with participants. For example, one participant reported a close friend as saying that they would "drag [the participant] over the graduation line." The participant continued, "It sounds really empowering, but on the flip side, it's, 'you're lazy', 'you're not doing your work', or, 'you're not good enough.'"

The final general category, *faculty and staff*, describes the experiences with faculty and staff that acted as supports or barriers to participants' postsecondary success. Some spoke about faculty and staff generally, but most comments centered on individual faculty or staff who were either a support or barrier to their success. Two participants reported faculty and staff as only a support to their postsecondary goals while the remaining four described faculty and staff as providing a combination of barriers and supports. Among the latter, one participant stated,

I just text[ed] one of my math teachers today. He was extremely busy, but anytime I had a question or I wanted to meet with him he met with me after class. He would like sit in on our study break sometimes just in case we had questions. Most of them were not supportive.

Another participant, after stating that she had not received as much support as she would have liked, shared a purely positive example of a specific professor,

He took me under his wing and gave me a job and introduced me into a new realm of STEM that I had never heard of before. . . . And he helped me intertwine it with my interests, so he took me under his wing and opened me to a new job.

It was apparent from these and similar comments that faculty could have a powerful influence on postsecondary success beyond the content they teach.

The influence of participant minority status on postsecondary success came up in relation to faculty and staff, with one female participant stating, “Professors don’t understand, can’t relate, either from being from the inner city or having a disability or being a woman. . . . There were a lot of boundaries and barriers.” Similarly, another stated, “I was in the town and they don’t see people of color. And that exists also in the administration.”

Participants also talked about the need for more mentoring and guidance from faculty and staff in STEM. For example,

Getting mentorship—that was a huge barrier, not necessarily knowing how to navigate the road. Also not being aware of the programs that are available for students in STEM like, you know, there are so many programs that can help you move along your education, and I didn’t have a counselor in my degree who would meet with me regularly and say, hey, have you heard about this program or that program? You should apply to this; you should apply to that. I was kind of on my own. And a lot of the students, that was the sentiment in STEM, just being on your own.

Typical. Categories were considered typical when they included comments from 4 to 5 participants. Only one typical category emerged for interpersonal factors. This category, labeled *Others*, represented interpersonal supports or barriers experienced with unspecified mentors or service providers outside of the college they attend. Four participants spoke exclusively of positive supports while one spoke only of barriers to postsecondary education experienced from others. An example of support came from a participant who stated, “I’ve had several mentors who are physicians, who are public health workers, who, you know, eventually they became my mentors over time once they realized my dreams were in alignment with what they do.”

Rare. Three participants spoke of the support received in K-12 education that was important to them. This category, labeled *Teacher and Staff*, reflects statements about teachers or staff in their K-12 experience who were important for the participants’ success. All responses in this category were positive and responses ranged from general assistance they re-

ceived from teachers, to specific teachers or staff who were integral to participant successes in K-12. “I can honestly say [my high school teacher is] one of the people that really pushed me to go to the next level of science . . . He was so proud of the fact that I was able to overcome [having a disability].”

Accommodations

The accommodations domain consisted of two categories. Both categories (faculty or staff response and Peer Attitudes Toward Accommodation) had general representativeness. Of the five who spoke of effectiveness of accommodations received, three reported only positive experiences, one reported mixed experiences, and one more neutral experiences.

General. The first category involved *faculty and staff* responses to accommodations. Three participants spoke only of negative and one only of positive faculty or staff responses to accommodations. Of the remaining two participants, one described a mix of negative and positive responses while the last participant provided only neutral statements about the accommodations response from faculty and staff. Of all the responses, the negative faculty and staff responses were the most abundant. One participant stated,

I had one professor tell me, “why do I have to constantly sign your test accommodation forms,” in a very snarky kind of way. It annoyed him that I had to go to him, even when I asked him if he’d be willing to sign them for the rest of the semester, if it bothered him, he refused. But every time I would go to him, he would give me an attitude, and it made me really uncomfortable asking him for the accommodations. . . . I’ve been asked by three professors what my disability is and I heard they weren’t supposed to do that, but I didn’t know.

Other negative faculty and staff responses were described to include a lack of understanding or awareness about individuals with disabilities and the accommodation support needed in an academic setting. Another more specific negative response described how STEM specific faculty and or staff were not supportive of individuals with disabilities. One participant commented,

Most of them did not really give a crap about special needs because they’re very elitist in STEM courses. So, as far as they’re concerned, you’re

dumb . . . And I did not find a lot of support in the field for people with disabilities.

A participant who described only positive faculty or staff responses to accommodations suggested that the procedural announcement about the Disability Services Office at the beginning of class each semester from a professor was discreet and seemed to be beneficial.

The second general category, *peer attitudes towards accommodations*, included participant statements about peers' attitudes toward accommodations. Three participants reported negative peer attitudes toward accommodations while three reported neutral experiences of peer attitudes toward accommodations. Participants who expressed negative peer attitudes towards accommodations explained the disapproval experienced from peers due to receiving accommodations. In the context of explaining their difficulty with negative peer attitudes one participant stated, "so they'd say, why do you get to take the exam somewhere else? Why can't you take the exam with us? And they would kind of like make a snide remark like, oh, you look fine to me." Other negative peer attitude statements discussed issues of disclosure and the implicit negative bias that came with having a disability (e.g., being thought of as "lazy"). The three participants who only provided neutral responses stated, "They didn't care that much." Other participants mentioned that with invisible disability there was more control over whether peers knew of the accommodation. One participant stated, "I was very discreet about it, so no one ever knew," and another said, "Hardly anybody really noticed because I don't look like I have a disability. My disability's not visible."

Individual Factors

The individual factors domain consisted of five categories that emerged from participant interviews as well as a miscellaneous category of individual factors that were mentioned by only one participant. The results that follow are presented in order of representativeness from typical (motivation) to rare (difficulty forming relationships, help-seeking, participation in college organizations, and confidence). No general categories emerged from the data.

Typical. Five participants identified *motivation to learn* as one of the most salient individual factors present in their collegiate experience. Within this category, three emphasized the importance of motivation to their postsecondary success. The two remaining participants spoke of their motivation to learn as a

key to success while also noting struggling, at times, with a lack of motivation. Of the positive statements, most participants noted similar motivations toward learning. One participant demonstrated motivation in spite of trials in stating, "I tried to give it the best that I could, given my circumstances. It may not be great, but I'm just going to persevere and just keep at it. I just kept at it. Even when I would fail miserably . . . I just didn't give up."

Rare. Three participants identified *difficulty forming relationships* as one of the salient individual factors present in their collegiate experience. Within this category the personal impact of disability was the most identified reason for difficulties forming relationships (e.g., depression). Participants also identified fears about stigma from peers as salient in their difficulty forming relationships. One participant commented, "I was always worried that I might get judged differently or viewed differently by others. So I always had difficulties talking about my disability. I always had this feeling that people were going to look at me differently."

The second rare category involved three participants and their *help-seeking behaviors* within collegiate settings. Comments were categorized as being help-seeking behaviors when participants stated an effort to reach out to others in connection with their postsecondary success. Each of these participants emphasized the importance of communication to their success in school. Participants focused on developing academic networks, which included other students, faculty, and/or support staff to increase their likelihood of success. One participant explained, "Studying with your peers, with some assistance from the teacher, is essential because not everybody is going to get everything, but together you can fill in the gap."

The third rare category, *Participation in College Organization*, involved two participants and reflected positive collegiate experiences specifically related to joining and participating in campus organizations. The positive aspects of this form of participation noted by interviewees included belonging, social and career networking, philanthropy, and increased self-confidence, for example,

It was when I started to get more involved in the different organizations and clubs for students with disabilities that I started to kind of learn that I shouldn't be embarrassed about my disability or shouldn't be afraid of being labeled and that I'm not on my own.

And another participant stated,

And you can also get some type of . . . pride for being a student at a specific college. It makes you feel like a unit. And when you join little clubs, like I'm vice president for Society of Automotive Engineering now, you know, and you start to work with your team, you start to feel like, oh, this is us, this is our own, even if it's against the world. It feels good.

Of particular note was an emphasis on disability advocacy. One participant states, "I'm so active in these organizations, to try to help . . . [include] the students in the same activities that the other students do because we can do them. It has to start from somewhere, the advocacy and standing up."

The final rare category, *confidence*, was expressed as an important individual factor for two participants. One participant stated a purely negative reflection of confidence, when asked if they sought out a mentor in college responded with, "No, I did not feel like I was worthy of one." The other participant made statements connecting confidence to postsecondary success while also noting a lack of confidence at times that was a barrier to success. This participant, after speaking of successful efforts to maintain high levels of confidence stated, "Another challenge, too, is being so scared of failure that you can't even open the textbook and your hands are sweating and, you know, not having anybody to talk to and say I'm feeling this kind of way."

Miscellaneous. Categories were miscellaneous when they included comments from fewer than two participants. The three miscellaneous categories encompassed statements from participants on the personal importance of disability acceptance, prioritization, and faith. Although these individual factors did not receive much attention from multiple participants, they are interesting aspects to consider in regards to college success.

MIND Alliance

The MIND Alliance domain consisted of two categories that emerged from participant interviews. The two typical categories (influence of the MIND Alliance and effectiveness of the MIND Alliance) are presented.

Typical. Participants identified *influences of the MIND Alliance* in two subcategories, *academic and career*, and *social*. Within the subcategory of aca-

ademic and career influences of Mind Alliance, five participants noted specific their educational and career influences. Several students mentioned the influence of the various workshops provided by MIND Alliance, with the resume building workshops said to be particularly influential. The MIND Alliance was stating as having a broad influence ranging from shaping interest in STEM (e.g. "It helped affirm that I wanted to go into behavior science.") to positively affecting opportunities for work experience (e.g., "I was able to get my hands dirty, especially in the chemical lab. . . it was a really good resume builder. [It] helped me understand that, my disability isn't the end of the road . . . [It] made me feel fortunate.").

The other subcategory influence of the MIND Alliance was *social influence*. Four participants reported a positive social influence of the MIND Alliance program. One participant stated, "[Students with disabilities] were also treated like regular students with goals and ambition and it was great." Another student commented, "I was also able to network with some other students. Even though we all knew we were in there with disabilities we didn't have to talk about it. It was just nice seeing one another."

The second typical category was *effectiveness of the MIND Alliance* with four participants commenting. Participant remarks included general statements, for example, the graduate student who praised MIND Alliance services then stated, "if I had [MIND Alliance] when I was an undergrad it would've been totally different—totally different." Another graduate stated, "I just thought it was a well-run program and it gave me a lot of inspiration and commitment." Participants tended to express that the program was executed successfully and contributed to their personal achievements in STEM postsecondary education.

In addition to the previous categories, five participants made suggestions for improvements to the MIND Alliance. The majority of suggestions were for increased outreach, promotion, and networking. Some participants commented that they would have benefited from learning about MIND Alliance earlier and other participants commented that there were more who could benefit but may not be aware of its existence. One student explained, "I only found out by accident, so I think had I known before I probably would've jumped on ship earlier." These comments, in the face of a thorough marketing and recruitment effort, highlight the difficulty of effective outreach to this population of underrepresented college students on commuter campuses through traditional mecha-

nisms (e.g., flyers, posters, advertisements). Two students who enjoyed the lectures and workshops hosted by MIND Alliance stated an interest in having more of them. Another student noted the need for increased networking with professors as well as with mentors in STEM stating, "Creating a mentorship connection, having a one-to-one connection where you assign a mentor to one or two students, kind of creating a regular interaction. I think that's important." Despite the provision of some mentorship and internship services, two participants suggested that the MIND Alliance have an increased role or focus on facilitating internship opportunities in STEM.

Limitations

The implications of this study should be considered within the context of a few limitations. First, we do not expect that the beliefs and behaviors of this small sample are inclusive of all postsecondary students from the target population. Additionally, although our research team followed the recommended guidelines for self-identifying bias and other processes for analyzing the data objectively, including bringing in an auditor to minimize the likelihood of clear misinterpretation of comments, it is possible that a different research team may have found other ways to organize the data. Another aspect of the study that could be considered a limitation was in the few participant comments that centered directly on the influences of minority statuses other than disability or the combination of disability and other underrepresented statuses as was expected in response to the questions about barriers and facilitators of postsecondary STEM education or about their experiences generally. This result is similar to that found by Erten (2011) in studying the experience of women with disabilities in postsecondary education, where only disability was primarily highlighted. There are several potential explanations for this result, including the following: a) less comfort for participants in discussing other underrepresented statuses, b) greater challenge for participants in describing the lived experience of intersectionality and how it shapes the college experiences, c) disability may be viewed by participants as a more salient status for college students in STEM fields, especially on a campus with a larger number of students from racial and ethnic minority backgrounds. Given Erten's findings, the latter seems likely. Future research focused on this area is needed to interpret these results. Finally, data from the interviews was not

shared with participants for a check of the accuracy of information, also known as member checking. Despite these limitations, we believe that our study has important implications for postsecondary research for students from racial and ethnic minority backgrounds with disabilities pursuing STEM or related fields.

