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ACCOMMODATIONS EXPERIENCE AND RETENTION OF STUDENTS WHO ARE DEAF OR HARD-OF-HEARING IN POSTSECONDARY EDUCATION SETTINGS

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by

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Accommodations experience and retention of students who are deaf or hard-of-hearing in postsecondary education settings

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Students who are deaf or hard-of-hearing represent a special population of students with unique accommodation needs (Cawthon & Online Research Lab, 2008). The goal of these accommodations, whether utilized during classroom instruction or assessment, is to ensure students have access to academic material and are able to demonstrate their skills on knowledge assessments. These students have historically had less access to higher education and in the last few decades research has examined their low rates of retention in postsecondary institutions (Lang, 2002). Previous research has examined a variety of social and academic factors in relation to retention of deaf or hard-of-hearing students (Albertini, Kelly, & Matchett, 2011). However, this research is often limited to few sites and time windows, rather than examining the longitudinal nature of retention.

This dissertation proposed to utilize the deaf or hard-of-hearing sample in the National Longitudinal Transition Study-2 (NLTS2) to examine the extent of the relationship between students' experiences of accommodations in their postsecondary setting and their retention in that setting. Particular aspects of this experience included student evaluations of their accommodations' utility and whether they received sufficient accommodations. Analysis included two logistic regression where responses to questions regarding accommodations, controlling for previous school performance, socioeconomic status, and co-occurring disabilities, were used to predict college retention. Analysis also addressed whether the student's communication modality moderates the relationship between students' evaluations of accommodations utility and sufficiency and college retention.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

Students who are deaf or hard-of-hearing (SDHH) are a diverse group of individuals with specific cultural and linguistic characteristics. There are a number of labels that are used to refer to individuals who are deaf or hard-of-hearing. These labels include, but are not limited to, hearing impaired, deaf, hard-of-hearing, late-deafened, and Deaf. These terms represent different models of one's identity, ranging from a medical model, an educational model, and a cultural model. Hearing impaired is a term typically utilized by a variety of institutions to describe the influence of the person's hearing loss on one or more areas of everyday functioning. The person-first movement (Collier, 2012) led away from this particular label toward placing the chosen label after the person, in this case 'a person with a hearing loss' or 'students who are deaf or hard-of-hearing' to place emphasis on an individual's capacities rather than on deficits, as the term hearing impaired implies (Lane, 1992).

It is also important to distinguish between deaf (lowercase) from Deaf (capitalized). Deaf (capitalized) is an identity category, alternatively referring to oneself as culturally deaf. Persons who are Deaf, although also diverse, may utilize sign language and have a distinct group of cultural traditions and associate with the Deaf community (Padden & Humphries, 1988). In contrast, deaf (lowercase), is typically used to refer to a person's hearing loss or a group of students who have hearing loss and is considered a disability category under educational legislation (Individuals with Disabilities Act, 1990).

These individuals may communicate in a variety of modalities including spoken or signed languages, such as American Sign Language (ASL) (Stredler-Brown, 2010).

SDHH may retain a variety of identities including hearing, hard-of-hearing and d/Deaf (Bat-Chava, 2000). Although bound by the common experience of experiencing a hearing loss, SDHH may acquire the hearing loss in a number of ways including congenitally, through an illness, or trauma at any point in life (Picard, 2004). These sources of variation are important to acknowledge because several etiologies for hearing loss also contribute to the development of co-occurring disabilities (e.g. Usher-Syndrome; deaf-blindness) (Van Dijk, Nelson, Postma, & Van Dijk, 2010). Students with co-occurring disabilities currently make up approximately 45% of SDHH (Mitchell, 2004). Thus, the term SDHH encompasses students with a wide variety of demographic characteristics.

SDHH also vary with regard to their early language environments that may influence their later school choices and experiences (Humphries, 2013; Niskar et al., 1998). SDHH receive education in several ways including schools for the deaf and mainstream schools (Holden-Pitt, 1997). These settings may match individual student needs or struggle to adequately provide students access to their academic and social environment (Ramsey, 1997).

POSTSECONDARY EDUCATION AND THE TINTO MODEL OF STUDENT RETENTION

Each year greater numbers of SDHH matriculate and continue on to higher education than in previous decades (Wagner, Newman, Cameto, & Levine, 2005; Newman et al., 2011).   The National Longitudinal Transition Study-2 (NLTS2) indicates that 74.7% of deaf or hard-of-hearing young adults have ever enrolled in some kind of postsecondary institution (Newman et al., 2011). It should be noted that these rates are higher than other disability groups also included in NLTS2, such as students with learning disabilities (Newman et al., 2011). However, SDHH are also more likely than their hearing peers to leave their postsecondary setting within the first year (Lang, 2002). The postsecondary attrition of SDHH is documented in the research literature (Stinson & Walter, 1992; United States Department of Education, 1999) and is an area of significant study within the field of deaf education (Schroedel, Watson, &Ashmore, 2003). Stinson and Walter (1992) found that 70% of SDHH left their postsecondary education institution before completing their degree. There are a number of reasons postulated for why SDHH leave postsecondary education. Several researchers propose that SDHH may struggle with the academic demands of college and changes in their career interests (Lang, 2002; Albertini et al., 2011). Other researchers point out that SDHH may encounter communication barriers that influence interactions with their hearing peers and faculty members (Peterson, 2010; Brown & Foster, 1989). These aspects of the SDHH postsecondary persistence are aligned with the Tinto Model of Persistence, a theoretical model that proposes that students may persist in a setting when they are engaged both academically and socially with the institution they attend (Tinto, 1993). Conversely, if students or the group to which they belong (e.g., students of color, students with

disabilities, first generation college students) are alienated socially or academically, they are more likely to disengage from the institution and eventually leave. The aspects of the Tinto model that are the focus of this dissertation are indicated in Figure 1 below.
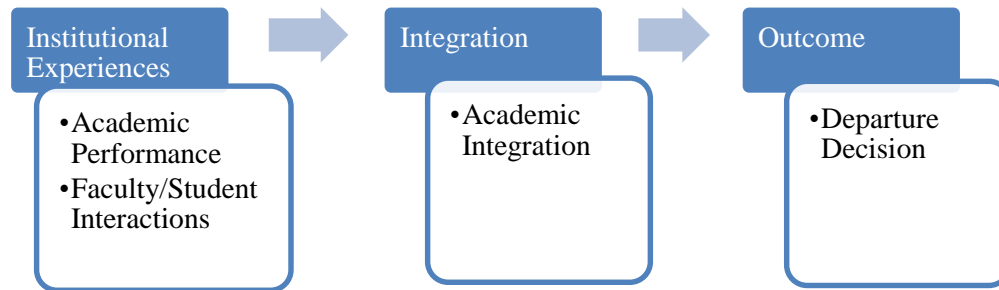
Figure 1. Academic Aspects of Tinto Model of Persistence.

Tinto emphasizes in his model that these factors should be conceptualized as a longitudinal process of interactions between the student and various people in the institution setting including fellow classmates, faculty members, support personnel and larger systems (Tinto, 1993). In this way, his model is a conglomeration of interactive processes rather than a strict linear progression of events leading to a students' decision to exit the educational setting. Beyond the aspects included above, Tinto also includes factors that precede student enrollment in the academic institution and influence their goals and commitments to the academic institution, such as family background, skills/ abilities and previous schooling (Tinto, 1993). Several of these factors are included as covariates in the proposed study. Additionally, Tinto (1993) incorporates student intentions, goals and commitments to the academic and social aspects of the institution.

The student arrives at the institution with intentions and goals and re-evaluates them during encounters with the institution that influence their perceptions of their integration into the setting (Tinto, 1993). Although these aspects of Tinto's model are not directly measured in the proposed study, they are assumed to influence students' experiences of their postsecondary education setting and their ultimate decision to persist in or depart from that setting.

One component of the typical higher education classroom demonstrates the Tinto model's applicability to SDHH: participation in class discussions. Classroom participation can represent both the social and academic integration aspects of Tinto's model of persistence (Tinto, 1993). Classroom participation by SDHH is linked with their retention in higher education (English, 1993). However, participation in discussions common to college classrooms can present challenges for SDHH. The pace of these interactions combined with the time delay that accompanies interpreting reduces the individual SDHH's opportunity to participate in a class discussion and decreases the likelihood of participation by the student (Foster, Long, & Snell, 1999). These potential barriers to classroom engagement may influence their academic engagement with the institution. Additionally, students may be sensitive to their classmates and instructors lack of awareness regarding the barriers that may prevent the student from participating (Winston, 1995). In this example, a common classroom experience has the potential to alienate SDHH academically and socially. If the student described above chose to leave the institution, Tinto's model of persistence (Tinto, 1993) could explain the mechanisms through which the student disengaged from the institution and dropped out.

Tinto's model focuses on the broad mechanisms behind students' decisions to persist or leave the postsecondary education setting. However, there is an additional emphasis on determining ways to ensure that students persist in their settings and achieve higher levels of education and employment (Schroedel et al., 2003). Research concerned with SDHH postsecondary success emphasizes the importance of the period between school and work or school and the postsecondary setting (Punch, Hyde & Creed, 2004; Bowe, 2003). In particular, for students who have disabilities, the transition into the college environment is crucial to their postsecondary persistence (Corcoran, 2010). Partially for this reason, researchers often focus on the transition skills of SDHH as a way to improve post-secondary outcomes (Luft, 2012). Punch et al. (2004) recommended supporting student decision-making processes, providing information on accommodations responsibilities of workplace and educational settings, assertiveness training, and work experiences. Similarly, Bowe (2003) highlighted a need for self-advocacy and job-related skills (e.g. on-the-job training, knowing preferred accommodations, job-search skills). The above research emphasizes the need for balance between providing enough scaffolding for students to advocate for themselves and giving students the experience of enacting that advocacy.

ACCOMMODATIONS: ACCESS POINTS FOR SDHH

One area of potential intervention and engagement is the accommodations students receive in the postsecondary education setting. The term **accommodations** encompasses a wide variety of changes in the learning environment or testing procedures

that allow students to access the curriculum and demonstrate their knowledge (Thurlow, 2007). Examples of accommodations include extended time, test items read aloud and providing a classroom aide (Lazarus, Thurlow, Lail & Christensen, 2009). Accommodations in this broad sense are governed by several pieces of legislation that differ according to the student or individual's current setting.

In the K-12 setting entitlement legislation, including the Individuals with Disabilities Education Improvement Act (2004), the No Child Left Behind Act (2002) and Section 504 of the Rehabilitation Act (1975), focus on meeting students' individual education needs and including their progress in larger state and national assessments of student learning. In the postsecondary setting civil rights legislation, including the Americans with Disabilities Act (1990) and Section 504 of the Rehabilitation Act (1975), aim to ensure that individuals' are not discriminated against based on their disability and are afforded equal opportunities in society due to that disability (Gordon & Keiser, 1998).

The change in legislation intent is mirrored in the change in expectations for students with disabilities regarding their accommodations. Schools and states are responsible for identifying students with a disability that influences their educational process or ability to benefit from education (Individuals with Disabilities Act Part B & C, 1990). Students are members of Individual Education Plan (IEP) teams that also include their parents, teachers and school administrators (Jacob & Hartshorne, 2007). Student participation in IEP meetings varies from little or no involvement to significant involvement regarding accommodations preferences (Mason, Field & Sawilowsky,

2004). This contrasts strongly with the role students are expected to play in the postsecondary setting where they are responsible for disclosing their disability to the appropriate office, knowing what accommodations they will require to access the setting (Stodden, Whelley, Chang, & Harding, 2001) and possessing skills to advocate for those accommodations (Test, Fowler, Wood, Brewer, & Eddy, 2005). Despite these proverbial hoops students must jump through, SDHH do access accommodations in the postsecondary setting (Albertini et al., 2011).

It is important to emphasize that SDHH show variability in the degree to which they consider themselves to have a disability (Garberoglio, 2012). This potentially limits applications for accommodations at a disability service office, and the rates at which they disclose their hearing loss to the university. In particular, students with a severe or moderate hearing loss are more likely to disclose their disability to their postsecondary education setting than students with a mild hearing loss (Garberoglio, 2012). For SDHH who do disclose and approach the disability services office to apply for accommodations, the disability services office may function as an additional point of academic contact with the university. These experiences may influence their academic integration (Tinto, 1993) within the postsecondary education setting.

SDHH often use a variety of accommodations to meet their diverse needs (Cawthon, 2004). Many factors, including those mentioned above, influence the accommodations that students use during their education. Accommodations are important for SDHH in accessing the classroom material and engaging in the class milieu. SDHH

receive a variety of accommodations that can be similar to other students with disabilities such as extended time or a small-group setting (Cawthon & Online Research Lab, 2006). However, SDHH also use accommodations that are specific to their communication and language characteristics such as sign language interpreters and text-based accommodations (Marschark, et al., 2006). Additionally, accommodation use is not the sole criterion for ensuring SDHH access to the postsecondary education setting. Quality of accommodations and consistency in their delivery, as assessed through self-report, is an area of interest for professionals who work with SDHH and researchers interested in accommodations efficacy (Cawthon, Leppo & the pepnet 2Research Evidence Synthesis Team, 2013). Researchers and practitioners also examine student perspectives on their own accommodations. Research on student perceptions of accommodations demonstrates that students do evaluate how helpful, distracting and fair their accommodations are (Elliott & Marquart, 2004). Smith (2004) indicated that individual college students did credit accommodations with being important for their success in the postsecondary education setting. However, research specific to SDHH raises concerns about the qualifications of service providers for these students (Sapere & Convertino, 2005). Specifically, some research indicates that the interpreters who are responsible for providing communication access in a student's class may not possess sufficient skills to meet this challenge (Schick, Williams, & Kupermintz, 2005) and instructors may make unwarranted assumptions regarding student access and interpreter skill (Winston, 1995). This is especially problematic because students who use particular accommodations such as interpreters and text-based services are not receiving instruction and information

9

directly, they are receiving it through these service providers (Lang, 2002). These service providers mediate the communication between the student and individuals in the classroom. Additionally, students report difficulties with the quality and availability of particular accommodations (Smith, 2004; Harris, 2012; Belch, 2004; Lang, 2002). Unfortunately, it seems that accommodations are not always of high quality in the postsecondary education setting.

