

ACADEMIC ENGAGEMENT OF DEAF AND HARD OF HEARING STUDENTS IN
A CO-ENROLLMENT PROGRAM

by

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Holy Bible, American Standard Version

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ABSTRACT

In this observational study the researcher examined the Academic Engagement of deaf and hard of hearing (D/HH) students in a co-enrollment setting. Academic Engagement refers to attention, class participation, and time-on-task. Co-Enrollment is a model of group inclusion that provides D/HH students with access to a D/HH peer group as well as access to the general education curriculum.

D/HH students typically lag behind their hearing peers in achievement, due in part to difficulties with accessing the general education curriculum both in special schools for the Deaf or self-contained classrooms, as well as in traditional inclusive settings. One way to know if a student has actually had access to, rather than mere exposure to the curriculum is to determine if he has attended to the instruction and participated in the instructional activities. Co-enrollment programming holds promise for addressing the problems with access that D/HH students typically experience in other educational placements; therefore the researcher hypothesized that in this unique setting D/HH students would demonstrate levels of Academic Engagement equal to their hearing peers. The researcher further hypothesized that there would be a relationship between Academic Engagement and the classroom environment, and that this relationship would be similar for D/HH and hearing students. Using a correlational research design, these hypotheses were tested by conducting repeated observations with use of the *Mainstream Version of the Code for Instructional Structure and Student Academic Response (MS-CISSAR)* for measuring Academic Engagement.

Results indicated that D/HH students in a co-enrollment setting were as Academically Engaged as their hearing peers; however they were less engaged in *active*

forms of Academic Engagement (i.e., Academic Responding) than their hearing peers.

Associations were found between aspects of Classroom Ecology, such as the size of Instructional Grouping, and the degree of Academic Engagement for both D/HH and hearing students. The associations between Academic Engagement and Classroom Ecology were similar for D/HH and hearing students; however some differences were found as well. The implications of these results are discussed and suggestions are made for future research.

CHAPTER 1: INTRODUCTION

Deaf and hard of hearing (D/HH) students typically lag behind their hearing peers in all areas of achievement, particularly in reading comprehension. This is true even for D/HH students who have no additional disabilities. Although one aspect of deaf education which has changed in the last few decades is the fact that an increasing number of D/HH students are being educated in inclusive settings (i.e., within the general education classroom), one fact that has remained constant in the past half-century of deaf education is this: most deaf children never obtain beyond a 4th grade reading level (Hart, 1978; Paul, 1998; Qi & Mitchell, 2012; Traxler, 2000). Math performance is also a concern. Qi and Mitchell (2012) reported that math achievement for high school-aged D/HH students, while slightly higher than reading achievement, still was not above a 6th grade level, based on the Stanford Achievement Test for deaf and hard-of-hearing student norming samples by age, between 1974 – 2003 ("Stanford Achievement Test, 9th Edition, Form S: Norms booklet for deaf and hard of hearing students," 1996a).

Various factors contribute to this delay in achievement experienced by D/HH students. First and perhaps foremost, while states are mandated to measure the achievement of all students in the general education curriculum, which is aligned with state standards; the fact remains that D/HH students who attend either special classes or special schools may not have had access to the general education curriculum (Holt & Allen, 1989; Lytle & Rovins, 1997). However the problem of testing students' mastery of a curriculum that they have not had access to is not unique to D/HH students attending special schools or self-contained classrooms. While D/HH students who are mainstreamed into or included in general education classrooms are exposed to the general

education curriculum, exposure does not necessarily constitute access (Metz, Chambers, & Fletcher, in press).

D/HH students attending general education classrooms experience various problems with actually accessing (i.e., receiving) the general education curriculum. One problem is a lack of direct communication access to staff and peers who sign (Kirchner, 1994). A D/HH student attending general education classrooms using a traditional model of inclusion may be the only D/HH student in the classroom, or sometimes even the only D/HH student in the entire school. If the student's primary mode of communication is sign language, he or she may have a sign language interpreter translating the teacher's instruction and his or her classmates' questions or comments. However, some educators have raised concerns about the effectiveness of mediated instruction (through an interpreter) versus direct instruction (Marschark, Sapere, Convertino, & Seewagen, 2005). Sadly, sometimes even this indirect method of receiving instruction via an interpreter is not always available. In my role as an itinerant teacher of deaf and hard of hearing students, on occasion I have witnessed deaf students whose only mode of communication was sign language, placed in general education classrooms without the necessary accommodation of a sign language interpreter. This naturally leads to the student missing out on the majority of classroom instruction, being dependent solely on what, if anything, he or she can glean from written material or visual aids. Fortunately D/HH students in general education classrooms whose primary mode of communication is sign language often are assigned an interpreter; however even then there are times when the interpreter is absent, with no substitute available. In addition to lack of access to an interpreter, another issue is access to a *qualified* interpreter. Researchers who studied

the skill level of 2,100 educational interpreters across the United States, found that 60% of them lacked the necessary interpreting skills to provide full access (Schick, Williams, & Kupermintz, 2006).

Another access problem experienced by D/HH students in general education classrooms is that of lack of consistent use of amplification devices which enable the student to access aural information. Although many students have their own personal devices such as hearing aids and/or cochlear implants, it may be challenging for parents and/or teachers to hold the student accountable for using their personal listening devices in a classroom where use of such devices carries the stigma of being different. The same can be said of FM systems that may be provided to students by the school for use in addition to or in lieu of a personal amplification system. (An FM system is a Frequency Modulated listening device that amplifies the speaker's voice above background noise.) However, even when the student is willing to consistently use his cochlear implant, hearing aids, and/or FM system, it can be challenging for the teacher of deaf and hard of hearing (D/HH teacher) to enlist the cooperation of the general education teacher to maintain and consistently use these devices.

Still another access problem that D/HH students may experience in general education classrooms is that of lack of use of appropriate instructional accommodations. In order to truly have access to, rather than merely exposure to, the general education curriculum, the D/HH student may need various instructional accommodations such as more frequent checking for understanding, liberal use of visual aids, a teacher skilled in use of communication repair strategies, or pre-teaching/review of new vocabulary and concepts, to name a few.

Another concern is the social isolation that may occur due to a lack of access to a D/HH peer group. At times, both deaf and hard of hearing students and the teachers and therapists who serve them may be viewed as simply visitors in the classroom rather than fully included as members of the class with the same rights and responsibilities as other class members (Antia, Stinson, & Gaustad, 2002).

These difficulties with access to the general education curriculum, to direct communication, to amplification and listening devices, to appropriate instructional accommodations, and to a D/HH peer group, may lead to decreased levels of academic engagement, and thus delayed achievement. Co-Enrollment is a group inclusion model that holds promise for addressing these concerns. In a co-enrollment classroom, typically between one-third to one-half of the students are D/HH, with the remainder of the class being typical hearing students. The class is co-taught by a general education teacher and a teacher of deaf and hard of hearing students who share equal responsibility for educating both the D/HH and hearing students (Kirchner, 1994). The co-enrollment classroom consists of both D/HH and hearing students and staff who sign, and D/HH students who also use hearing aids, cochlear implants, and FM systems. Researchers of co-enrollment programs have found positive social and communication outcomes for both D/HH and hearing students (Bowen, 2008; Jimenez-Sanchez & Antia, 1999; Kluwin, 1999; Kreimeyer, Crooke, Drye, Egbert, & Klein, 2000; Luckner, 1999; McCain & Antia, 2005). Researchers also have found positive academic outcomes for students in co-enrollment programs (Kreimeyer et al., 2000; McCain & Antia, 2005); although less emphasis has been placed thus far on academic performance of students in co-enrollment programs than on their social skills.

Significance of the Study

One way to know if students are actually receiving instruction (that is to say if they actually have access to the curriculum rather than mere exposure) is to study whether or not they are academically engaged. Academic Engagement is an important variable to study because previous researchers have found positive, direct correlations between Academic Engagement and achievement (Dotterer & Lowe, 2011; Fitzpatrick & Pagani, 2013; Greenwood et al., 1984; McWayne, Fantuzzo, & McDermott, 2004). Due to the unique classroom ecology of a co-enrollment program (e.g., smaller instructional groups, direct communication access to staff and peers who sign, widespread use of hearing aids, cochlear implants, and FM systems), we would expect that D/HH students in this setting would be as academically engaged as their hearing peers, that is to say that they would demonstrate the same level of attention and participation as their classmates. Therefore, this is a study of the degree of Academic Engagement of D/HH students in a co-enrollment program in comparison to that of their typical hearing classmates.

Research Questions

The research questions I sought to answer with this study were as follows:

1. Is there a difference between the degree of Academic Engagement of D/HH students in a co-enrollment classroom and that of their hearing peers?
2. Is there a relationship between Academic Engagement and Classroom Ecology for students in a co-enrollment program?
3. Does the nature of this relationship differ for D/HH students and hearing students in a co-enrollment program?

Study Limitations and Delimitations

The primary limitation of this study is that it is being conducted in only one setting; thus caution should be taken not to generalize these results to other co-enrollment programs. However, care has been taken to delimit or control for various aspects of the study as follows:

1. The co-enrollment program used as the setting of this study has been described in detail in order to provide a basis for comparison to other co-enrollment programs.
2. The two groups being compared (D/HH and hearing) have been selected and matched in a way to ensure as much homogeneity as possible, thus limiting the effect of variables other than the independent variable, which is hearing status.
3. The instrument chosen to measure the dependent variable, Academic Engagement, was chosen for its validity and reliability and its wide-spread use in the field of education as a measure of engagement through direct observation.

CHAPTER 2: LITERATURE REVIEW

Background

A co-enrollment program for D/HH students was started in 1982 under the direction of Carl J. Kirchner, in Burbank Unified School District in California. Kirchner (1994) wrote about this program, coined the term “co-enrollment,” and proposed this model as an alternative to traditional models of inclusion in which a single D/HH student is placed in a general education classroom, receiving fractured services from itinerant support personnel. Kirchner’s article sparked interest in the program, which resulted in various other co-enrollment programs being established.

Characteristics of Co-Enrollment Programs

I examined all of the literature I could find on co-enrollment programs in the United States. In addition to the one article by Kirchner (1994), in which the concept of co-enrollment programming was proposed, I found six empirical studies on co-enrollment: Bowen (2008), Jimenez-Sanchez and Antia (1999), Kluwin (1999), Kreimeyer (2000), Luckner (1999), and McCain and Antia (2005). None of these research studies on co-enrollment provided an essential elements checklist for key elements of a co-enrollment program; however I found that the six programs examined had the following things in common:

1. All of the classes were *co-taught* by a general education teacher and a teacher of deaf and hard of hearing who shared responsibility for educating all students (hearing and D/HH).

2. All of the classes had a *critical mass of D/HH students*. The ratio of D/HH students to hearing students in each study varied from one-fifth to one-half, with one-third being the most common ratio.

3. With the exception of the study done by Kluwin (1999), all of the programs were described as *multi-grade* classes. (The program studied by Kluwin may or may not have been multi-grade as this was not stated in the article.)

4. Use of *interpreters and/or signing aids* was common; although the manner and degree to which interpreters were used varied from program to program.