Discussion and Implications

This study provides postsecondary disability service providers, faculty, and staff insights for understanding the experiences, supports, and barriers of STEM students in from racial ethnic minority backgrounds with disabilities. Current results indicate several important areas for supporting postsecondary STEM education for students from racial and ethnic minority backgrounds with disabilities. Having adequate interpersonal supports, meeting accommodation needs, and possessing certain individual factors were reported as playing key roles in postsecondary STEM success. The MIND Alliance was viewed as providing valued supports and services for this sample. It is important to understand how postsecondary disability providers such as professionals in disability services centers or offices, administration, and or educators can help aide in these specific concerns for minority college students with disabilities in STEM.

The domain of interpersonal factors was the most prominent to emerge from this study. Participants spoke of family, peers, faculty, staff, and others influence on their pursuit of STEM education. Results show that postsecondary service providers, educators, and advisors, although not typically the primary provider of interpersonal support, must appreciate the importance of supportive relationships to educational success as well as the barriers and facilitators for achieving these relationships. College and university disability service providers have a unique opportunity to provide direct mentoring and to connect students from these underrepresented backgrounds to mentors who tend to have fewer role-models than the general population (Dunn, Rabren, Taylor & Dotson, 2012).

The culture of competitiveness experienced by some in STEM education is cause for concern in light of the effect it was reported to have on interpersonal relationships. Seymour and Hewitt (1997) similarly reported a major cause of students with and without disabilities switching from science degrees related to the overall coldness of the classroom. Participants from this study described classrooms with a culture of excessive competition as having the potential to alter

faculty-student interactions as well as student-student interactions. It is possible that a competitive educational climate where one person's success is perceived as requiring another's failure (as is the case when grading on a curve) may create a higher risk social environment that is more taxing for students whose disabilities create additional difficulty forming relationships.

Recent research suggests an improving climate in STEM education and faculty-student interactions (Hedrick, Dizén, Collins, Evans, & Grayson, 2010), but results from the current study highlight continued need in this area. It is important that disability service providers working with this population recognize and understand the intended and unintended consequences of classroom competitiveness on interpersonal supports and on success generally. Disability service providers, in collaboration with faculty and staff, may identify opportunities to encourage more cooperative methods of teaching and assessment when specific instructors or classes display a culture of competition that appears to discourage interpersonal supports. Examples of cooperative methods include the use of the inverted classroom (Strayer, 2012) and the incorporation of team projects (Jenson et al., 2011).

The MIND Alliance was reported as facilitating a sense of belonging and interpersonal support by a majority of participants. Although these results are based on a very small sample, disability service providers and other administrators may see an opportunity for incorporating similar programs targeted to this population as a means for facilitating healthy interpersonal support from peers and faculty. In a path-analytic study of MIND Alliance students, interpersonal support was found to have robust direct effects on STEM goal persistence and barrier coping efficacy, as well as a strong indirect effect on goal persistence through its influence on STEM outcome expectancy (Dutta et al., in press). In support of the approach taken with the MIND Alliance, Vaccaro, Daly-Cano, and Newman (2015) suggested disability service providers work closely with academic and student affairs staff to design and implement programs, policies, and services that go beyond the classroom to other areas of campus life, such as residence life, orientations, and other student activities. In circumstances where formal programs that involve multiple entities on campus are not feasible, student-led organizations and support groups may still serve to provide increased supports for this population.

Given the emphasis on interpersonal support received from peers, the creation of peer-led team learning, particularly, mastery peer-led team learning developed by Street et al. (2012) may fill a need for this population. This approach to peer-led team learning combines peer-led team learning with universal design for instruction principles. The weekly group meetings in this model of learning provide an opportunity for more senior students to lead newer students in collaborative learning experiences in ways that account for diverse learning styles. In a small sample, Street et al. reported better grades and higher levels of persistence in STEM courses for students with learning disabilities or ADHD who participated in mastery peer-led team learning vs. those who did not.

Providing adequate accommodations was another domain emphasized by participants. Many challenges can arise when attempting to provide individualized accommodations in large STEM classrooms (Love-Stowell et al., 2015). Yet, it was apparent from this study and others that accommodations can have a great influence on self-efficacy, self-determination, and academic outcomes (Cardoso et al., 2013; Dunn et al., 2012). Students rarely reported being unable to get needed accommodations, but instead focused on how those accommodations were provided. Multiple participants talked about the negative effect of an accommodation that was given grudgingly or with skepticism about the need. It is apparent from students in this sample that more work can be done to help faculty with the process of accommodation even when the outcome is to provide it (Erten, 2011; Jenson et al., 2011).

Peer perceptions of accommodation also had a great influence on how participants felt about seeking and using accommodations, with negative or ambiguous peer responses decreasing the likelihood of students with disabilities using them. Disability service providers must be mindful in their marketing and promotion of accommodation services of a dual need to reach those needing accommodations but also to influence faculty and peers' perceptions of the legitimacy and importance of accommodations on campus for students with visible and invisible disability. When disability service providers recognize the negative attitudes of others in creating resistance to accepting or using accommodations, they should balance efforts to teach self-determination and self-advocacy with efforts to train and influence attitude change of students and faculty. Mamiseishvili and Koch (2010) suggested that meeting a course instructor outside of class

to discuss accommodation needs. This approach, although more time consuming than other approaches, may help to breed more positive attitudes about accommodations in giver and receiver. Disability service offices can help facilitate and aide these conversations between faculty and students where needed.

Finally, individual factors played an important role in STEM success for this sample. Disability service providers can have a great influence by emphasizing and encouraging the use and cultivation of strengths in processes that are more often focused on the identification of limitations. Recent research suggests the strength-based approach stressed in positive psychology can be very effective in shaping attitudes and influencing outcomes (e.g., Chou et al., 2013; Smedema, 2014). In the spirit of positive interventions, disability service providers can also share success stories about students who experienced a similar situation and achieved their academic and career goals (Hartley, 2013).

Conclusion

The experience of STEM students from racial and ethnic minority backgrounds with disabilities has received little attention in the research. This qualitative study provides insights into the experiences of this population and highlights some of the areas of greatest importance for encouraging STEM success. Participants noted both supports and barriers to the pursuit of their STEM education, with the greatest emphasis being placed on the influence of interpersonal supports. The MIND Alliance played an important role in facilitating interpersonal supports and other forms of support for students from racial and ethnic minority backgrounds with disabilities. Disability service providers can play a critical role in addressing each of the factors that emerged from this study, including facilitation of interpersonal supports, accommodations, and addressing individual factors.

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Invisible Injuries: The Experiences of College Students with Histories of Mild Traumatic Brain Injury

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Abstract

This qualitative study explored the college life phenomenon as experienced by students with mild traumatic brain injury (MTBI). Previous research about such students has focused on topics including study strategy use, access of support services, and insights from caregivers or instructors. However, little attention has been paid to the perceptions of postsecondary students, and available data stems almost exclusively from structured survey items and quantitative research studies. The lack of direct input from students with MTBI means professionals have limited insight into perceptions about students' challenges and successes associated with college experiences. To address this research gap, we asked five college students with MTBI to discuss their college experiences, factors mediating those experiences, and perceived similarities and differences between themselves and other college students with and without disabilities. Each interview lasted approximately one hour and used a semi-structured interview protocol. Data were analyzed using established phenomenological methods. Results suggested that the students experienced cognitive, physical, and social-emotional changes that altered their academic experiences, necessitated academic accommodations, and required self-advocacy skills. In addition, family and teacher support, self-determination, and academic accommodations positively affected students' college experiences, whereas factors such as injury invisibility, coursework difficulty, and teacher misconceptions or lack of support had negative effects. The findings highlight the need for additional education and support for college students with MTBI and the educators who serve them.

Keywords: Mild traumatic brain injury, college experiences, academic accommodations, support services, self-advocacy

Traumatic brain injury (TBI) has gained recognition among the general public over recent years primarily because of two phenomena: (a) the large number of military personnel returning from areas of conflict with blast injuries or other forms of TBI (Warden, 2006; Zoroya, 2005) and (b) the growing number of professional athletes who have reported histories of multiple concussions (i.e., mild traumatic brain injuries [MTBIs]) resulting in persistent cognitive and physical deficits (Guskiewicz et al., 2005; McKee et al., 2009). Awareness of the potential negative ramifications associated with MTBIs may be of particular interest to postsecondary institutions as they experience increasing enrollments of students with this diagnosis. As defined by the WHO Collaborating Centre Task Force:

MTBI is an acute brain injury resulting from mechanical energy to the head from external physi-

cal forces. Operational criteria for clinical identification include: (i) 1 or more of the following: confusion or disorientation, loss of consciousness for 30 minutes or less, post-traumatic amnesia for less than 24 hours, and/or other transient neurological abnormalities such as focal signs, seizure, and intracranial lesion not requiring surgery; (ii) Glasgow Coma Scale score of 13–15 after 30 minutes post-injury or later upon presentation for healthcare. These manifestations of MTBI must not be due to drugs, alcohol, medications, caused by other injuries or treatment for other injuries (e.g. systemic injuries, facial injuries or intubation), caused by other problems (e.g. psychological trauma, language barrier or coexisting medical conditions) or caused by penetrating craniocerebral injury. (Carroll, Cassidy, Holm, Kraus, & Coronado, 2004, p. 115)

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The surge in military veterans and athletes identified with TBIs has serious implications for colleges and universities. This is because large numbers of military personnel enroll in colleges to prepare for civilian careers following their deployments (McBain, Kim, Cook, & Snead, 2012), and many aspiring athletes participate in college sporting events either as the culmination of their athletic careers or as a preliminary step before entering into professional sports (Beamon & Bell, 2002; Brown, Glastetter-Fender & Shelton, 2000; Lally & Kerr, 2005). As the diagnosis of MTBI becomes more common within military and athlete populations, an increase is also likely in the diagnosis of such injuries in other populations of young adults because of greater awareness. Hence, colleges and universities can expect a growing volume of students identified with TBI-related disabilities (Daneshvar et al., 2011; Grossman, 2009; Madaus, Miller, & Vance, 2009). This phenomenon is likely to add substantial numbers to what has previously been a relatively uncommon disability category within postsecondary education institutions. In particular, increasing numbers of individuals with MTBIs are likely to join existing groups of college students with histories of more severe TBIs stemming from traditional causes such as motor vehicle accidents and falls (Church, 2009; Daneshvar et al., 2011; MacLennan & MacLennan, 2007). Because of this trend, a critical need exists for college educators and disability service providers to understand the factors that lead to successful academic and social experiences for college students with TBIs (Grossman, 2009; Kennedy, Krause, & Turks-tra, 2008; Madaus et al., 2009).

Previous researchers have examined various facets related to the experiences of college students with differing severities of TBI. They have used quantitative measures, case studies, surveys, and interviews to explore topics such as high school transition and/or post-high school experiences (Haag, 2009; Todis & Glang, 2008; Todis, Glang, Bullis, Ettl, & Hood, 2011), learning and study strategy use (Bush et al., 2011), study skill and accommodation implementation (Hux et al., 2010), the nature of academic challenges faced (Kennedy, et al., 2008), and factors relating to work or postsecondary education success (Dawson, Schwartz, Winocur, & Stuss, 2007). How students with histories of MTBI perceive their college experiences or what factors they believe contribute to positive or negative college experiences remains largely unexplored, however. Hence, the purpose of this study was to explore the phenomenon of col-

lege life as experienced by students with histories of MTBI. The overarching research questions were:

1. What are the perceptions of students with histories of MTBI about their college experiences?
2. What factors mediate these perceptions?