PROPOSED STUDY

The objective of the proposed study is to ascertain student perceptions of accommodations in the postsecondary education setting. Determining whether accommodations are helpful and contribute to student persistence in the postsecondary education is especially important for SDHH. For individuals who communicate using sign language, their interactions with hearing persons are mediated by a third person, such as a sign language interpreter. This may limit the quality or engagement of an interaction, particularly if the person mediating the communication does not have the requisite skills to provide true access in this situation (Schick et al., 2005).Additionally, the low-incidence nature of SDHH, which may contribute to fewer SDHH-specific accommodations being available, requires SDHH to advocate for these accommodations to be available in their setting. This need for advocacy is illustrated in the case of K.M. v.s. Tustin Unified School District, where individuals advocated to ensure that communication access realtime translation (CART) was available in a school district (No.11-56259). Finally, many individuals who are deaf or hard-of-hearing use

accommodations beyond the educational setting and this may influence their evaluations of their accommodations (Punch, Hyde, & Power, 2007). I argue that a distinct experience for deaf or hard-of-hearing students is the use of accommodations to participate not only in the classroom environment, but also in their interactions with other students, faculty members and university personnel. For this reason, accommodations may take on greater importance for SDHH than they do for students with disabilities. Their cultural and linguistic characteristics set them apart and accommodations facilitate connection with hearing individuals. Therefore, it is important to examine what role accommodations play in this constellation of distinct interactions that influence SDHHs' decisions to exit the setting and whether accommodations influence their decisions to leave or persist in that setting.

The proposed study will examine the influence that perceived utility and sufficiency of accommodations have on the persistence of SDHH in the postsecondary education setting. This study also pays particular attention to the role that language, previous achievement, socioeconomic status, ethnicity, additional disabilities and previous student accommodation use play in the larger picture of SDHH retention. These variables are particularly important to incorporate due to the variability and diversity of SDHH with respect to communication modes, co-occurring disabilities and ethnicity (Mitchell & Karchmer, 2006). Finally, the specific reasons students gave for their choice to exit their program prior to earning their degree or certificate will be summarized. This provides a unique opportunity to examine Tinto's (1993) hypotheses regarding student persistence as it is related to academic and social engagement with the academic

institution. Through the examination of these variables and perspectives, the proposed study aims to contribute to the research regarding SDHH persistence in higher education by examining the accommodations that provide a point of academic engagement with the institution where the student is enrolled.

Chapter 2: Method

RQ1: To what extent do student's perceptions of accommodations' utility and sufficiency influence students' later retention in postsecondary education?

Prediction 1: Students who report that their accommodations are 'somewhat useful' or 'very useful' will be more likely to persist or graduate from their post-secondary education program than students who report that their accommodations are 'not very useful' or 'not at all useful'.

Rationale 1: Research indicates that students can and do evaluate the accommodations they receive with regard to how useful they are (Elliott & Marquart, 2004; Smith, 2004). Additionally, accommodations can facilitate classroom engagement through providing SDHH with access to classroom material and classroom communication (Foster et al., 1999). This classroom engagement is especially important for encouraging SDHH to persist in postsecondary education (English, 1993). Thus, it is possible that accommodations can influence student's engagement with their academic institution, and thus their decision to remain at that post-secondary institution. Despite the importance of accommodations for SDHH, students and faculty sometimes report difficulties with accommodations quality (Smith, 2004; Harris, 2012).

Prediction 2: Students who report that they are 'definitely getting enough' or 'probably getting enough' accommodations will be more likely to persist or graduate

from their post-secondary education program than students who report that they are 'probably not getting enough' or 'definitely not getting enough' accommodations.

Rationale 2: Research indicates that students do believe that accommodations are important for their academic success (Peterson, 2010; Smith, 2004). However, students and support personnel report concerns regarding the availability of particular accommodations (Harris, 2012).These concerns regarding availability are particularly raised for accommodations that are used for language and communication, including interpreters and text-based accommodations.

RQ2: To what extent does a student's communication modality moderate the relationship between their perceptions of accommodations utility and sufficiency and the students' later retention in postsecondary education?

Prediction 3: The relationship between student perceptions of accommodations utility and sufficiency and the student's later retention in postsecondary education will be stronger for students who use sign language to communicate.

Rationale 3: As noted above, concerns regarding the availability of accommodations and the quality of accommodations (Smith, 2004; Harris, 2012) apply particularly to accommodations that are used for language and communication, such as interpreters and text-based accommodations. Additionally, these accommodations mediate communication between students and hearing individuals (Lang, 2002), including other students and their instructor. Therefore, these types of accommodations

14

address these student's integration into the academic environment, a key component in Tinto's model of student persistence (Tinto, 1993).

RQ2: What reasons do students give for leaving postsecondary education?

Prediction 4: Descriptive analysis of reasons given by students for leaving postsecondary education will show that some students left their postsecondary education setting due to reasons that involve their accommodations and services, such as "didn't get services needed."

Rationale 4: Students who are deaf or hard-of-hearing often use accommodations to access the classroom and engage with fellow classmates (Foster et al., 1999). Additionally, English (1993) indicated a link between SDHH classroom engagement and retention in higher education. Thus, if accommodations are unable to provide SDHH with access to the academic environment, they may contribute to a student's academic disengagement with the institution (Tinto, 1993). Beyond the theoretical and practical concerns of accommodations, universities may not provide adequate information regarding accommodations (Cawthon, Nichols, & Collier, 2010) or students may encounter barriers in securing accommodations through the appropriate office (Cawthon & Cole, 2010).

STUDY DESIGN

The study used secondary data analysis of the second National Longitudinal Transition Study (NLTS2). The proposed analysis for research question 1 used logistic

regression to determine if a students' positive assessment of accommodations was associated with a greater likelihood of them graduating. A student's perspective of accommodations was composed of their answers to two questions, whether the accommodations they used were useful and if they believed they had received sufficient accommodations. Unfortunately, there are limitations to drawing meaningful conclusions from the answers to only two questions. The answers to these questions may not fully capture the extent of student perceptions regarding their accommodations

An important component to accommodations is the language and communication characteristics of SDHH. For this reason, I included whether the student used sign language to communicate in the analysis and I classified the accommodations used according to whether they included language or communication components. I included variables thought to influence student's retention (Foster et al., 1999; Davis-Kean, 2005; Tinto, 1993) including socioeconomic status, previous student achievement and co-occurring disabilities in the analysis as covariate variables.

PARTICIPANTS

NLTS2 Sampling Procedure

The proposed study used information from the National Longitudinal Transition Study – 2 (NLTS2) dataset. The United States Office of Special Education Programs (OSEP) authorized the NLTS2 to improve the understanding of the accomplishments of students transitioning into adulthood. The NLTS2 study stratified operating American

public schools based on their region, enrollment size, and district wealth before random sampling. This stratification served two purposes: the generation of sampling weights to certify that NLTS2 achieved a nationally representative sample and to streamline estimation. Following the precedent of the National Assessment of Education Progress, the U.S. Department of Commerce, and the U.S. Bureau of Economic Analysis, 'region' included the following categories: Northeast, Southeast, Midwest and West. School enrollment classifications, based on enrollment in grades 7 through 12, were as follows: 4,660 to 14,930 enrolled students constituted large enrollment, 1,620 to 4,660 enrolled students constituted medium enrollment, enrollment below 1,620 or above 14,930 was classified as small and very large, respectively. To ensure that NTLS2 was a nationally representative sample with respect to district wealth, the Orshansky index[1] (Fisher, 1992) was used to organize districts. The classifications used were as follows; 0 to 13 percent below poverty (Orshansky) was high wealth, 14 to 24 percent Orshanksy was medium wealth, 25 to 43 percent Orshansky was low wealth and more than 43 percent Orshansky constituted very low district wealth. After this stratification, local education agencies and special schools (those serving students with visual or hearing impairments or multiple disabilities) were stratified with respect to disability category. Students were selected randomly from each disability category. Students with low-incidence disabilities (e.g., traumatic brain injury, deaf-blindness) and older students were oversampled to ensure sufficient participation by these groups in Wave 5.

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[1] The Orshanksy index refers to the proportion of the student population living below the federal definition of poverty. This index is a well-accepted measure for computing community wealth.

Study Participant Criteria

I selected the participants for this study who had responses to the School Program Survey in Wave 1, with responses to the Parent/Youth survey in Wave 3, 4, or 5, who reported being in a postsecondary education setting, who reported that they had a hearing impairment[2], and who reported using accommodations in Waves 3, 4, or 5. NLTS2 documentation offers the following federal definition of hearing impairment for consideration "An impairment in hearing, whether permanent or fluctuating, that adversely affects a child's educational performance. Deafness is a hearing impairment so severe that the child cannot understand what is being said even with a hearing aid." It should be noted that a student's classification as 'hearing impaired' in NLTS2 was dependent upon the student's school district's classification of that student as having a hearing impairment, rather than an individual identification.

I did not include students who were not in postsecondary education settings because the primary research question focuses on students in higher education. Postsecondary education included students who were in 2-year or community colleges, 4-year colleges or universities and vocational or technical schools. Results were not disaggregated according to student setting due to small sample size. Students from Waves 3, 4 and 5 were included in this analysis to account for the differing ages of students at the start of NLTS2. However, I selected student responses for this study at a single time point for the individual student to avoid counting an individual student more than once.

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[2] This is the category label used by NLTS2 to describe youth who are deaf or hard-of-hearing.

The time point selected for each individual student was the final time point for that student to allow for sufficient time for student to matriculate. The purpose of the proposed study was to examine the perspectives of SDHH, thus only students who reported having a hearing impairment in NLTS2 were included in the analysis. Finally, as the study focused on student perceptions of accommodations, only students who reported using accommodations were included in the study. SDHH who also have co-occurring disabilities (SDHH++) were included in the sample used for this study. I chose to include these students because they make up a sizeable percent of all SDHH (Holden-Pitt & Diaz, 1998). Such students are often excluded from analyses which examine accommodations use for SDHH based on reading level (Cawthon, Winton, Garberoglio, & Gobble, 2011; Johnson, Kimball & Brown, 2001). Students with co-occurring disabilities are not more likely to use particular accommodations, however, than students without co-occurring disabilities. It is not until distinct groups of SDHH++ are compared, such as SDHH +learning disability or SDHH + Attention Deficit Hyperactivity Disorder (ADHD), that differences in accommodations use emerges (Leppo, Cawthon, & Bond, 2013). However, it is possible that SDHH++ may encounter more barriers or have greater difficulty in the post-secondary education setting due to their co-occurring disability. Therefore, I included this group of SDHH in the analysis and I used presence of an additional disability as a covariate in the analysis. The number of participants who met all the study criteria was 121.

MEASURES

NLTS2 collected data from the study participants using several instruments. These instruments included the Parent Survey, Parent/Youth Survey, School Characteristics Questionnaire, Teacher Questionnaire, School Program Questionnaire, Direct Assessment and Alternate Assessment. The following table indicates which survey instruments were used in which waves of the study. Shaded boxes denote that a particular instrument was used in the current study.

Table 1

NLTS2 Data Collection and Instrumentation

Instrument	Wave 1	Wave 2	Wave 3	Wave 4	Wave 5
Parent Survey	X				
Parent/Youth Survey		X	X	X	X
Direct Assessment		X			
Alternate Assessment		X			
School Program Questionnaire	X	X			
Teacher Questionnaire	X	X			
School Characteristics Questionnaire	X				

Questions on these measures were tailored to the particular group of stakeholders. For example, a parent would not be asked about the amount of time the student spent in special education classes, but the participant answering the school program survey questions would. It is important to note that for the Student/Parent survey only the parent or guardian answered the questions in wave 1, both student and parent/guardian answered the questions in wave 2 and the student answered the questions in wave 3, 4 and 5.

Depending on the age of the youth (under 18), the parent was contacted in waves 3, 4 and 5 and encouraged to fill out the parent portion.

I used information drawn primarily from the Parent/Youth survey because this is the only measure used consistently across Waves 1-5. The questions regarding accommodations in the postsecondary setting were only asked in the computer assisted telephonic interview if the student indicated that they were in a post-secondary setting. This means that students who completed the paper survey did not have a chance to answer these questions. The consequence of both circumstances is the reduced number of students in the sample. The reduced number of participants means the sample weights created by NLTS2 to establish a nationally representative sample are not used in these analyses. This means that the results of this study cannot be extrapolated to the national population of students who are deaf or hard of hearing and limit the generalizability of this study to individuals with similar characteristics to the participants in this sample.

VARIABLES

In this analysis, the independent variables were the student's perspectives of accommodations and accommodation density. The student's perspectives of accommodations were assessed through two questions from the student survey. The first question asked about the student's perception of the accommodations they received as useful and students indicated on a 4-point Likert scale how useful they thought the services and accommodations had been in helping them stay in school and do their best in the particular postsecondary education setting (e.g. 4-year college or university, 2-year

college or community college, vocational or technical school). This scale included the following possible responses: not at all useful (1), not very useful (2), somewhat useful (3), and very useful (4).

The second question asked about the student's perspective on whether they though they received sufficient accommodations. The students indicated on a 4-point Likert scale whether they felt they have received enough services and accommodations to help with the particular postsecondary education setting (e.g. 4-year college or university, 2-year college or community college, vocational or technical school). This scale included the following possible responses: definitely getting enough (1), probably getting enough (2), probably not getting enough (3), definitely not getting enough (4).

Another variable of interest was whether the student used sign language to communicate, as reported on the parent survey in Wave 1. For this question, the parent selected what methods the student used to communicate such as sign language, lip reading, cued speech, oral speech, communication board/book or something else. For this question, the respondent could indicate multiple communication modalities used. For example, if a student used both sign language and cued speech the respondent was able to indicate this in their response to this question. The developers of NLTS2 created a variable that was coded as 1 if the respondent indicated that the student used sign language as one of their communication modalities and 0 if the respondent indicated that the student did not use sign language to communicate. This created variable was the one used in this analysis. Communication modality was included because it indicates the

communication method through which the individual student likely accesses their environment. Students who received instruction through manual communication methods may be more likely to use particular language or communication accommodations in the future.

The accommodations received are reported by the student. The student selects from a list of accommodations used that supported the student's participation in postsecondary education. The list of accommodations ranged from having a reader or interpreter in the classroom to more time in taking tests. The full list is included in Table 2 according to categories coded by Cawthon, Leppo, Bond, and Ge (submitted manuscript).