5. Although overall communication procedures and modalities varied from program to program; all of the authors affirmed *use of sign language by all members* (D/HH and hearing, staff and students) as a key component of the program. Bowen (2008) described simultaneous communication (speech/signs combined) as the primary communication modality of the co-enrollment classroom and states, “a major premise of the co-enrollment model is that hearing students and staff will learn to communicate through sign language.” Jimenez-Sanchez and Antia (1999) stated that all hearing teachers sign at all times when communicating with deaf students or Deaf co-teachers. “Incidental learning,” or the opportunity for deaf students to acquire knowledge through “overheard” conversations, rather than solely through explicit, direct communication, is one stated purpose of this communication policy. Bowen (2008), Kluwin (1999), and Kreimeyer, Crooke, Drye, Egbert, and Klein (2000), described formal sign language instruction for all students as a component of the programs examined. Kreimeyer and colleagues (2000) and Luckner (1999) stated that visitors to the co-enrollment classroom could not distinguish between which students were D/HH or hearing based on sign

communication alone due to the sign language proficiency of hearing students. The co-enrollment classrooms examined by Jimenez-Sanchez and Antia (1999) had a unique feature: the fact that the special teachers of D/HH students in each of the co-teaching teams were themselves Deaf.

In a recent review of co-enrollment programs in the United States, Antia and Metz proposed a fidelity of implementation checklist for this model of inclusion (Antia & Metz, 2013). This list may be useful either for educators wishing to establish co-enrollment programs, or for researchers to use in verifying and describing key elements of co-enrollment programs used as the setting of research studies.

Co-Enrollment Research

To date co-enrollment research has resulted in positive outcomes for all stakeholders (teachers, D/HH students, and hearing students), with the only negative outcome being the time involved for co-teaching teams to collaborate. In this section I describe the research to date, and in the following section I synthesize the outcomes of this research. In 1999, several different groups of researchers published findings related to co-enrollment programming (Jimenez-Sanchez & Antia, 1999; Kluwin, 1999; Luckner, 1999). Jimenez-Sanchez and Antia conducted a qualitative study to examine the perceptions of co-teaching teams about the effectiveness of co-enrollment programming. Kluwin conducted an experimental study to examine the social ramifications of co-enrollment programming for D/HH students. Luckner conducted a qualitative study to examine the effectiveness of this model from the perspective of all stakeholders: teachers, parents, D/HH students, and their hearing classmates. In 2000, Kreimeyer et al. conducted a mixed-methods study for the purpose of examining and describing a

particular co-enrollment program during its first three years of inception. Using a single-subject A-B design for examining frequency of interactions among D/HH students and their hearing peers, as well as observations, interviews, and an examination of Stanford-9 Achievement Test scores, these researchers examined various aspects of co-enrollment programming. In 2005 this same co-enrollment program was examined by McCain and Antia. They examined both social behavior and academic achievement for D/HH students in this setting, as well as for D/HH students with additional disabilities. In 2008, Bowen conducted an experimental study in a different co-enrollment program for the purpose of examining social interaction and friendship patterns among D/HH and hearing students in a co-enrollment program. Finally, in 2013, Metz and Spolsky conducted a qualitative study to examine the perceived benefits and challenges of co-enrollment programming by surveying co-teaching teams as well as therapists and support-personnel in a co-enrollment program.

Outcomes of Co-Enrollment Programming

Academic

One academic benefit of including D/HH students in a general education setting is to provide them with access to the general education curriculum; all of the programs examined satisfied this purpose. Three of the qualitative studies I examined reported perceived academic benefits of co-enrollment. Luckner (1999), Jimenez-Sanchez and Antia (2000), and Metz and Spolsky (2013), reported high teacher expectations as a benefit of co-enrollment for D/HH students. Jimenez-Sanchez and Antia stated,

The greatest benefit for D/HH students in this program was interacting with teachers who had high expectations of them. All informants stated that they expected the

D/HH students to perform [the same] socially, academically and linguistically as their hearing peers did at the same grade level. (p. 220).

Additionally Jimenez-Sanchez and Antia stated that teacher participants reported that formal test measures showed substantial academic growth for D/HH students.

Furthermore, teacher participants also felt students benefited from the variety of teaching approaches used by co-teachers. Similarly, Luckner (1999) reported that participants cited the combined expertise of two teachers as an advantage to meeting the needs of all students. Luckner also reported the lower staff to student ratio as a perceived benefit to co-enrollment.

Two quasi-experimental studies also reported academic benefits to D/HH students in co-enrolled programs. Kreimeyer and colleagues (2000) examined academic achievement of D/HH students as measured by the *Stanford 9 Achievement Test (SAT-9*; "Stanford Achievement Test Series, Ninth Edition," 1996a) for the 2nd and 3rd years of the program. Paired sample *t*-tests were conducted to determine whether significant differences existed between students in the co-enrollment program and the D/HH and hearing normative populations. The performance of the co-enrolled students has been summarized in Table 2.1 Note that although these students scored below the *hearing* norms in reading comprehension, they scored above the norms compared to national *D/HH* norms. In mathematical problem solving and mathematical procedures, although students scored below the hearing norms for the 2nd year of the study, by the third year of the study no significant difference was found in their scores. To address concerns that the presence of multiple D/HH students in a single classroom might impede delivery of curriculum and the achievement of hearing students, performance for hearing students in

co-enrolled classrooms was compared to their same grade peers in classrooms that did not include D/HH students. No significant differences were found between these groups (Kreimeyer et al., 2000).

Table 2.1

Co-enrolled Student Performance on Stanford-9 Achievement Subtests

SAT 9 Subtest	D/HH students Compared to <i>Hearing</i> Norms	D/HH students Compared to <i>D/HH</i> Norms
Reading Vocabulary	No significant difference	No significant difference
Reading Comprehension	Below norms	Above norms
Mathematical Problem Solving	No significant difference for year 3, but below norms for year 2	No significant difference
Mathematical Procedures	No significant difference for year 3, but below norms for year 2	No significant difference

Note. This information was compiled from results reported by Kreimeyer et al., 2000.

McCain and Antia (2005) also examined academic outcomes as measured by the *SAT-9*, and the *Social Skills Rating Scale (SSRS)*; Gresham & Elliot 1990). Due to the small sample size, *SAT-9* scores were analyzed using descriptive rather than inferential statistics. Academically, the D/HH students scored below their hearing peers in the areas of reading, math and language; however the researchers noted that they took the *SAT-9* tests on grade level, thus all students scored within the range of the test. Additionally they scored above the 50th percentile when compared to a national sample of peers who are D/HH. Furthermore, as a group, the D/HH students were found to be making approximately one year of progress in most areas for most years, based on an analysis of the *SAT-9* scores. Academic performance also was measured using teacher rated

academic competence scores from the *SSRS*. Hearing students received overall higher ratings than the D/HH students; however a univariate analysis of variance revealed that the D/HH students' scores were not significantly different than the scores of their hearing peers (McCain & Antia, 2005).

Social

One purpose of the inception of the co-enrollment model was to decrease the social isolation that D/HH peers may experience in traditional mainstream settings; therefore it is important to examine the social outcomes of co-enrollment programs. Two of the qualitative studies examined revealed the following perceived social benefits of co-enrollment. Jimenez-Sanchez and Antia (1999) in a study of co-teaching teams that consisted of hearing general education teachers paired with Deaf teachers of D/HH reported that students had the opportunity to interact every day in an environment where they had equal status, equal communication access, and the opportunity to observe positive communication and collaboration between adults. Additionally D/HH students were expected to employ those same collaborative skills with their hearing peers. Luckner (1999) reported observing D/HH students socializing with a diverse group of peers. Additionally, teachers, parents, and students commented about the sense of community and belonging fostered by the co-enrollment environment as a result of being fully included, as opposed to being pulled out of class to receive special education services.

Four of the quantitative studies examined offered empirical evidence for the social benefits of co-enrollment programming. Kluwin (1999) examined the long-term social integration of D/HH students in a co-enrollment program based on administration

of the *Childhood Loneliness Scale* (Asher, Hymel, & Renshaw, 1985), *My Class Inventory* (Fisher & Barry, 1985), and the *Piers-Harris Children's Self-Concept Scale* (Franklin, 1981). The researcher concluded that D/HH students educated in a co-enrollment setting over a long period of time did not differ significantly from their hearing peers on measures of social isolation, loneliness, or self-concept. Kreimeyer and colleagues (2000) conducted a single subject A-B design study to measure frequency of social interaction between D/HH students and their hearing peers. Researchers found a significant increase in interaction in a structured classroom environment, with some evidence of generalization to the lunch room setting. McCain and Antia (2005) found that, based on teacher and student ratings on the Social Skills and Problem Behaviors of the *Social Skills Rating System* (Gresham & Elliott, 1990), D/HH students did not differ significantly from their hearing peers.

Communication

Two of the studies examined offered empirical evidence on communication outcomes of co-enrollment programming. Bowen (2008) found a positive correlation between sign skills for hearing students and the number of years in a co-enrollment classroom. McCain and Antia (2000) found no significant difference between the scores of D/HH and hearing students on self-reported measures of understanding and being understood by teachers and peers based on the *Classroom Participation Questionnaire (CPQ)*, adapted from the *Perceived Communication Ease Questionnaire* (Garrison et al., 1994).

Academic Engagement

In this section I discuss how Academic Engagement is defined and describe the link between Academic Engagement and achievement for students of varying ages and disabilities, including the minimal research conducted thus far on the Academic Engagement of D/HH students. The search terms used for locating articles about Academic Engagement included *academic engagement*, *student engagement*, *school engagement*, *child engagement*, and *classroom participation*. Research studies that focused solely on aspects of Academic Engagement other than as classroom participation, attention, and on-task behaviors were not included in this review. Conversely, studies that did focus on this aspect of Academic Engagement were included, even if they happened to use different terminology such as *classroom participation*, or *classroom academic survival skills*.

Conceptual Definition

The extant literature on Academic Engagement, also sometimes referred to as student engagement or school engagement, does not contain any single, agreed upon definition for this term. Some authors define it rather broadly and include aspects such as students' attitudes toward school (Green, Martin, & Marsh, 2007) motivation to achieve (Furrer & Skinner, 2003; Green, et al., 2007; Skinner, Furrer, Marchand, & Kindermann, 2008), and behaviors such as doing homework and turning in assignments (Suarez-Orozco, Pimentel, & Martin, 2009), while others define it more narrowly to refer to variables such as class attention (Blatchford, Bassett, & Brown, 2010; Frey, 2009), participation (Blatchford et al., 2010), and time on task (Blatchford et al., 2010; Liapusin, Umbreit, Ferro, Urso & Upreti, 2006; Martens, Lochner & Kelly, 1992). Other

researchers acknowledge that engagement is a multi-faceted construct that incorporates all of these variables. Fredericks, Blumenfeld, and Paris (2004) define school engagement as encompassing three types of engagement: *emotional*, *cognitive*, and *behavioral*. The term cognitive engagement is used interchangeably with self-regulation and refers to a student's ability to set goals, invest effort in learning, and use metacognitive strategies for accomplishing tasks. Emotional engagement is defined as students' attitudes and values toward school and includes reactions such as interest, boredom, or anxiety. Behavioral engagement refers to behaviors such as concentration, attention, asking questions, and contributing to class discussions. For the purpose of this study I am focusing on the latter definition of Academic Engagement or behavioral engagement, defined as class attention, participation, and on-task behavior. Note that although this study is concerned primarily with behavioral engagement, because cognition, emotion, and behavior are interrelated characteristics, it is a given that both cognition and emotion have an effect on behavior.

