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Knowledge of basic concepts in deaf/hard of hearing children

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**KNOWLEDGE OF BASIC CONCEPTS IN DEAF/HARD OF HEARING
CHILDREN**

By

Lauren Schafer

**An Independent Study
Submitted in partial fulfillment of the
Requirements for the degree of:**

Masters in Deaf Education

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Approved by:

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Abstract: Basic concept knowledge of children who were deaf/hard of hearing was tested using the Bracken Basic Concept Scale: 3rd Edition. These children were given both the receptive and expressive portions of the test. Results indicate delays in overall basic concept knowledge in children who are deaf compared to their normal-hearing peers.

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Abbreviations

1. Bracken Basic Concept Scale- Third Edition: Receptive (BBCS-3:R)
2. Bracken Basic Concept Scale- Expressive (BBCS:E)
3. School Readiness Composite (SRC)
4. Total Composite Score (TC)

INTRODUCTION

Students who are deaf and hard of hearing are known to have significant delays in both their expressive and receptive language skills (Yoshinaga-Itano, 2003). These delays stem from their lack of language acquisition in the earliest months of their lives. Due to this, by 2001, the majority of the 50 states in the United States mandated Universal Newborn Hearing Screening (Yoshinaga-Itano, 2003). Universal Newborn Hearing screening has resulted in the age of identification of hearing loss and age at entrance into intervention programs to drop from an average two-year level to within the first few months of life (Yoshinaga-Itano, 2003). In a study done by Yoshinaga-Itano, it was found that infants identified between birth and 2 months of age performed significantly better at 40 months of age than did later-identified infants on measures of general development and expressive language. The main purpose for newborn hearing screenings and early intervention programs is to provide these children who are deaf or hard of hearing a chance to develop appropriate communication skills and school readiness skills. Having these skills will allow these children a chance to successfully mainstream into a general education classroom (Harrington, DesJardin, Shea 2009).

School readiness skills are defined as “a quality that renders the child to participate successfully in a regular public school curriculum” (Carlton and Winsler, 1999). These skills are important for the academic development of young children. Most researchers and educators agree that the domains of physical development, emotional well-being, social competence, communication skills, and general knowledge are all areas of knowledge needed to be successful in school. Another important area of school readiness is mathematical concepts. In a study done by Ducan and colleagues (2007), it was found that the strongest predictor of later reading and

math abilities in normal-hearing children was school-entry math scores. These school readiness skills are important indicators of later academic achievement.

A basic concept can be defined as “a word in the most elementary sense, that is a label for one of the basic colors, comparatives, directions, materials, positions, quantities, relationships, sequences, shapes, sizes, social or emotional states and characteristics, textures, and times. Basic concepts are basic in the sense that they represent the most rudimentary concepts in these specific categorical areas.” (Bracken, 2009) Knowledge of basic concepts has been shown to be intricately related to a preschool child’s overall cognitive development (Wilson, 2004). These concepts represent the fundamental, functional vocabulary needed to understand classroom conversations and teacher directions. It also has been found that knowledge of basic concepts directly correlates with overall vocabulary development, language development, and school readiness skills. Basic concepts have been identified by some researchers as the foundation of early childhood knowledge (Bracken and Crawford 2009). Because of this, most states in the United States include basic concepts in their educational standards. It is important to test the knowledge of these basic concepts in young children to assess their overall school readiness ability and where the children’s strengths and weaknesses lie.

The Bracken Basic Concept Scale, Third Edition: Receptive (BBCS-3:R, Bracken 2006) in conjunction with the Bracken Basic Concept Scale: Expressive (BBCS:E; Bracken 2006) is a formal assessment tool used to measure the knowledge of basic concepts in young children. It assesses cognitive abilities through the development of concepts thought to be the most rudimentary units of intelligence and language (Howell and Bracken 1992). These tests have been found to be a good predictor of children’s school readiness ratings as well as for their

retention or referral for services (Panter, 2009). Basic concepts extend the importance of vocabulary because concepts are cognitively more complex and functional than common vocabulary terms. Because of this, basic concepts predict both reading and mathematics abilities better than do traditional vocabulary tests. Therefore, the BBCS-3:R in conjunction with the BBCS:E is a good predictor of school readiness skills and overall academic achievement (Bracken, 2011).