Literature Review

Individuals with TBIs of all severities report cognitive impairments in areas such as memory, attention, and executive function (Kennedy & Krause, 2011; Rødset, 2008). Unless individuals exhibit overt physical disabilities, however, the cognitive and psychological repercussions of their injuries may be overlooked both by professionals and lay people (Schutz, Rivers, McNamara, Schutz, & Loboto, 2010). Because of this tendency, TBI is often referred to as an “invisible injury” (Brain Injury Association of America, n.d.) or a “silent epidemic” (Klein, 1982, p. 1). For college students with histories of MTBI, the cognitive deficits they face as well as the hidden nature of these deficits may affect both academic performance and social participation (Beers, Goldstein, & Katz, 1994; Konrad et al., 2011). In many ways, the dilemmas encountered by students with MTBI may be comparable to those documented for students with other types of hidden disabilities such as attention deficit/hyperactivity disorder, learning disability, or psychiatric disability (Eckes & Ochoa, 2005; Wolf, 2001).

The actual number of students with TBIs enrolled in postsecondary education settings remains unknown, which presents a challenge for educational disability service providers. A key barrier is that students with TBIs are frequently under-identified or mislabeled at the elementary and secondary levels (Schutz et al., 2010). For example, according to the U.S. Department of Education, National Center for Education Statistics (2016), approximately 26,000 elementary and secondary students received special education services because of verification through the TBI disability category during the 2013-2014 school year. This number, however, falls far below the documented rate of emergency room visits (i.e., 3082.5 per 100,000) and hospitalizations (i.e., 80.8 per 100,000) for TBI in children from birth to age 14 as reported between 2009 and 2010 alone (Centers for Disease Control, 2012) and does not account for the plethora of students who sustained mild TBIs but never obtained medical intervention.

In response to this gap in extant literature, two separate groups of researchers have recently sought to identify the occurrence of TBI in college students. Krause and Richards (2014) surveyed undergraduate students and found that 16.4% self-reported a history of at least one “brain injury” or “concussion” (p. 1302). Brown, Hux, and Schmidt (2015) used terminology such as “blows to the head,” “whiplash injuries,” and “loss of consciousness” rather than the potentially stigmatizing terms “brain injury” and “concussion” to solicit similar information from undergraduate students. They found that approximately 28% of the undergraduate students self-reported at least one possible brain injury event and that 19% of those students had also experienced an associated loss of consciousness. Although neither research group related students’ reports of possible TBI events to their receipt of disability services or classroom accommodations, the results confirm that the presence of students with histories of TBI on college campuses is not uncommon.

Few colleges employ staff and faculty experienced in providing services to individuals with TBI despite the fact that such students sometimes attend postsecondary institutions. For example, a survey of disability service offices in Ohio colleges showed that only 39% employed individuals qualified to address deficits directly related to TBI (Harris & DePompei, 1997). Plus, findings from the same study revealed that the mechanism for identifying college-based services and initiating academic accommodations appeared to rest with the affected students. Even as recently as 2008, a survey of 35 college students with TBI showed that approximately 45% were unfamiliar with or had never used student disability services, and, of the remaining students, only half reported using the services “pretty often” or “all the time” (Kennedy et al., 2008, p. 517).

The frequency with which students with MTBI are unaware of or fail to take advantage of college-based disability supports is troubling. Todis and Glang (2008) reported that students who received high school transition supports directly linking them to college student disability services experienced a greater likelihood of completing college successfully than those not receiving such supports. Many students with histories of one or more MTBIs, however, never receive an official diagnosis (Beers et al., 1994; Segalowitz & Lawson, 1995). Thus, although some students with MTBIs continue to demonstrate physical and cognitive deficits for months and even years

post-injury (Beers et al., 1994; Marschark, Richtsmeier, Richardson, Crovitz, & Henry, 2000; Ryan, O’Jile, Gouvier, Parks-Levy, & Betz, 1996; Ryan & Warden, 2003; Segalowitz & Lawson, 1995), they may not be aware of their eligibility for student disability services or academic accommodations (Kennedy et al., 2008; Tincani, 2004).

When college students with MTBI do seek out evaluation or intervention, methods such as cognitive testing and surveys highlight persistent challenges. For instance, when completing behavioral assessments, individuals with MTBIs frequently demonstrate cognitive deficits such as diminished memory for spatial information (Beers et al., 1994; Chuah, Maybery, & Fox, 2004), decreased divided attention skills (Blanchet, Paradis-Giroux, Pépin, & Mckerral, 2009), working memory deficits (Kumar, Rao, Chandramouli, Pillai, 2009), and impairments in general attention, problem-solving, and memory skills (Beers et al., 1994). Students with MTBIs responding to surveys also reported decreased memory and attention skills and physical changes including headaches, nausea, and sleep disturbances (LaForce & Martin-MacLeod, 2001; Segalowitz & Lawson, 1995; Triplett, Hill, Freeman, Rajan, & Templer, 1996). Results from evoked-response potential measurements also suggest that, although students with MTBIs often performed similarly to peers on all but the most complex tasks, they achieved the comparable results only through expenditure of higher cognitive effort than their non-injured peers (Potter, Bassett, Jory, & Barrett 2001; Potter, Jory, Bassett, Barrett, & Mychalkiw, 2002; Segalowitz, Bernstein, & Lawson, 2001).

Further complicating the challenges faced by college students with MTBIs is the fact that they must contend not only with cognitive and physical challenges but also with the social and emotional changes resulting from their injuries (Konrad et al., 2011). Results from surveys and interviews have shown that students with all severities of TBI may experience changes including mood alterations, irritability, poor anger management, depression, and anxiety (Kennedy et al., 2008; Konrad et al., 2011; LaForce & Martin-MacLeod, 2001; Ryan et al., 1996; Segalowitz & Lawson, 1995; Stewart-Scott & Douglas, 1998). Such shifts in personality and behavior are likely contributors to the narrowing of circles of social support, the destruction of existing friendships, and the prevention of new friendship development so often reported among survivors of TBI (Hux et al., 2010; Ylvisaker, 1998). Kennedy and her colleagues

(2008) confirmed this phenomenon through a survey in which they found approximately 50% of college students with TBIs of varying severities reported difficulty with relationships, and close to 30% indicated they had problems maintaining friendships.

College students with MTBIs routinely experience academic, cognitive, and social-emotional challenges that have the potential to affect their postsecondary experiences. However, perceptions of these students remain largely unexplored. As such, the purpose of this research was to obtain information about the phenomenon of being students with MTBIs in postsecondary settings.

Methodology

Participants

Five students with self-reported histories of MTBI participated in the study. These students came from a larger group of 15 part-time or full-time undergraduate and graduate students enrolled at a large state university who had previously identified themselves either to us or to the Services for Students with Disabilities (SSD) office as having sustained one or more TBI. Students received information about the study either through the SSD office or word-of-mouth, and interested students self-selected to participate.

All participants met individually with us and completed research and clinic consent documents and demographic and brain injury background forms before participating in the interview. They also received a TBI Symptom Checklist to complete at their leisure. As shown in the Appendix, this form listed possible persistent symptoms within the categories of intellectual impairments (32 items), psychological consequences (16 items), mood disorders (3 items), physiological impairments (14 items), personality alterations (21 items), and neurological problems (12 items). Four participants returned the checklist during subsequent visits with us, and the fifth opted to send the checklist via electronic mail. Two participants also provided us with results of post-injury neuropsychological evaluations administered previously by other professionals. The following paragraphs provide specific information about each of the five participants with MTBI.

Gabe. Gabe was a 24-year-old, Caucasian, full-time, second-year graduate student majoring in American History who lived alone in an off-campus apartment. He sustained his MTBI during a physical altercation during his senior year of college. He opt-

ed not to seek medical attention at that time and continued his coursework without interruption. Approximately one month post-injury, however, he sought diagnostic services to address persisting issues (e.g., headaches, memory deficits). He was diagnosed with post-concussion syndrome (PCS) at that time, although a computed tomography (CT) scan of his brain revealed no damage.

Gabe identified ten intellectual impairments, no psychological consequence, one mood disorder, six physiological impairments, nine personality alterations, and two neurological problems on the TBI Symptom Checklist. Verbally, he reported persistent intellectual difficulties at the time of the study including poor concentration, idea repetition during writing assignments, and memory problems. He also noted decreased task initiation, disorientation, and uncertainty about his level of knowledge about topics. Gabe reported experiencing mood swings exacerbated by the MTBI as well as inconsistent routines and fluctuating, and sometimes excessive, caffeine consumption. He stated he had decreased tolerance for alcohol and drugs, difficulty relaxing, and trouble falling and staying asleep at night. Despite these challenges, he chose not to register for accommodations through the SSD office, although he reported the chair of his department was aware of his injury. Gabe reported expending greater amounts of energy on his coursework following his injury than before, but his grades remained comparable.

Mason. Mason was a 20-year-old, Caucasian, full-time, second-year undergraduate student who lived on campus with a roommate and had not yet declared a major field of study. He sustained a short period of unconsciousness as the result of a motor vehicle accident occurring between his junior and senior years of high school. Following the accident, he spent four days in the hospital where, according to self-report, Mason was diagnosed with a severe concussion. Because Mason's MTBI occurred during summer break, he entered his senior year without interruption in the fall but received accommodations consisting of one-on-one assistance for examinations and extended time on homework.

Mason participated in a neuropsychological evaluation approximately one month prior to study participation. Performance on validity indices (i.e., *Computerized Assessment of Response Bias* and *Test of Memory Malinger*) administered at that time suggested non-neurological factors were adversely affecting his task performance; hence, all evaluation

scores must be interpreted with caution. Mason's performance on the Ward short form of the *Wechsler Adult Intelligence Scale-III* yielded scaled scores ranging from 6 to 9 on verbal subtests and 6 to 8 on performance subtests. His Verbal IQ score of 89 fell in the low average range, his Performance IQ score of 77 was in the borderline range, and his Full Scale IQ of 82 corresponded with the low average range. This contrasted with estimated premorbid intellectual ability in the average range based on Mason's current reading skills, educational level, and other demographic variables. Mason's performance on the *Rey Auditory Verbal Learning Test* yielded standard scores ranging from 70 to 73 and corresponding with verbal memory in the borderline range. His visual memory as measured by the *Rey Complex Figure Test* fell in the extremely low range (i.e., standard scores from 22 to 64). Mason also performed in the borderline or extremely low range on tests of word retrieval (i.e., *Animal Naming Test*, *Controlled Oral Word Association Test*, and *Boston Naming Test*). This contrasted with his high average (i.e., standard score of 110) receptive language performance on *Token Test* and his average performance (standard scores from 95 to 106) on the *Finger Tapping Test* and *Finger Localization Test*.

Mason endorsed five intellectual impairments, two psychological consequences, no mood disorder, one physiological impairment, no personality alteration, and no neurological problem on the TBI Symptom Checklist. Verbally, Mason reported persistent attention and memory deficits as well as struggles with panic attacks and anxiety at the time of this study. His SSD accommodations included extended time to complete assignments and tests, a quiet testing location, and early class registration. Mason expressed uncertainty about changes in grades or academic performance after his MTBI. He reported spending greater amounts of time completing assignments than before his injury, although he thought this change might be attributable to the increased demands associated with college versus high school curriculum rather than to his MTBI.

Julie. Julie, a full-time, African-American, third-year undergraduate student who lived alone in on-campus housing, sustained her MTBI while participating in an athletic practice session during her freshman year of high school. She experienced a brief period of unconsciousness followed by extreme grogginess. Julie's mother took her to the emergency room where Julie received a CT scan; she did not recall the results of the scan. One day after Julie's

injury, she returned to school but, for the remainder of her freshman year, remained on high levels of medication to address attention deficits, severe migraines, and depression. She was given an IEP with a designation of MTBI and received extended time to complete assignments. Julie transferred from her private high school to a public one at the start of her sophomore year but left before the end of the first semester because of continued physical and cognitive problems. During this time, she met with a counselor to re-learn study skills and cognitive compensation strategies, and she worked with a neurologist to manage the physical symptoms persisting from her MTBI. In Julie's third year of high school, she enrolled in an intensive on-site program through her school district that allowed her to complete all of her sophomore and junior credits over the course of a single year. She received "A" grades for all of her work in the program and then returned to the regular public school program where she successfully completed her senior year.

Julie participated in a psycho-educational evaluation approximately 1.5 years after sustaining her injury. Results revealed performance generally in the average to high average range on standardized measures assessing visual processing (*Motor Free Visual Perception Test – 3rd edition*: 90th percentile), visual-motor integration (*Beery-Buktenica Developmental Test of Visual-Motor Integration*: 30th percentile), auditory processing (*Comprehensive Test of Phonological Processing*: average range), conceptualization (*Woodcock-Johnson III, Quantitative Concepts*: 61st percentile; *Test of Auditory Processing Skills*, Auditory Cohesion Index: 50th percentile), association (*Woodcock-Johnson III, Academic Knowledge*: 82nd percentile), acquiring and remembering general knowledge (*Woodcock-Johnson III, General Knowledge*: 82nd percentile), and verbal reasoning (*Test of Auditory Processing Skills*, Auditory Reasoning: 37th percentile; *Cognitive Assessment System*, Planning: 79th percentile; Simultaneous Processing: 73rd percentile; Attention: 50th percentile; Successive Processing: 91st percentile). The testing revealed no areas of substantial cognitive impairment.