The operational definition of Academic Engagement for this study is student attention, participation and on-task behavior as measured by the *Mainstream Version of the Code for Instructional Structure and Student Academic Response* (MS-CISSAR, Greenwood & Reynolds, 2011). This instrument will be explained in detail in Chapter 3.

Academic Engagement and Achievement

We might assume, based on common sense, that Academic Engagement is necessary for achievement. After all, if a student is not engaged, in other words has not attended to, or has not received the given information, then how could the student possibly acquire or master the information? It also logically follows that this assumption would apply to learners of all ages from pre-school through adult, regardless of learning

style or existence of a disability. There is a history of research findings that support a positive correlation between Academic Engagement and academic achievement for student populations of various ages and disabilities. In this section I describe these studies in order according to the age of the participants, from pre-school through adolescents.

McWayne, Fantuzzo, and McDermott (2004) examined the relationship between Academic Engagement of preschoolers in a Headstart program with the academic achievement of those same students just prior to entering kindergarten. Participants consisted of 195 students in a large, urban head start program who were expected to enter kindergarten the following fall. In the context of this study Academic Engagement, or classroom engagement was measured using the *Preschool Learning Behavior Scale (PLBS)*: McDermott, Green, Francis, and Stott, 1996). This measure is a 29 item behavior scale used to assess preschool children's approaches to learning in 3 areas: Competence/Motivation, Attention/Persistence, and Attitude Toward Learning. Collectively these three areas include items about children's willingness to try new tasks, the degree to which they pay attention, their determination and persistence to complete tasks, and their willingness to cooperate with the teacher. The *Early Screening Inventory-Revised, Kindergarten Version (ESI-K)*: Meisels, Marsden, Wiske, & Henderson, 1997) was used as the measure of achievement. This 25-item developmental screening instrument was administered to the students at the end of the school year prior to entering kindergarten. Children were asked to perform a variety of tasks or answer questions designed to provide an overview of their development in areas such as speech, language, cognition, and fine and gross motor coordination. Examiners reportedly chose this

instrument because it has been shown to be a good predictor of school performance through the end of 2nd grade. Using hierarchical regression modeling, students' performance on the PLBS was found to be significantly associated with performance on the *ESI-K* (partial $R^2 = 10.89$, $p < .0001$).

Fitzpatrick and Pagani (2013), conducted a large longitudinal scale study ($n = 2,120$) of Canadian children and found that Academic Engagement skills in kindergarten were positively correlated with better academic achievement in 4th grade. These participants, from part of a larger study, were followed annually from 5 months of age to 2nd grade, then again 2 years later in 4th grade. The measure of Academic Engagement was a researcher-developed 7 item classroom engagement scale. This instrument used kindergarten teacher ratings of 1 (never) to 3 (always) to compute a mean engagement score for each participant from the following items: follows rules and instructions, follows directions, listens attentively, completes work on time, works autonomously, works neatly and carefully, and works and plays cooperatively with other children. Academic achievement was measured at the end of 4th grade using the following measures: math achievement (Canadian Achievement Test); and math, reading and spelling achievement (teacher ratings of near the top of the class, middle of the class, or below the middle of the class). An overall mean was computed across all subjects. The mean Academic Engagement score in kindergarten was 2.68 (standard deviation = .37). A 1-unit increase in scores on the classroom engagement scale predicted better fourth-grade math scores (unstandardized $\beta = 2.09$; 95% confidence interval [CI], 1.36–2.81), and overall academic achievement (unstandardized $\beta = .41$; 95% CI, 0.19–0.63). Thus,

being on-task in kindergarten predicted later achievement on an unfamiliar, standardized math test as well as on teacher-rated math, reading, and spelling achievement.

In several studies, Cobb (1969, 1970, & 1972) found a relationship between performance on standardized achievement tests and student engagement behaviors such as attending to the teacher, following teacher instructions, and volunteering to answer academic questions in first and fourth grade classrooms. In the context of these studies, these engagement behaviors were referred to as “academic survival skills.” Given that these studies demonstrated a correlation between engagement and achievement, Cobb and Hops (1973) continued their examination of Academic Engagement or “academic survival skills” and achievement to determine if a *causal* relationship could be established. Toward this end, they conducted an intervention study on the effect of academic survival skills training and reading achievement with a group of low-achieving first graders. The independent variable for this study was Academic Engagement, or academic survival skills. The dependent variable was reading achievement as measured by the Vocabulary and Comprehension subtests of the *Gates-MacGinitie Primary A*. The setting was three general education first-grade classrooms in a public school district. The participants were eighteen first-grade children, six from each classroom who had been identified as having both low academic survival skills and low standardized reading scores. One classroom served as the control ($n = 6$), while the other two classrooms comprised the experimental group ($n = 12$). The specific “academic survival skills,” or Academic Engagement skills that were observed and documented included attending, work, volunteering, and looking around. (Frequencies for looking around were subtracted

from frequencies for attending, work and volunteering). These behaviors were explicitly taught during the four-week intervention phase. The experimental group did show significant increases in academic survival skills at the conclusion of the intervention, as opposed to the control group who maintained approximately the same level. Additionally participants in the experimental group either maintained or increased their academic survival skills during the follow up period four to six weeks after the intervention period. The research hypothesis was supported in that researchers were able to demonstrate a causal link between increased academic survival skills (or Academic Engagement) and reading achievement as the experimental group showed a significant increase in both academic survival skills and reading achievement, while the control group stayed about the same in academic survival skills and made only a small gain on mean reading achievement scores during the intervention period. In short, the experimental group, who started out with somewhat lower reading achievement scores, surpassed the reading growth of the control group at the conclusion of the intervention and continued to show greater gains during follow-up. See Table 2.2.

Table 2.2

Academic Survival Skills and Reading Achievement

	Baseline		Post Intervention		Follow-Up	
	AE \bar{x} (SD)	ACH \bar{x} (SD)	AE \bar{x} (SD)	ACH \bar{x} (SD)	AE \bar{x} (SD)	ACH \bar{x} (SD)
Control Group	.57 (.04)	40.9 (3.4)	.60 (.18)	43.2 (4.5)	.56 (.10)	45.1 (4.0)
Experimental Group	.56 (.02)	38.1 (2.2)	.67 (.13)	48.7 (4.6)	.73 (.08)	54.7 (3.3)

Note. AE = Academic Engagement (or Academic Survival Skills), ACH = Reading Achievement.

Dotterer and Lowe (2011) studied school engagement, classroom context, and academic achievement in 5th graders. The researchers hypothesized that classroom context (e.g., relationship with teacher, classroom social/emotional climate, and instructional quality) would predict the extent to which students are engaged, and that school engagement, in turn would predict academic achievement. They further explored whether these associations would be similar or different for students with previous achievement difficulties. Participants were 1,014 students in 5th grade from ten states across all regions of the United States. The measure used to study Academic Engagement (or the vernacular of these researchers, behavioral engagement) was the *Classroom Observation System- 5th Grade* (NICHD ECCRN 2005, 2006, as cited by Dotterer & Lowe, 2011). For the purpose of this study, the *Study Child Engaged in Academics* composite was used to assess the degree to which the students were academically engaged, in other words, on-task and paying attention. Observations were coded in a series of eight, 10-minute cycles which were rated on a scale of 1 to 7 with lower scores indicating less engagement and higher scores indicating more engagement. Achievement was measured using the *Woodcock Johnson Psychoeducational Battery Revised (WJR;* Woodcock & Johnson, 1989) Broad Reading and Broad Math subtests. The researchers found that behavioral engagement (that is to say academic behaviors such as attending) were significantly and positively related to academic achievement, for students who were not previously identified as struggling learners. For struggling learners however, behavioral engagement was not significantly related to academic achievement. (Struggling learners were defined as those whose previous performance was one standard

deviation below the mean on the *WJR* tests of achievement in 3rd grade.) Thus, while this study generally supports findings from previous research that Academic Engagement is positively related to academic achievement, these results also indicate that, at least for adolescent children who are low achievers, Academic Engagement alone may not be enough to support sufficient academic progress.

Academic Engagement of D/HH Students

Borders, Barnett, and Bauer (2010) studied classroom participation for D/HH children compared to their hearing classmates in a traditional inclusive setting. The participants were five D/HH children with mild to moderate hearing losses from five different general education classrooms, grades first through fourth. The total number of hearing students that participated from each classroom varied from six to sixteen. The classrooms were located in large metropolitan areas in the midwestern United States. The measurement used was a researcher-developed momentary time-sampling instrument that measured both student engagement and teacher behaviors. The teacher behavior sampled included the following: provision of practice opportunities, classroom directives/routines, classwide verbal directions, individual verbal directions, visual prompts, physical prompts, and hand-over-hand prompts. Student engagement was defined as the child being engaged in a classroom learning activity with his/her face being oriented toward the teacher providing instruction, or toward the peer answering a question, or toward the instructional materials during an independent activity. During transitions the child was considered to be engaged if he/she were following the teacher's direction to move to a new activity. The results indicated that the D/HH students were engaged in classroom activities at rates near to their hearing peers; however this

engagement came at a price: the D/HH students received individual prompting more often than their hearing peers. Hearing peers rarely received prompting beyond classwide verbal directives.

Limitations of Previous Research

In summation, co-enrollment is a group inclusion model for D/HH students which holds promise for addressing the problems that D/HH students have with accessing the general education curriculum in both segregated settings as well as in traditional inclusive settings. Provision of access to the general education curriculum may in turn result in greater levels of Academic Engagement, which may have a positive impact on students' levels of achievement. Nevertheless there are limitations to the research conducted thus far.

Research in the area of co-enrollment is limited in two ways: the fact that thus far more attention has been placed on social and communication outcomes rather than academic outcomes, and the fact that none of the previous research studies have described the co-enrollment programs in sufficient detail to allow for either replicability or comparability to other studies. Research in the area of Academic Engagement has been limited to studies done primarily with students without disabilities or students with high-incidence disabilities; however only one small scale-study (Borders et al., 2010) has been completed on the Academic Engagement of students who are deaf or hard of hearing.

I have attempted to address these limitations by conducting a study of Academic Engagement in a co-enrollment setting, and with a somewhat larger population of D/HH students than what has previously been studied, thus advancing our knowledge of academic outcomes for D/HH students in a co-enrollment setting. Additionally I have

taken care to describe the program in great detail in order to provide a context for comparison for future researchers.

CHAPTER 3: RESEARCH METHOD

Research Design

This observation study was done using both a causal-comparative (also called ex-post facto) and correlational design. The design is causal-comparative in that I measured the effect of an independent variable which cannot be manipulated (hearing status) on a dependent variable (Academic Engagement). The research is ex-post facto as I retrospectively compared existing groups: D/HH students versus hearing students. The correlational design allowed for examining the relationship of many independent variables, for example classroom ecology events such as instructional grouping and task or activity, to a single dependent variable: Academic Engagement. Neither of these designs are used to prove a causal relationship; however both correlational and causal comparative studies can inform us about the likelihood of a relationship between two variables. I examined Academic Engagement of D/HH students in comparison to their hearing peers *in a co-enrollment setting*; therefore the results of this study add to the body of knowledge about the practice of co-enrollment. In the context of this study, co-enrollment was a constant, not a manipulated variable. I predicted that there would *not* be a relationship between hearing status and Academic Engagement in this co-enrollment setting; therefore the research hypothesis is the null hypothesis.