Table 2

List of Accommodations on NLTS2 Parent/Youth Survey

Testing Accommodations		*Instructional Accommodations*	*Mental Health/ Other*	
Language/ Communication	**Other**	**Language/ Communication**	**Other**	
Having tests and other materials read to youth	More time in taking tests	Large print or Braille materials	Additional time to finish assignments	A behavior management program
Scribe to record answers	Different tests	Books on tape	Different Assignments	Help with learning strategies or study skills
Instructions given in sign language or manual communication	Different grading standards	A reader or interpreter	Special use of a calculator	Support group for students with disabilities
	Different setting to take tests	Note taker in class	A personal aid or instructional assistant to help in class	Early registration
	Use of computer or spell checker in class or to take tests		Support person to monitor academic progress, help with managing school workload	Psychological or mental health services or counseling
			Tutor	Social work services
			Physical changes in the classroom, special desks	Occupational therapy or life skills training
			Changes to equipment	Service coordination or case management
			Computer software designed for students with disabilities	Physical adaptations in the classrooms
			Use of computer or spell checker in class or to take tests	Other service or accommodation
			Computer adapted for student's needs	Child care

It is likely that the number of accommodations a student receives is related to their perception of whether they received enough accommodations. For example, a student who receives few accommodations may be more likely to think they have not received sufficient accommodations than a student who uses many accommodations. For this reason, I included a correlation in the analysis to determine the extent to which there is a relationship between students' responses to whether they received sufficient accommodations and the number of accommodations they said they used.

The dependent variable in the analysis was the student's response to whether they are currently in school. This variable is dichotomous and students could indicate that they were still in school or had graduated from school (grouped into one outcome) or not graduated but not still in school.

A variable of additional interest was the reason why students chose to leave their postsecondary setting. For this question, I chose a variable that examined if the student responded 'not graduated but not still in school', why they had left their postsecondary program. For this question, the student chose from a preselected list of options. I grouped these options into the following categories: not enough services and academic problems. These options were included because they are indicative of student disengagement with the postsecondary education environment that is hypothesized to be at the heart of student choices to leave postsecondary education (Tinto, 1993). Table 3 contains the categorization of the accommodations into these categories. This variable was analyzed

descriptively to determine if there are trends in the reasons students chose to leave the

postsecondary education setting prior to completing their degree.

Table 3

Reasons for Leaving Postsecondary Education Setting

Not Enough Services	Academic Problems
Didn't get services needed	Youth changed schools
	Didn't have time/conflicted with other demands
	Poor grades/not doing well
	Didn't like school
	Didn't get into the program he or she wanted
	Youth couldn't get along with teachers

There are a number of variables that are important to include when examining

retention outcomes. These variables were included in the analysis as covariates. These

covariates included two distinct types. There were covariates related to student

characteristics and covariates related to the student's environment.

Student Characteristics

The first covariate was previous achievement in high school (Stratton, O'Toole, &

Wetzel, 2007), as assessed by student the students' typical grades. The student's typical

grades variable was drawn from the Wave 1 cross instrument survey. This particular

variable was created based on responses from the teacher survey, parent survey and

school program survey regarding student typical grades for coursework.

The second covariate was presence of a co-occurring disability. This variable came from the Youth/Survey in Wave 1. For this question, the parent was asked to confirm the disability or disabilities that were reported by the student's school. The parent had the option to confirm or not confirm the presence of this disability. If the parent confirmed the presence of the disability, the student was considered to have a disability in this analysis. The list of potential disabilities included a wide range of disabilities, from learning disabilities/dyslexia to traumatic brain injuries. [3]

Environment

Student socioeconomic status was included in this analysis because it is thought to influence student opportunity to access resources and higher education (Sirin, 2005). In this study, I used two variables to measure socioeconomic status. The first was parent income and the second was parent education level (Davis-Kean, 2005). Both of these variables came from the Parent Survey in Wave 1. These variables were included in the logistic regression analysis as distinct variables.

ANALYSIS PLAN

Preliminary Analyses

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[3] The disability categories included by NLTS2 were: asthma, attention deficit disorder (ADD/ADHD), autism, complete blindness, cerebral palsy, deafness, deaf/blindness, Down syndrome, dyslexia, emotional disturbance or behavior disorder, hard of hearing/hearing impairment, health impairment, learning disability/learning handicap, mental retardation, physical or orthopedic impairment, speech or communication impairment, spina bifida, traumatic brain injury, visual impairment/partial sight, developmental delay, multiple disabilities, seizure disorder, epilepsy, Tourette's syndrome, diagnosed with other disorder

I used SPSS Statistics Version 20.0 software (Wagner III & Wagner, 2012) to conduct all analyses of interest. For first step in the analysis, I conducted correlational analysis between the number of student accommodations used and the student's rating of whether they received sufficient accommodations. Following this, I computed correlations between the independent variables (accommodations utility, accommodations sufficiency, communication modality) and the dependent variable (retention) to determine if there was a relationship between student responses to these questions and their later retention. Next, correlations were computed between the independent variables and the covariates as well as between the dependent variable and the covariates to determine the relationships among these variables.

Power Analysis

The selection criteria of this study resulted in a final sample size of 121 participants. As a result, G*Power was computed using G*POWER 3.1.7 software (Faul, Erdfedler, Buchner, & Lang, 2009) to determine the study's achieved power for the reduced sample size. In the sensitivity power analysis regarding detecting an effect for accommodations use rating, an alpha level of .05, Pr (Y = 1 l X=1) HO = 0.50, R^2 Other X= .159 (computed from regressing all covariates on accommodations use rating) and n=121 were used. This analysis indicated that the analysis had a 62% chance of detecting an odds ratio of 1.5. The same analysis was run using accommodations sufficiency rating, with the exception of using a R^2 Other = .011 (computed from regressing all covariates on accommodations sufficiency rating). This analysis indicated that the logistic

regression had a 68% chance of detecting an odds ratio of 1.5. This constitutes a significant reduction in power in comparison with the power analysis using the expected 200 participants and has consequences for the level of effect needed to find a significant result. However, when using the odds ratio metric of 2.0 for practical significance (Ferguson, 2009), 94 and 96% power were achieved respectively. Therefore, this analysis had sufficient power to detect an effect of practical significance and insufficient power to detect smaller effects.

Logistic Regression

I used the first logistic regression to determine if student ratings of accommodations usefulness predicted their retention, when taking their high school achievement, presence of an additional disability, accommodations use in high school, and socioeconomic status into account. I used the second analysis to determine if student ratings of whether they had sufficient accommodations predicted their retention, when taking their high school achievement and socioeconomic status into account. Logistic regression analyses yielded information regarding model fit and significance of effects (Mertler & Vannatta, 2005). The Wald statistic was used to determine the significance of each predictor in the model. For the purposes of this study, the logistic regression helped determine whether any of the predictor variables, including the covariates, are statistically predictive in distinguishing between students who complete their program/graduate and those who do not graduate or complete their program.

Finally, a descriptive analysis of student answers to why they chose to leave the postsecondary setting, if they left prior to completing their degree, was conducted. This analysis included frequency counts of the categories proposed: insufficient services, academic problems and personal/logistic/resource problems. I used this analysis to examine student's perspectives of why they left the postsecondary setting.

Chapter 3: Results

SAMPLE DESCRIPTIVES

Table 3.1 summarizes demographic characteristics of study participants. Of the students in this sample, 40 percent had a co-occurring disability. The most common co-occurring disabilities were ADD/ADHHD, Learning Disability, Vision Impairment/Blindness. Other Health Impairment, and Speech/Language Disability. Interestingly, no students in this sample had autism, Down's syndrome, Emotional Disturbance, Mental Retardation, Multiple disabilities, or Traumatic Brain Injury. Additionally, most students achieved mostly B's and C's in high school, which may reflect the academic requirements for entering most postsecondary programs.

Table 4

Participant Demographics

Variables	Category	Wave 3-5 Percentage	Wave 1 Percentage
Parent Income			
	$5,000 or less	<10%	<10%
	$5,001-$10,000	<10%	<10%
	$10,001-$15,000	10%	<10%
	$15,001 - $20,000	10%	<10%
	$20,001-$25,000	10%	10%
	$25,001-$30,000	10%	10%
	$30,001-$35,000	10%	10%
	$35,001-$40,000	10%	10%
	$40,001-$45,000	<10%	<10%
	$45,001-$50,000	10%	10%
	$50,001-$55,000	<10%	10%
	$55,001-$60,000	<10%	10%
	$60,001-$65,000	10%	10%
	$65,001-$70,000	<10%	10%
	$70,001-$75,000	<10%	10%
	Over $75,000	10%	20%
Parent Education			
	9th grade or above, not a High School graduate	20%	<10%
	High School graduate or GED	30%	20%
	Post High School education no degree	10%	10%
	Vocational-technical degree	<10%	10%
	2 year college degree/AA degree	10%	20%
	4 year college degree/BA, BS degree	10%	20%
	Some post BA, BS work, no degree	<10%	10%
	Masters degree, e.g., MSW, MA, MPH	<10%	10%
	PhD, MD, JD, LLB or other professional	<10%	<10%
Co-occurring Disability		50%	40%
	ADD/ADHD	20%	10%
	Autism	<10%	0%
	Developmental Disability	<10%	<10%
	Down's Syndrome	<10%	0%
	Emotional Disturbance	<10%	0%
	Learning Disability	10%	10%
	Mental Retardation	<10%	0%
	Multiple Disabilities	<10%	0%
	Other Health Impairment	20%	20%
	Physical Disability	10%	10%
	Speech/Language Disorder	10%	10%
	Traumatic Brain Injury	<10%	0%
	Visual Impairment	10%	10%

High School Grades			
	Mostly F's	<10%	0%
	Mostly D's and F's	<10%	0%
	Mostly D's	<10%	0%
	Mostly C's and D's	10%	<10%
	Mostly C's	10%	10%
	Mostly B's and C's	30%	30%
	Mostly B's	10%	10%
	Mostly A's and B's	30%	40%
	Mostly A's	10%	10%
Communication Modality	Used Sign Language to Communicate	50%	50%
Postsecondary Institutions Attended since High School			
(n=110)	2-year or community college		70%
(n=80)	Vocational or Technical School		30%
(n=100)	4-year college or university		70%

4

Table 4. *Participant Demographics, cont.*

PRELIMINARY ANALYSIS

Data were closely inspected using a preliminary multiple regression to calculate

Mahalanobis distance to determine if outliers were present. A chi square criterion of

26.13 for 8 degrees of freedom (number of variables) was used. Using this criterion, no

outliers were identified and data analysis proceeded. The preliminary multiple regression,

with postsecondary retention as the dependent variable and parent income, parent

education, and co-occurring disability, communication modality (e.g. used sign

language), student rating of accommodations utility and sufficiency as independent

[4] *Note*. In accordance with IES policy, all percentages are rounded to the nearest tens
place

variables, was conducted to produce tolerance statistics. Tolerance for all variables

exceeeded.1, indicating that none of the predictor variables were significantly correlated.

CORRELATION RESULTS

Preliminary Descriptives

Below are the descriptives for the variables of interest, accommodations use

ratings, accommodations sufficiency ratings and retention.

Table 5

Variables of Interest

Variables	Category	Percentage
Accommodations Usefulness Rating		
	Not at all useful	20%
	Not very useful	20%
	Somewhat useful	20%
	Very useful	30%
Accommodations Sufficiency Rating		
	Definitely not getting enough	10%
	Probably not getting enough	10%
	Probably getting enough	40%
	Definitely getting enough	50%
Postsecondary Retention		
	Currently enrolled or graduated	80%
	Left postsecondary education for other reason	20%

[5]

Correlations

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[5] *Note*. In accordance with IES policy, all percentages are rounded to the nearest tens
place

Table 6

Correlation Matrix

		np1K15Detail	np1K8	np1UseSign	Grades	DHHplu	NewRetention	accomUse	accomSuf
np1K15Detail	Pearson Correlation	1	.344**	-.090	-.025	-.064	-.075	-.045	.037
	Sig. (2-tailed)		.000	.324	.783	.484	.417	.624	.690
	N	121	121	121	121	121	121	121	121
np1K8	Pearson Correlation	.344**	1	-.047	.107	-.066	-.060	-.155	-.014
	Sig. (2-tailed)	.000		.608	.243	.469	.510	.089	.880
	N	121	121	121	121	121	121	121	121
np1UseSign	Pearson Correlation	-.090	-.047	1	-.070	-.165	.062	-.324**	-.016
	Sig. (2-tailed)	.324	.608		.447	.071	.499	.000	.864
	N	121	121	121	121	121	121	121	121
Grades	Pearson Correlation	-.025	.107	-.070	1	-.020	-.015	-.134	.069
	Sig. (2-tailed)	.783	.243	.447		.827	.869	.144	.452

		1	2	3	4	5	6	7	8
DHHplu	N	121	121	121	121	121	121	121	121
	Pearson Correlation	-.064	-.066	-.165	-.020	1	.071	.143	-.062
	Sig. (2-tailed)	.484	.469	.071	.827		.442	.116	.502
	N	121	121	121	121	121	121	121	121
NewRetention	Pearson Correlation	-.075	-.060	.062	-.015	.071	1	-.189*	-.181*
	Sig. (2-tailed)	.417	.510	.499	.869	.442		.038	.047
	N	121	121	121	121	121	121	121	121
accomUse	Pearson Correlation	-.045	-.155	-.324**	-.134	.143	-.189*	1	-.013
	Sig. (2-tailed)	.624	.089	.000	.144	.116	.038		.890
	N	121	121	121	121	121	121	121	121
accomSuf	Pearson Correlation	.037	-.014	-.016	.069	-.062	-.181*	-.013	1
	Sig. (2-tailed)	.690	.880	.864	.452	.502	.047	.890	
	N	121	121	121	121	121	121	121	121

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 6. *Correlation Matrix, cont.*

When using pairwise deletion there were significant correlations are between parent education and parent income level ($r = .344$, $p<.01$) and between communication modality (e.g. used sign language, did not use sign language) and accommodations utility ($X^2=-.324$, $p<.01$). The moderate positive correlation between parent income and parent education is expected and consistent with the literature using these two variables to represent socioeconomic status (Davis-Kean, 2005). The moderate negative correlation between accommodations utility and communication modality does lend some support for the hypothesis of an interaction between communication modality and accommodations utility. This correlation does seem to indicate that students who use sign language are less likely to evaluate their accommodations as useful for their success in postsecondary education.

There were also weak positive associations between accommodations utility and postsecondary retention ($X^2=.189$, $p = .038$) and between accommodations sufficiency and postsecondary retention ($X^2=.181$, $p=.047$). This indicates that students who graduated or were still in their postsecondary setting were more likely to rate their accommodations as being useful and indicating that they received enough of them. The correlation between student's ratings of accommodations sufficiency and number of accommodations reported used was not significant ($r = -.012$). Therefore, it does not appear that students who utilize more accommodations are more or less likely to report that they received sufficient accommodations.