Julie identified ten intellectual impairments, three psychological consequences, one mood disorder, four physiological impairments, two personality alterations, and two neurological problems on the TBI Symptom Checklist. She described a variety of persistent intellectual impairments at the time of the study including difficulty concentrating, processing information, and solving problems. Emotional chal-

allenges included emotional lability, feelings of depression and anxiety related to her injury, and a sense that others did not understand her difficulties. Physically, she reported struggles with fatigue, tension, sleep regulation, and sensitivity to sound, noise, and light.

Julie's SSD accommodations included classroom note-takers or permission to audio-record class lectures, extended testing time in a quiet location, and priority class registration. She reported spending long hours on her coursework. Although many of Julie's grades were "A's" or "B's," she had failed or withdrawn from several courses over the past three years. She also changed majors during her sophomore year from Textiles, Clothing, and Design to Hospitality, Restaurant, and Tourism Management because of the rigorous nature of the coursework in her first major. She reported that her current major was less stressful and demanding and that she was enjoying the courses.

Molly. Molly was a 27-year-old, African-American, full-time doctoral student in Psychology who lived alone in an off-campus apartment. She sustained her MTBI when she fell and hit her head on the counter and floor of her home shortly before beginning graduate school. Shortly after her injury, Molly's mother took her to see a medical practitioner because of repeated episodes of dizziness that were especially prevalent while she was driving. Molly was diagnosed with PCS at that time. During the first semester of graduate school, Molly's mother took her for diagnostic services to address persisting physical and cognitive issues (e.g., attention difficulties, emotional lability). As a result of testing, Molly received brief outpatient occupational and physical therapy services, neurofeedback from a neuropsychologist, and approximately four months of speech therapy to address organization difficulties. At the time of the study, Molly continued to meet with her neuropsychologist to address ongoing cognitive and emotional challenges.

Molly identified four intellectual impairments, no psychological consequence, no mood disorder, one physiological impairment, three personality alterations, and no neurological problem on the TBI Symptom Checklist. Molly stated having persistent difficulties with time management, task initiation, emotional lability, and hypervigilance. Despite these challenges, she chose not to register for accommodations through the SSD office, although she indicated she asked professors for extensions on papers as needed. Because of differences in undergraduate and graduate coursework, Molly felt com-

parison of her pre- and post-injury effort regarding schoolwork was not possible. Her grades, however, remained comparable.

Dana. Dana was a 34-year-old, African-American, part-time, fourth-year undergraduate student who was majoring in Public Affairs and Community Service and lived off-campus with dependents. She sustained a MTBI as the result of a physical assault occurring five years after high school. Immediately after her MTBI, Dana declined medical treatment but visited the emergency room one to two days later to have the bump on the right side of her head examined. She returned to the hospital approximately two years after her injury because of persistent cognitive challenges; an MRI performed at that time revealed no apparent brain damage. Approximately two years after that, she saw a neuropsychologist for a neurocognitive evaluation, and he diagnosed her as having sustained a MTBI. Dana did not, however, pursue recommended treatment from the neuropsychologist because of financial constraints. She enrolled part-time in an undergraduate program at her local university seven years after her injury.

Dana endorsed thirteen intellectual impairments, four psychological consequences, no mood disorder, two physiological impairments, three personality alterations, and no neurological problem on the TBI Symptom Checklist. Verbally, she described persistent intellectual impairments including difficulty with attention, memory, and information processing as well as struggles expressing her thoughts verbally. She also noted emotional changes including increased agitation and irritation, anxiety, discouragement, and apathy. Physically, she reported ringing in her ears and numbness and tingling in parts of her body. Her SSD accommodations included extended testing time in a quiet location. Because of the time lapse between Dana's high school attendance and her return to college, changes in grade performance were unknown. Since her return to college, Dana reported expending large amounts of time and energy to complete assignments and needing to review information repeatedly to learn it. She felt this process was more difficult than prior to her injury, although she questioned the impact of her age as well.

Materials

Interview questions. We developed a three-item semi-structured interview. Questions one and two were designed to elicit responses from participants about their experiences as college students with

MTBI and factors that shaped these experiences. We also created probes for these questions to encourage participants to clarify and expand their comments. The third question allowed participants to contribute any additional information they felt was relevant to the topic or to comment on gaps in the line of questioning.

Equipment. Audio recording of the interviews was completed using an Olympus Digital Voice Recorder VN-8100PC.

Procedures

Study design. We used a phenomenological approach to structure the research, because an investigative technique focusing on unique events meshed well with the highly-individualized life experiences of college students with MTBI. In addition, phenomenological information analysis leading to descriptions highlighting the essence of individuals' experiences aligned with our desire to identify commonalities as guides for educators attempting to develop and implement effective college accommodations. Finally, phenomenology's close association with post-positivist thinking and its view that reality requires the melding of internal experiences and external events and involves both inquiry and reflection (Creswell, 2007; Denzin & Lincoln, 2011) made it an ideal approach to explore the realities of students as mediated by their internal MTBI experiences and the external events of college life.

Our role as the researchers. We have background experiences researching and working with individuals with TBIs. Given our experiences, we exerted caution to avoid biasing the study findings with our preconceived notions about the life experiences of individuals with MTBI. We did this by developing a semi-structured interview that included broad, non-leading questions and follow-up queries encouraging the free description and exchange of ideas. In the last portion of each interview, following the guidelines of Creswell (2007) and Moustakas (1994), we encouraged participants to share any additional information related to their experience about being a college student with MTBI that they felt had not been adequately addressed during the previous part of the interview.

Interviews. Individual interviews with study participants lasted approximately one hour each and took place in a quiet room with a one-way mirror through which a second person observed and took online field notes. During the interviews, the participants described their experiences as college stu-

dents with MTBIs and discussed factors influencing those experiences. Follow-up questions addressed topics commonly related to college experiences (e.g., coursework, social life) as well as ideas emerging from earlier responses. At the end of each interview, participants had the opportunity to provide additional details or information they felt relevant to expressing the experience of being a college student with a MTBI. Artifacts included our field notes taken during the interviews and demographic, symptom, and injury data collected via questionnaire, checklist, and structured interview questions. All interviews were digitally recorded for later transcription and analysis.

Data Analysis

We used a phenomenological methodology outlined by Moustakas (1994) and Creswell (2007) to analyze statements from transcribed interviews. We first read through each transcript twice, writing critical statements in the margins. Next, we reviewed the critical statements, giving them all equal weight, and began to group them into "clusters of meaning" (Creswell, 2007, p. 61). After that, we compared our initial findings with one another and used them to reach consensus on the clusters of meaning most representative of all participants. We used the final clusters of meaning to generate a textual description of participants' experiences as college students with MTBIs. We identified structural factors—such as aspects relating to teachers, family, and social life—that mediated the reported experiences (Moustakas, 1994, Creswell, 2007). Finally, we used the information from the textual and structural descriptions to ascertain the "essence" of the participants' college experiences (Creswell, 2007, p. 62).

Validation and Validity Checks

Coding and analysis of the transcripts served as the first form of validation confirmation of the interview data, and member checking by survivor participants functioned as the second form. Validity was assessed through triangulation with seven studies where researchers asked college students with TBIs (Haag, 2009; Kennedy et al., 2008; LaForce & Martin-MacLeod, 2001; Stewart-Scott & Douglas, 1998) or differing combinations of college students, their families, friends, educators, and medical providers (Bush et al., 2011; Hux et al., 2010; Todis & Glang, 2008) about challenges associated with postsecondary education. We focused on students with different severities of TBI: mild (LaForce & Martin-MacLeod,

2001), mild-to-moderate (Haag, 2009), moderate-to-severe (Todis & Glang, 2008), severe (Bush et al. 2011; Hux et al., 2010; Stewart-Scott & Douglas, 1998), and unspecified (Kennedy et al., 2008). Two of the studies (LaForce & Martin-MacLeod, 2001; Kennedy et al., 2008) involved surveys, and the remaining five studies (Bush et al., 2011; Haag, 2009; Hux et al., 2010; Stewart-Scott & Douglas, 1998; Todis & Glang, 2008) involved participant interviews.

Results

Our analysis of the participants' transcripts led us to discover an overarching theme of *change* and two subthemes (i.e., changes to self and changes in the college experience). Each subtheme contained three areas further defining the types of changes experienced by participants. *Changes to self* included (a) cognitive changes, (b) physical changes, and (c) social/emotional changes; and *changes to the college experience* included (a) academic changes, (b) accommodation changes, and (c) advocacy changes. The participants' college experiences were further mediated by positive and negative factors. Positive mediating factors were (a) self-determination, (b) support from family and friends, (c) teacher support, and (d) academic accommodations; negative mediating factors were (a) injury invisibility and (b) coursework difficulty.

Changes to Self

Cognitive changes. All participants experienced persistent cognitive difficulties as a result of their MTBIs. A majority reported diminished information processing speed. For instance, Dana avoided group work, because she felt that she needed "extra time to really process the information." Gabe, too, stated, "I think things take me longer...than they did for me in the past; longer than...they do for my peers, generally."

Attention deficits also emerged as challenges for some participants. For example, Gabe noted, "I will get distracted...when I'm doing research on the Internet. I'm supposed to be looking up journals, [and] like I'll just subconsciously go to Facebook or something." Even Mason, who attributed the majority of his academic challenges to his transition from high school to college, acknowledged that he could "maybe get sidetracked and maybe that's [an] attention thing."

Several participants spoke about memory difficulties following their MTBIs. For example, Molly

commented, "After my head injury, I would just...not...encode things. So it was like the forgetfulness was still there but was just a little bit more." Dana echoed this sentiment, saying, "Classroom settings, sometimes they can just be a challenge....You have to go in there, you have to listen, you have to try to retain all this information. A lot of times writing notes is just like, 'Okay, I wrote them but what did we talk about?'" Gabe, too, struggled with issues related to memory, reflecting, "I used to have this passive, like latent memory of the things that I did over...a window of five or six days. I could say immediately what I did two days ago, as where after the injury,...I haven't been able to do that. I have to actively sit down and think about it, and the day, instead of being a singular day, sometimes seems like it's made up of several conjoined parts."

Physical changes. The participants experienced various physical changes resulting from their injuries. For example, Mason sustained an arm injury that prevented him from resuming his athletic endeavors, and Molly experienced vision changes that interfered with her ability to track written words; Gabe and Julie reported persistent headaches.

A majority of the participants also mentioned sleep cycle disturbances. Dana remarked, "I would say the biggest thing would be sleep. I wasn't sleeping well....Or if I did get to sleep, it was like my mind just wasn't ready to rest." Gabe, too, reported difficulty getting his mind to rest, commenting, "I also develop...this kind of mania at night where—I think it's because I'm tired—my...thoughts seem to accelerate." Julie's sleep issues frequently resulted in physical and academic consequences. As she put it, "It's like, something's gotta give there....This week was bad, because I stayed up way too late like for the last two weekends, so my brain's like, 'You really can't keep doing this,' and I missed class because I slept through the alarm."

Mental and physical fatigue were also common participant complaints. For example, Molly reported, "The second year I had it [the MTBI],...things like reading an article...made me really tired....I would read something, and I would be like, 'I need to take a nap.'" Julie's mental and physical fatigue frequently affected her emotional state. For instance, she described a difficult day saying, "Finally I just wanted to burst into tears, because I just was like, 'I'm tired.'...I turn into a two-year-old—honestly—where I'm like, 'I don't wanna.'" I get really whiney and really tired, and I space really bad."

Three of the participants also reported less stamina for the rigors of college than students without disabilities. Julie remarked, "I think I'm Wonder Woman, but I'm not. I think that's the biggest thing, is just like trying to do everything, and I can't." She went on to say, "I feel like they're [peers] able to balance everything out and juggle it more." Gabe too remarked, "I mean I have a much lower threshold for stress and work which...it's all relative to other people."