Hypotheses

In addition to predicting that the D/HH students would not differ significantly from their hearing peers on the variable of Academic Engagement, I also predicted that there are relationships between Classroom Ecology and Academic Engagement for students in a co-enrollment setting, and that these relationships are similar for D/HH

students and hearing students in this setting. (Classroom Ecology refers to various aspects of the classroom environment such as the physical setting, the subject or activity, and the instructional grouping. This variable is explained in more detail in the data collection setting.)

The hypotheses for these predictions are as follows:

1. D/HH students in a co-enrollment program will not differ in Academic Engagement from their hearing classmates.
2. There are relationships between Classroom Ecology and Academic Engagement for students in a co-enrollment setting.
3. The relationship between Academic Engagement and Classroom Ecology is similar for D/HH students and hearing students in a co-enrollment setting.

Setting

The setting of this study was a co-enrollment program in an urban school district in the southwestern United States. This setting was selected both because it was a conveniently located local program, as well as for its long, stable, history. This program has been in existence for 18 years, since its establishment in 1994. The school was comprised of grades K-8 in multi-age classrooms. The co-enrollment program consisted of three multi-age co-enrollment classrooms: a kindergarten/first/second grade combination (K/1/2); a first/second/third grade combination (1/2/3); and a third/fourth/fifth grade combination (3/4/5). Although the K/1/2 and 3/4/5 classrooms were the focus of this study, I have described the entire program here for the sake of providing a context for the setting.

Each class was co-taught by a general education teacher and a teacher of the deaf and hard of hearing. Two sign language interpreters were assigned to each class. Each of the teachers of the deaf and hard of hearing were fluent in sign language, while each of the general education teachers had levels of sign language proficiency that varied from beginning to advanced. One instructional assistant was shared by the three classrooms. The speech and language pathologist who served the students in the program as stated on their Individual Education Plans (IEPs) was site-based, had been with the program since its inception, and was fluent in American Sign Language. An itinerant educational audiologist also served the students according to their IEPs. Additionally all three classrooms were frequented by many volunteers and practicum students from the nearby university. Both the co-enrolled hearing students and the adult volunteers in the classrooms possessed varying levels of sign language proficiency. A sound-field FM system was used in all three classrooms, in addition to personal FM systems used by individual D/HH students in conjunction with their hearing aids or cochlear implants. See Table 3.1 for the percentage of D/HH students in each class.

Table 3.1

Percentage of D/HH Students by Classroom

Classroom:	Number and Percent of D/HH	Number of Hearing	Total Number of Students
K/1/2	11(42%)	15 (58%)	26
1/2/3	8 (30%)	19 (70%)	27
3/4/5	13 (44%)	17 (56%)	30
All Three Classes Combined	32 (39%)	51 (61%)	83

Curriculum, Classroom Management, and Communication Policy

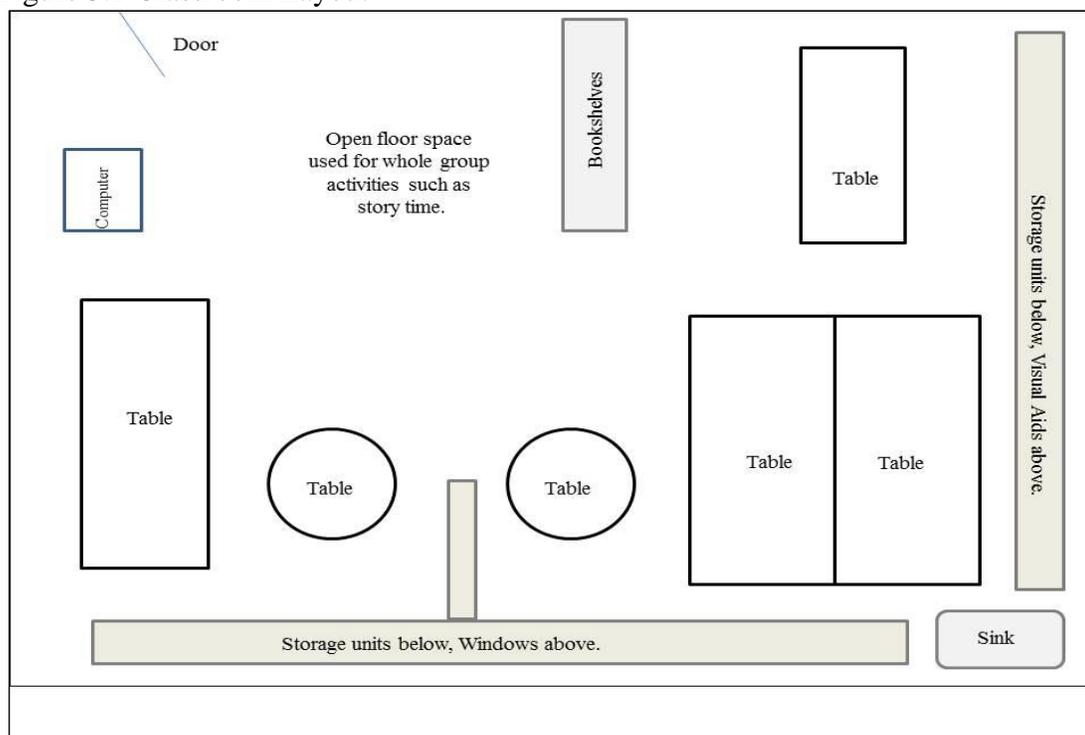
The core reading and math curricula used in the program were as follows: for word attack, *Wilson Foundations* (Wilson, 2004 - 2010); for reading comprehension, *Harcourt Trophies* ("Harcourt Trophies Series," 2005); and for math, *Investigations* (TERC, 2012). The school uses the *Bens Bells Character Education* program ("Kindness Programs," 2013). The school-wide behavior plan is called *The Miles 3 B's: Be Safe, Be Responsible, and Be Respectful*. Additionally, a frequent behavioral cue they use is to say "Show me a Full Body Commitment," from the *Early Social Behavior Books Series* (Everly, 2005).

The communication policy and procedures in place in the co-enrollment program are a combination of a Bilingual/Bicultural approach as well as a Total Communication philosophy. It is Bilingual/Bicultural in nature in that both English and American Sign Language (ASL) are taught as separate but equal languages. ASL-certified interpreters are used for all direct instruction lessons with the interpreters signing for staff and students who speak, and voicing for staff and students who sign. However the program is also harmonious with a Total Communication philosophy in that any communication modality or combination thereof that a student may use to express his or her ideas is accepted and respected. Both D/HH and hearing students may express themselves at various times via sign alone, speech alone, Simultaneous Communication (speaking and signing at the same time), speech supported with sign, or sign supported with speech. While some staff and students may use sign language in English word order, care is taken to use conceptually accurate signs, thus Manually Coded English systems are not used.

Snapshot of a Co-Enrollment Classroom

In this section I describe what a typical class period may look like in this co-enrollment program. The classroom is a large, rectangular shaped room, about twice the size of a regular classroom. Most of the wall space is covered with visual materials; some instructional and some decorative. There are no student desks in the room; however there are five tables, some open floor space, a computer, and lots of cubbies, book shelves, and storage units. Classroom supplies, curricula and materials are fairly well organized, but the room has a somewhat cluttered look. The environment is very busy, both visually and auditorilly. See Figure 3.1 for a layout of the classroom.

Figure 3.1 Classroom Layout



There are 27 students in the room, along with 6 adults: the general education teacher, a teacher for the deaf and hard of hearing, two sign-language interpreters, one speech therapist, and one instructional assistant. The D/HH teacher, who is herself Deaf,

is instructing a small reading group of seven students (two deaf, one hard of hearing, and three hearing) at the rectangular table at the far left end of the room. The group is reading aloud together, round-robin style, and discussing story vocabulary. An interpreter is interpreting for the group.

At the round table next to this group, is a group of three hearing students taking turns reading leveled readers to each other and recording their progress in reading logs. The three are working primarily independently, with occasional cues from the D/HH teacher, or any one of the other staff in the room, to stay on task. Seated on the floor in the middle of the room are four pairs of students (altogether eight students: six hearing, one deaf, and one hard of hearing) also reading leveled readers to each other. One instructional assistant is seated with this group, monitoring their reading and answering questions as needed. The pairs switch around as they finish reading to each other, then search for another reading partner.

At the small, round table in the center of the room, the speech therapist is working one-to-one with a hard of hearing student. She is listening to him read a leveled reader, working primarily on articulation and vocabulary, but also a little on reading comprehension as well. Seated at this same table is a hearing student, working independently on a writing assignment.

Five students (1 deaf, 1 hard of hearing, and 3 hearing) are seated around the large square table at the back of the right end of the room. They are working independently in leveled readers, each reading silently to himself/herself (or in some cases reading aloud quietly to himself/herself.) An interpreter, acting as an instructional assistant, is seated at

this table, monitoring students' independent work and occasionally answering students' questions or requests for help.

Finally, at the rectangular table at the front of the right end of the room, the general education teacher is seated with 2 hearing students. She is collecting DIBELS (Dynamic Indicators of Basic Literacy Skills) data with one student, and the other student is reading independently. As the period progresses, the teacher eventually dismisses this student and calls another one over for testing.

Participants

Although I had planned initially to conduct this study in all three of the co-enrollment classrooms, due to the limited number of parental consents obtained from the third/fourth/fifth grade classroom as well as time constraints for collecting data, the study was conducted in only two of the classrooms: the kindergarten/first/second grade combination (K/1/2) and the first/second/third grade combination (1/2/3). The D/HH student participants in this study consisted of all of the D/HH students enrolled in the K/1/2 and 1/2/3 classrooms of this co-enrollment program for whom parental consent could be obtained, with one single exclusion criteria: no students with a significant concurrent disability were included. For this purpose both intellectual disability and severe emotional disability were considered to be "significant" disabilities. Eligibility for placement and services as a D/HH student in this program required that the student have an educationally significant hearing loss.

The *Functional Rating Scale (FRS; Karchmer & Allen, 1999)* which was filled out by the D/HH teachers at the beginning of the study, provided information about students' age, grade, gender, functional hearing status, and functioning levels in

communication, cognition, and social behaviors. (The *FRS*, which can be found in Appendix A, is described in detail in the Instruments section.) For demographic information on amplification use, level of functional hearing, and communication modality of the D/HH participants, see Tables 3.2, 3.3 and 3.4 respectively.

Table 3.2

D/HH Participants' Amplification Use

Amplification	Number of Participants (N = 9)
Bilateral Hearing Aids	4
Hearing Aid + Cochlear Implant	2
Cochlear Implant Only	2
FM system in conjunction with HA or CI	7
No Amplification	1

Table 3.3

D/HH Participants' Functional Hearing

Functional Hearing Level	Number of Participants, N = 9
Functions Normally	3
Mildly Limited	1
Severely Limited	5

Table 3.4

D/HH Participants' Communication Modalities

Communication	Number of Participants (N = 9)		
	Functions Normally	Mildly Limited	Severely Limited
Receptive Sign	2	6	1
Expressive Sign	2	6	1
Receptive Oral	4	1	4
Expressive Oral	4	2	3

Note. As you read across, each row totals 9 as there were 9 participants. Two of the 9 participants were rated as Functions Normally in all four modalities. No one was rated as severely limited in all four modalities.