LOGISTIC REGRESSION RESULTS

The first logistic regression examined the relationship between student ratings of accommodations utility and student retention in their postsecondary setting, while taking parent income, parent education, high school grades, and whether the student had a co-occurring disability into account. An interaction term was also included to test the hypothesis that communication modality would moderate the relationship between student ratings of accommodation utility (Communication Modality x Accommodations Utility) and postsecondary retention. The second logistic regression examined the relationship between student ratings of accommodations sufficiency and student retention in their postsecondary setting, while taking parent income, parent education, high school grades, and whether the student had an additional disability. An interaction term was also included to test the hypothesis that communication modality would moderate the relationship between and student rating of accommodations sufficiency and postsecondary retention (Communication Modality x Sufficiency).

All covariates were entered into the first block and the variable of interest (use or sufficiency) and interaction term were entered in the second block. Communication modality and co-occurring disability were specified as categorical variables and contrast coded as indicator variables, meaning they were tested as presence or absence of group membership. Ratings of accommodations utility and sufficiency, parent education, parent income and grades were considered continuous variables for the purposes of this analysis.

Regression results indicate the overall model fit for all predictors (parent income, parent education, high school grades, presence of co-occurring disability, accommodations use rating, and interaction between accommodation use and

communication modality) was adequate (-2 Log Likelihood = 53.942, Hosmer and

Lemeshow Goodness of fit test X^2 (8) = 4.858, p = .773) and statistically reliable in

distinguishing between postsecondary retention (X^2 (7) = 9.043, p = .250). The model

correctly classified 82.1% of the cases. However, it should be noted that the model

correctly classified only 8.3% of cases where students left the postsecondary setting for

another reason while it correctly classified 98.2% of cases where students left because

they graduated or were still in school. Regression coefficients are presented in Table 3.3.

Wald statistics indicated that that none of the predictors significantly predict

postsecondary retention

Table 7

Logistic Regression Results for Student Rating of Accommodation Use

Variable	B	S.E.	Wald	df	Sig.	Odds ratio
Parent Income	.056	.088	.406	1	.524	2.048
Parent Education	.717	.452	2.516	1	.113	2.048
High School Grades	.096	.278	.119	1	.730	1.101
Co-occurring disability	-.634	.781	.659	1	.417	.530
Accommodation Use	.960	.819	1.375	1	.241	2.611
Communication Modality	-.820	1.777	.213	1	.644	.440
Accommodation Use x Communication Modality	-.215	.935	.053	1	.818	.806
Constant	-5.004	3.136	2.547	1	.111	.007

Regression results indicate that the overall model fit for all predictors (parent income, parent education, high school grades, presence of co-occurring disability, communication modality, accommodations sufficiency rating, and interaction between accommodation sufficiency and communication modality) was adequate (-2 Log Likelihood = 55.773, Hosmer and Lemeshow Test Goodness of fit X^2 (7) = 7.501, p = .484)) and was statistically predictive in distinguishing between postsecondary retention (X^2 (7) = 7.211, p = .407). The model correctly classified 82.1% of the cases. However, it should be noted that the model correctly classified only 8.3% of cases where students left the postsecondary setting for another reason while it correctly classified 98.2% of cases where students left because they graduated or were still in school. Regression coefficients are presented in Table 3.4. Wald statistics indicated that that none of the predictors

significantly predict postsecondary retention

Table 8

Logistic Regression Results for Student Rating of Accommodation Sufficiency

Variable	B	S.E.	Wald	df	Sig.	Odds ratio
Parent Income	.020	.086	.053	1	.818	1.020
Parent Education	.459	.409	1.260	1	.262	1.582
Co-occurring disability	-.661	.764	.748	1	.387	.516
High School Grades	.163	.294	.310	1	.578	1.178
Accommodation Sufficiency	-.690	1.095	.397	1	.529	.501
Communication Modality	-4.887	4.192	1.359	1	.244	.008
Accommodation Sufficiency x Communication Modality	1.396	1.173	1.417	1	.234	4.039
Constant	.466	4.426	.011	1	.916	1.593

DESCRIPTIVE ANALYSIS

An aspect of particular interest to this study was whether students would indicate that lack of services or accommodations were the reason that they left postsecondary. As mentioned before, most students in the sample did graduate or were still in their postsecondary program. Therefore, very few students in the sample answered this particular question (n=39). It is important to remember that students may have attended multiple postsecondary programs during NLTS2 and students may have indicated any of these reasons for any of these particular programs. Additionally, students could choose multiple reasons for leaving postsecondary settings. For example, a student could indicate

that they left their postsecondary setting to go to another school and because they did not like the school they were currently attending.

As mentioned previously, only reasons related to accommodations or services or academic difficulties in general were of interest to this study so frequencies for only these reasons are reported in the table below. Percentages are listed for the percent of students who answered this question rather than for the percentage of the entire sample.

Table 9

Reasons for Leaving Postsecondary Settings

Reason for Leaving	*Percentage*
Didn't get services needed	0%
Changed schools	20%
Didn't have time/conflicted with other demands	<10%
Poor grades/not doing well	10%
Didn't like school	<10%
Didn't get into the program he or she wanted	0%
Youth couldn't get along with teachers	0%

[6]

These results indicate that none of the students in the sample indicated that they left postsecondary settings because they did not receive the services they needed. Additionally, none of the students reported leaving postsecondary settings because they didn't get into the program they wanted or couldn't get along with teacher. Instead, the most common reason students gave for leaving their postsecondary setting was to change schools.

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[6] Note. In accordance with IES policy, percentages are rounded to the nearest tens place

Chapter 4: Discussion

STUDY FINDINGS

This study sought to determine the extent to which SDHH perceptions of whether their accommodations were useful or whether they received enough accommodations would influence their retention in postsecondary settings. The study also examined the extent to which the students' communication modality moderated the relationship between their perceptions of their accommodations usefulness and their retention in the postsecondary setting and between student perceptions of receiving sufficient accommodations and their retention in the postsecondary setting. The study also took the influence of student socioeconomic status, previous achievement, and co-occurring disabilities into account. I predicted that students who gave positive ratings of accommodations usefulness would be more likely to persist or graduate from their postsecondary education program. Similarly, I predicated that students who indicated they received sufficient accommodations would be more likely to persist in, or graduate from, their postsecondary education program.

Initial correlation results indicated that there was a weak relationship between student positive ratings of their accommodations usefulness and their tendency to remain in or graduate from their postsecondary program. A similar weak relationship was found between student ratings of whether they received sufficient accommodations and their tendency to persist in or graduate from their postsecondary program. Moderate correlations were found between parent income and parent education level and between communication modality and student ratings of accommodations usefulness. The latter

correlation indicated that students who use sign language were less likely to evaluate their accommodations as useful for their success in postsecondary education.

However, none of these relationships were detected in the logistic regression results, indicating that none of the covariates or variables of interest predict student retention in their postsecondary setting. Model fit statistics also indicated that the proposed model was an adequate fit for the data. It is important to remember in reviewing these results that the dichotomous retention variable was significantly negatively skewed. This means that most of the participants in this study persisted in their postsecondary education program or had graduated.

The brief analysis of the reasons that students gave for why they left the postsecondary setting also yielded unexpected results. None of the students who left their postsecondary program indicated that they left because they did not get the services they needed. Instead, the highest number of students reported that they left their postsecondary setting because they changed schools, followed by reported poor grades. It is important to remember the small number of students who answered this question in comparison with the larger number of students with data for the retention variable when reviewing these results.

IMPLICATIONS

The results of this study contrast strongly with the depiction of SDHH as being significantly more likely to leave their postsecondary setting prior to completing their program (Stinson & Walter, 1992; United States Department of Education, 1999; Schroedel et al., 2003; Lang, 2002). Instead, they provide support for the findings of

Newman et al. (2011) that 52.9% of students who are deaf or hard-of-hearing who enrolled in postsecondary settings completed their program within eight years in comparison with 55% of their same-age peers who were not deaf or hard-of-hearing. Extending the Tinto model of student persistence (Tinto, 1993) to this circumstance, these students are engaged academically or socially with their postsecondary setting and the result is their continued persistence in their postsecondary program or eventual completion of their desired degree.

Additionally, none of the students in the sample reported that they left postsecondary education due to insufficient services. Although interpretations drawn from these frequency counts are exploratory or tenuous at best, they do provide some support for the idea that students are either not encountering or able to surmount potential barriers to accessing the accommodations they need to remain engaged academically in the postsecondary institution (Tinto, 1993). The most frequent reason that students gave for why they left is also encouraging. Students, rather than disengaging from their postsecondary environment and leaving postsecondary education entirely, instead reported changing schools, perhaps in the pursuit of an environment that is better suited to their education goals or provided them with something that better engaged them academically or socially. This may tie in with the second most common reason students gave for leaving their postsecondary setting, poor grades. Students who were not succeeding academically may have pursued avenues in which they could be more successful, perhaps at a different school or in the workforce. This lends support to the focus on ensuring SDHH are prepared academically for the postsecondary education

environment (Boutin, 2008; Albertini et al., 2011) and possess the requisite self-advocacy skills to obtain accommodations in a variety of postsecondary environments (Bowe, 2003; Test et al., 2005; Punch et al., 2007).

The above results are encouraging in larger discussions of the educational progress of SDHH, with the support of accommodations, in postsecondary education settings. However, they also raise the following question: what is next? Postsecondary education is not the endpoint for accommodations advocacy for SDHH, instead it is preparation for continued accommodations advocacy in the workplace. Unfortunately, research indicates that potential communication barriers continue to be of concern for deaf and hard of hearing employees (Punch et al., 2007), particularly in work-related informal and social situations. Punch et al. (2007) also reported that deaf and hard of hearing individuals did encounter barriers to securing particular accommodations in the workplace and negative attitudes by hearing co-workers or employers. Additionally, in comparison with hearing peers, Deaf adults are underemployed, underpaid, and encounter disparities with career advancement (Kelly, 2013). According to the American Community Survey (2011), in 2011, 47.9% of deaf adults were employed and a greater number of deaf individuals were not in the labor force (44.8%) in comparison with 22.6% of the general population. Although employment options for deaf individuals with postsecondary education have improved, concerns regarding reliance on Social Security Income (SSI) and reduced employment opportunities for individuals without postsecondary education persist (Houston, Lammers, & Svorny, 2010).

The negative correlation between communication modality and accommodations usefulness ratings tentatively supports the findings in the literature regarding concerns about the quality and availability of sign language interpreters (Sapere & Convertino, 2005, Smith, 2004; Lang, 2002; Harris, 2012), a common accommodation for SDHH in postsecondary settings (Marschark et al., 2006). Although this dissertation cannot make causal inferences between communication modality and accommodations usefulness ratings, it can state that students who used sign language were less likely to rate their accommodations as being more useful. Because SDHH are relying on these "access assistants" (Thurlow, 2007) to engage with instruction and hearing individuals (Lang, 2002), they may be more likely to critically evaluate these accommodations in terms of their usefulness.

Finally, the results of this study indicate that student perceptions of accommodations utility and sufficiency do not influence student retention. Additionally, none of the predictors traditionally assumed to influence student retention including socioeconomic status (Sirin, 2005), high school achievement (Stratton et al., 2007), and additional disabilities (Berktold & Horn, 1999) were significant. The time lapse between the predictor variables in Wave 1 and the outcome variables in Waves 3-5, a maximum of eight years, could have placed the traditional predictors of parent SES and high school achievement too far distant from the students' current postsecondary persistence. Cawthon et al. (submitted manuscript) found similar results when examining student accommodations patterns in high school and postsecondary settings. Cawthon et al. (submitted manuscript) also concluded that the differences between the high school and

postsecondary accommodations settings meant that underlying mechanisms for student persistence in high school may not mirror those influencing student persistence in postsecondary settings. However, Cawthon et al. (submitted manuscript) did find that students demographic characteristics, such as additional disabilities, ethnicity and socioeconomic status, did influence the particular accommodations students used in postsecondary settings.

The failure to find significant effects may also be due to the study's achieved power, as discussed further below. Additionally, the correlations between the variables I the model, while not high enough to trigger the computer processor or researcher to eliminate the correlated variables, may explain the non-significant results. Logistic regression is highly sensitive to correlations among model variables and these correlations may have further reduced the analyses power and decreased the likelihood of detecting a significant effect. Thus, multicolliniarity may explain the null results.

An alternative explanation is that students' self-reports do not always line up with the definite components influencing their performance. Research on test accommodations and student perceptions indicates that students' have overall positive perspectives of accommodations but that these positive perspectives may not always be accurate indicators of how effective these accommodations are in influencing student test scores (Elliott & Marquart, 2004; McKevitt & Elliott, 2003; Lang et al., 2005). Additionally, in the larger picture of student retention, accommodations may have a miniscule role to play in the larger Tinto model of student persistence (1993) when considered with other predictors of postsecondary retention for SDHH including social integration (Stinson,

Scherer, & Walter, 1987) and general in-college characteristics, such as degree

expectations and net price of attendance (Mamiseishvili & Koch, 2011). Specifically,

Mamiseishvili and Koch (2011) found that among students with disabilities, those who

were female, African American, younger, lived on campus, enrolled full-time, had higher

degree expectations and first-year GPA were more likely to persist in their postsecondary

program. The in-college characteristics of campus living, enrollment status, and degree

expectations tie closely with the goals and student commitment to institution components

of the Tinto model of student persistence (Tinto, 1993), while the background

characteristics of age, ethnicity and gender are background factors that influence

student's intentions to enroll in postsecondary settings. These components should be

included in future examinations of students' persistence in postsecondary settings.

LIMITATIONS

There are a number of notable limitations to this study that must be examined

when interpreting the findings of this study. These limitations fall into two main

categories, methodological and analysis limitations.

Methodological Limitations

This dissertation was a secondary data analysis of the NLTS2 dataset. There are a

number of limitations to secondary data analysis. First and foremost, the secondary data

analyst has no influence on the study measures, data collected or sampling procedures

used in the study. Therefore, the questions asked or the sampling may not be ideal for the

purpose of the secondary analysis. Additionally, the secondary data analyst may use the

data for purposes not originally intended by the database creators. An illustration of this

limitation in this study was the influence of the age of NLTS2. The NLTS2 study data was collected from 2001-2011 (Wagner et al., 2005). The accommodations landscape has shifted significantly in the intervening years to reflect the emergence of several technologies of importance to SDHH. These technologies include many varieties of text-based accommodations including Computer Assisted Realtime Translation (CART) and Short Message Service (SMS) texting that many SDHH use to participate in a variety of social and academic situations (Marschark et al., 2006). However, NLTS2 did not specifically ask about these accommodations, which may be an integral part of academic and social engagement students, particularly for those who do not use sign language. The closest category to these types of technologies included in NLTS2 is 'assistive technology' that refers to any technology "used to increase, maintain or improve functional capabilities of individuals with disabilities" (Assistive Technology Act of 1998). This means that the analysis could not capture an important category of accommodations used by many SDHH.