Oral language and cognitive abilities contribute to school readiness skills, or conceptual knowledge, for young children with hearing loss. Because children with hearing loss have delays in their oral language skills, prior findings suggest that preschool to primary-age children with hearing loss may be at a serious risk for acquiring conceptual knowledge (Harrington et. al 2009). Previous research has found that when administering the BBCS-3:R and the BBCS:E to children who are deaf or hard of hearing, these children scored approximately two standard deviations below the typically developing children in the normative sample (Harrington et al., 2009). Children with hearing loss demonstrate significant delays in receptive and expressive vocabulary skills compared to age-matched children with normal hearing. In a study done by Sarant and colleagues (2008), children with hearing loss were compared to typically-developing children with normal hearing on several language measures and it was found that half of the children with hearing loss had significant language delays. Knowing this, it is no surprise that children who are deaf and hard of hearing would perform below their normal hearing peers when given the BBCS-3:R and the BBCS:E. However, this previous research did not take into account communication modalities, the age of intervention, type of amplification devices used by the children, and in what type of program the children were enrolled. Any of these factors might

have an impact on how children with hearing loss perform on the assessment and their overall school readiness.

This study will examine how deaf and hard of hearing children age five and six years perform on the BBCS:3-R and BBCS:E. These children will all be enrolled full time in an auditory-oral school for the deaf and wear hearing aids and/or cochlear implants. The study will examine how these children compare to their age-matched normal-hearing peers in their basic concept knowledge. It also will examine in what areas of basic concepts these children have deficits and in what areas they are performing well. This information will be useful for educators of the deaf to see where their students are doing well and in what areas there needs to be more focus, so these children will have the school readiness skills to excel in the mainstream general education setting. In summary, the current study has two goals: to see how children enrolled in an auditory-oral program compare to their age-matched normal-hearing peers in basic concept knowledge and to see where the strengths and weaknesses lie within these concepts in order to help educators see where the focus needs to be in educating these children in order to improve their school readiness skills.

METHOD

Participants

Ten children who are deaf participated in this study. No hard of hearing children currently enrolled in the two schools met the inclusion criteria. Inclusion criteria consisted of children who were enrolled full time in an auditory-oral school for the deaf and were between 5 and 6 years, 11 months of age. None of these children have known cognitive or physical disabilities. The children consisted of three females and seven males and ranged in age from 5

years, 7 months to 6 years, 11 months ($M=6$ years, 1 month). All of the children have a bilateral sensorineural hearing loss, with either a profound loss or a severe-profound loss in both ears. These children were identified with a hearing loss between the ages of birth and 3.5 years ($M=14.6$ months). They began receiving services in an auditory-oral school for the deaf between the ages of 4 months to 4 years ($M=30.6$ months).

All of the children tested used a cochlear implant (CI) in at least one ear. Each child was implanted after using a hearing aid for several months before the ear was implanted. The average age at implantation was 27 months, with length of implant use ranging from 2 to 5 years. At the time of testing, 3 children used a hearing aid in the ear that was not implanted. All devices were activated and in good working order during testing.

Procedures

Participating children were selected from two private, auditory-oral schools in St. Louis, Missouri: Central Institute for the Deaf and the Moog Center for Deaf Education. The Principal of Central Institute for the Deaf and the Director of the Moog Center for Deaf Education were contacted through email asking whether or not they would be willing to have their students participate in this study. Both agreed and provided the researcher with names of children who fit the criteria. A packet was then sent out to the parents of these children by the school. The packet included a letter that explained the study (Appendix A), a consent form attached, a brief parent questionnaire, and a self-addressed stamped envelope. The questionnaire asked basic information about the child such as his/her date of birth, when he/she was identified with a hearing loss, the age of amplification, and the age he/she began attending an auditory-oral school for the deaf (Appendix B). The parents filled out the consent form (Appendix C) and the

questionnaire and mailed them back to the researcher. The researcher then contacted the schools and set up times to test the ten children.

Tests were administered individually to the children in a comfortable room in their school. For each student, a time was selected during the school day that did not unduly disrupt the student's school schedule. Frequent breaks were offered throughout the 45-minute test session, which occurred over a period of one day. The BBCS-3:R was administered to each child first, followed by the BBCS:E.

Measures

Both the BBCS-3:R and the BBCS:E were administered to all children.

The BBCS-3:R measures a child's comprehension of 282 foundational and functionally relevant concepts in ten conceptual categories. The BBCS:E measures a child's ability to verbally label basic concept in these same categories. There are ten subtests: Colors, Letters, Numbers/Counting, Size/Comparisons, Shapes, Direction/Position, Self-/Social Awareness, Texture/Material, Quantity, and Time/Sequence. The easel-backed stimulus book contains colorful, stimulating, and developmentally-appropriate visual stimuli designed to capture young children's attention and interest. This standardized test is individually administered and presented orally within the context of complete sentences. The BBCS-3:R and the BBCS:E have good reliability for the total test as well as for each subtest and have been documented as a valid screening instrument to predict academic achievement in young, typically-developing children who have normal hearing (Harrington et. al, 2010).