In Table 3.5 you will find information about the hearing students' skill level in each communication modality. Two of the hearing students possessed at least minimal sign skills, while seven of the hearing students received ratings of functions normally on both receptive and expressive sign skills.

Table 3.5

Hearing Participants' Communication Modalities

Communication	Number of Participants (N = 9)		
	Functions Normally	Mildly Limited	Severely Limited
Receptive Sign	7	2	0
Expressive Sign	7	2	0
Receptive Oral	9	0	0
Expressive Oral	9	0	0

The hearing student participants consisted of average or typically performing students. The number of hearing participants from each class were equal to the number of D/HH students in each of the two multi-age classrooms. The *FRS* was used to match each D/HH participant with a hearing classmate based on gender, grade, and similar functioning on cognitive skills (i.e., *Thinking and Reasoning* and *Social Skills/Behavior*). All students were assigned an identification number; therefore student confidentiality was protected as no personally identifiable information was stored by the researcher at the end of the data collection phase.

One way of strengthening a causal-comparative research design and of ruling out alternative causal factors is to use groups that are as homogenous as possible. This was done by using a random stratified sampling procedure. All of the D/HH students with no concurrent disability for whom parental consent was obtained were selected. Students were divided into strata based on grade and gender, then a random sample of hearing students was chosen from each stratum. There were instances in which there was no exact hearing match for a D/HH student. In this event, students were matched as closely as possible using the following procedure: if it were necessary to choose between matching on either grade level or functioning versus gender, grade and functioning level were given priority. If there were no exact grade level match, sometimes a child was matched with a peer one grade higher or one grade lower; however when this occurred, I alternated between matching with one grade higher in one instance, then one grade lower in the next instance, to avoid having a group of D/HH students who were consistently matched with either higher or lower grade level peers. Regarding homogeneity of

functioning levels, neither D/HH nor hearing children designated as severely limited on *Thinking and Reasoning* or *Social Skills/Classroom Behavior* were included in the study. There were two instances in which it was necessary to pair a D/HH student designated as “mildly limited” on *Thinking and Reasoning* with a hearing student designated as “functions normally,” simply because there were no hearing student participants in that class or at that grade level who were classified as “mildly limited.” The final sample size consisted of eighteen students: nine D/HH and nine hearing; twelve from the K/1/2 classroom (6 hearing and 6 D/HH), and six from the 1/2/3 classroom (3 hearing and 3 D/HH). For demographic information on the hearing status, grade, gender, and cognitive functioning levels of participants, see Table 3.6.

Table 3.6

Participants’ Levels of Cognitive Functioning, Gender, and Grade

Demographic Characteristic	<u>D/HH Students (N = 9)</u>		<u>Hearing Students (N = 9)</u>	
	Functions Normally	Mildly Limited	Functions Normally	Mildly Limited
Thinking and Reasoning	7	2	9	0
Social Interaction and Classroom Behavior	9	0	9	0
Male	5		3	
Female	4		6	
Kindergarten	3		2	
First Grade	1		2	
Second Grade	3		3	
Third Grade	2		2	

Data were collected at the end of the school year; therefore all students, even kindergarten students or students who entered the program for the first time this year, had

experienced nearly one year of co-enrollment programming. Thus all student participants had spent enough time in this co-enrollment setting to experience whatever impact (either beneficial or detrimental) that this model of inclusion had to offer. Nevertheless, as some students had entered the program as kindergarteners and continued in the program, there were both D/HH and hearing participants who had experienced the co-enrollment program for up to 4 years.

Instruments

Two instruments were used for collecting data: the *Functional Rating Scale (FRS)* (Karchmer & Allen, 1999) and the *Mainstream Version of the Code for Instructional Structure and Student Academic Response (MS-CISSAR; Greenwood & Reynolds, 2011)*. Additionally the following three instruments were used for data analysis: the MS-CISSAR, *G-Power 3.1.5* software (Faul, Erdfelder, E., Lang, A.G., & Buchner, 2007), and the *IBM SPSS Statistics 20* software (IBM Corp., 2011). The following is a description of these instruments.

Functional Rating Scale

The *FRS* was adapted from the *Functional Assessment Section of the Annual Survey of Deaf and Hard of Hearing Children and Youth, 1997-98* as reported by Karchmer and Allen (1999). The scale was used to measure children's functional performance in three broad areas: *Cognitive and Social, Communication, and Functional Hearing*. Each item was rated by the child's teacher as functions normally, mildly limited, or severely limited. The items in the category of *Cognitive and Social* were (a) *Thinking and Reasoning*, (b) *Maintaining Attention to Classroom Tasks*, and (c) *Social*

Interaction/Classroom Behavior. Thinking and Reasoning was used to rule out children with severe cognitive disabilities, and *Social Interaction/Classroom Behavior* was used to rule out children with severe emotional disabilities. The *Communication* section included items for rating the children's performance in receptive and expressive language for both sign and oral communication. The *Functional Hearing* section was used to rate children according to their functional use of hearing, regardless of degree of hearing loss or type of amplification used.

Demographic information that was collected in addition to the *FRS* was gender, age, grade, classroom, type of amplification used, and the number of years in a co-enrollment setting. This scale was filled out by the D/HH teachers for all children who received parental consent. This information was used to eliminate children with severe cognitive or emotional disabilities as well as to match qualifying children on gender, grade, and functional performance on *Thinking and Reasoning* and *Social Interaction/Classroom Behavior*.

MS-CISSAR

The *operational definition* of Academic Engagement for this study is student attention, participation, and on-task behavior as measured by the *Mainstream Version of the Code for Instructional Structure and Student Academic Response* (MS-CISSAR; Greenwood & Reynolds, 2011). The MS-CISSAR is a computer-based systematic observation instrument supported by the *EcoBehavioral Assessment Systems Software* (EBASS) 3.0. The MS-CISSAR was developed and validated for use with elementary and middle school students in both general and special education settings. The instrument

uses momentary time sampling of variables or “events” in the categories of Classroom Ecology, Teacher Behavior, and Student Behavior. The instrument has been used by researchers to collect information on the Academic Engagement of students, and also to analyze Academic Engagement in conjunction with variables of Classroom Ecology and Teacher Behavior (Donne & Zigmond, 2008; Greenwood, Horton, & Utley, 2002). The observer responds to an auditory beep from the computer at 20 second intervals to select the event being observed from choices on the computer screen. Evidence of criterion-related validity has been found in that academic responding is positively correlated with academic achievement (Greenwood, C.R.; Horton, & Utley, 2002). Additionally, studies have reported inter-observer reliability scores of 80% or higher, following training on the instrument. (Fredericks, et al., 2011) This instrument was chosen for this study because of the given validity and reliability information and because it is a frequently used instrument in this field, thus allowing comparisons between this study and others that have used the same instrument. A more detailed description of the 105 observable events measured by the MS-CISSAR is included in the following section, titled Data Collection.

Data Collection

Data were collected conducting repeated observations using the *Mainstream Version of the Code for Instructional Structure and Student Academic Response* (MS-CISSAR; Greenwood & Reynolds, 2011). The MS-CISSAR allows educators or researchers to collect data on Academic Engagement using a momentary time-sampling computer-based instrument. Data are collected in three broad categories: Ecological

Events, Teacher Events and Student Events. For the purpose of this study Student Events and Ecological Events were the variables of interest.

Although the MS-CISSAR includes data on Teacher Events, which consists of the subcategories of Teacher Definition, Teacher Behavior, Teacher Approval, Teacher Focus, and Teacher Position, I chose not to analyze this variable as I did not have confidence in the validity of the Teacher Events data due to concerns about the appropriateness of using this portion of the MS-CISSAR in this unique setting. The co-enrollment classrooms typically have a minimum of four, and often as many as five or six adults in the room at one time. The students engage in a great deal of independent study during which no staff member is interacting with the student, while at other times there are one or more staff members interacting with a student simultaneously. This made it quite difficult to designate the appropriate teacher during a given cycle. Additionally because this condition changes very rapidly, often the staff member designated as the teacher during the Teacher Events interval is frequently no longer the staff member interacting with the student twenty seconds later during the Student Events interval. Teacher behavior and its possible impact on Academic Engagement could certainly be a valuable variable to examine in a future study; however this may be better accomplished with a different instrument or different methods than what were employed in this study. The following sections contain a detailed description of the variables of interest in this study: Student Events and Ecological Events. The interested reader may refer to Appendix B for a description of the Teacher Events which are available using the MS-CISSAR.

Student Events

Student Behaviors, or Student Events, are subdivided into three major sections as follows:

1. **Task Management.** Task Management consists of behaviors that enable a student to participate by making an academic response. Task Management includes paying attention in class as well as behaviors for getting ready to participate such as fetching materials or locating the correct page in a book.

2. **Academic Responding.** Academic Responding includes class participatory activities such as reading, writing, and speaking.

3. **Competing Responses.** Competing Responses include inappropriate, off task behaviors such as non-compliance.

For a complete list of all observable student events that are coded using the MS-CISSAR, see Table 3.7.

Table 3.7

Student Events

Event Category	Events to Record
Academic Responses	Writing, Task Participation, Read Aloud, Read Silent, Talk Academic, Typing, No Academic Response
Task Management Responses	Raise Hand, Play Appropriately, Manipulate Materials, Moving, Talk Management, Attention, No Task Management
Competing Responses	Aggression, Disruption, Talk Inappropriate, Look Around, Non-Compliance, Self-Stim, Self-Abuse, No Inappropriate

Ecological Events

Ecological events are subdivided into 5 major sections as follows:

1. **Setting.** Setting is the physical space where the observation takes place, for example the general education classroom versus the resource room or the computer lab.

2. **Activity.** Activity refers to the subject matter being taught, for example reading, math, or science.

3. **Task.** Task refers to the actual curriculum or media materials that the student is using during the Activity. Examples of Tasks include use of materials such as readers (basal readers or textbooks), workbooks, paper and pencil, listen/lecture, discussion.

4. **Physical Arrangement.** Physical Arrangement refers to how the students are positioned in the room in relationship to each other. The three possible Physical Arrangements are Entire Group, Divided Group, or Individual. An example of Entire Group would be a traditional classroom arrangement of students seated in rows of desks. An example of Divided Group would be students seated at various table groups. Individual refers to the target student seated alone, away from the group, such as in an individual study carrel.

5. **Instructional Grouping.** Instructional Grouping refers to the number of students involved in the same instructional activity as the target student. Instructional Grouping is coded as Whole Class instruction, Small Group instruction, One-to-One instruction, Independent instruction, Multi-Media instruction, and No Instruction. Whole class instruction is coded when the target student is receiving the same instruction as all of the other students, for example when all students are listening to the teacher lecture. Small

Group instruction refers to when the target student is receiving the same instruction as at least one other student, but not all of the students in the class. An example of Small Group instruction would be reading groups. One to One instruction is defined as the target student receiving one to one instruction from a teacher, therapist, aide, or peer tutor. Individual instruction refers to a student working independently, for example when doing self-managed, independent seat work, or working alone at the computer. Multi-Media instruction is coded when the target student is engaged in an on-line, web-based class or tutorial, or if the student is watching a pre-recorded class or lecture. No Instruction is defined as no task, with no questions, commands, or talk from the teacher. For a complete list of all the ecological events, see Table 3.8.