Another methodological limitation involves the suggested sample weights NLTS2 provided to make the study nationally representative. I chose not to use the sample weights. I chose not to use these weights because there were not sufficient students in the sample for the sample weights to be useful in extrapolating results to the larger population of SDHH. Additionally, the nature of data collection, via telephonic assisted interview or shortened paper survey, presented potential barriers to SDHH, particularly those with severe hearing loss. Thus, the data are most likely missing due to these barriers, rather than missing at random. The weighting procedure corrects only for data

missing at random, not differential participant attrition. This analysis decision limits the interpretations that can be made from the results of the analysis to students who are similar to those included in the sample. Additionally, this means that the results cannot be extrapolated to the larger population of SDHH. Instead, results may be comparable for SDHH who are demographically similar to participants in this study.

It is important to also recognize the differences between the demographic characteristics of the students in wave one and the characteristics of the students who had complete data for the Wave 3-5 variables. These students had similar rates of using sign language. However, fewer students in Waves 3-5 had additional disabilities and had parents with higher reported income and education levels. Additionally, students in Wave 1 had higher percentages of students with lower grades. While these comparisons are not statistically measured and thus interpretations are tentative, they do raise questions about the demographic profile of students who continued to participate in NLTS2. It is possible that there was differential attrition of students from lower socioeconomic backgrounds and those who were lower performers academically. This means that students who may be at greatest risk of leaving college, those with fewer financial and academic resources, were not included in this study. Therefore, continued research should make continued efforts to ensure that these students perspectives are incorporated within the research concerning SDHH.

Additionally, I used two individual self-report items to determine student accommodation experiences with accommodations utility and sufficiency. This study

used two items as the foundation of the analysis regarding student perceptions of their accommodations and their ability to predict student retention. It is important to note the limitations of using single items to make interpretations of larger concepts or measure their relationship with other variables. These single items are not sufficient to ensure that a core construct is measured reliably or that the item in fact represents an underlying construct, in this case whether an accommodation was useful or not. Additionally, both of these items are self-report items and based on the student's own perceptions of whether their accommodations were useful or if they received enough accommodations.

Another limitation is the choice not to examine the difference in students' previous educational settings. The students in NLTS2 spanned several settings from schools for the deaf to mainstream settings. The influence that student setting has on student outcomes is often examined in the research literature (Holt, 1994; Kluwin, 1992). The research literature findings are varied regarding the influence of setting on long-term student academic outcomes (Powers, 2003; Antia & Stinson, 1999; Schick et al., 2013) and comparisons are complicated by the differences in the types of students that attend each setting (Stinson & Kluwin, 2010). Additionally, students may have experience with both separate and mainstream school settings during their K-12 education (Moores, 1996). Moreover, the communication philosophies for schools for the deaf and mainstream schools can be diverse and include only ASL, total communication, bilingual-bicultural approaches among others (Marschark, Lang & Albertini, 2002). The school setting variable was not included in the analysis due to this variability and its tenuous link to academic outcomes.

Finally, the overall sampling of NLTS-2 focused solely on students with identified disabilities in middle or high school. This means that students who were not identified as being deaf or hard-of-hearing prior to the start of the study were not included. Students may acquire a hearing loss at any point in their lives, including prior to high school graduation or during post-secondary education. It is possible that for these students, accessing accommodations may prove even more challenging because they may be unaware that they are eligible for accommodations or lack the documentation to prove the existence of a disability.

Analysis Limitations

A key limitation of this analysis was the achieved power. This study had insufficient power to detect small or medium effects. This was especially problematic given the initial correlation results. Although these results were significant, they were weak to moderate correlations and interpretations of these effects are tenuous at best. With a larger number of participants, the logistic regression results might have been significant and indicated a small relationship between student ratings of accommodation use and retention and between student ratings of accommodations sufficiency and retention

The statistical analyses chosen, logistic regression, had some limitations that should be acknowledged. First, logistic regression is sensitive to outliers and thus I carefully inspected the raw data to determine the presence of these scores prior to running the analysis (Mertler & Vannatta, 2005). Additionally, if there are too few cases for each

combination of discrete variables then parameter and standard error estimates would be too large (Mertler & Vannatta, 2005). To address this concern, several of the NLTS2 variables were modified to collapse categories that would yield similar results. For example, the chosen dependent variable, retention, was coded if a student was still in school and working toward their degree or if the student had graduated/completed their program. However, these represented separate options on the NLTS2 survey. To reduce the likelihood of not having sufficient numbers of students in each of the categories, degree completion/graduation and still in school were collapsed into a single category and contrasted with 'not still in school but not graduated'. Similar to this limitation, if there are too few cases in each of the categories of the variables in the analysis, then the power of the analysis to detect a significant effect will be substantially reduced (Mertler & Vannatta, 2005). To reduce the likelihood of this limitation influencing sample power, the number of cases in each combination of variable categories (e.g. the number of students who completed their program/are still in school who rated that their accommodations were 'somewhat useful') were determined. Finally, multicollinearity is a concern for logistic regression, particularly if there are high correlations between predictor variables (Mertler & Vannatta, 2005). To address this concern, I followed the recommendations of Tabachnick and Fidell (1996) and checked for predictor variables in the analysis that showed correlations higher than 0.8 (Stevens, 2009) with other predictor variables (in this case only one variable in the pair would be eliminated). No predictors had correlations higher than 0.8 and therefore I did not remove any variables from the analysis. However, the correlations between predictor variables and the outcome variable

54

noted, although not high enough to reach the 0.8 threshold, may have resulted in multicollinearity that interfered with the ability of the analysis to detect a significant effect.

CONCLUSION

Student accommodations, although a component in the academic lives of SDHH, do not appear to be definitively connected with their retention or graduation in the postsecondary setting. Additionally, students did not report leaving for reasons related to accommodations or services. The larger message for research with SDHH in postsecondary settings is that the majority of these students are graduating or continuing to work toward obtaining their degree or certificate. Although accommodations may be a component of these students' postsecondary experience, it is likely that there are other factors influencing students' decisions to persist in their postsecondary setting such as in-college characteristics (Mamiseishvili & Koch, 2011) or other mechanisms that promote academic or social engagement with the postsecondary institution (Tinto, 1993). Finally, the encouraging result that the majority of SDHH included in this study were persisting or graduating in their postsecondary setting draws the focus of policy makers and educators to the next setting, the workplace. It is essential that SDHH enter the workplace prepared to advocate for their accommodations and that systems advocacy focus on the current economic and barriers to the career advancement of deaf employees (Kelly, 2013; Houston et al., 2010).

Appendix A: Literature Review

BACKGROUND OF INDIVIDUALS WHO ARE DEAF OR HARD-OF-HEARING

Demographics and Definitions

This dissertation focuses on the unique access-related experiences of students who are deaf or hard-of-hearing (SDHH) in postsecondary education settings. These individuals form a very heterogeneous group based on a number of factors beyond their hearing loss including cultural identification, etiology, family background, language modalities, and educational setting. This heterogeneity also extends to the etiology of hearing loss which can be congenital or acquired, occur prior to the acquisition of language (prelingual) or after the acquisition of language (postlingual) (Niskar et al., 1998). These personal and environmental characteristics are important to consider when evaluating research which examines outcomes of SDHH.

Estimates of the exact number of individuals with hearing loss in the United States vary based on the ways in which the data are collected and the ways in which hearing loss is defined ('have trouble hearing', 'use hearing aid', 'deaf in one ear'). A commonly cited statistic is the United States Census Bureau (2008) which indicated that approximately 3.5% of the United States population has a hearing loss. Estimates regarding the number of children who are deaf or hard-of-hearing are slightly easier to find. However, these numbers are limited only to children who are receiving special education services to accommodate their deafness and thus may exclude children with a hearing loss not deemed educationally relevant (Mitchell & Karchmer, 2011). In this

56

context, educational relevance is determined in accordance with IDEIA (2004) , which states that students qualify under IDEA-Part B if they have one of the thirteen named disabilities and they require special education or related services due to that disability (Jacob & Hartshorne, 2007).

According to the Annual Survey of Deaf and Hard-of-Hearing Children and Youth conducted by the Gallaudet Research Institute (GRI) , 1.1 per 1,000 children are identified for special education due to deafness or hearing loss (Mitchell and Karchmer, 2006). Mitchell (2004) examined issues regarding the generalizability of the GRI results and proposed guidelines to improve how representative these numbers are for the larger IDEA Child Count population by weighting responses. The estimate for the percentage of youth between ages six and twenty-two with a hearing impairment in IDEA Child Count is 1.14%. In particular, Mitchell (2004) points out that the GRI has greater facility with obtaining numbers of children who are deaf or hard-of-hearing in schools for the deaf than mainstream programs, particularly those mainstream programs with low response rates, and tends to oversample particular regions of the United States (e.g. West South Central region).

Students who are deaf or hard-of-hearing come from a variety of ethnic backgrounds. Additionally, the number of students from diverse backgrounds, particularly Hispanic or Latino, is steadily increasing (Mitchell & Karchmer, 2006). Mitchell (2004) also found that the GRI oversampled Hispanic/Latino youth potentially due to Hispanic/Latino youth over-representation in mainstream self-contained classrooms and special schools, and over-sampling of states with high Hispanic/Latino

enrollment. These changing demographics are important to keep in mind when synthesizing research regarding individuals who are deaf or hard-of-hearing that has historically tended to focus on the white Deaf experience (Fernandes & Myers, 2009).

Another aspect of diversity for students who are deaf or hard-of-hearing (SDHH) is whether they have co-occurring disabilities. Mitchell (2004) reported that the GRI and weighted results using IDEA Child Count both indicated that 45% of SDHH had at least one co-occurring disability. These co-occurring disabilities range from disabilities related to academic settings such as learning disabilities or intellectual disabilities, to sensory disabilities including blindness, motor disabilities such as cerebral palsy and mental illness disabilities such as depression or anxiety (Shaver, Newman, Huang, Yu and Knokey, 2011). This large percentage of SDHH with co-occurring disabilities heightens the need to include these students in overall conversations regarding SDHH (Holden-Pitt & Diaz, 1998). Additionally, rates of particular co-occurring disabilities are on the rise, particularly autism (Szymanski, Brice, Lam, & Hotto, 2012). However, there is limited literature regarding the unique needs and characteristics of these SDHH beyond their demographic characteristics (Leppo et al., 2013).

The Importance of Language

A key factor in the developmental trajectory for children who are deaf or hard-of-hearing is the language environment surrounding them from birth to three years old (Sass-Lehrer, 2010). This degree of early access to language, which can be auditory or visual, has the potential to influence future cognitive, communication and social functioning and is the focus of early intervention for infants who are deaf or hard-of-

58

hearing (Calderon & Greenberg, 1997). This emphasis on early intervention has led to earlier and earlier identification of students who are deaf or hard-of-hearing including the hearing screening many hospitals administer directly after birth (Spencer, 2002). For children who are pre-lingually deaf, access to competent visual language support by parents is essential to their later literacy development (Chamberlain & Mayberry, 2008). Additionally, Petitto & Marenette (1991) found that children who acquire language in this way babble using signs similar to the way hearing children babble as they acquire spoken language. Importantly, these children continue to acquire signed language on a similar developmental timeline similar to that of hearing children acquiring spoken language (Petitto et al., 2001). However, access to language support is easier said than done, especially for the 90% of deaf or hard-of-hearing children who are born to hearing parents (Moores, 2001). The implication of this statistic is the potential communication gulf that separates the child from their parents and the barriers that both must overcome to reach the other. For children, especially pre-lingually deaf children, this can mean delay in language acquisition (Marschark, 2001) or in extreme cases, language deprivation. For parents this means confronting a mountain of decisions regarding their child's education, which professionals to turn to for guidance and what language model or models they want to provide in their home (Meadow-Orlans, 2003). Finally, families must confront the glaring question 'is being deaf or hard-of-hearing a disability? Or is it just different?' (Leigh, 2010, p. 459). It is important to remember that this answer to this question is not set in stone for the rest of the child's life. Although parents may choose the initial answer, the child may revisit or change it as they grow.

Parents must also make choices about which methods will be used to teach their child to communicate. There are a number of approaches currently used, all with staunch supporters and fervent opponents. The three primary approaches are Auditory, Visual and Multimodality (Stredler-Brown, 2010). The auditory approach emphasizes spoken language and focuses on improving access to auditory information, typically through the use of various technologies including hearing aids (Flexer, 1999; Nicholas & Geers, 2006).The visual approach uses a sign system, such as ASL or Manually Coded English, to access language through a visual modality (Stredler-Brown, 2010). This approach also includes the bilingual communication approach which emphasizes fluency in both the signed language and a language of the hearing community (which may be spoken or written) (Marschark et al., 2002). Finally, parents may choose to use both a visual and auditory approach for language instruction, the Multimodality approach. This approach incorporates a spoken language and a signed language, sign system or visual code (Watkins, Taylor, & Pitttman, 2004). The variety of approaches used to teach children who are deaf or hard-of-hearing to communicate is an important characteristic to consider when synthesizing literature regarding individuals who are deaf or hard-of-hearing.

It is also important to emphasize that access to language goes beyond language, it lays the foundation for social and emotional development for children. Language conveys emotion vocabulary, messages about social norms and everyday information (Calderon & Greenberg, 2010). The importance of language is illustrated through incidental learning, all of the things children 'pick up' by being passive recipients of conversation (e.g. a parent on the telephone, television/radio in the background) rather than active participants

(Calderon & Greenberg, 2010). Thus, it may not be surprising that for deaf children,

access to a visual language is related to their later social development. Additionally,

interactions with hearing peers are also influenced by language, communication ability,

mode of communication and familiarity with hearing peers (Antia, Kreimeyer, Metz &

Spolsky, 2011).