The first five subtests make up the *School Readiness* subtests and are designed to assess educationally relevant concepts children have traditionally needed to know to be prepared for

early formal education. The raw scores from each subtest are added together and this number is converted into a scaled score. This scaled score is called the School Readiness Composite (SRC). The SRC is a score designed to show the school readiness ability of the child. These first five subtests are:

Colors: This subtest includes colors that represent primary colors and those identified as basic color terms for all languages.

Letters/Sounds: This subtest includes upper and lower case letters and sounds that correspond to letters.

Numbers/Counting: This subtest includes single-and double-digit numerals and assigning number value to a set of objects.

Size/Comparisons: This subtest includes concepts that describe one dimension, two dimensions, or three dimensions. This subtest also measures a child's ability to match, differentiate, or compare objects based on one or more of their salient characteristics.

Shapes: This subtest includes two-and three- dimensional shapes. Two-dimensional shapes are represented by concepts such as circle, square, and triangle, and three-dimensional shapes include concepts such as cube and pyramid.

The BBCS-3:R and the BBCS:E total test scores reflect a combination of the first five subtests as described above and five additional subtests:

Direction/Position: This subtest includes relational terms that describe the placement of an object relative to another object or objects (e.g. *behind*, *under*), the position of an

object relative to itself (e.g. *together, closed*), or a direction of placement (e.g. *left, corner, center*).

Self-Social Awareness: This subtest represents a conceptual domain that is measured infrequently by preschool and primary language scales. The Self-Awareness items of this subtest include concepts referencing emotional states. Social awareness includes terms to describe kinship, gender, relative ages, and social appropriateness (e.g. *father, female, young, wrong*).

Texture/Material: This subtest includes terms that describe salient characteristics or attributes of an object (e.g. *heavy, hot, sharp*) or the basic composition of an object (e.g. *wood, glass, metal*).

Quantity: This subtest includes quantity terms that describe the degree to which objects exist and the space that these objects occupy (e.g. *all, full, triple*).

Time/Sequence: This subtest includes temporal or sequential terms (e.g. *after, second*).

Raw scores for each of the five subtests are converted into scaled scores. A Total Composite Score (TC) is computed by summing the scaled scores of the SRC and the five additional subtests and converting the sum to a composite score using the table in Appendix B in the manual. This TC score shows the complete basic concept knowledge skill level.

RESULTS

After each child was tested, his/her raw scores were calculated for each subtest for both the BBCS-3:R and the BBCS:E. The raw scores were then converted into scaled scores based on the norms developed for hearing children. Subtest scaled scores are normative scores used specifically to compare the child's test performances to the performances of children of the age-matched norm group. These scores are derived from the subtest raw scores and are converted to a score scale with a mean (*M*) of 10 and a standard deviation (*SD*) of 3, therefore the average range for scaled scores on the BBCS-3:R and the BBCS:E is from 8 to 12.

The Total Composite and the School Readiness Composite are determined by different methods. The Total Composite is derived from the sum of subtest scaled scores. In comparison, the School Readiness Composite is derived from subtest raw scores. Both of these sums are converted to a standard score with a mean (*M*) of 100 and a standard deviation (*SD*) of 15, therefore the average range for standard scores on the BBCS-3R and the BBCS:E is from 86-114. Table 1 describes the conceptual development levels for scaled and standard scores.

The first objective of this study was to see how children who are deaf enrolled in auditory-oral schools for the deaf compare to their age-matched normal-hearing peers on this test. Table 2 shows the composite standard scores of the deaf children for Receptive Total Composite (Receptive TC), Receptive School Readiness Composite (Receptive SRC), Expressive Total Composite (Expressive TC) and Expressive School Readiness Composite (Expressive SRC).

Individual Receptive TC scores ranged from 53 (very delayed) to 99 (average), with a mean Receptive TC score of 76 (delayed).

Individual Expressive TC scores ranged from 55 (very delayed) to 110 (average), with a mean Expressive TC score of 82.8 (delayed).

Individual Receptive SRC scores ranged from 69 (very delayed) to 112 (average), with a mean Receptive SRC score of 88.2 (average).

Individual Expressive SRC scores ranged from 84 (delayed) to 116 (advanced), with a mean Expressive SRC of 102.1 (average).

The second objective of this study was to identify specific strength and weaknesses in children who are deaf basic concept knowledge. Table 3 shows the scaled scores of the deaf children for all subtests of the BBCS-3:R.

Individual SRC scores ranged from 4 (very delayed) to 12 (average) with a mean score of 7.8 (delayed).

Individual scores on *Direction/Position* subtest ranged from 1 (very delayed) to 11 (average) with a mean score of 5.3 (delayed).