Table 3.8

Ecological Events

Event Category	Events to Record
Setting	Regular Classroom, Self-Contained Special Education Classroom, Resource Room, Library, Computer Lab, Music Room, Art Room, Gymnasium, Therapy Room, Hall, Auditorium, Other.
Activity	Reading, Math, Spelling, Handwriting, Language, Science, Social Studies, Computing, Free Time, Transition, Music, Arts and Crafts, No Activity, Pre-Vocational, Gross Motor, Daily Living, Self-Care, Business Management, Time-Out, No Activity.
Task	Readers, Workbooks, Worksheets, Paper/Pen, Listen to Lecture, Other Media, Electronic Media, Fetch/Put, No Task.
Physical Arrangement	Entire Group, Divided Group, Individual.

One research assistant and I observed and collected data on each student participant for four to seven observations, most of which were 15 minutes in length. The minimum total number of minutes observed for each participant was 56 minutes, with a maximum total of 105 minutes, and a mean of 71 minutes per student. Each participant was observed a minimum of twice during reading and once during math, with the remaining observations occurring during any classroom activity. The observations were completed during the last two months of the school year, across a period of four weeks.

Observations were completed within a short time-frame, in order to minimize the effects of time or maturation. To ensure that extraneous variables did not account for differences and to further reduce any possible time or maturation effect, observations were completed for one D/HH-hearing pair within the same one-week time period. When possible, the matched participants were observed simultaneously, with one researcher observing the D/HH participant and the other researcher observing the hearing participant. Each researcher observed approximately the same number of D/HH and hearing participants.

Reliability

Prior to conducting this study I attended 2 days of training on use of the MS-CISSAR. The criteria for passing the training was to achieve a 90% or better inter-observer agreement (IOA) score on three observation sessions conducted together with the trainer. Inter-observer agreement scores were obtained at the 97% level. I then trained a research assistant, until she achieved IOA at the 90% level across three sessions.

In order to collect IOA data for this study, ten percent of the observations were conducted by the researcher and the research assistant using simultaneous, independent

observations. The *MS-CISSAR* was used to calculate reliability data to check for inter-observer agreement. The reliability report generated for each IOA data collection session yields a percentage of agreement score for each variable as well as an overall agreement percentage for the total percent of agreement for all variables combined. The range of overall inter-observer agreement achieved was 90.77 to 98.97, with an average IOA of 93.61.

CHAPTER 4: RESULTS

Introduction

In this chapter data will be presented separately for each research hypothesis. *SPSS 20* was used for statistical analyses. To determine whether or not there was a significant difference in the degree of Academic Engagement of D/HH students in comparison to their hearing peers, *SPSS* was used to conduct independent samples t-tests. To examine the relationship between Classroom Ecology and Academic Engagement, *SPSS* was used to conduct Pearson product-moment correlations.

Descriptive data are provided in Appendix C. Table C1 contains the means, standard deviations and sums for the total minutes of observations completed for D/HH participants, hearing participants, and for the combined group, as well as total minutes observed for each subject area. Table C2 contains the means, standard deviations, and sums of total occurrences for each of the following variables: Academic Responding, Task Management, and Competing Responses.

Hypothesis One: Academic Engagement

D/HH students in a co-enrollment program will not differ in Academic Engagement from their hearing classmates. Academic Engagement was a composite variable that consisted of Academic Responding (e.g., speaking, reading, or writing) and of Task Management (e.g., listening or paying attention, raising hand, or manipulating materials). An independent samples t-test was used to compare the Academic Engagement of D/HH students to that of their hearing peers. The mean score is the

percentage of occurrences for the target variable (in this case Academic Engagement) for all observations combined.

There was not a significant difference in the scores for D/HH students ($M=84.53$, $SD=10.20$) and hearing students ($M=84.21$, $SD=13.65$); $t(16) = .057$, $p = .95$, 95% CI [-11.72, 12.36], $d = .02$. These results suggest that the D/HH students are as equally academically engaged as their hearing peers.

I further analyzed Academic Engagement by examining *active* and *passive* participation separately, as well as lack of participation in the form of Competing Responses. I used an independent samples t-test to compare D/HH students to their hearing peers on the following three composite variables: a) all Academic Responding variables (active participation), b) all Task Management Variables (passive participation/attention) and c) Competing Responses (non-attention, for example off task behaviors such as looking around, non-compliance, or off-topic chatting with a peer). For Academic Responding, there was a significant difference in the scores for D/HH students ($M = 29.51$, $SD = 8.13$) and hearing students ($M = 39.77$, $SD = 8.32$); $M = -10.25$, 95% CI [-18.48, -2.03], $t(16) = -2.64$, $p = .018$, $d = -1.32$. These results suggest that the D/HH students were less engaged in *active* Academic Responding than their hearing peers. For Task Management, there was a marginally significant difference in the scores for D/HH students ($M = 55.02$, $SD = 10.98$) and hearing students ($M = 44.44$, $SD = 10.19$); $t(16) = 2.11$, $p = .05$. These results suggest that the D/HH students were more engaged in Task Management (i.e., *passive* Academic Engagement) than their hearing peers. For

Competing Responses, there was no significant difference in the scores for D/HH students ($M = 10.36$, $SD = 7.78$) and hearing students ($M = 11.65$, $SD = 11.70$); $t(16) = -.27$, $p = .78$. These results suggest that the D/HH students were as engaged in Competing Responses (i.e., non-attention) as their hearing peers; although both groups of students had low mean scores on Competing Responses, indicating that both groups were well-behaved and attentive. These results are displayed in Table 4.1.

Table 4.1

Academic Engagement, Academic Responding, Task Management, and Competing Responses

	D/HH		Hearing		Sig. (2-tailed)
	Mean	SD	Mean	SD	
Academic Engagement	84.53	10.20	84.21	13.65	.95
Academic Responding	29.51	8.13	39.77	8.32	.018*
Task Management	55.02	10.98	44.44	10.19	.05*
Competing Responses	10.36	7.78	11.65	11.70	.78

* = statistically significant at $p < .05$ level.

Hypotheses Two and Three: Academic Engagement and Classroom Ecology

The second research hypothesis was: there are relationships between Classroom Ecology and Academic Engagement for students in a co-enrollment setting. The third hypothesis was: the relationship between Academic Engagement and Classroom Ecology

is similar for D/HH students and hearing students in a co-enrollment setting. These hypotheses were analyzed using Pearson correlations. The alpha level for all tests is .05.

Academic Engagement and Instructional Grouping

The first relationship I examined was between Instructional Group (Whole Class, Small Group, One to One, or Independent), and Academic Engagement. Note that this correlation does not indicate the percentage of time or number of occurrences of Academic Engagement in *each* instructional grouping; rather the correlation indicates the average number of occurrences of Academic Engagement as well as the average number of occurrences of each of these various sizes of instructional groups. For D/HH and hearing students combined, there was a significant negative correlation between Academic Engagement and Independent Work, $r(16) = -.499, p = .035$. These results indicate that there is a relationship between the size of the Instructional Group and the degree of Academic Engagement for students in this co-enrollment program.

Next I examined the relationship between Academic Engagement and Instructional Groups for D/HH students and hearing students separately. Both similarities and differences were found in the relationship between Academic Engagement and Instructional Grouping for D/HH and hearing students; for both groups there was a negative correlation between Academic Engagement and Whole Class Instruction. One notable difference between the D/HH and hearing students is that for hearing students there was a significant negative correlation between Academic Engagement and Independent Work $r(16) = .749, p = .02$; however such a negative correlation did not exist for the D/HH students. Except for the correlations for Independent Work, for all

other Instructional Groups the direction of the correlation was the same; however the strength of the correlations were different. For example, for hearing students a large, positive correlation existed between Academic Engagement and Small Group Instruction, while this same correlation was nearly zero for D/HH students. On the other hand for D/HH students a large positive correlation existed between Academic Engagement and One to One Instruction, while for hearing students this correlation was small. See Table 4.2

Table 4.2

Pearson Correlations for Academic Engagement and Instructional Grouping

		Whole Class	Small Group	One to One	Independent
Combined Groups	Pearson Correlation	-.227	.300	.427	-.499
	Sig. (2-tailed)	.366	.227	.077	.035*
Academic Engagement D/HH	Pearson Correlation	-.379	.031	.624	.060
	Sig. (2-tailed)	.314	.936	.073	.878
Hearing	Pearson Correlation	-.105	.640	.290	-.749
	Sig. (2-tailed)	.788	.063	.450	.020*

* = statistically significant at $p < .05$ level.

Academic Engagement and Subject

I also examined the relationship between Academic Engagement and Subject. The correlations are between the average number of occurrences of Academic Engagement

and the average number of occurrences during which instruction was being provided in a given subject area. I did not find any significant correlations between Academic Engagement and Subject for either D/HH or hearing students; however I did find some similarities in the direction of the correlations. For both D/HH and hearing students, Language was negatively correlated with Academic Engagement. Although there were some differences in the strength of the correlations, the only difference in the direction of a correlation was between Academic Engagement and Math, which was positively correlated for D/HH students and negatively correlated for hearing students. See Table 4.3.

Table 4.3

Pearson Correlations for Academic Engagement and Subject

		Reading		Math		Language	
		D/HH	H	D/HH	H	D/HH	H
Academic Engagement	Pearson Correlation	.120	.509	.370	-.147	-.495	-.299
	Sig. (2-tailed)*	.759	.162	.328	.706	.176	.434

Note. D/HH = deaf or hard of hearing, H = Hearing

* $\alpha = .05$

Academic Engagement and Task

Finally, I examined the relationship between average number of occurrences of Academic Engagement and the average number of occurrences of various Tasks for all students. The Task variables are Readers, Listen/Lecture, Discussion, and Paper/Pencil. Paper/Pencil is a composite variable that includes the following three MS=CISSAR Task variables: Paper and Pen, Workbooks, and Worksheets. There was a statistically

significant positive correlation for all students between Academic Engagement and the Task of Readers $r(16) = .593, p = .010$. There was also a statistically significant negative correlation for all students between Academic Engagement and Paper/Pencil Tasks $r(16) = -.627, p = .005$. See Table 4.6.

Table 4.4

Pearson Correlations for Academic Engagement and Task

		Paper/ Pencil	Readers	Listen/Lecture	Discussion	
Academic Engagement	Combined Groups	Pearson Correlation	-.627	.593	-.344	.142
		Sig. (2- tailed)	.005*	.010*	.176	.574
	D/HH	Pearson Correlation	-.260	.655	-.311	-.494
		Sig. (2- tailed)	.499	.055*	.415	.177
	Hearing	Pearson Correlation	-.860	.566	-.418	.436
		Sig. (2- tailed)	.033*	.122	.263	.240

* = statistically significant at $p \leq .05$ level.