Social-emotional change. Social and emotional changes were evident for all participants, but they were expressed in unique ways. Gabe, for example, struggled with negative emotions. He reflected, "I've become a much more angry person...I...tend to be very caustic in critiques of other people's work." Molly, too, struggled to interact with others, commenting, "[I] tend to be emotionally expressive, so...like if I'm bored or I'm kind of disgusted with something, it's hard for me to hide it. And having a head injury just makes all that worse." In contrast, Julie had many friends and interacted well with others. However, she struggled with an underlying fear of rejection fostered by her negative experience with her friends at the time of her injury. As she put it, "I overbook myself socially a lot,...or say yes to something when I know I have a paper due. But it's like I don't wanna be left out, because I don't want them [peers] to stop being my friends." She also struggled with emotional lability commenting, "I've always been emotional, but, like since my accident, like someone can do something, and I'll just start crying. There is no reason for me to cry, and then I start focusing more on like emotional stuff. And it totally affects my school stuff way more than it should." Dana's challenges with social interaction stemmed from her post-injury difficulties organizing and expressing her thoughts. For instance, she stated that before her BI she could, "engage in...debated conversations," but that after the accident, she avoided them. As a result, she became "a listener, because it just...becomes too much." Even Mason reported he had become more aware of the potential negative outcomes of risk-taking which affected his behavior during social situations with peers.

Changes to the College Experience

Academic. One of the key academic changes in the college experiences of the participants revolved around the time and effort required to complete coursework. For example, Mason commented, "If, for our test, I have to memorize so many things, I'd have to start probably earlier," and Gabe reported that

the writing process took longer for him than for his peers. Julie, too, struggled, reflecting, "I think I may need an hour to do stuff, but it really takes me three hours to do it, and I didn't comprehend that." Dana, on the other hand, recognized her decreased information processing speed and compensated by spending extra time to "write everything down and go over things more than once."

Some of the participants also noted difficulties with task initiation. For example, Molly commented that, prior to her injury, she was "really, really concerned" if she turned a paper in late, but, after her injury, she was unconcerned about submitting work in a timely fashion. She commented, "There are some days when I do not do any work at all...I know in grad school, in order to be productive, you need to get something done every day. But there are some days where...I'll just be sitting there in my office." Gabe echoed this sentiment, saying "I never had...the difficulty I have now in approaching my work. [It is]...like a mental obstacle to get started on it."

The participants responded to their academic challenges in different ways. Julie changed to a less rigorous major. Dana enrolled part time, and she and Mason both routinely used SSD accommodations. Molly moved to a different department where she felt the professors understood the academic implications of her MTBI, and Gabe purposely enrolled in less demanding credits. The results of these self-initiated modifications varied. Mason transitioned off academic probation after beginning to receive SSD services, but Dana continued to struggle with one of her courses. Julie reported increased satisfaction and academic performance in her new major; whereas, Molly and Gabe continued to report no change in their performance, which they described as comparable to that of their peers.

Accommodations. The participants identified registration with the SSD office and/or access to accommodations as a factor distinguishing their college experiences from those of their peers without disabilities. For example, Mason reported he routinely approached professors about his accommodations and Dana stated, "It is a challenge I think for me, not only being older but, with...a lot of the professors obviously I have to go to them and tell them,...'Okay,...I'm registered with the SSD office.'" Julie, too, felt the process added an extra layer of complexity commenting that it was "hard finding...a balance...and...learning how to take...advantage of them [resources]."

Molly and Gabe saw their need for accommodations as setting them apart from their peers without disabilities. Molly, for instance, commented that the professors in her first program routinely gave her easier research responsibilities like literature reviews instead of more complex tasks like data analysis. In her words it was "...like not getting the same training." In contrast, Gabe's concerns revolved around using extended time on a standardized entrance exam. As he put it, "I was looking into extended time...and I guess they qualify your school in some way if you get [it]. You just get an asterisk attached to it [the result]. So I don't know what kind of implication that would have in terms of [an] admission committee."

Advocacy. The participants acknowledged the need for self-advocacy as they sought services and support related to their MTBIs from professors. For Mason and Gabe, the process appeared to be relatively neutral. Gabe reported he rarely discussed his MTBI with individuals in his department, but that the chair of the department, "might know about it [the brain injury], because it was included in my application materials." He went on to say, "We might have talked about it once or twice, but it hasn't been the consequence of...any course work." Mason, on the other hand, reported freely talking with a number of his professors about his academic needs. In contrast, Julie's experience was stressful. She reported difficulty getting "the courage to go talk to a professor and tell him like, 'Hey I need extra time on this.'" Even Dana, who relied heavily on academic accommodations, acknowledged that she found approaching her professors challenging. Interestingly, although Molly expressed distress related to her need for accommodations, she reported that her self-advocacy skills with professors and others had improved over time.

The participants readily acknowledged the presence of personal, social, and environmental influences that colored their perceptions about their college experiences. Some of these influences were positive, and others were distinctly negative.

Positive Mediating Factors

Self-determinism. The participants identified their personal resolve, beliefs, and actions as positively affecting their perceptions of their experiences as college students. Dana, for example, pursued academic success by honing her note-taking skills and becoming "more organized" to meet her academic challenges; whereas, Mason reported spending more

time planning commenting, "[I] try and make sure I...do whatever I can to succeed."

Julie's self-determinism was rooted in her desire to demonstrate her intelligence and academic worth. She recalled, "My freshman year [of high school], I remember the principal of our high school told me that...'You need to understand that you're never going to college.'...So he's a big motivator in the fact that I'm gonna prove him wrong, and I'm gonna graduate." Similarly, Molly's decision to enroll in a complex statistical modeling course stemmed from her desire to prove to her professors that she was capable of completing challenging post-graduate work. Even Gabe reported being motivated to exceed the expectations of his professors by producing noteworthy academic projects.

Support from family and peers. Each of the participants listed some type of family and/or peer support as positively affecting their college experience. Support from mothers topped the list for four of the five participants. Mason, for instance, credited his mother with helping him receive accommodation services, and Molly commented, "My mom...is like my biggest advocate....I think I probably got better care than most people, because my mother made sure of it." Julie, too, reflected, "She's very helpful and supportive still, like when I'm stressed,...she'll come over at two o'clock in the morning if I need her to."

Gabe acknowledged the role of his parents but felt that peers, especially members of the opposite sex, strongly contributed to his positive experiences. He related that both his former girlfriend and last female roommate had provided support and structure for his life. Dana, too, reported she relied heavily on individuals outside of her immediate social circle because her parents and closest friend felt she was "fine." Specifically, she reported, "With a couple of students that...I feel comfortable with,...I can ask them, 'Well what...are we doing? What's going on?' And you know they'll just [say], 'This is what we're doing.'"

Educator support. The participants defined educational support in different ways. Julie reported her current college experience was positively affected by educational rehabilitation and supports provided by a teacher and a counselor during her high school education. She commented that her counselor had helped her "learn how to...think different, and learn how to learn again, 'cause that was the biggest struggle." Mason appreciated the access to necessary academic supports his postsecondary teachers provided stating, "They're really helpful, and they understand. They..."

meet my accommodations that I need.” Dana appreciated the professors who were “more structured” and went “by the syllabus.” Similarly, Gabe mentioned that his teachers’ class structure and expectations led to his positive views of postsecondary education, because it enabled him to complete course requirements without seeking formal accommodations. For Molly, the emotional support from her department and her academic mentor related strongly to her positive views of her college experience. She reflected, “I feel like I can be like, ‘I am really stressed out. I haven’t gotten a lot of sleep....I don’t feel like I know what I’m doing.’ And I don’t feel like he’s [the mentor] gonna hold that against me.”

Academic accommodations. The participants identified registration through the SSD office or access to academic accommodations as a positive factor mediating their college experiences. Mason commented, “I wasn’t [associated with] the Students with Disability [Office] my first year in college....That year didn’t go well. I got put on...academic probation....I registered [with the SSD office], and I got off academic probation after.” Dana, too, commented, “Just going...[to the SSD office] to take my tests, the pressure...is...almost gone. If I’ve taken the...test in the [class] room, it’s like an anxiety...I lose my focus.” Gabe, Julie, and Molly relied on accommodations to a lesser degree but still felt they were helpful. Julie, for instance, commented, “I really don’t have to use my services through SSD...like ever honestly...but this one class I’m like, “No, I need to do that [use accommodations].”

Negative Mediating Factors

Injury invisibility. The primary negative factor reported by all five participants was the perceived invisibility of their MTBIs. As Gabe put it, “I think...outwardly [I’m] the same in many respects. I don’t think it’s evident [the MTBI], but it’s very evident to me at times.” Molly, too, commented, “It’s almost easier to have like a broken leg or to be in a wheelchair, because people can see the obvious limitation. But when you have a brain injury, it’s not always obvious.” Julie echoed this sentiment reflecting, “If I had some head gear on,...[professors] would probably be like, ‘Oh yeah! You’re right. You do have a head injury.’ But because I look and I talk just fine,...they’re always shocked that something could be wrong inside.”

Coursework difficulty. A number of the challenges the participants faced related directly to

coursework expectations. For instance, Julie stated, “...it [college] was hard...mostly because...I was in a stressful major with a lot of critique...and it...affected me, it would stress me out emotionally too.” Dana, too, reported difficulty meeting postsecondary academic demands commenting, “It’s a challenge, because there is a lot of work, a lot of reading, and then you have to memorize these rocks [for geology class].” She then described her criminal procedure class saying, “...you have to not necessarily know the definitions, you have to apply, and that’s very challenging for me.” Mason, on the other hand, struggled with the general transition from high school to college coursework expectations.

Gabe and Molly’s difficulties with coursework performance related directly to their self-perceptions and the expectations of others. For example, Gabe remarked, “There’s been that looming concern that you need to obviously distinguish yourself,...so...that’s certainly exacerbated the course load that I’ve had. I could have arranged it so it was more manageable, less stressful on myself.” Molly, too, commented, “You had the added factor of having a brain injury, but you also had the added factor of ‘Oh great, I’m the only African American in this department.’ So,...I feel...the pressure of ...I have to be really, really good at this.”

Triangulation Results

We compared the results of the current study with findings from seven studies of postsecondary students with differing TBI severities (Bush et al., 2011; Haag, 2009; Hux et al., 2010; Kennedy et al., 2008; LaForce & Martin-MacLeod, 2001; Stewart-Scott & Douglas, 1998; Todis & Glang, 2008). Three of the studies (Bush et al., 2011; Hux et al., 2010; Todis & Glang, 2008) also included feedback from individuals associated with the participants with TBI (e.g., family, instructors, and peers).

Many of the findings from the validation studies aligned with those of the current study. For instance participants in all studies, including LaForce and Martin-MacLeod’s (2001) study examining post-injury symptoms in college students with MTBI, reported physical, cognitive, and social-emotional changes following their TBIs. One difference that emerged was that the current study participants reported long-standing *subtle* physical changes (e.g., fatigue, sleep cycle disturbances) following their MTBIs; whereas, individuals in the validation studies reported combinations of persistent *subtle* (Hux et al., 2010; LaForce

& Martin-MacLeod, 2001; Kennedy et al., 2008; Stewart-Scott & Douglas, 1998) and *overt* (e.g., poor coordination, impaired limb movement) (Haag, 2009; Hux et al., 2010; LaForce & Martin-MacLeod, 2001; Kennedy et al., 2008; Stewart-Scott & Douglas, 1998) symptoms.

Participants both in the current and validation studies mentioned academic changes either in the form of increased difficulty with coursework or with the implementation of academic accommodations following TBI. However, only participants in the current study and Haag's (2009) study discussed how the process of advocacy changed their perceptions of their college experience. Current study participants focused on factors such as finding courage to self-advocate and the negative impact of asking for help on self-perceptions of academic competency; this contrasted with Haag's participants who reported feeling guilty about asking instructors for support.

Haag's participants also identified patterns of power imbalance, oppression, bureaucratic barriers, and privilege at the instructional, departmental, and institutional levels that affected their college experiences. In contrast, although all participants acknowledged the need for support from instructors and several participants experienced difficulty obtaining needed accommodations and supports from single instructors, no established practices of mistreatment emerged. In fact, participants in the current study spoke positively of the supports provided through the SSD office and did not mention institutional barriers beyond the need for broader education about MTBI for faculty and staff.

Positive mediating factors were consistent between the current participants and those in the validation studies. However, differences in negative mediating factors emerged. Specifically, only two validation studies mentioned injury invisibility (Haag, 2009; Hux et al., 2010) and coursework difficulty (Bush et al., 2011; Todis & Glang, 2008). In contrast, current study participants identified both factors as integral to their college experiences.