Individual scores on the *Self/Social Awareness* subtest ranged from 2 (very delayed) to 10 (average) with a mean score of 5.9 (delayed).

Individual scores on the *Texture/Material* subtest ranged from 1 (very delayed) to 9 (average) with a mean score of 4.8 (very delayed).

Individual scores on the *Quantity* subtest ranged from 3 (very delayed) to 12 (average) with a mean score of 5.8 (delayed).

Individual scores on the *Time/Sequence* subtest ranged from a 1 (very delayed) to 10 (average) with a mean score of 5.9 (delayed).

Table 4 shows the scaled scores of the deaf children for all subtests of the BBCS:E.

Individual Expressive SRC scores ranged from 4 (very delayed) to 13 (advanced) with a mean score of 10 (average).

Individual expressive scores on *Direction/Position* subtest ranged from 3 (very delayed) to 9 (average) with a mean score of 6.7 (delayed).

Individual expressive scores on the *Self/Social Awareness* subtest ranged from 2 (very delayed) to 12 (average) with a mean score of 6.9 (delayed).

Individual expressive scores on the *Texture/Material* subtest ranged from 3 (very delayed) to 11 (average) with a mean score of 8.2 (average).

Individual expressive scores on the *Quantity* subtest ranged from 3 (very delayed) to 9 (average) with a mean score of 4.8 (very delayed).

Individual expressive scores on the *Time/Sequence* subtest ranged from a 1 (very delayed) to 10 (average) with a mean score of 7.0 (delayed).

DISCUSSION

The first goal of this study was to see how children who are deaf or hard of hearing enrolled in auditory-oral schools for the deaf compare to their age-matched normal-hearing peers in basic concept knowledge and school readiness skills. The results of this study show that, overall, the children in this sample performed below the average range in their overall basic

concept knowledge, as determined by their TC scores. These results support Harrington and colleagues findings (Harrington et. Al 2010) that children who are deaf or hard of hearing on average perform below the average range when compared to their age-matched hearing peers. However, overall, these children had age-appropriate school readiness skills when compared to their age-matched normal-hearing peers as measured by their SRC scores.

For the children who were included in the normative sample for the Bracken Basic Concept Scale, Third Edition, 47.2% of them received a higher Expressive TC composite score than a Receptive TC score and 46.7% received a higher Receptive TC composite score than an Expressive TC score. Similarly, 47.7% of the children included in the normative sample received a higher Expressive SRC composite score than Receptive SRC composite score and 47.7% received a higher Receptive SRC composite score than an Expressive SRC composite score (Bracken, 2006). For the deaf children in this study, 80% of them received a higher Expressive TC composite score than Receptive TC composite score and all of them received a higher Expressive SRC composite score than Receptive SRC composite score. This difference may be due to how deaf children learn vocabulary. Due to their hearing loss, they may not have the same benefit of “incidental learning” as their hearing peers so their receptive vocabularies may not be as extensive. Hearing children understand many more words than they produce because they have been exposed to them auditorily from birth. For deaf children, much of the vocabulary they learn may have been explicitly taught so that the vocabulary they understand and the vocabulary they produce may be very similar. A future study could examine the scores these 10 children receive on traditional receptive and expressive vocabulary tests to see if the children in this sample typically perform better on the expressive test than the receptive test.

The second goal of this study was to determine the specific strengths and weaknesses of children who are deaf or hard of hearing related to basic concept knowledge and school readiness skills. Previous studies have not provided this information and it is important for teachers of the deaf to know in what areas there are weaknesses so that these may be addressed. Receptively, 5 out of 10 children in this study scored within the average range on *School Readiness Skills*, 4 scored within the average range on *Texture/Material*, 3 scored in the average range on *Self/Social Awareness*, 2 scored within the average range on *Direction/Position*, 2 scored in the average range on *Time/Sequence*, and only 1 scored in the average range on *Quantity*. Expressively, 9 out of 10 children in this study scored within the average range on *School Readiness Skills*, 7 scored in the average range on *Texture/Material*, 5 scored in the average range on *Self/Social Awareness*, 5 scored in the average range on *Time/Sequence*, 4 scored in the average range on *Direction/Position*, and only 1 scored in the average range on *Quantity*. The results of this study show that both receptively and expressively, these deaf children are doing the best at understanding and producing the concept categories included in *School Readiness Skills* and the worst in understanding and producing the concepts assessed in *Quantity*.