A subject of great controversy within the community of individuals who are deaf

or hard-of-hearing is the promises and prices of cochlear implants for young children and

infants. Cochlear implants change sound into electrical signals that are transmitted

directly to the peripheral part of the auditory nerve (Lucker, 2002). Initially, cochlear

implants were recommended for late-deafened adults and postlingually deafened young

adults in the 1970's and 1980's (Mecklenburg & Lehnhardt, 1991). However, due to the

development of more refined models, their approval by the Food & Drug Administration

in the United States, large scale studies involving young children, and marketing

campaigns, the number of young children receiving cochlear implants increased

dramatically since the 1990's (Spencer, 2002). The GRI results for the 2006-2007 school

year indicated that 12.6% of American children currently have a cochlear implant

(Gallaudet Research Institute, 2006). Along with the increasing number of children who

are deaf or hard-of-hearing receiving cochlear implants come various perspectives on

under what circumstances children should receive cochlear implants, or if they should

receive them at all (Christiansen & Leigh, 2002). On the one hand, this technology

allows greater access to the auditory world and is sometimes seen as an advantage for

later outcomes (Spencer, Marschark, & Spencer, 2011). On the other, it has the potential

to influence a child's language choices (greater access to Spoken English) and some argue, deter the development of a Deaf identity (Lane & Bahan, 1998). This linguistic diversity, and the controversy it sparks, is an important consideration for researchers.

K-12 EDUCATION FOR SDHH

The language question leads to more questions regarding a child's educational placement. For children who are deaf or hard-of-hearing, there are several educational options. The two main settings are a school for the deaf or the mainstream public school system. Each of these settings has advantages and disadvantages. Each setting provides unique opportunities and resources that potentially prepare students for postsecondary environments. Conversely, each setting may be better suited for some students than others.

Schools for the deaf are considered more restrictive by IDEA (2004) but also are more likely to surround children with deaf role models (e.g. deaf staff members) and fellow students who are deaf or hard-of-hearing (Johnston, 1997; Padden & Humphries, 1988). Holden-Pitt (1997) proposes that this desire for an environment with other SDHH and exposure to Deaf culture may contribute to the higher number of high-school age students attending schools for the deaf. Concerns have been raised regarding the yearly progress and ability to meet benchmarks of schools for the deaf (Johnson, 2003). However, when evaluating these outcomes it is important to remember that schools for the deaf also have a higher number of SDHH who have co-occurring disabilities (Allen, 1992). Additionally, some research indicates that specialized schools provide greater

transition support for students including more information, discussion of options and parental support (Polat, Kalamboka, & Boyle, 2004).

In contrast, many SDHH are mainstreamed in the public education system (Holden-Pitt, 1997). In the mainstream setting, students may attend and participate in class with hearing students and learn through itinerant teachers (Ramsey, 1997). Itinerant teachers are teachers who are not tied to a specific school and travel between schools to instruct different students during the school day. Students may also attend a specific self-contained program for SDHH. The trend toward higher rates of placement in mainstream schools is more pronounced for children of hearing parents than children of deaf parents (Holden-Pitt, 1997). SDHH in mainstream classes do appear to achieve high levels of achievement, in comparison with students in self-contained classes (Holt, 1994). However, Holt (1994) also points out that it is unclear whether students with higher levels of academic skills are more likely to be selected for participation in classes with hearing peers, or if this inclusion model contributes to the academic success of these students. A mainstream environment often means that SDHH do not have frequent interactions with other SDHH or adults who are deaf or hard-of-hearing (Woodward, Allen, & Schildroth, 1988). Additionally, students who participate in mainstream classes through interpreters may not have access to high quality interpreters (Schick et al., 2005). Despite these difficulties, mainstream schools are more likely to provide students with other benefits, such as work experience (Polat et al., 2004)

SDHH in Postsecondary Education

Students who are deaf or hard-of-hearing currently have a number of options for postsecondary education open to them which embrace their cultural and linguistic diversity. The most famous of these institutions is Gallaudet University, established in 1864 by an Act of the 34th Congress (HR 806). Gallaudet University is unique in that it provides almost all instruction in American Sign Language (ASL) (Stinson & Walter, 1992). In this way, Gallaudet offers its students signing environment and a liberal arts education in 30 majors. Gallaudet also enjoys an international reputation for excellence regarding education and research, particularly with respect to deaf or hard-of-hearing individuals (http://www.gallaudet.edu/). In 1965, the National Technical Institute for the Deaf (NTID) was established by Congress on the grounds of Rochester Institute of Technology (RIT) (PL 89-36). NTID specializes in technical education and offers instruction in both ASL and spoken English. Other college programs are specifically tailored to SDHH, such as California State University at Northridge and Austin Community College. These programs are distinct from Gallaudet because they use accommodations, including interpreting and note-taking services, to provide access to instruction rather than instruction in ASL. These institutions are distinguished from other universities due to the sizeable number of SDHH in attendance and specialized staff in place to support student outcomes.

SDHH may also choose to attend mainstream universities and postsecondary programs and use accommodations, such as sign language interpreters, notetakers and assistive technology to allow them equal access to class instruction and course content. Students may also use accommodations to participate in social and extracurricular

activities. However, universities vary regarding whether they provide accommodations for these situations (Cawthon et al., 2009). If this situation arises, it means a student might be academically included but socially excluded, which may have repercussions for the students' engagement with the university.

The number of deaf or hard of hearing students currently enrolled in the variety of postsecondary education settings mentioned can be difficult to determine. It does appear that there has been a marked increase in enrollment of deaf or hard of hearing students in postsecondary settings. Wagner et al. (2005) reported that between the initial National Longitudinal Transition Study (NLTS) in 1987 and NLTS-2 data in 2005, the number of deaf or hard-of-hearing students enrolled in postsecondary education showed a 24-30% increase. The 1995-1996 data from the National Postsecondary Aid Study (United States Department of Education, 1999) indicated that 52.9% of deaf or hard-of-hearing young adults had completed any type of postsecondary education and 37% had completed degrees from two or four-year institutions. Thus, it appears that more and more SDHH are choosing to continue on to higher education settings.

PROBLEM OF DEAF STUDENT COLLEGE RETENTION

Despite the increase in the number of SDHH attending postsecondary institutions, SDHH are leaving postsecondary education settings before completing their degree. Stinson and Walter (1992) reported that 70% of students who were deaf or hard-of-hearing withdrew from college prior to completing their degree. Fifty percent of the students who are deaf or hard-of-hearing who entered postsecondary education between 1989 and 1990 withdrew (meaning they did not complete their program) by 1994 (United

States Department of Education, 1999). In contrast, 51% of all students who attended a four-year institution in 1995-1996 completed their program within six years (United States Department of Education, 1999). Additionally, only 12% of students with disabilities had graduated from college (Belch, 2004).

These statistics are particularly worrying given the importance of postsecondary education for future earnings. According to the U.S. Census Bureau, in 1998-2000 full-time workers with a 2-year college degree earned $36,800 per year in comparison to $30,400 for high school graduates (Day & Newburger, 2002). In further comparison, full-time workers with bachelor's degrees earned $52,200 per year. Additionally, the types of pre-employment experiences, including completing postsecondary education programs or training, may influence the types of jobs that deaf or hard-of-hearing individuals are competitive for (Boutin & Wilson, 2009). According to NLTS2 data, only 43.3% of hard-of-hearing students were competitively employed and 43.5% of deaf students were competitively employed in comparison with 70.8% of students with learning disabilities who were competitively employed (Wagner & Blackorby, 1996). Longitudinal data indicates that students who are deaf or hard-of-hearing experience educational, occupational and economic long-term gains after they complete their degrees (Schroedel & Geyer, 2000). Given retention outcomes for SDHH, it is important to examine research regarding student persistence.

TINTO MODEL FOR COLLEGE STUDENT PERSISTENCE

There are several theories regarding processes and factors that influence student persistence in postsecondary settings. Several researchers point out academic and social

factors may underlie some of the difficulties for these students (Astin, 1984; Braxton,

Vesper & Hossler, 1995, Tinto, 1993). One theory currently applied to SDHH is the Tinto

Model of Student Persistence (Smith 2004; Albertini et al., 2011). According to the Tinto

Model of Student Persistence (Tinto, 1993), there are a number of factors which

influence students' decisions to exit higher education prior to completing their degree.

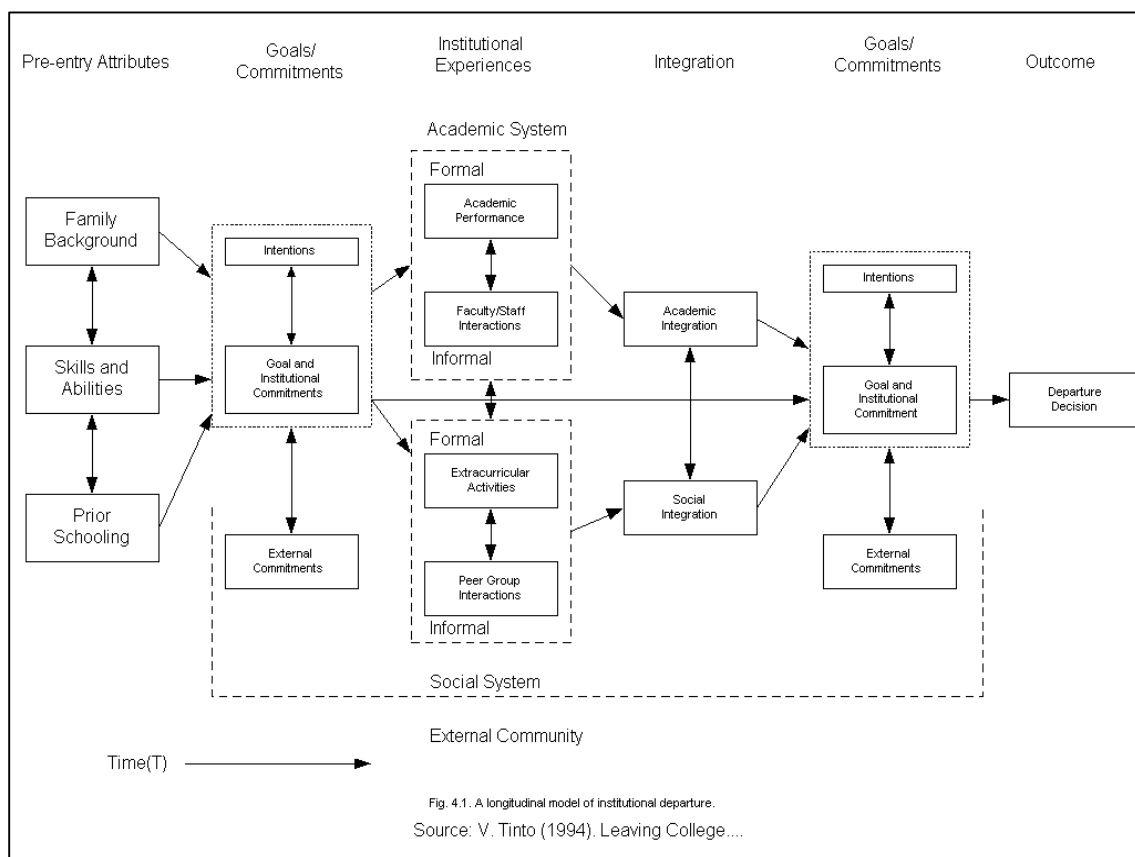Figure 2 below depicts this model (Tinto, 1993).

Fig. 4.1. A longitudinal model of institutional departure.
Source: V. Tinto (1994). Leaving College....

Figure 2. Tinto Model of Student Persistence.

There are background factors which take place prior to a student's enrollment

including family background, skills and abilities and prior schooling experiences. These

factors influence a student's intentions, which influence their goals and commitment to

the institution to at the time of enrollment (Tinto, 1993). At this point, the student's time in the educational setting has two main facets, the social and the academic systems. Within the academic system academic performance and faculty/staff interactions influence a student's sense of academic integration into the larger university system (Tinto, 1997). In a similar way, the students' participation in extracurricular activities and the student's peer group interactions influence their sense of social integration into the system (Walter, Foster, & Elliot, 1987). These two facets of integration come together with the student's previous goals and commitments to the academic institutions to influence their current goals and commitments to the institution. A student's goals and commitments to the institution ultimately influence their decision to leave the academic institution or continue to persist. These views are expressed succinctly by Schroedel et al. (2003): "if student's academic and social needs are not addressed, they will drop out" (p.70).

RETENTION OF SDHH IN HIGHER EDUCATION

Researchers have postulated a variety of theories to explain the higher attrition rate for college students who are deaf or hard of hearing. Some researchers point out that SDHH face many of the same difficulties of their hearing peers in pursuing higher education including difficulty adjusting to the academic expectations of college (Scherer & Walter, 1988; Boutin, 2008). However, these students also face potential barriers regarding expectations and attitudes for students with disabilities (Niles & Haltis-Bowlsbey, 2009) and challenges unique to deaf or hard-of-hearing students (Boutin,

2008). Lang's 2002 review of the literature indicated that academic preparation, difficulty learning through support services, program length and difficulty with course loads and changes in career interests were all reasons students may not complete their degree.

Tinto (1993) also pointed out that the closer the student's affiliated community was to the particular institution, the stronger the individual student's bond with the institution. This is important to emphasize because the stronger that bond, the more likely the student as to persist at the institution. Conversely, the more marginalized the student's affiliated group is in the larger institution community; the more likely they were to leave the institution. This nuance of Tinto's theory (1993) may have particular applicability to SDHH who assert a Deaf identity and are members of the Deaf community.

SOCIAL INTERACTIONS AND IDENTITY

The social integration aspect of Tinto's model (1993) has direct applications to SDHH. Individuals who identify as culturally deaf possess a strong cultural tradition regarding the creation of a social environment built on linguistic diversity. Schools for the deaf, both K-12 and postsecondary institutions like Gallaudet and NTID, exemplify these spaces where students who are deaf may go to be surrounded by other students who share their communication preferences and potentially, culture (Marschark, et al., 2002). Smaller versions of these spaces occur in the mainstream postsecondary education system as well, such as deaf clubs (Woll & Lad, 2011) and online communities.