Discussion

The number of postsecondary students with TBI is increasing (Daneshvar et al., 2011; Grossman, 2009; Madaus et al., 2009). Although the majority of individuals who sustain MTBIs fully recover within a period of several weeks or months, a small subset

experience ongoing challenges (Carroll et al., 2004). The findings from participants in the current study suggest that postsecondary students with persistent symptoms post-MTBI may face fundamental *changes* to their self-perceptions and to their college experiences. Specifically, participants identified negative cognitive, physical, and social-emotional changes coupled with academic challenges, accommodation needs, and advocacy roles that they felt set them apart from their peers without TBIs.

Internal and external mediating factors may affect the perceptions of college students with MTBIs. The participants in the current study identified self-determination to succeed, access to accommodations, and family and educator support as factors that positively affected their college experiences. In contrast, they identified injury invisibility and coursework difficulty as negative mediating factors.

Factors beyond those specifically identified by the participants may have contributed to perceptions about college experiences. First, the participants attended a large university with robust SSD services and supports. However, postsecondary SSD supports and services vary among institutions and are generally less comprehensive in smaller colleges and universities (Raue & Lewis, 2011). Thus, had the participants attended a smaller institution or one with limited services, their perceptions about the positive role accommodations played in their college experience might have differed. On the other hand, had the students attended a smaller institution, their struggles with self-advocacy, injury invisibility, and coursework management might have been less pronounced, because they knew their instructors better and felt more comfortable sharing their accommodation needs with them.

The results of seven validation studies (Bush et al., 2011; Haag, 2009; Hux et al., 2010; Kennedy et al., 2008; LaForce & Martin-MacLeod, 2001; Stewart-Scott & Douglas, 1998; Todis & Glang, 2008) provided strong confirmatory support for the current study findings. The differences that emerged, however, suggest that college students with MTBIs may struggle with subtle or invisible deficits and find the process of self-advocacy more challenging than their counterparts with more severe TBIs. In part, this may reflect a heightened self-awareness of cognitive and physical deficits and the need to advocate with instructors more frequently than is necessary by individuals with more apparent deficits.

The physical, cognitive, and social emotional challenges reported by college students with MTBI in LaForce and Martin-MacLeod's (2001) study aligned with those of the participants in the current study. However, the current participants did not report the overt symptoms detailed by LaForce and Martin-MacLeod. In addition, the quantitative nature of the study precluded LaForce and Martin-MacLeod from exploring the personal perceptions, experiences, and mediating factors addressed in the current study.

Many of the results from Haag's (2009) study of college students with mild to moderate acquired or TBI correspond with those reported herein. For example, participants in both studies valued academic accommodation and self-advocacy and found others' lack of knowledge about TBI problematic. However, Haag's participants described systemic institutional problems such as organizational structure and impersonal processes that negatively affected their experience; whereas, the participants in the current study did not report such issues and, in fact, reported support from professors as a positive mediating factor. The reasons for this difference are unclear. They could relate to variations in educational systems in Canada—where Haag's study took place—and the United States. Meaningful distinctions may also have been present between the two participant groups. For example, all participants in the current study had MTBIs, but participants in Haag's study had a mixture of mild to moderate acquired and traumatic brain injuries. Also, at least three of Haag's participants had distinct physical impairments that might have contributed to their challenges.

Implications for Postsecondary Institutions and Educators

Current study participants identified academic and educator supports as key positive mediating factors to their college experience and coursework difficulty and injury invisibility as negative factors. Postsecondary institutions and educators can take a number of steps to address these factors and improve outcomes for students with MTBIs. For example, research shows that outcomes are better for students with TBIs who are linked directly to disability services at the postsecondary level (Todis & Glang, 2008). As such, a focus on streamlining transition services for students with MTBIs who have received academic accommodations at the secondary level may be beneficial. Although current study participants reported awareness

of their eligibility for academic accommodations, this is not necessarily the norm (Kennedy et al., 2008). Developing methods for information dissemination (e.g., class announcements) about available academic supports and eligibility criteria to all students may be an effective means of addressing this problem. Postsecondary institutions may also find it beneficial to employ professionals with expertise in TBI who could then provide disability service providers, educators, and other postsecondary personnel with valuable education about MTBI characteristics, educational implications, and efficacious interventions. Once given the tools to work more effectively with students with MTBIs, educators are likely to feel better prepared to identify and develop individualized classroom supports that will facilitate academic success.

Study Strengths and Limitations

The phenomenological approach of this study provided the opportunity to hear directly about the perceptions of postsecondary students with MTBIs regarding their college experiences. Limitations include the relatively small number and the self-selection of participants. Both factors limit the generalizability of the findings and contribute to the possibility that the participants were not representative of the broader population of students with MTBI on university campuses. A third limitation is that the participants experienced MTBIs, which likely limits the applicability of findings to individuals with more severe injuries. Finally, the findings reflected the perceptions of students attending a large, Midwestern, public university. As such, the results may not generalize to other geographical regions, private institutions, or smaller colleges and universities.

Suggestions for Future Research

Advances in the identification of people with MTBIs and in the treatment of individuals with more severe injuries have led to improved outcomes for survivors as a whole. In turn, improved outcomes have prompted an increase in the number of survivors seeking or continuing higher education pursuits. Given this scenario, future research seeking to elucidate more clearly the struggles faced by college students with TBIs is critical. In particular, professionals need to determine methods of tailoring academic accommodations to meet individual student needs and designing interventions to aid with persistent cognitive, physical, and psychosocial challenges. They should

also further investigate the impact of internal factors—such as self-determinism, culture, and race—and external factors—such as support systems, institution characteristics, available supports and services, and faculty and staff MTBI training—on students' perceptions about college experiences.

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Appendix

TBI Symptom Checklist

Name:

Date:

Persistent Intellectual Impairments

- Memory problems
- Difficulty concentrating
- Attention Difficulties
- Easily Distracted
- Misplacing or difficulty tracking things
- Difficulty making decisions
- Difficulty solving problems
- Difficulty understanding spoken instructions
- Difficulty understanding written instructions
- Difficulty finding words
- Difficulty communicating thoughts/feelings
- Unintentionally repeating the same remarks
- Unintentionally repeating the same activities
- Stuttering or stammering
- Difficulties doing simple math
- Impaired abstraction or literalness
- Mental rigidity
- Deficits in processing information
- Deficits in sequencing information
- Difficulty executing or doing things
- Difficulty starting or initiating things
- Difficulty handling work requirements
- Difficulty handling school requirements
- Having to check and re-check what you do
- Disoriented by slight changes in daily routine
- Unsure about things that you know well
- Difficulty learning new things
- Doing things slowly to ensure correctness
- Impaired ability to appreciate details
- Impaired ability to benefit from experience
- Difficulty taking care of yourself
- Difficulty taking care of children

Persistent Psychological Consequences

- Easily agitated or irritated
- Easily startled
- Feelings of paranoia
- Spells of terror or panic
- Feelings of depression
- Persistent anxiety
- Anxiousness or feelings of fear and dread
- Feelings of discouragement
- Withdrawal or social isolation
- Feeling others do not appreciate your difficulties
- Feeling everything is an effort
- Feeling inept or worthless
- Laughing or crying without apparent cause

- Worrisome thoughts won't leave your mind
- Insensitive to others and social context
- Diminished insight

Persistent Mood Disorders

- Mood swings
- Shouting or throwing things
- Temper outbursts that you cannot control

Persistent Physiological Impairments

- Headaches or head pains
- Increased sensitivity to touch
- Ringing in ears
- Easily fatigued
- Numbness or tingling in parts of your body
- Weakness or loss of strength
- Feeling tense or keyed up
- Restlessness, unable to sit still
- Lessened ability to perform physically
- Decreased tolerance for alcohol and drugs
- Appetite disturbances
- Trouble falling asleep
- Awakening during the night
- Sleep that is restless or disturbed

Persistent Personality Alterations

- Passivity or submissiveness
- Aggressiveness
- Apathy, lack of interest or emotion
- Overly sensitive
- Discouragement or demoralization
- Increased emotional distress
- Chronic frustration
- Grandiosity or boastfulness
- Excessively talkative
- Compulsive writing
- Egocentricity
- Childishness
- Silliness
- Overly responsible
- Irresponsibility
- Impulsively
- Self-indulgent
- Indiscreet comments and acts
- Obscene comments or acts
- Increased shame or guilt
- Religiosity

The Academic and Psychosocial Impacts of Ehlers-Danlos Syndrome on Postsecondary Students: An Integrative Review of the Literature

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Abstract

Ehlers-Danlos Syndrome (EDS) is a complex, often invisible, connective tissue disorder that has arguably profound psychosocial and academic impact on postsecondary students. It is an underdiagnosed and misunderstood condition that is the focus of little research, particularly within the social sciences. Several factors influence the academic experiences of postsecondary students with EDS, including institutional issues, faculty attitudes, accommodations, school attendance, and technology use. Psychosocially, adjusting to new or changing diagnoses, dealing with the stigmas and misperceptions of others, and the ongoing identity formation of youth are major factors for students. Since there is a notable shortfall in academic literature with the specific focus of EDS in postsecondary education, this review draws from the peripheral fields of chronic illness and disability studies for support.

Keywords: Ehlers-Danlos Syndrome, chronic illness, post-secondary, psychosocial, academic barriers

Ehlers-Danlos Syndrome (EDS) is a connective tissue disorder where the body does not produce proper collagen (Ehlers-Danlos National Foundation [EDNF], 2009). Collagen is effectively the “glue” that holds the body together, and it directly affects approximately 80% of human systems, including skin, organs, joints, and the nervous and circulatory systems (EDNF, 2009). There are multiple manifestations of EDS; the most common are the classical, hypermobility, and vascular types. The vascular form of EDS can result in spontaneous organ rupture and often precludes an average lifespan. The diagnosis rate of the different types of EDS is presently unknown. However, according to the EDNF (2015), the prevalence of EDS is estimated to be about one in 2,500 to one in 5,000. Using these incidence rates, the EDS population in Ontario, Canada, for example, can be estimated to be approximately 2,700, given a population of 13.7 million people (Statistics Canada, 2014). Vascular EDS is estimated to have a prevalence of approximately one in 250,000 (EDNF, 2015).

EDS is not a new disease. In 1901, Edward Ehlers, a Danish dermatologist, recognized the con-

dition when he published details of a patient with lax joints, hyper-extensible skin, and inclination to bruising (Parapia & Jackson, 2008). In 1908, Henri-Alexandre Danlos, a French physician, suggested that skin fragility and vascularity were cardinal features of this syndrome (Parapia & Jackson, 2008). The classification of EDS began in the late 1960s when it was defined according to nine subcategories (Parapia & Jackson, 2008) that have since been revised to six main types (EDNF, 2015).

Many people with this disorder become symptomatic as young adults (Adib, Davies, Grahame, Woo & Murray, 2005; EDNF, 2009), right around the time that they are considering or are enrolled in postsecondary education. Daily dislocations cause many problems for students with EDS in the school setting (Tinkle, 2010). Furthermore, low muscle tone and delayed fine and gross motor skills cause individuals with EDS to appear clumsy and uncoordinated (Adib et al., 2005). Many students with this disorder are unable to participate normally in physical and regular classroom activities. This circumstance negatively affects their physical and psychosocial development.

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Currently, there is limited research on EDS. Of the research that does exist, little of it focuses on educational accommodations and modifications that can help students with their academic and psychosocial development. Instead, the focus is clinical issues and, thus, serves medical professionals rather than students, educators, and support workers (e.g., Adib et al., 2005; Castori et al., 2012; Milhorat, Bolognese, Nishikawa, McDonnell & Francomano, 2007; Savasta, Merli, Ruggieri, Bianchi & Sparta, 2011). No studies have been found in which the relationship between EDS, emotional and social development, identity formation, and academic achievement are examined. As such, there remains a large gap in the body of knowledge about this disease and the postsecondary student experience. Moreover, because EDS and its co-morbidities are under-recognized in the general population, there is a systemic lack of awareness of the accommodations required for students with this condition. Even in the broader context of chronic illness and postsecondary education, there are few resources. In short, students with chronic illnesses, such as EDS, are an under-studied, under-represented population in the postsecondary environment.

This literature review builds around two overarching interconnected themes: academic considerations and psychosocial considerations. Within these themes, specific subcategories are explored. They include institutional issues, faculty attitudes, accommodations, school attendance, technology, and stigmas and (mis)perceptions relating to chronic illness. Before relevant literature in these areas is explored, essential terminology is explained and a number of key ideas drawn from Federal and Provincial legislation are offered as important context. The grounding theoretical framework is also presented in advance of the literature itself.