With this information it can be identified in what specific areas teachers of the deaf need to focus their attention on in order to instill in their students the basic concept knowledge needed to succeed in a mainstream classroom. After analyzing data and identifying specific concept areas that were difficult for these deaf children, there are several areas on which teachers of the deaf should focus their attention. The majority of children in this study did not have difficulty understanding or producing numbers and counting as assessed by the *School Readiness* subtests. Their greatest difficulty was with understanding and being able to produce the higher level mathematics concepts that are assessed in the *Quantity* subtest such as part/whole, relative

quantity (e.g. *lots, few, many, nothing*), volume (e.g. *full, empty*), comparatives (e.g. *more than, less than*), multiples (e.g. *double, pair, triple*), fractions (e.g. *half, third*), and the use and understanding of mathematical signs (e.g. +, -). Understanding of these concepts can contribute to the language that enables children to talk about numbers and counting in ways that communicate and generalize knowledge beyond the number of the objects being measured, weighed, counted, divided, distributed, or otherwise treated mathematically (Bracken, 2006).

When analyzing the data from the receptive and expressive subtests of *Quantity*, three concept areas were difficult for the children in the study: part whole, comparatives, and multiples.

Direction/Position is another area in which many concepts were unknown. Direction and location concepts describe the relative location or position of objects in space. Children first view objects in locations from their own perspective then progress to having the ability to take another's perspective. In addition to perspective, direction and position concepts are most frequently represented as prepositions. These include concepts that address vertical (e.g. *above, below, up, down*) horizontal (e.g. *right, left, next to*), three dimensional (e.g. *around, through*), internal/external (e.g. *in, out, between*), and relative proximity (e.g. *near, close, far*), and the child's perception of front or back. When analyzing the data from the receptive and expressive *Direction/Position* subtests, three concept areas were difficult for the children of this study: internal/external, relative proximity, and the child's perception of front and back.

Time/Sequence is another area in which many concepts were unknown. This subtest deals with children's knowledge and awareness of natural events (e.g. *morning, daytime, night*), temporal order of events (e.g. *starting, before, finished*), temporal absolutes (e.g. *never, always*),

scheduling (e.g. *early, arriving, leaving*), speed (e.g. *fast, slow*), relative age (e.g. *new, old*), and descriptive temporal nuances (e.g. *nearly, waiting, just*). It also considers the mathematical nature of seriation (e.g. *first, second, third*) and frequency (e.g. *once, twice*) (Bracken 2006). When analyzing the data from the receptive and expressive *Time/Sequence* subtests, four concept areas were difficult for the children in this study: temporal absolutes, scheduling, temporal nuances, and seriation.

Finally, *Self/Social Awareness* is an area in which many concepts were unknown. As with academic content areas, children's sense of self and formation of self-concepts are developmental in nature (Bracken 1996). This subtest assesses knowledge associated with gender, familial relations (e.g. *brothers, sisters, father, mother*), age, health and physical awareness (e.g. *tired, healthy, sleepy, relaxing*), affective states (e.g. *happy, sad, smiling, angry*), and social mores (e.g. *right, wrong, difficult, easy*). When analyzing the data from the receptive and expressive *Self/Social Awareness* subtest, three specific concepts were difficult for children in this study: health and physical awareness, affective states, and social mores. These three concept areas typically are later developing in normal-hearing children.

There are some limitations to this study. First is the small sample size. Only 10 children participated, all of whom came from only two auditory-oral schools for the deaf in the same city. The results of this study would be more reliable if there was a larger sample size and the children came from a variety of schools across the country. Due to the time constraints and the logistics of testing the children, testing in other states or schools was not feasible.

Another limitation is that this study did not include any participants who previously were enrolled in auditory-oral schools for the deaf but are currently enrolled in kindergarten and first

grade mainstream classrooms. It is quite possible that these children have better conceptual knowledge than the majority of the children in this study so they were able to mainstream successfully in the early grades.

A third limitation of this study may be the rapport between the examiner and the participants as these participants did not know the testing examiner. Although the examiner attempted to establish good rapport with each child, the children may have been more open and attempted to guess when they did not know an answer if the examiner was someone with whom they were familiar. This potentially could have had an effect on the participants' responses. It may have been beneficial to spend more time with the participants before the testing sessions began.

In summary, this study suggests that when it comes to school readiness skills, children who are enrolled in auditory-oral schools for the deaf, have a mean score within the average range in both the BBCS-3:R and the BBCS:E when compared to their age-matched normal-hearing peers. This implies that children have a good foundation in the following categories: *Colors, Letters/Sounds, Numbers/Counting, Size/Comparisons* and *Shapes*. Deaf children demonstrated greater difficulty in the other subtests that were included in the TC composite scores: *Direction/Position, Self/Social Awareness, Texture/Material, Quantity*, and *Time/Sequence*, with the only mean score to fall within the average range being in the expressive *Texture/Material* subtest. Concepts of quantity were the weakest basic concept area for these children. It is important for teachers of the deaf to know where these weaknesses lie, specifically in what areas of these concepts, in order to better help develop basic concept knowledge in children who are deaf or hard of hearing. It is also vital for these teachers to expose their students to higher level vocabulary in order to help develop the basic concept knowledge in their

students. If teachers of the deaf can work on these areas, it may be that children who are deaf or hard of hearing will have the school readiness skills and basic concept knowledge necessary to be successful in the mainstream environment in the early grades.