In contrast with signing environments, social interactions with hearing peers can be a difficult area to negotiate for SDHH. SDHH report low social satisfaction and struggles to communicate with and be included by their hearing peers (Stinson & Walter, 1992). Additionally, researchers point out the role of social isolation as part of the communication barriers (Smith, 2004; Lane, Hoffmeister, & Bahan, 1996; Brown & Foster, 1989). Lang (2002) also punctuated the role that these barriers, social isolation and exclusion from the university 'family' plays in student dissatisfaction with the social aspects of the college environment. For some students, this communication divide between them and others is a pattern repeated since childhood (Antia et al., 2011). Consistent with Tinto's postulation that students may leave an institution when they do not feel integrated academically or socially, social integration may be particularly salient for SDHH and a reason they choose to withdraw from postsecondary education (Stinson & Walter, 1992). Researchers particularly point out having equal communication access as important to making a campus or program 'deaf friendly' and inclusive (Harris, 2012; Peterson, 2010; Smith, 2004). These findings mirror those in the employment literature which indicate that deaf or hard-of-hearing employees report that work-related informal and social situations presented the greatest challenge (Punch et al., 2007) due to the communication barriers in these situations (e.g., fellow staff members who do not sign, no interpreter is scheduled outside of formal meetings).

Students may address these difficulties by seeking out and forming support networks of professionals and peers. Networks of resource personnel can be especially helpful in aiding students to negotiate the transition to the postsecondary setting. This

reliance on networks is similar to findings regarding the employment search strategies utilized by deaf adults. Punch et al. (2007) found that adults with a deaf or hard-of-hearing identity were likely to use personal contacts and networks when searching for a job. In this way SDHH may share tips and resources with each other and create networks that aid newer college students in negotiating the postsecondary environment. SDHH may engage with fellow SDHH to create a community that is based on their linguistic diversity and forms a smaller space within the larger university. In her interviews with SDHH, professionals who worked with these individuals, and faculty members, Harris (2012) indicated several themes that appeared important in these students' success and retention. Of greatest relevance to this discussion is the theme of relationship connectedness. The relationship connectedness theme stresses the importance of connections for students, both with previous networks (e.g. family, hearing connections at home) and the desire for more support in building these networks within the university context. These networks included deaf peers and collaboration with faculty members, including mentorship.

IDENTITY

Embedded within the social interactions and communication modes of SDHH, is the concept of identity. This identity may be based solely on language preferences such as a student who is hard-of-hearing and prefers to use sign language or spoken English depending on the situation. A SDHH identity may also be based on the Deaf cultural identity (Padden & Humphries, 1988). However, it is also important to emphasize the

71

wide range of identity identifications that all individuals, including SDHH, make

regarding a number of characteristics including race, gender, and sexual orientation.

There are a number of perspectives on the development of deaf or hard-of-hearing (DHH)

identities (Leigh, 2010). Bat-Chava (2000) conceptualized DHH identity with regard to

social identity, meaning the relationship between the individual and group membership

identification. In this model, an individual's affiliation with a group label is influenced by

their perception of that group as positive or negative. In this way three identity

categories: culturally hearing, culturally Deaf and bicultural are described based on

communication (e.g. perceived importance of signing) and socialization (e.g. attitudes

toward deaf people). In contrast, Glickman (1996) conceptualized DHH identity in

concert with the stage racial identity development models of the 1960s. Glickman labeled

these stages culturally hearing, culturally marginal, immersion and bicultural. Maxwell-

McCaw (2001) took an approach based on acculturation identity models. Her model

emphasizes the level of psychological identification with Deaf culture, hearing cultures

(depending on the contact an individual has with these cultures), behavioral involvement

with and cultural competence in these various cultures. The position of hard-of-hearing

individuals is balanced precariously between two worlds, hearing and Deaf (Leigh,

2010). These individuals may experience varying shades of marginalization and support

from both cultures and their identification with either group may reflect any of these

shades of experience (Harvey, Cotton, & Koch, 2007).

The development of a deaf or hard-of-hearing identity is also informed by the

interactions that the deaf community has historically in relation to society. Unfortunately,

many of these historical interactions have been very negative and often stem from a negative view of deaf and hard-of-hearing individuals. These interactions include the eugenics movement, institutionalization of deaf or hard-of-hearing persons, misdiagnosis, failure to recognize ASL as a language, and paternalistic attitudes toward the Deaf community (Glickman & Gulati, 2003). This cultural history with the hearing community contributes to modern views and a heightened sensitivity to paternalism and oppression. Unfortunately, many barriers to access and negative views of the abilities of deaf or hard-of-hearing students persist today (Lane et al., 1996). Additionally, the depictions of and societal messages about the Deaf community may influence the views deaf or hard-of-hearing children have about ascribing a Deaf identity (Bat-Chava, 2000).

Despite the complexity of DHH identity development and the varying circumstances that may lead an individual SDHH to one identity or another, there is some consensus in the ways this identity influences their academic and social progress. Smith (2004) pointed out that a key theme to resilience in her interviews with students who were deaf or hard-of-hearing was their cultural identity. Students who described themselves as having a strong Deaf cultural identity tended to have less trouble adjusting to the mainstream college setting. Lang (2002) also emphasized the important role that identity negotiation plays in the lives of deaf or hard-of-hearing postsecondary students. Iparasnis (1997) points out that the sociocultural perspective of a deaf child as a bilingual and bicultural minority may be a useful heuristic for understanding some deaf or hard-of-hearing children. If one applies this heuristic to SDHH in the postsecondary setting, then the literature regarding college persistence and identity development in minority students

(Escobedo, 2007) may contribute to the understanding of the role a strong cultural identity plays in the persistence of deaf or hard-of-hearing students.

An individual's identity continues to influence their perceptions and development far beyond adolescence and young adulthood. Punch et al. (2007) examined the differences among university graduates in Australia. They found two distinct groups existed along identity lines. One group described themselves as having a deaf or hard-of-hearing identity and preferred to communicate using Australian Sign Language (Auslan) and the other described themselves as having a hearing identity and preferring to communicate in Spoken English. Punch et al. (2007) found that these groups differed in terms of their employment, job-search activities, difficult workplace situations and use of accommodations. Individuals with a DHH identity were more likely to be employed in education related fields, look for jobs through personal contacts, perceive meetings, training activities and informal social situations as problematic due to communication barriers, and more likely to use sign language interpreters, improved lighting, telephone relay service and special arrangements for professional development and training days. Individuals with a hearing identity were more likely to work in the private sector and use telephone amplifies and assistive listening devices as accommodations (Punch et al., 2007). Given the role of accommodations in the lives of individuals who are deaf or hard-of-hearing, it is important to review essential research and legislation related to accommodations.

BACKGROUND ON ACCOMMODATIONS

Accommodations

The school experience of a students considered to have a disability is influenced by their unique needs and the services schools employ to ensure that students with disabilities can meaningfully participate in and benefit from education in mainstream settings. Currently, mainstream school systems view SDHH through the educational model lens, rather than the cultural model supported in deaf education. Mainstream schools in the United States approach meaningful participation in a variety of ways to comply with federal mandates which address students with disabilities (Education for all Handicapped Children Act, 1975; IDEIA, 2004) and their participation in mandated accountability testing (NCLB, 2001). The purpose of accommodations has changed significantly over time (Lazarus et al., 2009).

The purpose of an **accommodation** in the classroom is to ensure a student's access to the class content and the ability to participate in the class (Thurlow, 2007). The diversity in accommodations reflects the diversity in the population of students with disabilities. For example, a student who has low vision or blindness requires very different accommodations for a student with a learning disability in math. The student with low vision or blindness might require larger print text or a Braille version of the test, while the student with a learning disability in math might require extra time on math tests or a math facts chart. Due to the diversity in the needs of students with disabilities and the difficulty of experimentally manipulating the accommodations that students receive, accommodations that vary according to district as well as the individual needs of the

75

student most studies of accommodations typically focus on a particular group of disabilities or type of disability.

Ideally there is a link between the accommodations set out in a student's IEP and the accommodations utilized for classroom instruction and testing. However, Fuchs and Fuchs (2001) indicate that some students may receive a standard 'package' of accommodations rather than one individualized to their needs. They postulate that this may be due to teacher inexperience with various accommodations and restrictions on resources to determine when accommodations are genuinely helping the student and when they are not.

Variations in Educational Policy on Accommodations

Although the intent to include students with disabilities and equitably meet their needs is a common goal for educators and policy makers, individual states have very different ways of addressing accommodations and state policies regarding these accommodations are complex.

State policies governing accommodations are not static or dichotomous; some accommodations are allowed, allowed with restrictions, or prohibited altogether. Similarly, determination of which accommodation fit what category is made at the state level. These decisions are made using several criteria that differ across states including: whether the accommodation is determined by the student's IEP, whether it is used during class instruction, length of time the accommodation has been used for that student, whether the accommodation maintains the validity of the test and resulting scores, the individual needs of the student and the purpose or nature of the test and the nature or

category of the disability (Lazarus et al., 2009). Recently validity concerns have become more important in the decision making process regarding which accommodations are allowed. This is in response to comments that accommodations may overinflate a student with a disabilities' actual test score rather than reducing the influence their disability has on this test score (McDonnell, McLaughlin, & Morison, 1997). The accommodations that individual states allow, allow with restriction or prohibit vary and often reflect shifts in policy regarding mandated testing (NCLB, 2001) or students with disabilities (IDEIA, 2004). Nevertheless, some accommodations have consistently appeared in statewide tests including Braille, large print tests, individual test administration and small group administration. Other accommodations are the subject of great controversy, as debate centers around whether they confer an unfair advantage to students with disabilities or invalidate these students' test scores; controversial accommodations include the use of spell check devices and calculators (Lazarus et al., 2009). The most ubiquitous accommodations in statewide testing and the accommodations research literature are extended time and oral reading of the test questions. However, there are other common accommodations whose effectiveness is rarely presented in the research literature, including sign interpretation of test questions (Maihoff et al., 2000). The use of accommodations has changed considerably in the last twenty years and continues to change, directed by policies and student needs.

Of particular relevance to accountability testing are accommodations which are utilized to ensure that student test performance actually reflects their true ability rather than the effect of their disability on the test-taking experience. The term **accommodation**

in this sense refers to changes in the standard test administration or circumstances of the administration (American Educational Research Association (AERA), American Psychological Association (APA), and the National Council on Measurement in Education (NCME), 1999). These changes do not change the content of the test and are meant to reduce the effects of a student's disability on their test performance. For example, a student with low vision or blindness would be aided by the accommodation of enlarged print to diminish the influence of their low vision or blindness on their test performance. Ideally, accommodations given during testing would influence only the test scores of students with disabilities by reducing the influence of construct irrelevant variance on their test scores (Elliott, Kratochwill, & McKevitt, 2001). Construct irrelevant variance refers to excess variance resulting from extraneous factors (e.g. small print of test for a student with low vision or blindness) which are irrelevant to the construct the test proposes to measure (Lang, Elliott, Bolt, & Kratochwill, 2008). However, many researchers debate whether these accommodations interfere or change the validity of the test results and may make the test 'easier' rather than 'more fair' for students with disabilities (Phillips, 1994; Lang et al., 2008). This debate also affects the assumption of the comparability of the test scores for students with disabilities to students without disabilities using these standardized tests.

SELF-PERCEPTIONS OF ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Students' scores and achievement are of primary concern to educators and policy makers, however the internal construal's regarding performance and efficacy continue throughout the educational process and long after students they leave the halls of

78

education. Therefore, assessing student's perceptions of their accommodations and the social, personal aspect of testing in schools is of importance. Results from tests students take provide researchers with valuable information regarding accommodations; in addition students can offer a remarkable degree of insight into their experience with the accommodations they receive. Research on student perceptions of accommodations indicates that students with disabilities can and do evaluate whether accommodations are helpful or distracting (Elliott & Marquart, 2004). The majority of students, regardless of disability status, prefer receiving an accommodation like extended time on a test to not receiving an accommodation (Lang et al., 2008). However, whether students receive accommodations does not ensure that they will maximize the utility of those accommodations (Lang et al., 2008). In short, student perceptions of test accommodations appear to be positive overall and students appear to envision these accommodations as fair for students who need them.

ACCOMMODATIONS IN THE POSTSECONDARY SETTING

In the postsecondary settings of higher education, training programs and work, the student's rights and negotiations of accommodations switches from governance by IDEA to the Americans with Disabilities Act (ADA, 1990) and Section 504 of the Rehabilitation Act of 1973 (1973). As an aside, Section 504 applies to students in K-12 settings but takes on a more important role in the postsecondary setting. The change in legal statutes regarding individuals with disabilities, transfers the burden of negotiating accommodations from the school to the individual student (Gordon & Keiser, 1998). The student is now 'in the drivers seat' of determining which accommodations they require,

knowing their rights with relation to these accommodations, and pursuing the

accommodations through the appropriate channels. Students with disabilities may also

have a different relationship with their university through Tinto's model (1993). Students

with disabilities have a set of interactions with the university that are not experienced by

students who do not require services and accommodations to provide equal opportunities

in higher education. These interactions, which can be positive or negative, may contribute

to student's perceptions of their academic integration within the university.

Some students are more adept at pursing these steps than others, particularly those

students with strong self-advocacy skills (Test et al., 2005). Students also vary in their

level of preparation for discussing accommodations in higher education. Only 2% of the

students with learning disabilities in Cawthon and Cole's (2010) study indicated that they

had discussed how to communicate to their next setting (in this case a university) about

what services and accommodations they needed to be successful in the setting. For

SDHH, accepting the mantle of responsibility for their accommodation choices may lead

to reflection on the philosophical question posed by Leigh (2010) regarding whether

deafness is a difference or disability. This re-evaluation may further influence student

attitudes toward accessing accommodations through Disability Services offices.