A Note on Terminology Use

The terms chronic illness and disability are not interchangeable nor are the concepts mutually exclusive. The United Nations (2007) used the term disability to apply to all persons with disabilities including those who have long-term physical, mental, intellectual, or sensory impairments, which, in interaction with various attitudinal and environmental barriers, hinder the person's full and effective participation in society on an equal basis with others. The term chronic illness is less formally defined. Larson (2006) defined chronic illness as "an ongoing medical condition with a spectrum of social, economic, and

behavioural complications which require meaningful and professional involvement" (p. 5). The consensus is that a chronic illness is a medical condition, disease, or injury that has lasted more than three to six months and has caused an individual to significantly alter his or her day-to-day activities (Repetto et al., 2012). Decreased endurance, mobility, or cognitive functioning results in a limitation of the individual's ability to continue his or her usual lifestyle (Wide-man-Johnston, 2015). An individual with chronic illness is never cured.

Because there is no specific literature on the psychosocial and academic development of postsecondary students with EDS and limited literature on the topic of chronic illnesses and postsecondary education, the literature of disability studies was considered in this review. Furthermore, as the rights of individuals with chronic illness are governed by the same legislation as disabilities, many of the examples cited within the disability studies literature can be applied to people with chronic illnesses as well. While EDS is a chronic illness by definition, many of its symptoms result in temporary or long-term disablement; thus, within the body of the paper the terms chronic illness and disability are both used. As further context to the review, as appropriate, the ideas presented within the aforementioned sub-sections will focus on issues and barriers with recommendations and strategies outlined in a Summary section.

Legislation

In Canada, Section 15(1) of the Charter of Rights and Freedoms (1982) stated the following:

Every individual is equal before and under the law and has the right to the equal protection and equal benefit of the law without discrimination and, in particular, without discrimination based on race, national or ethnic origin, colour, religion, sex, age, or mental and physical disability.

Notably absent from the above statement is mention of geography. Hence, accommodations for persons with disabilities enrolled in postsecondary institutions varies according to where the student lives. Additionally, the Charter is quite broad and, therefore, open to interpretation when accommodations for persons with disabilities are developed and regulated (Black, 2004). Further, health status and chronic illness are not mentioned specifically in this legislation, thus generating questions about how they should be

addressed and accommodated. By comparison, in the United States of America, the passing of Section 504 of the Rehabilitation Act of 1973 allowed, for the first time, many people with severe limitations to enter higher education (Stephens & Norris-Baker, 1984).

At the provincial level, in Ontario, important strides have been made that mandate accommodation of persons with disabilities. In 2001, the Ontarians with Disabilities Act was passed. It requires the government and wider public sector including colleges, universities, hospitals, and school boards to develop accessibility plans (Ministry of Community and Social Services, 2013). In 2005, the Government of Ontario passed the Accessibility for Ontarians with Disabilities Act; the aim of this act is to make Ontario barrier free for individuals with disabilities (Mullins & Preyde, 2012). Additionally, according to the Ontario Human Rights Commission, service providers must take the needs of persons with disabilities into account and remove all existing barriers to services like education.

Models for the Conceptualization of Disability, Illness, and Health: Biopsychosocial Model

The biopsychosocial model of disability, illness, and health grounds the examination of the academic and psychosocial considerations required for students with chronic illnesses including EDS. The biopsychosocial model suggests a complex interaction of biological, psychological, and social factors that play a significant role in an individual's ability to function (Falvo, 2014). Conceptualizing chronic illness and disability as health conditions that affect functional capacity allows for increased understanding of individual experiences of such health conditions. The World Health Organization (WHO, 2014) accepted the biopsychosocial model as the dominant approach to understanding disability and health. The WHO acknowledges that all persons may experience elements of disability over the course of a lifetime through changes in health or environment and the impact of the disability/health condition on the functioning of an individual. Just as people vary in relation to their functional capacity, people vary in their personal resources, access to social supports, and abilities to cope (Falvo, 2014). Through the application of the biopsychosocial approach, an understanding of disability and health that incorporates all aspects of an individual's life experience will be obtained.

Academic Considerations

For the purposes of this review, the term academic considerations is used to refer to logistical concerns that affect learning within the postsecondary educational setting. These concerns include but are not limited to institutional issues, faculty attitudes, accommodations, school absence, and technology.

Institutional issues. Recent research indicates that more than half of Americans experience at least one chronic illness (Goodwin & Morgan, 2012). Despite the challenges that persons with chronic illnesses face, they can be highly productive members of the academic community. The key to their success lies in institutional policies and practices that ensure equity and support productivity. In a 2005 postsecondary report entitled "Ontario: A Leader in Learning," the following directives were set out:

Require institutions to reach out to students with disabilities at their schools and in their communities to ease the transition to postsecondary education. Provide funding for enhanced academic and career counseling on campus. Allow for the evolution of centres of research and service excellence and distribute funding to institutions for supports and services on the basis of the size of a given institution's population of students with disabilities. (Higher Education Quality Council of Ontario, 2013, p. 1)

Each of the above touches on a major facet of the issue of access to postsecondary education for persons with disabilities and/or chronic illness. According to Jung (2003), in postsecondary education, accessibility refers to "the institution's legal obligation to create genuine learning opportunities for people with disabilities to participate in all aspects of university life" (p. 92). The duty to accommodate requires the institution to take an active part in modifying practices, facilities, and/or services that prevent the inclusion and participation of students with disabilities who are otherwise qualified to attend school. In addition to bigger picture issues such as inadequate funding to reach out to students with chronic illness and make systemic and structural changes, other more subtle barriers also hinder the full participation of students with chronic illnesses. Some of these barriers include a lack of faculty and peer awareness; lack of participation in academic and non-academic discourse; and financial, time, and other resource constraints (Hutcheon & Wolbring, 2012). Each of these barriers is problemat-

ic since they lead to diminished postsecondary school experiences and negative effects on students' beliefs, identities, and self-concept.

Faculty attitudes. According to Jackson (2013), educators may be uncomfortable dealing with students with chronic illness because they lack knowledge and understanding of specific conditions. In the case of a chronic illness, the faculty member must feel adequately prepared to help the student. Faculty attitudes and responses can dramatically affect the academic success of students with chronic illness. How open faculty is to learning about different medical conditions and modifications and accommodations that support their students with such illness is particularly important. Faculty who are positive and approachable help students with chronic illnesses to feel secure and included in their learning environments. Too often, there is a level of skepticism about chronic illness on the part of faculty that students need to overcome in addition to their other challenges.

Perceptions of negative attitudes by faculty may prevent students with chronic illnesses like EDS from disclosing their health situations, using self-advocacy skills, and requesting accommodations (Rao, 2004; Sachs & Schreuer, 2011). In a survey conducted by Sachs and Schreuer (2011), 50% of students with disabilities indicated that faculty members understood their needs but only 25% of faculty members were willing to help accommodate them. In an effort to capture the faculty perspective, Bruder and Mogro-Wilson (2014) examined faculty awareness and attitudes towards students with disabilities. While their study was limited to one university and to disabilities in general, their study consisted of 2,056 faculty and graduate students. Despite the fact that half of the faculty reported having a student with a disability in at least one of their classes, faculty members still reported feelings of pity, awkwardness, embarrassment, and admiration for students with disabilities. Within the classroom the majority of faculty members provided accommodations to students with disabilities. However, 7% of the faculty viewed the provision of accommodations as inconvenient, disruptive, and caused feelings of unfairness in other students. Furthermore, 59% of the faculty were uncertain as whether students with disabilities were being fairly treated by the university, with 18% stating that the university was doing a poor job including students with disabilities in social organizations and co-curricular activities. Other findings indicate that faculty may be reluctant to provide certain accommodations for fear of lowering academic standards (Barzandeh, 2005).

Accommodations. People with chronic illnesses represent a significant proportion of the population of persons with disabilities (Jung, 2003). Most students with chronic illnesses like EDS depend on disability policies and supports in order to access the same postsecondary educational opportunities as their non-disabled peers (University of Manitoba, 2014). For some, making higher education more accessible and including previously excluded groups in the classroom are perceived as disruptive and even threatening to the existing institutional order of the university (Hutcheon & Wolbring, 2012; Jung, 2003). Students who receive academic accommodation as a result of a chronic illness may also be the target of resentment on the part of their peers because accommodations may be seen as unfair despite the fact that, in reality, accommodations correct inequitable outcomes of social arrangements (Jung, 2003).

Students with chronic illnesses, like EDS, experience unique issues that often require specific and targeted educational accommodations. In a study comparing young adults with childhood onset of chronic illness with their healthy peers, those with chronic illness experienced lower rates of high school graduation, college attendance, college graduation, and employment (Maslow, Haydon, McRee, Ford, & Halpern, 2011). Better educational accommodations in secondary school and an increased emphasis on the transition to postsecondary education for students with chronic illnesses might encourage students requiring accommodations to enroll in postsecondary degree or diploma programs and experience success (Haas & Fosse, 2008). In Ontario, transition planning for students moving from secondary school to postsecondary education is part of a student's Individual Education Plan (IEP) (Ontario Ministry of Education [OME], 2002). If the student does not have an IEP, he or she will likely not have a transition plan in place prior to graduation from secondary school.

While students with EDS have needs similar to those of students with disabilities, they also have unique challenges and issues that may require deviation from the standard academic accommodations typically provided in the postsecondary institutional setting (Korbel, Lucia, Wenzel, & Anderson, 2011). Often students do not realize that they are allowed to advocate for themselves and ask for different accommodations if the ones in place are ineffective (Kurth & Mellard, 2006). Kurth & Mellard examined how postsecondary students with disabilities perceived the accommodations available at 15 community and technical colleges in California, Minnesota and Kansas.

Their findings suggest that the accommodations offered to postsecondary students who have disabilities are often ineffective and inappropriate because the accommodations focus on the disability rather than on the students' contextual and functional needs. For example, a common accommodation offered to students is writing tests and examinations in an alternative location. While this accommodation meets the academic needs of a student, the student may feel isolated from classmates. Thus, accommodations must be examined to ensure that they are meeting both academic needs as well as the student's personal needs. The postsecondary students in Kurth and Mellard's study also stated that independence was one of the most important factors when selecting an accommodation. While adaptive technology (e.g., computers, tablets, voice-to-text, text-to-voice) provides academic independence, accommodations were not provided to ensure that the participants were able to maintain independence in terms of transportation, extracurricular activities, housing, and accessible facilities. Overall, Kurth and Mellard conclude that while postsecondary institutions are meeting their legal obligations a greater focus must be given to the entire context of student life by incorporating system wide universal design concepts.

At the postsecondary level, it is the responsibility of the student to self-advocate to ensure his or her needs are being appropriately met. While many services are often available within institutions, the student must still advocate for him or herself in order to receive appropriate accommodations. Additionally, while students generally have the opportunity to select accommodations from a list of possibilities, it is their responsibility to work with faculty and disability service professionals to tailor them to their circumstances (Kurth & Mellard, 2006). Further, faculty have different interpretations of accommodations. Thus, students must communicate with their instructors to ensure that their needs are being met while the integrity of the postsecondary institution is still maintained (Korbel et al., 2011). Faculty need to recognize that no two days will be the same for students with chronic illnesses and that some of the most helpful accommodations are discretion, understanding, and adaptability.

A further challenge affecting student success is a pedagogical one. Faculty often lack the knowledge and experience to prepare materials, classes, and courses for students with chronic illness. One way of designing lessons and classroom activities to ac-

commodate multiple student needs is the practice of Universal Design (UD). UD is a philosophy and set of principles that relate to the structuring of teaching and course design (Davies, Schelly & Spooner, 2013). While primary and secondary school environments have adopted some of the practices of UD, postsecondary institutions have been slower in adopting this design. This slow uptake may be due to the fact that faculty rarely have formal teacher training. Hence, unless institutions offer specific UD workshops, it is unlikely that faculty will have experience in designing courses using its principles (Dallas, Upton, & Sprong, 2014). Incorporating UD into higher education requires an institutional shift from the individualized nature of accommodation to training opportunities for faculty in the use of UD.

Perhaps there has been a lack of emphasis on training faculty to work with students and colleagues with chronic illnesses and disabilities because people with disabilities/chronic illnesses comprise a small minority of the overall postsecondary population. Barnes (1999) noted the following:

The current presentation of disability in universities fosters the notion that disability is an individual or family 'problem'; that the disabled voice is absent from the curriculum; that disabled people are objectified as a result; that there is a lack of critical analysis and that this is due to the absence of disabled scholars and researchers within universities. (p. 567)

Although Barnes' remarks are a valuable commentary, it is also possible that there is a presence of disabled scholars and researchers in the academy who choose not to disclose their disabilities or chronic illnesses. Making a systemic change, like institutional implementation of UD, could help all students since individual learning needs and styles are recognized and valued in the UD context. Furthermore, accommodations would likely not need to be individually sought to the degree they presently are.