It is recommended that schools for the deaf should consider using the BBCS-3:R and the BBCS:E as part of their annual testing. These tests are intended to be administered by individuals who have experience or training in administering, scoring, and interpreting standardized tests. This would include speech language pathologists, psychologists, educational diagnosticians, early childhood teachers, and special education teachers (Bracken, 2006). The manual also provides a form for parent-teacher conferences in which teachers can mark concepts as mastered or not mastered. This would allow them to see which specific concepts in each category the children understand and/or produce. The results of these tests, therefore, would provide one more piece of information to determine whether or not a child is ready to enter a mainstream classroom.

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Table 1

Conceptual Development Levels

Scaled score	Standard Score	Conceptual Development
16-19	130 and above	Very Advanced
13-15	115-129	Advanced
8-12	86-114	Average
5-7	71-85	Delayed
1-4	70 and below	Very Delayed

Table 2

Table of Composite Standard Scores for both Receptive and Expressive portions of BBCS

	Receptive TC Composite Score	Expressive TC Composite Score	Receptive SRC Composite Score	Expressive SRC Composite Score
Child 1	60	76	89	99
Child 2	95	100	112	116
Child 3	66	81	73	101
Child 4	73	88	93	106
Child 5	79	87	81	86
Child 6	79	78	86	106
Child 7	53	55	69	84
Child 8	99	97	98	112
Child 9	73	71	83	97
Child 10	83	95	98	114

Table 3

Table of Receptive Scaled Scores on the BBCS-3: R

	1-5 SRC	6 Direction/ Position	7 Self/Social Awareness	8 Texture/ Material	9 Quantity	10 Time/ Sequence
Child 1	8	5	2	3	3	1
Child 2	12	11	7	9	7	9
Child 3	5	5	6	4	4	3
Child 4	9	4	5	5	4	7
Child 5	6	5	8	8	7	5
Child 6	7	5	7	7	7	6
Child 7	4	1	1	1	3	5
Child 8	10	4	9	8	6	6
Child 9	7	5	4	6	5	7
Child 10	10	8	10	9	12	10

Table 4

Table of Expressive Scaled Scores on the BBCS:E

	1-5 SRC	6 Direction/ Position	7 Self/Social Awareness	8 Texture/ Material	9 Quantity	10 Time/ Sequence
Child 1	10	6	4	8	4	5
Child 2	13	8	11	10	9	9
Child 3	10	8	6	7	6	5
Child 4	11	7	9	8	4	10
Child 5	8	9	9	11	3	8
Child 6	10	7	2	9	4	7
Child 7	4	3	3	3	3	1
Child 8	13	8	10	9	5	10
Child 9	9	5	3	6	4	5
Child 10	12	6	12	11	6	10

Appendix A



SCHOOL OF MEDICINE

**Program in Audiology and
Communication Sciences**

Graduate Programs
Audiology
Deaf Education
Speech and Hearing Sciences

November 1, 2011

Dear Parents,

I am writing to let you know about a new research project that is going to be conducted at Washington University in St. Louis through the Program in Audiology and Communication Sciences. I am currently a second year graduate student in the program and this research study will be part of my independent study. My advisor for this project is Karen Kupper, the Testing Coordinator at the Moog Center for Deaf Education and a Lecturer at Washington University in the Program in Audiology and Communication Sciences. I thought you may be interested in learning about this project and perhaps allowing your child to participate in this study.

The primary goal of this study is to examine the following question: How does the knowledge of basic concepts in kindergarten-aged children enrolled in auditory-oral schools compare to their same-age normal-hearing peers? Basic concepts are labels for the most rudimentary concepts in different categorical areas such as directions, colors, relationships, or quantities. Knowledge of basic concepts is important because it represents the foundational language terms used to describe the world that young children experience on a daily basis, crucial for student/teacher interactions in a classroom setting.

Children who participate in this study will be administered all the receptive and expressive subtests of the Bracken Basic Concept Scale, Third Edition. This activity will take approximately 25-35 minutes for each student. The session will be carried out at your child's school at a time that minimizes the disruption of other activities. The children will receive a small prize, such as a piece of candy or small toy, at the end of the session. Each child will be assigned an identification number and all data collected will be linked only to this number to keep all information completed confidential.