BARRIERS TO SECURING ACCOMMODATIONS

As students adjust to the implications of the switch from IDEIA (2004) in the K-

12 setting to ADA (1990) in the postsecondary setting, there are a number of barriers

which have the potential to block their progress in obtaining the accommodations they

need to be successful in this setting. The steps to successfully securing accommodations are depicted in Figure 3 below.
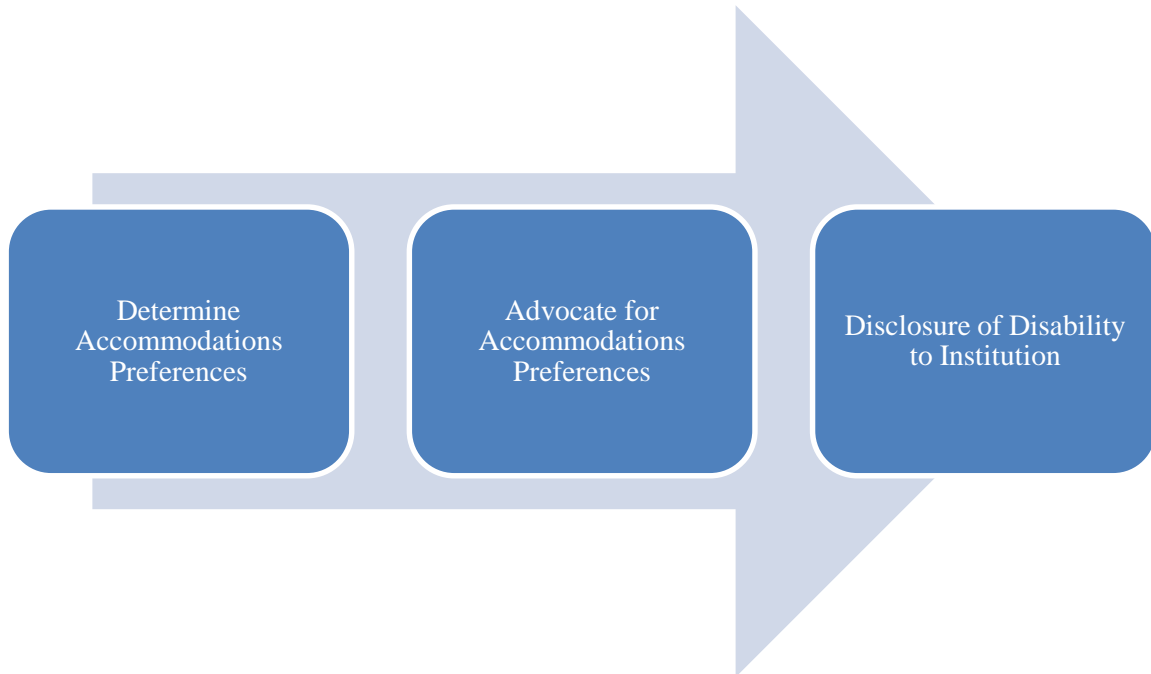

Figure 3. Steps to Securing Accommodations in Higher Education.

First, the student must know how to make decisions about which accommodations are the most helpful to them (Test et al., 2005). Many practitioners and researchers emphasize the importance of students with disabilities taking more active roles in their IEP meetings, particularly as the students become older (Peters, 1990). However, Corrigan, Jones, and McWhirter (2001) informally reported that many of the participants in their career development for college students with disabilities group had never requested accommodations prior to the group. Additionally, Martin et al. (2006) indicated that middle and high school students spoke in only 3% of the ten second intervals of the IEP meeting, rarely showed leadership behavior and had the lowest scores on the IEP

meeting knowledge questions. They liken the student's role in the IEP as one of tokenism, the student is there but not engaged or expected to have a significant role. This supposition is supported by Mason et al. (2004) which indicated that many IEP participants reported that students were present but not involved in the IEP meeting. They also indicated that if students were involved in the IEP meeting, they were most likely to be involved in determining their accommodations and goals (Mason et al., 2004). This lack of student leadership is echoed in the findings of Luft and Huff (2011) regarding the transition skills of deaf or hard-of-hearing high school and middle school students. They found that the students were not achieving research-based competencies in transition skills. Thus it appears that some students enter post-secondary settings without sufficient experience or preparation for the transition to those settings.

Once students know what accommodations they require, the next step is being able to verbalize this and advocate for their particular needs (Stodden et al., 2001). These skills, along with the above references to self-knowledge, are commonly referred to as self-advocacy and self-determination skills. Test et al. (2005) conceptualized self-advocacy as involving knowledge of self, knowledge of rights, communication, and leadership. The communication piece, which involves students being able to negotiate, be assertive and problem solve in both individual and group situations, is especially essential when discussing accommodations. Although ADA (1990) and Section 504 (1973) indicate that an institution cannot discriminate against the student and must make a "reasonable accommodation", what constitutes a 'reasonable' accommodation is often left up to the student and institution to negotiate (Gordon & Keiser, 1998). Thus, the task

82

asked of these students is much more complicated than their possible participation in an IEP meeting when they were in high school.

Finally, the crux of accommodations in the postsecondary setting is students must disclose their disability to the institution and submit required documentation of that disability to the proper office (Gordon & Keiser, 1998). Charles, Duncan, Prowse, and Southern (2007) indicate that students may approach disclosure decisions by weighing the potential costs against the potential benefits. For these students, a benefit would be obtaining an accommodation which could be helpful to them and a possible cost is exposing oneself to negative attitudes toward students with disabilities. Additionally, students with disabilities often have particular self-views about themselves as an individual with a disability (Stanley, Ridley, Harris, & Manthorpe, 2011) and these views may be positive or negative. Additionally, some students may object to the label 'disability' and prefer a different term that affirms their unique characteristics (Charles et al., 2007). It also important to recognize that many students make a number of disclosure choices regarding whom they disclose to and under what circumstances they will disclose their disability. For example, Charles et al. (2007) indicated that some students chose to disclose their disability to the university after they were formally admitted to the university. For these students, timing was an important distinction related to their disclosure decisions. Disclosure decisions may also intersect with research regarding the accommodations choices made by individuals who endorse a hearing identity in comparison with those who endorse a D/deaf or hard-of-hearing identity (Punch et al., 2007). Students who endorse a hearing identity may choose to avoid disclosure and try to

matriculate through higher education without accommodations that could be helpful to them.

The above research highlights the complexity of the road to securing accommodations in higher education. It is possible that at each point along the way there are students who give up and try to complete their degree without accommodations to avoid disclosure, students who struggle to advocate for their needs in this setting or students who are unaware of accommodations that are available or potentially helpful to them. Thus, Cawthon and Cole (2010)'s finding that only 43% of the students with a learning disability interacted with the Office of Student Disability (OSD) at their university, may not be entirely surprising. In this instance, some students may avoid disclosing their disability to the larger university system to obtain accommodations. Cawthon and Cole (2010) also found that 21% of these students also encountered obstacles to obtaining accommodations while at the university.

One particular obstacle students may encounter is the reticence of some faculty members to grant accommodations to students with disabilities. This places the greater burden on the student to be able to advocate for their accommodations in the classroom, requiring greater self-determination skills (Davis & Smith, 2000). Burgstahler, Duclos, and Turcotte (2000) point out that faculty members report not feeling confident in determining what accommodations are reasonable or not reasonable in the university setting. This finding contrasts with the results of Belch's (2004) study which indicated that one of the key elements to the college success of students are the accommodations made by faculty members. This corresponds with the views of SDHH who report feeling

that faculty members lack of understanding of Deaf culture is a barrier to their academic success (Smith, 2004; Peterson, 2010). The important role that faculty members appear to play in the lives of these students has prompted some researchers (Smith, 2004 ; Peterson, 2010) to suggest faculty training regarding working with SDHH.

COMMON ACCOMMODATIONS UTILIZED BY SDHH

SDHH may use accommodations that are common to other student groups; however they also use accommodations which are reflective of their cultural and linguistic diversity. One accommodation commonly used by exclusively by students who are deaf or hard of hearing is a sign language interpreter (Cawthon, 2004). A sign language interpreter is a professional with training in sign language (Napier, 2011). This individual may facilitate communication between individuals who are deaf or hard-of-hearing or between individuals who are deaf or hard-of-hearing and hearing persons. These professionals adapt their interpreting style to fit the communication preferences of the deaf or hard-of-hearing person utilizing their services (Smith, 2004). Interpreters are typically certified by the Registry of Interpreters for the Deaf (RID) and their level of certification ranges from level III (Generalist) to V (Master). Interpreters may also hold certificates specific to their setting including K-12, higher education or legal proceedings (Registry of Interpreters for the Deaf a-c). These interpreters are also responsible for knowing and adhering to a code of ethics regarding their interpreting practices and roles.

Speech-to-text accommodations rely on text for communication purposes. This category of Communication Access Realtime Translation (CART) accommodations includes C-Print, TypeWell and court reporter services (Smith, 2004). When using court

reporter services, CART is operated by a certified court stenographer who types the speech and sounds in the environment into a special keyboard. This keyboard is a shorthand keyboard which then transposes the actual text onto a screen within view of the client. For circumstances with multiple clients, this screen can be projected onto a larger screen for easier viewing. (Larew, Graves & Hardeman, 2000). This particular category of accommodations appear to be most useful for SDHH and have good reading skills but struggle to follow classroom discussions due to their hearing loss (Stinson et al., 1999).

SDHH may also use the services of notetakers. Notetakers can be especially helpful for students who rely on sign language interpreters for access to class content. Because sign language is a visual language, it is very difficult for students to simultaneously watch the interpreter and take notes on class content. Students may utilize notetakers from the Disability Services Office who may have special training on notetaking. However, other students may prefer to request access to a hearing classmate's notes.

SDHH may also utilize assistive listening devices to capitalize on their residual hearing for face-to-face and classroom communication. These devices can also supplement verbal learning for deaf or hard-of-hearing students with speechreading and listening skills. Assistive listening devices come in several shapes and sizes and can include radio microphone and infared and induction loop systems (Warick, Clark, Dancer, & Sinclair, 2003).

RESEARCH ON SDHH ACCOMMODATIONS USE

Cawthon and Online Research Lab (2008) indicated that the top five testing accommodations used by SDHH are extended time, small group/individual administration, test directions interpreted, test items read aloud and test items interpreted. Interpreters, readers and scribes are referred to in K-12 accountability test literature as "access assistants" (Thurlow, 2007). There are standards which accompany "access assistants" to ensure that they do not intentionally or unintentionally provide students with answers to test questions or give unsanctioned information that can aid students. At this time, all fifty states have guidelines regarding access assistants, although more guidelines pertain to scribes and readers than sign language interpreters (Thurlow, 2007). These guidelines often pertain to the access assistant's qualifications (e.g. skills necessary to translate the test into the student's method of sign language) and procedures to follow before, during and after testing (e.g. before testing interpreter should be familiar with test instructions and terminology) (Clapper, Morse, Thurlow & Thompson, 2006).

In the postsecondary setting, the accommodations used by individual SDHH are personalized to the student's needs and preferences, limited by what accommodations the individual educational setting has to offer. Lang (2002) indicated that the most common types of support services utilized by SDHH included tutoring, interpreting, real-time captioning and academic advising. Peterson (2010) indicated that the deaf or hard-of-hearing students interviewed utilized sign language interpreters the most frequently, although a few did request extended time, note-taking services and distraction free testing. Hyde et al. (2009) reported that note-taking was the most common

accommodation used by SDHH followed by interpreters, and technological and communication aids (e.g., hearing aids, TTYs, SMS messaging).

Despite this heterogeneity of accommodations use in higher education, research regarding SDHH and accommodations focuses on the efficacy of two groups of accommodations: text based accommodations and sign language interpreters (Marschark et al., 2006). Text based accommodations include captioning, computer assisted real-time captioning (CART), and notetakers. Research regarding sign language interpreting of lectures finds no differences between live interpreting in comparison with videotaped interpreting in terms of student retention of lecture content (Marschark, Sapere, Convertino, & Seewagen, 2005). Stinson et al. (2009) found that high school students' retention of lecture material was higher when using speech-to-text services in comparison with a combination of note-taking and sign language interpreter services. However, college student retention of lecture material was equal in both conditions. These results in conjunction with the accommodations whose effects remain unstudied for SDHH (e.g. extended time, distraction free testing) outline the need for clarifying the relationship between SDHH and the accommodations they use.

At this juncture, it is also important to recognize that the postsecondary level students are responsible for making choices about the accommodations they use. These students may choose particular accommodations based on their identity choices (hearing vs. d/Deaf or hard-of-hearing) in the same way that workers do (Punch et al., 2007). Thus, accommodations choices may be influenced by personal characteristics rather than solely academic access.

ACCOMMODATIONS AND ACADEMIC OUTCOMES

The larger question remains, what relationship do accommodations have with SDHH academic outcomes? SDHH who access the class material and milieu through interpreters and text based accommodations are learning 'through a third party' (Lang, 2002). The indirect nature of this learning places greater importance on the expertise of the interpreters, captionists and notetakers. Unfortunately, the expertise of these personnel cannot be assumed. In particular, Schick et al. (2005) found 60% of the educational interpreters surveyed did not have sufficient skills to provide classroom access for SDHH. Even when interpreter quality is assured, students may not always comprehend the lecture material to the extent instructors may assume they do (Marschark et al., 2005). This same principle influences student participation in class. Instructors who are unfamiliar with interpreters may not notice the time delay that is necessary for the transfer of the information, lessening the likelihood that a student will be able to participate in a class discussion (Foster et al., 1999). This is especially worrisome given the link between classroom participation by SDHH and their retention in higher education (English, 1993). This link may be explained by the importance of social and academic integration in Tinto's model (Tinto, 1993). If SDHH are distanced from engagement with their instructors and peers by their unequal opportunities to participate in classroom discussion (e.g. rapid pace of vocal interactions), this may influence their perceptions of their level of integration with the institution academically and their hearing peers socially. This distance may be keenly felt particularly if instructors or classmates assume that the presence of an access assistant (Thurlow, 2007) guarantees student access and

potential for engagement (Winston, 1995). It is important to remember that the illusion of access (e.g. presence of an interpreter) is not the same as actual access.

Accommodations play a large role in the lives of deaf or hard-of-hearing individuals in the postsecondary setting. Given this role it is important to examine student evaluations of the importance and efficacy of their accommodations. In her interviews with deaf or hard-of-hearing students, Smith (2004) found that several of the students reported that accommodations were very important to their college success. Unfortunately, these students also expressed frustration with the quality of some accommodations. Similarly, Harris (2012) found in her interviews with students and professional staff within a disabilities office that both groups considered accommodations to be important. However, they also highlighted the effects of recent funding cuts on the university's ability to provide these accommodations.

Despite the barriers note to securing accommodations in higher education, deaf or hard of hearing students report themselves as more confident and able to access resources, like accommodations, than being able to apply general college success strategies (e.g. time management, study skills) (Albertini et al., 2011). These strategies, in addition to personal factors, appeared to be more important for the academic success of underprepared SDHH.

SDHH, ACCOMMODATIONS AND ATTRITION

The research above illustrates the importance of accommodations in the academic

lives of SDHH in postsecondary settings. Qualitative research regarding student

perceptions of their accommodations indicates that students also see their

accommodations as important to their academic success (Smith, 2004; Harris, 2012).

However, research also reveals student and staff concerns regarding the quality and

availability of accommodations in the higher education setting (Harris, 2012; Belch,

2004; Lang, 2002). Additionally, the application of the Tinto model of student

persistence (Tinto, 1993) to deaf or hard-of-hearing students (Smith, 2004; Albertini et

al., 2011) highlights the importance of processes which influence the interactions

between these students and various individuals in the postsecondary education setting to

the student's decisions regarding exiting or persisting in that setting.

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