School attendance. A student with chronic illness may be absent from class due to appointments or hospitalizations. As a result they will miss valuable learning time and risk falling behind in their studies. Students with a chronic illness are absent, on average, ten days per academic year compared to a three-day absence for those who do not have chronic conditions (Jackson, 2013). This higher rate of absenteeism contributes to lower levels of academic achievement

which can negatively affect success in receiving and retaining bursaries and scholarships. Financial stress, health stress, social isolation, and slower maturation are all negative outcomes of prolonged absence (Martinez & Ercikan, 2009; Maslow, Haydon, McRee & Halpern, 2012). As health declines, so too does academic achievement and school attendance (Haas & Fosse, 2008).

Technology. As noted previously, students with chronic illness tend to be absent from school more frequently than their healthy peers. According to Jackson (2013), there is high value when faculty and institutions support the learning of chronically ill students during periods of absence. By continuing to complete course requirements at home, the student will be aware of what is being covered in class and be better prepared when he or she does return to school. Another possible solution to allay concerns about absence is enabling students who are unable to physically attend class to interact with their peers and the course material through various new technologies (e.g., podcasting lectures, discussion forums, Skype sessions, webinars). Increasing opportunities for distance and online education are being offered through Canadian postsecondary institutions (Ontario Ministry of Training, Colleges and Universities, 2015). Wilkie (2011) asserted that the impacts and implications of chronic illness on students deny them the normal social interactions of school. In these cases, technology-mediated education may be a viable option for facilitating learning and socializing. Web cams, voice and video streaming, along with other technologies including asynchronous course methods, can help students who are in hospital or recovering at home to stay engaged in their coursework (Jackson, 2013). While there are ethical factors such as gaining consent from all other students to appear on video, technology has emerged as an important means of providing engagement and socializing opportunities for the EDS student at home. These newer forms of technology provide wonderful flexibility and new opportunities for people who were previously marginalized, limited, and prevented from seeking educational experiences through alternative models (Black, 2004).

Psychosocial Considerations

For the purposes of this review, the social and emotional impacts of chronic illness on postsecondary students will be examined under the broad category of “psychosocial considerations.” Social and emotional considerations are, arguably, linked in the case of EDS in an academic environment. Health conditions can trigger significant change, resulting in stress associated with psychological turmoil and physical imbalance as individuals adjust to lifestyle changes, loss of control, pain and discomfort, and potential alterations in status, independence, and financial stability (Falvo, 2014). Given that EDS is chronic, painful, and potentially disabling, it follows that it may include some degree of psychosocial impairment (Lumley, Jordan, Rubenstein, Tsipouras & Evans, 1994).

Many people with EDS experience co-morbidities like dysautonomia, a disorder of the autonomic nervous system function that can be local or generalized, acute, or chronic (National Institute of Neurological Disorders and Stroke, 2013). One of the effects of this co-morbidity is orthostatic intolerance (Mayo Clinic, 2009), which affects recreation and social development. Students with EDS and various co-morbidities may find it harder to participate in common postsecondary social settings including going to the gym and going out with their peers. Socialization is important since studies show that students with friends and social supports recover more quickly from illnesses and are healthier overall than those who are isolated from peers and classmates (Ryan, 2001; Wentzel, Barry, & Caldwell, 2004). This finding suggests how substantive the effect of EDS and related conditions is on daily functioning and how important accommodations and a normalized social context are.

In addition to the physical aspects of EDS that affect an individual’s social and emotional wellbeing, how individuals view their conditions, causes, and implications greatly affects their social interactions (Falvo, 2014). The diagnostic process for EDS is a significant predictor of reaction as well; reactions of grief, fear and anxiety, anger, depression, and guilt are common following diagnosis (Smart, 2012). The lack of obvious disease in relatively high functioning of people with EDS may lead physicians to suggest psychiatric diagnoses rather than physical or medical ones (Lumley et al., 1994). When these reactions are experienced simultaneously, they can affect the emotional state of a student pursuing a postsecondary education. Positive social interaction and interpersonal support can help students with chronic illness to offset some of

this emotional turmoil. Conversely, health conditions can lead to a change in social status whereby students with chronic illnesses may find themselves in a socially devalued role (Falvo, 2014). Social isolation can easily precipitate an emotional spiral.

Although many young people cope well with the emotional aspects of having a chronic illness, many chronically ill young people are likely to have a lower level of emotional wellbeing than their healthy peers (Herts, Wallis, & Maslow, 2014; Yeo & Sawyer, 2005). This circumstance makes sense given the various physical symptoms of chronic illnesses, including the following:

- Fatigue and limited physical endurance due to the drain of energy on the person's body or the presence of chronic pain;
- Fluctuating capacity to participate in daily activities due to exacerbations and remission of the disease itself;
- Difficulty concentrating due to emotional factors, medication side effects, or pain;
- Difficulty with mobility due to inflamed joints, limited nerve function, or decreased strength;
- Periods of diminished productivity throughout the day; and
- Frequent absence from class. (University of Manitoba, 2014, pp. 23-24)

Chronic illness is particularly frustrating when students feel well enough to complete their studies most of the time. It becomes additionally problematic when the limitations of their illness coincide with the time needed for preparing assignments, meeting deadlines, and/or taking exams. These frustrations can trigger negative thoughts and self-perceptions. Chronic illnesses, like EDS, can be a barrier to self-confidence and a sense of self-efficacy since it is associated with the risk of failure (Cunningham & Wodrich, 2006). Feelings of uncertainty, being unable, incapable, or not good enough result from challenging and unpredictable physical symptoms. They are often exhausting and have significant and longstanding emotional impacts (Falvo, 2014).

Another important psychosocial consideration is the invisibility of EDS. Matthews (1994) defined invisible disability as "one that is hidden so as not to be immediately noticed by an observer except under unusual circumstances or by disclosure from the disabled person or other outside source" (p. 7). Having a chronic illness that is not visible leads to different

set of psychosocial implications than a visible disability or illness does. Because there are no apparent outward physical signs to indicate limitations, others have no basis on which to alter their expectations regarding the functional capacity of the individual (Falvo, 2014). In this situation, there is often a need to "prove" the validity of the illness because it is not immediately visible to others. Many individuals with invisible illnesses and disabilities have remarked that "you get tired of defending yourself all the time" (Smart, 2012).

Conversely, with an invisible illness or disability, the individual has the ability to fully control his or her identity since there is no visible "evidence" of disability (Olney & Brockelman, n.d.). In a study conducted by Olney and Brockelman, students with visible disabilities appeared to have integrated disability into their identities to a greater degree than those who had invisible disabilities. The researchers also discovered that, if students with disabilities felt that faculty viewed them as competent, they would be more likely to disclose their disabilities than otherwise. The politics of visibility has significant psychosocial impacts on postsecondary educational accommodations as well as relationships with faculty, peers, and the involved students themselves.

Stigmas and (mis)perceptions. Another dominant theme in the literature pertains to how students with chronic illnesses are perceived by their peers and faculty. Stigma is related to what society considers to be deviations from the norm (Falvo, 2014). Often, healthy individuals view those with chronic illnesses as their conditions rather than as individuals (Smart, 2012). For the most part, stigmatization occurs because of a lack of understanding about the condition. Unfortunately, the power of stigma can overshadow the positive characteristics of individuals with chronic illnesses like EDS; it can impact self-perceptions and the person's willingness to accept or divulge the health condition (Falvo, 2014). One of the most significant causes of misperceptions about students with EDS is the symptom of easy bruisability which is often misconstrued as abuse. An altered body image because of scarring and the use of adaptive equipment (e.g., braces and mobility aids) may add to feelings of stigmatization (Berglund, Nordstrom, & Lutzen, 1999).

Stigmatization is a characteristic of postsecondary life and is particularly prevalent in cases of invisible illnesses or disabilities. People with invisible illnesses or disabilities often receive negative comments about their disability. Comments can range from belittling

comments about the severity of their issues to comments that suggest that people with disabilities are bad, unstable, or incapable. In an effort to avoid stigma, individuals with chronic illnesses may deny, minimize, or ignore their condition and/or management plans (Falvo, 2014). Invisible illnesses, like EDS, can be very difficult interpersonally because the person with EDS appears to be healthy when he or she, in actuality, is not (Vash & Crewe, 2004). This difference in appearance and health often elicits negative comments and perceptions from others such as when people with invisible illnesses or disabilities use the accommodations to which they are entitled (e.g., an accessible parking permit). There is likewise the perception that people with disabilities or illnesses do not belong in a college or university setting. Chronically ill students and students with disabilities may be seen to unnecessarily drain or waste scarce educational resources, especially when there is fierce competition for funding and enrolment (Jung, 2002; Hutcheon & Wolbring, 2012). Having access to normal life and social activities including attending school, gaining meaningful employment, and maintaining contact with peers are essential for boosting self-esteem and improving quality of life.

Recommendations for Practice

In this review, the psychosocial and academic impacts of EDS on post secondary students were examined. Institutional issues, faculty attitudes, accommodations, school attendance, and technology use comprised the most significant academic issues for postsecondary students with EDS. Psychosocially, experiences with stigmas and misperceptions were found to be the most prevalent themes.

Based on the reviewed literature, several recommendations for improvement to the postsecondary experience for students with EDS more generally have been identified. They include:

- Increasing faculty knowledge through training opportunities to help alleviate some of the worry and uncertainty associated with teaching students with EDS. Increased training related to chronic illness, such as EDS, in postsecondary education may also help faculty understand the need to accommodate students with such illnesses. In cases of highly variable illnesses, like EDS, an orientation course or workshop on chronic illness in general that provides fundamental information about how to manage the health problems associated with the illness can be beneficial (Obeng & James, 2010). In the case of EDS, the training should address the fact that certain activities like repetitive motions and daily activities (e.g., carrying heavy books, note taking, standing or shifting positions in class, etc.) may cause damage to joints or fragile tissues (Snuggs, 2013) and put the student at risk for injury.
- Encouraging disability service educators to work collaboratively with faculty and students to develop supportive environments. This way, faculty learn to understand the need for student accommodation as well as the process of developing reasonable accommodations that do not compromise the academic integrity of the institution. Disability services need to ensure appropriate treatment of the students using their services by faculty and other professionals within the institution.
- Allowing students with EDS access to accommodations, such as those outlined by the University of Manitoba (2014), encourages full participation in the postsecondary academic environment. Suggested accommodations include having note-takers, having professors provide hard-copies of session materials, private and confidential conferencing with professors, permitting the use of computers,, home access to library/resources,, permitting the recording of lectures,, tutoring services, flexibility with deadlines, extra time on exams and tests, writing exams in a separate space, and flexibility with attendance penalties.
- In addition to these more standard accommodations, institutions must consider accommodations that are outside of the norm, including such things as permitting students to lie down as needed, to shift positions or stand up in class, and to use varying adaptive/assistive devices (e.g., canes, wheelchairs, neckbraces) without a requirement for disclosure.
- Advertising available supports and services to students with chronic illnesses, like EDS including access to leadership and mentorship opportunities on campus. Supports and services must address all aspects of campus life (e.g., transportation, housing, extracurricular and social activities) and not just the academic components.

- Considering enhanced funding and scholarship opportunities as well as academic and career counseling for students with chronic illnesses as per the Higher Education Quality Council of Ontario (2013) recommendations.
- Utilizing technology-mediated education where appropriate (e.g., podcasting lectures, discussion forums, Skype, etc.) to assist students with EDS and other chronic illnesses in full academic participation despite potential absences.

Summary

Currently, chronic illness is not specifically addressed in Canada's provincial and federal legislation that ensures rights of access for persons with disabilities. Students with chronic illnesses depend on disability policies in order to access the same educational opportunities as their healthy peers, which means that they must often identify themselves as having a disability rather than an illness. Furthermore, not all people with EDS or other chronic illnesses experience physical disabilities. Hence, it is possible that students who have never considered themselves persons with disabilities before enrolling in postsecondary education must self-identify as a person with a disability in order to access the programs and services they need to ensure academic and psychosocial success.

Since there is an underwhelming amount of existing literature on EDS in postsecondary students, literature from chronic illness and disability studies were consulted. It is assumed that the postsecondary experience for students with EDS is similar to the postsecondary experience of students with other chronic illnesses and disabilities. Much of the literature and discussion relating to accommodations is both generalizable and transferable between groups. Thus, the psychosocial and academic impacts of EDS on postsecondary students requires further consideration.

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