The information I gain from this study can be used in the future to improve the transition of children who have hearing loss into mainstream classrooms. If you have any questions, please don't hesitate to contact me at lschafer@wustl.edu (480-343-3406), Karen Kupper at kkupper@moogcenter.org (314-692-7172), or Dr. Heather Hayes at hhayes@wustl.edu (314-747-0109).

If you would like your child to participate in this study, please return the attached short questionnaire to me in the self-addressed envelope by December 1, 2011.

Sincerely,

Lauren Schafer

Appendix C

INFORMED CONSENT DOCUMENT

Project Title: Knowledge of Basic Concepts in Deaf/Hard of Hearing Children

Principal Investigator: Lauren Schafer

Research Team Contact: Karen Kupper, kkupper@moogcenter.org

- If you are the parent/guardian of a child under the age of 18 who is being invited to participate in this study, the word “you” in this document refers to your child. As the parent/guardian, you will be asked to read and sign this document to give permission for your child to participate.
- If you are 18 years of age or older and reading this document, the word “you” in this document refers to you. You will be asked to read and sign this document to indicate your willingness to participate.

This consent form describes the research study and helps you decide if you want to participate. It provides important information about what you will be asked to do during the study, about the risks and benefits of the study, and about your rights as a research participant. By signing this form you are agreeing to participate in this study.

- If you have any questions about anything in this form, you should ask the research team for more information.
- You may also wish to talk to your family or friends about your participation in this study.
- Do not agree to participate in this study unless the research team has answered your questions and you decide that you want to be part of this study.

WHAT IS THE PURPOSE OF THIS STUDY?

This is a research study. We invite you to participate in this research study because you are a 5-6 year old child with a known hearing loss, attend an auditory-oral school for deaf/hard of hearing students, and wear a hearing aid or cochlear implant.

The purpose of this research study is to examine how the knowledge of basic concepts of kindergarten-aged children enrolled in auditory-oral schools for deaf/ hard of hearing students compares to their same-age normal-hearing peers. Basic concepts are labels for the most rudimentary concepts in different categorical areas such as directions, colors, relationships, or quantities. Knowledge of basic concepts is important because it represents the foundational language terms used to describe the world that young children experience on a daily basis (crucial for student/teacher interactions in a classroom setting.) This study also will explore possible reasons for why the scores for the deaf/hard of hearing children are the same as or different from the normative sample.

WHAT WILL HAPPEN DURING THIS STUDY?

- **What is going to happen to the participant as part of this study?**
 1. You will come to the testing area located in your school where you will meet the investigator. (Testing will take place in your school at a time that will not disrupt other instruction.)
 2. You will be told about the study and asked if you are willing to participate.
 3. The investigator will administer the Bracken Basic Concept Scale to you. You will be asked to point to pictures or answer questions about pictures.
 4. You will be there for 25-40 minutes.
 5. After you are finished taking the test, the investigator will thank you for your time and provide a small prize, such as a piece of candy or small toy.
 6. No further commitment is needed from you; once you are finished taking the test, your participation in the study will be completed.
- **What is being asked of parents**
 - You will be asked to complete a short questionnaire about your child's hearing loss. You may choose to not answer any of the questionnaire questions.
 - The information you provide about your child's hearing loss will be kept in a locked file cabinet. Any information that is entered in the computer will be stored in a password protected file.

HOW MANY PEOPLE WILL PARTICIPATE?

Approximately 10 people will take part in this study conducted by investigators at Washington University.

HOW LONG WILL I BE IN THIS STUDY?

If you agree to take part in this study, your involvement will last for one testing session lasting 25-40 minutes.

WHAT ARE THE RISKS OF THIS STUDY?

No foreseeable risks in this study

WHAT ARE THE BENEFITS OF THIS STUDY?

You will not directly benefit from being in this study. However, the investigators hope that in the future, other deaf/hard of hearing children may benefit from this study because it will provide valuable information about the school readiness skills of children who are deaf/hard of hearing. It may show concept areas in which teachers of the deaf need to concentrate in order to make transition into the mainstream school setting easier.

WILL IT COST ME ANYTHING TO BE IN THIS STUDY?

You will not have any costs for being in this research study.

WILL I BE PAID FOR PARTICIPATING?

You will not be paid for being in this research study.

HOW WILL YOU KEEP MY INFORMATION CONFIDENTIAL?

We will keep your participation in this research study confidential to the extent permitted by law. However, it is possible that other people such as those indicated below may become aware of your

participation in this study and may inspect and copy records pertaining to this research. Some of these records could contain information that personally identifies you.