To determine if this relationship between Academic Engagement and Task was similar for D/HH and hearing students, I examined these correlations for each group separately. The results were similar. For both D/HH and hearing students there was a large, positive correlation between Academic Engagement and the Task of Readers. For both D/HH and hearing students there was a moderate, negative correlation between Academic Engagement and the Task of Listening to a Lecture. Additionally Paper/Pencil

Tasks were negatively correlated with Academic Engagement for both groups; however the correlation was small for D/HH students and very large, as well as statistically significant, for hearing students $r(16) = -.846$, $p = .004$. One notable difference was found in the association between Academic Engagement and the Task of Discussion in that for hearing students there was a moderate, positive correlation between occurrence of Academic Engagement and occurrences of Discussion activities, while for D/HH students this association was a moderate, negative correlation.

I found the fact that a marginally significant, positive correlation existed between Academic Engagement and the Task of Readers for D/HH students, $r(16) = .655$, $p = .055$, to be interesting in light of the fact that D/HH students typically lag behind their hearing peers in reading achievement. Thus, I chose to examine the frequency with which D/HH students engage in the Task of Readers to that of their hearing classmates. An independent samples t-test revealed that there was not a significant difference in the scores for D/HH students ($M=17.60$, $SD=10.47$) and hearing students ($M=14.12$, $SD=14.75$); $t(16) = .577$, $p = .57$, 95% CI [-9.308, 16.26], $d = .28$. These results indicate that the D/HH students spend an equal amount of time using Readers as their hearing classmates.

CHAPTER 5: DISCUSSION

The most important finding of this study is that the D/HH students were as equally Academically Engaged as their hearing peers; however the D/HH students, on average, did have lower levels of Academic Responding than their hearing peers. One explanation for the fact that that the D/HH students in this setting are as attentive and on-task (passively engaged) as their hearing peers in this setting could be the unique features of this co-enrollment program which provide D/HH students with access to, rather than mere exposure to, the general education curriculum. Unlike traditional inclusive settings where there may be only one D/HH student in a classroom with fractured support services from itinerant special educators or therapists, the D/HH students in this co-enrollment program are truly members of the class and are expected to perform and function the same as their hearing classmates. The deaf students have some direct instruction in sign language from teachers and staff fluent in sign, as well as some direct sign communication with hearing peers. The hard of hearing students have consistent access to personal amplification devices and FM systems (and staff knowledgeable about using and maintaining them), without having the stigma of being the only student using this technology. All of the students have the benefit of the combined expertise of the general education teacher and the teacher of deaf and hard of hearing working to provide differentiated instruction to all students. While all of these factors may be contributing to the level of Academic Engagement of D/HH students in this setting, I did not compare the Academic Engagement of these students to D/HH students in traditional inclusive classrooms. Such a comparison is an important next step in this line of research.

The D/HH students in this study did have lower levels of Academic Responding (active engagement) than their hearing peers. Academic Responding consists of Writing, Task Participation, Reading Aloud, Reading Silently, and Academic Talking. Most of these methods of Academic Responding are language dependent, except for Task Participation, which may or may not be very language-oriented depending on what the actual task is. One explanation for why the D/HH students had lower levels of Academic Responding than their hearing classmates could be the fact that D/HH students overall tend to have delayed language skills. As seen in Tables 3.4 and 3.5 of Chapter 3, according to teacher ratings' of students' communication skills using the *FRS*, the Deaf students had overall lower ratings on both oral and sign communication than their hearing classmates. Specifically, on expressive language skills, only four of the nine D/HH students were judged by teachers to be functioning normally on oral expressive language, and only two of the nine D/HH students were judged to be functioning normally on expressive sign skills. However all nine of the hearing students were judged to be functioning normally on expressive oral skills, and seven of the nine hearing students were judged to be functioning normally on expressive sign skills.

Another factor that may contribute to D/HH students' lower levels of academic responding could be issues surrounding mediated communication through use of interpreters. Although the D/HH students in this program do have a good deal of direct instruction and communication with staff and peers who sign, interpreters are also used, especially for whole group instruction. Interpreter lag could contribute to the D/HH student's ability to effectively participate in class discussions. Future researchers may

want to examine the Academic Responding level of D/HH students who do *not* have delayed language skills, as well as examining Academic Responding levels of D/HH students during direct instruction/communication situations versus mediated instruction through an interpreter.

Some evidence was found to support the hypothesis that there are relationships between Classroom Ecology and Academic Engagement for students in a co-enrollment program. The greatest number of *statistically significant* correlations were for Academic Engagement and Task. For hearing students an inverse relationship existed between Academic Engagement and Paper/Pencil Tasks, resulting in a large, negative correlation $r(16) = -.627, p = .005$. For D/HH students a large, positive correlation existed between Academic Engagement and the Task of Readers $r(16) = .655, p = .05$.

The correlations of *greatest magnitude* occurred for Academic Engagement and Instructional Grouping. For D/HH students a large, positive correlation existed between Academic Engagement and One to One instruction $r(16) = .624, p = .073$. For hearing students a large, positive correlation existed between Academic Engagement and Small Group instruction $r(16) = .640, p = .063$, and a large negative correlation existed between Academic Engagement and Independent work $r(16) = -.749, p = .02$.

An examination of the correlation between Academic Engagement and Subject did not reveal either any statistically significant correlations or any correlations that were large in magnitude. This suggests that there is no association between Academic Engagement and Subject ; therefore we can conclude that students are similarly engaged across subjects as no systematic differences in engagement by subject were found.

Regarding the large and/or statistically significant correlations between Academic Engagement and Instructional Group or Task, it is important to keep in mind that this data does not tell us the percentage of time that a student was academically engaged during each type of instructional group or task; therefore we cannot say that the variables that were highly correlated with Academic Engagement are necessarily predictors of engagement. However future research could include an examination of highly correlated variables using a conditional probability analysis to determine which ecological variables are predictors of higher levels of academic engagement.

An interesting finding in this study was the large, positive correlation between Academic Engagement and the Task of Readers for D/HH students. While we cannot tell from this data set the percentage of time that students were academically engaged during the Task of Readers, we do know that overall Academic Engagement was not significantly different for D/HH students ($M = 84.53$) and their hearing classmates ($M = 84.21$); and that the mean number of occurrences of the Task of Readers for D/HH students ($M = 17.60$) and hearing students ($M = 14.12$) was not significantly different. Previous researchers have found that students with delayed reading achievement typically spend less time in class actually engaged in reading than do students who are not delayed in reading; thus indicating that the students who need the most practice with reading actually receive the least amount of practice (Donne, 2011). The current findings, which indicate that students in this co-enrollment setting receive as much time in reading practice as their hearing peers, holds promise for increased levels of reading achievement.

Some evidence was found to support the hypothesis that the relationship between Classroom Ecology and Academic Engagement is similar for D/HH students and their hearing peers. Generally speaking, the correlations between variables were usually in the same direction (72% of the time), however the strength or magnitude of the correlations were different. I believe the most important finding here is to examine the differences that vary in direction, particularly if the strength of the directions in which they vary is large. The reason this is important is that if a variable is not similarly associated with Academic Engagement for both D/HH and hearing students, we should examine that variable more closely, perhaps with a probability analysis to determine whether the variable is a strong predictor of academic engagement for each group. Not only is it important to determine which variables may be predictors of Academic Engagement, but in cases where the variables differ in predicting Academic Engagement of D/HH versus hearing students, examining these differences could give educators insight into potentially different learning styles of D/HH and hearing students.

For example, Discussion was negatively correlated with Academic Engagement for D/HH students, but positive for hearing students. One plausible interpretation of this could be that if D/HH students are less engaged in Discussions than their hearing peers, the D/HH students' lower language levels may be a hindrance to their ability to participate in class discussions. Possible ways to address this might include building additional wait time into discussions to allow for interpreter lag, thereby giving D/HH students a greater opportunity to respond. The additional wait time also would allow for time to pass the FM mic to each speaker. Additionally liberal use of visual aids may

support student's comprehension of discussion material. Although these things are already done to some extent in this program, future research could be done to determine the consistency with which these accommodations are made and what impact, if any these accommodations have on student engagement and performance.

Another pair of correlations that varied greatly both in direction and magnitude was between Academic Engagement and Instructional Group. For hearing students, this resulted in a large negative correlation, while for D/HH students the result was a moderate, positive correlation. The existence of such a large, negative correlation between Academic Engagement and Instructional Work for hearing students warrants further investigation to determine if there is a probability that hearing students are less engaged in independent work than their D/HH and peers, and if so what could be the possible causes. In this setting, the classrooms tend to have a very high noise level. One might examine whether hearing students are more distracted than their D/HH peers by the noise level when trying to do independent work as a possible explanation for this difference.

Synthesis and Analysis of Current and Previous Findings

The only previous study on Academic Engagement that was conducted specifically with D/HH students was a study by Borders and colleagues (2010). This previous study was similar to the current one in that both studies examined Academic Engagement of D/HH students in inclusive settings. The main differences between the two studies were as follows: The study by Borders and colleagues took place in traditional inclusive classrooms (five classrooms with one D/HH student per room); the

current study took place in a co-enrollment program (two classrooms, with a critical mass of D/HH students in each room). The study by Borders and colleagues included only students with mild to moderate hearing loss, while the current study included students with a complete range of hearing loss. Although both studies used event sampling to record student engagement, the study by Borders and colleagues examined passive engagement (attention) while the current study looked at both passive and active engagement (both attention and academic responding). Borders' study examined both engagement and teacher behaviors, while the current study examined both engagement and classroom ecology. Borders' study consisted of observations conducted only during language arts, with a total of one hour of observations per student. The current study included observations in all academic areas with a total of one to one and half hours of observations per student.

The results of the study by Borders and colleagues was that students with mild to moderate deafness in a typical inclusion setting had rates of passive engagement *near* to that of their hearing peers; however they received more teacher prompting than their hearing peers. The current study results were that D/HH students in a co-enrollment setting had rates of passive engagement *equal* to that of their hearing peers; however teacher behaviors were not analyzed; therefore no information was obtained on the level of prompting given to D/HH students in comparison to their hearing peers.

Strengths, Limitations, and Directions for Future Research

Researcher Bias

Although I believe that special education placement decisions should be made on an individual basis by a multi-disciplinary team that considers the full continuum of educational placements available for D/HH students as well as for students with other disabilities; I confess to having a strong bias toward co-enrollment programming. My examination of the extant literature on co-enrollment programming, combined with my personal observations and research, have led me to the conclusion that co-enrollment programming may be the best placement option for many Deaf and hard of hearing students, and that it should be a more widely offered placement option.

Sample Size

Although the sample size of this study was small, as is typical in research studies drawing from the population of students with a low-incidence disability, in this study I did obtain a larger sample size of D/HH students ($n = 9$) than in the only previous study of the academic engagement skills of D/HH students ($n = 5$; Borders et al., 2010.) Additionally a substantial number of observations were conducted for each student (between four to seven observations), with a total of approximately 21 ½ hours of observation. Thus, although the amount of data collected (sample size and number of observations), were substantial, the importance of these findings suggest that this study should be repeated with a larger sample of D/HH students. Due to time constraints both for collecting parental permission as well as for collecting data, I did not take full advantage of the entire D/HH student population at this school. Given more time, and

possibly an incentive for recruiting participants, it may be possible to repeat this study in this setting, but with a larger sample size. Increasing the number of observations for each student would be beneficial as well, as would expanding the study to include other co-enrollment programs.