- Government representatives, (including the Office for Human Research Protections) to complete federal or state responsibilities
- University representatives, to complete University responsibilities
- Washington University's Institutional Review Board (a committee that reviews and approves research studies)

To protect confidentiality:

- during the recruitment process, letters will be sent to the parents of selected students by the school director.
- the test will be conducted in a room that is not near other classrooms so other children will not know who is or is not participating in the study.
- the recording sheet the investigator uses to record your responses will only have your identification number and not your name recorded.
- these recording sheets will remain securely in the principal investigator's possession until they are transferred to the faculty advisor's locked file cabinet where they will be stored, and only accessed when reviewing the data.

If we write a report or article about this study or share the study data set with others, we will do so in such a way that you cannot directly be identified.

Protected Health Information (PHI) is health information that identifies you. PHI is protected by federal law under HIPAA (the Health Insurance Portability and Accountability Act). To take part in this study, you must give the research team permission to use and disclose (share) your PHI for the study as explained in this consent form. The research team will follow state and federal laws and may only share your health information with the agencies and people listed under the previous section titled, "HOW WILL YOU KEEP MY INFORMATION CONFIDENTIAL?"

Once your health information is shared with someone outside of the research team, it may no longer be protected by HIPAA.

The research team will only use and share your information as explained in this form. When possible, the research team will make sure information cannot be linked to you (de-identified). Once information is de-identified, it may be used and shared for other purposes not discussed in this consent form. If you have questions or concerns about your privacy and the use of your PHI, please contact the University's Privacy Officer at: 866-747-4975.

Although you will not be allowed to see the study information, you may be given access to your health care records by contacting your health care provider.

If you decide not to sign this form, it will not affect

- your treatment or the care given by your health provider.
- your insurance payment or enrollment in any health plans.
- any benefits to which you are entitled.

Refusal to sign this consent form precludes you from taking part in the study.

If you sign this form:

- you authorize the use of your PHI for this research study.
- your signature and this form will not expire as long as you wish to participate.
- you may later change your mind and not let the research team use or share your information (you may revoke your authorization).
 - To revoke your authorization, complete the withdrawal letter, found in the Participant section of the Human Research Protection Office website at <http://hrpo.wustl.edu> (or use the direct link: <http://hrpohome.wustl.edu/participants/WithdrawalTemplate.rtf>) or you may request that the investigator send you a copy of the letter.
 - **If you revoke your authorization:**
 - the research team may only use and share information already collected for the study.
 - your information may still be used and shared if necessary for safety reasons.
 - you will not be allowed to continue to participate in the study.

IS BEING IN THIS STUDY VOLUNTARY?

Taking part in this research study is completely voluntary. You may choose not to take part. If you choose to participate in this study, you may stop participating at any time. If you decide not to be in this study, or if you stop participating at any time, you won't be penalized or lose any benefits for which you otherwise qualify

WHAT IF I DECIDE TO WITHDRAW FROM THIS STUDY?

You may withdraw by telling the study team you are no longer interested in participating in the study.

WHAT IF I HAVE QUESTIONS?

We encourage you to ask questions. If you have any questions about the research study itself, please contact Lauren Schafer at: 480-343-3406. If you feel that you have been harmed in any way by your participation in this study, please contact Heather Hayes at: 314- 747-0104 or Karen Kupper at: 314-692-7172.

If you have questions, concerns, or complaints about your rights as a research participant please contact the Human Research Protection Office, 660 South Euclid Avenue, Campus Box 8089, St. Louis, MO 63110, (314) 633-7400, or 1-(800)-438-0445 or email hrpo@wusm.wustl.edu. General information about being a research participant can be found by clicking “Participants” on the Human Research Protection Office web site, <http://hrpohome.wustl.edu>. To offer input about your experiences as a research participant or to speak to someone other than the research staff, call the Human Research Protection Office at the number above.

This consent form is not a contract. It is a written explanation of what will happen during the study if you choose to participate. You are not waiving any legal rights by agreeing to participate in this study.

Your signature indicates that this research study has been explained to you, that your questions have been answered, and that you agree to take part in this study. You will receive a signed copy of this form.

Do not sign this form if today’s date is after EXPIRATION DATE: 12/13/12.

(Signature of Participant)

(Date)

(Participant's name – printed)

Parent/Guardian Name and Relationship to Participant:

Do not sign this form if today's date is after EXPIRATION DATE: 12/13/12.

(Child's name – printed)

(Signature of Parent/Guardian) (Date)

(Name of Parent/Guardian- printed) (Relationship to participant – printed)

Statement of Person Who Obtained Consent

The information in this document has been discussed with the participant or, where appropriate, with the participant's legally authorized representative. The participant has indicated that he or she understands the risks, benefits, and procedures involved with participation in this research study.

(Signature of Person who Obtained Consent)

(Date)

(Name of Person who Obtained Consent - printed)