Instrumentation Problem

I had originally intended to examine possible associations not only between Classroom Ecology and Academic Engagement, but also between Teacher Behavior and Academic Engagement. I realized too late in the study that the MS-CISSAR Teacher Events were not capturing relevant teacher behaviors in a valid way due to the large number of adults in the room, the rapidly changing roles of each adult, and the large amount of independent work that students do as a result of the frequency of differentiated instruction. According to the code for teacher definition in the MS-CISSAR technical manual, when no staff member is directly interacting with the student, the observer should code whichever staff member happens to be nearest to the student at that moment. This resulted in a lot of irrelevant coding for this variable. However as this would be a valuable variable to study in the future, it could be accomplished in one of several ways: a) a different instrument may be more appropriate to use, b) the MS-CISSAR may be appropriately used if we change the coding criteria to selecting “no staff” whenever there is not an adult providing direct instruction or supervision to the target student, or c) the methods might be changed to conduct observations only during direct instruction.

Research Design and Method

A strength of this study was the matching of students on grade, gender, *Thinking and Reasoning Skills*, and *Social Skills/Classroom Behavior*. This resulted in having highly homogeneous groups to compare. Additionally, each individual of a deaf/hearing pair was observed at the same time whenever possible. Ideally this would have resulted in each student being observed doing the same activity, in the same group. However, due to the multi-age nature of these classrooms, combined with the frequency of small-group and one to one instruction, it was often the case that the two students being observed simultaneously were not in the same room at the same time, much less in the same group or activity. One could attempt to address this by asking classroom teachers to match students not only on grade and cognitive functioning level, but on placement in the same reading and/or math groups, but this would be difficult and could result in an even smaller sample size.

Implications for Practice

These findings add to the body of knowledge about the potential benefits of co-enrollment programming for D/HH students. Results may imply that the accommodations offered to D/HH students in the co-enrollment program are enabling the students to have equal access to the general education curriculum as evidenced by the fact that these D/HH students are as equally on-task as their hearing peers. An increasing number of D/HH students are being educated in general education classrooms. At the same time, some states have begun to close special schools for the deaf, thus cutting off this avenue of opportunity for D/HH students to be educated in a bilingual setting with direct access

to staff and peers who sign. This current study, which adds to the body of positive outcomes of co-enrollment programming, indicates that this model of inclusive education for D/HH students may be worth expanding. Establishment of more co-enrollment programs would result in this model being more widely available as a placement option for D/HH students who need equal access to the general education curriculum as well as continued access to direct instruction in sign language.

APPENDIX A

FUNCTIONAL RATING SCALE

Directions for completing the Functional Rating Scale

The purpose of the Functional Rating Scale is to obtain information about the student's typical functioning at school and at home. Please complete all three parts of the scale by circling the descriptor that best fits each area.

- When completing the Cognitive Social Scale (Part 1) indicate if you are unable to rate the student.
- When completing the Expressive and Receptive Communication scale (Part 2), rate the student separately for each form of communication: sign communication, oral communication and simultaneous (oral and sign) communication. You can rate the student as not using one of these forms of communication. If you are unfamiliar with the student's ability to communicate through any of these means you can circle "Unable to rate".
- When completing the Functional Hearing scale (Part 3) rate the student's functioning when s/he is using his/her typical amplification.

Child's Initials: _____ **Gender:** Boy Girl **Today's Date:** _____

Child's Grade Level: K 1 2 3 4 5 **Classroom:** K/1/2 1/2/3 3/4/5 **Hearing Status:** (D/HH or Hearing): _____

Amplification Devices Used (Circle all that apply): HA CI FM None

Number of Years in Co-Enrollment Program (Circle one. Count this year as 1 year): 1 2 3 4 5 6

Person completing form:

Initials: _____ **Relation to child:** _____

Please mark one box for each row that best describes the child's functioning

FUNCTIONAL RATING SCALE

Part 1: Cognitive and Social

	<i>Functions Normally</i>	<i>Mildly limited</i>	<i>Severely limited</i>	<i>Unable to rate</i>
<i>Thinking /Reasoning</i>	Student thinks and reasons normally, plays games, solves puzzles and problems comparably to other students the same age	Student is slow to solve age-appropriate puzzles and problems or learn new things, but may acquire these intellectual skills with instructional supports	Student has considerable difficulty solving age-appropriate puzzles and problems, lags far behind peers and may require individualized instruction to master even simple tasks.	Rater not familiar with student's thinking/reasoning
<i>Maintaining attention to classroom tasks</i>	Student usually attends to classroom instruction sufficiently to learn material.	Student's attention in class frequently wanders, sufficient to impair instruction, but the student can master classroom tasks with some instructional support.	Student has extreme difficulty attending to classroom material, even for short periods of time; student may act impulsively or withdraw frequently from classroom activities.	Rater not familiar with student's attention to classroom tasks
<i>Social Interaction /classroom behavior</i>	Student exhibits social skills and behavior that are appropriate for his/her age	Student exhibits some inappropriate behavior that may include fighting, biting, hitting, screaming. However, this behavior is not disruptive enough to require frequent separation of the student from the classroom.	Student frequently exhibits inappropriate social behavior and is often disruptive of classroom activities. Student often needs to be separated from the class.	Rater not familiar with student's social interaction and classroom behavior.

Part 2: Expressive and Receptive Communication

	<i>Functions Normally</i>	<i>Mildly limited</i>	<i>Severely limited</i>	<i>Does not know</i>	Unable to rate
<i>Expressive sign (only) communication</i>	Student communicates in sign expressively with his/her teacher and peers fluently and easily.	Student has some difficulty expressing him/herself in sign. However, difficulties can be overcome by repetition and explanation.	Student has considerable difficulty expressing him/herself using sign.	Student does not know or use sign.	Rater not familiar with student's expressive sign communication
<i>Receptive sign (only) communication</i>	Student comprehends the sign communication of others accurately and easily.	Student has some difficulty comprehending sign communication from others. Difficulties can be remediated by repetition and explanation.	Student has considerable difficulty comprehending sign communication from others.	Student does not know or use sign.	Rater not familiar with student's receptive sign communication
<i>Expressive spoken (only) communication</i>	Student communicates in spoken language expressively with his/her teacher and peers fluently and easily.	Student has some difficulty expressing him/herself in spoken language. However, difficulties can be overcome by repetition and explanation.	Student has considerable difficulty expressing him/herself in spoken language.	Student does not know or use spoken language.	Rater not familiar with student's expressive oral communication
<i>Receptive spoken (only) communication</i>	Student comprehends the spoken communication of others accurately and easily.	Student has some difficulty comprehending spoken communication from others. Difficulties can be remediated by repetition and	Student has considerable difficulty comprehending spoken communication from others.	Student does not know or use spoken language.	Rater not familiar with student's receptive oral communication

	<i>Functions Normally</i>	<i>Mildly limited</i>	<i>Severely limited</i>	<i>Does not know</i>	<i>Unable to rate</i>
		explanation.			
<i>Expressive simultaneous (spoken and signed) communication</i>	Student communicates using both spoken and sign language expressively with his/her teacher and peers fluently and easily.	Student has some difficulty expressing him/herself using spoken and sign language. However, difficulties can be overcome by repetition and explanation.	Student has considerable difficulty expressing him/herself in spoken and sign language.	Student does not know or use spoken and sign language simultaneously.	Rater not familiar with student's simultaneous expressive communication
<i>Receptive simultaneous (spoken and signed) communication</i>	Student comprehends the simultaneous (spoken and sign) communication of others accurately and easily.	Student has some difficulty comprehending simultaneous (spoken and sign) communication from others. Difficulties can be remediated by repetition and explanation.	Student has considerable difficulty comprehending simultaneous (spoken and sign) communication from others.	Student does not know or use simultaneous (spoken and signed) communication.	Rater not familiar with student's receptive simultaneous communication

Part 3: Functional Hearing

	<i>Functional Normally</i>	<i>Mildly limited</i>	<i>Severely limited</i>	<i>No functional hearing</i>	<i>Unable to rate</i>
<i>Functional hearing</i>	Student has negligible difficulty in receiving auditory information.	Student needs frequent spoken repetitions, occasional visual or tactile communication support or both.	Student realizes some benefit from auditory communication although unable to function adequately without visual or tactile communication.	Student receives no benefit from spoken communication.	Rater not familiar with student's functional hearing.

APPENDIX B

Teacher Events

Teacher Events

Teacher Events are subdivided into five main categories: Teacher Definition, Teacher Behavior, Teacher Approval, Teacher Focus, and Teacher Position. *Teacher Definition* refers to the role of the primary adult or person providing instruction with whom the child is interacting. Some examples are general education teacher, special education teacher, peer tutor, or instructional assistant. *Teacher Behavior* refers to the behavior of the above named person. Some examples of teacher behaviors are talk academic (Phoenix is the capital of Arizona.), question academic (What city is the capital of Arizona?), talk management (Open your workbooks to page 34.), and talk discipline (John, please pay attention.). *Teacher Approval* refers to the teacher's expression of approval or disapproval with class or student performance. It is coded as either approval, disapproval, or neither (neutral). *Teacher Focus* is defined as who the teacher is directing her attention to. This would be coded as either target, if the teacher is solely addressing the target student; target/other, if the teacher is addressing the target student and others in the class; other if the teacher is addressing a student or group of students that does not include the target student; or no one, if the teacher is not addressing or attending to anyone in particular, for example if the teacher is sitting at her desk grading papers. *Teacher position* refers to where the teacher is in the room related to the target student, for example front, back, or side. For a complete list of all teacher events recorded using the MS-CISSAR, see Table B1.

Table B1

Teacher Events

Event Category	Events to Record
Teacher Definition	Regular Education Teacher, Special Education Teacher, Aide, Student Teacher, Volunteer, Related Services, Substitute, Electronic Media Teacher ^a , No Staff
Teacher Behavior	Question Academic, Question Management, Question Discipline, Talk Academic, Talk Management, Talk Discipline, Talk Non-Academic, Non-Verbal Prompt, Attention, Read Aloud, Singing, No Response
Teacher Approval	Approval, Disapproval, Neither
Teacher Focus	Target, Target and Other, No One, Other
Teacher Position	In Front, At Desk, Out of Room, Side, Back, At Media

^aInstruction delivered via television or computer monitor as in on-line tutorial or educational video.

APPENDIX C
Descriptive Statistics

Table C1

Minutes Observed by Subject

	D/HH			Hearing			Combined Groups		
	Mean	SD	Sum	Mean	SD	Sum	Mean	SD	Sum
Total Minutes Observed	75.55	15.89	680	66.00	9.50	594	70.78	13.62	1274
Min. Obs. Reading	40.34	16.32	363	35.07	9.64	315	37.72	37.71	679
Min. Obs. Math	35.76	15.86	321	43.82	16.61	394	39.79	16.30	716
Min. Obs. Language	8.28	10.57	75	6.03	12.09	54.33	7.17	11.08	129
Min. Obs. Other	15.05	14.98	135	14.87	11.64	133.86	14.96	13.02	269

Table C2

Total Occurrences of Major Variables

	D/HH			Hearing			Combined Groups		
	Mean	SD	Sum	Mean	SD	Sum	Mean	SD	Sum
Academic Responding	29.52	8.13	266	38.78	8.32	358	34.65	9.57	624
Task Management	55.02	10.98	495	44.44	10.20	400	49.73	11.63	895
Competing Responses	10.37	7.79	93	11.66	11.71	105	11.01	9.67	198

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