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Bimodal and Bilingual: Language Characteristics of ASL and English Users

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University of Arkansas

Undergraduate Honors Thesis

Communication Sciences and Disorders

Spring 2021

Paper Outline:

- I. Introduction
 - A. Incidence and Prevalence of Deafness
 - B. Congenital Deafness - how many babies are born with profound hearing loss?
 - C. ASL use - how many individuals use both ASL and English to communicate
 - D. Statement of the problem: Is there an accepted or standard operational definition of bimodal/bilingual in the literature within the field of Deaf Education?
- II. ASL
 - A. History / origins of ASL
 - B. When ASL was first considered a “language”
- III. Properties of Language
 - A. Semantics
 - B. syntax
 - C. phonology
 - D. morphology
 - E. Pragmatics
- IV. Purpose of the study
 - A. XX people use ASL, a full and complete language, to communicate
 - B. Many hearing people, including CODAs, are proficient in both ASL and English to communicate.
 - C. Research question - What operational definition of bimodal/bilingual is used in the literature within the field of Deaf Education for Deaf individuals?

Bimodal bilingualism is the use of both an oral and a sign language, which in the United States often includes the ability to perceive and produce both American Sign Language (ASL) and spoken English (Emmory, Borinstein, Thompson, & Gollan, 2008). The primary focus of this research is to examine the operational definition of bilingualism, specifically when English and ASL are the two languages used, within the scholarly journals in the related field of deaf education. There is an abundant amount of research regarding language of children and adults who are deaf or hard of hearing (d/hh); however, it is unclear if researchers are using a similar definition when describing the characteristics of bimodal / bilingual communication. This study uses a content search of scholarly literature in the field of deaf education to provide descriptive information of the operational definitions used in research when referring to individuals who are bilingual in ASL and English.

Introduction

Language is an incredibly important aspect of human development. While all humans are born with a capacity to learn language, there are ways in which language development can be encouraged through interaction and reinforcement with parents or caregivers (Allen & Kelly, 2015). Understanding how language develops in children who are learning two languages can provide a better understanding of language development in general. Significant data has been collected on the language development of children with typical hearing from birth to age five, beginning with cooing sounds and cries that reflect the infant's needs and progressing to producing speech sounds to forming words to eventually telling a short story. Less is known about the language development for children who are deaf or hard of hearing (d/hh), as they have diverse access to language models (Scott & Dostal, 2019).

In the United States, approximately two to three out of 1,000 children are born with a unilateral or bilateral hearing loss. Of these children, more than 90% of them were born to hearing parents, which has an effect on their language acquisition (NIDCD, 2016). Hearing loss can be either congenital or acquired. Congenital hearing loss is present at birth, or very soon after. The causes for this type of hearing loss can be attributed to hereditary characteristics or complications during pregnancy or childbirth. Acquired hearing loss has many different causes and can occur at any age. Some causes are specific medications, chronic ear infections, infectious diseases (WHO, 2013). Children who are d/hh may learn language through easily accessible visual languages or communication systems, including American Sign Language (ASL) or through using hearing technology with intense therapy that focuses on listening and spoken language skills.

It has been observed that d/hh children develop language at a rate is similar to that of a hearing child when provided access to a full and complete language, either through hearing technology and intervention or a full and complete model of ASL (Scott & Dostal, 2019). Extensive research has been conducted to determine how language is acquired for hearing children. Hearing children who were born to hearing parents acquire their language in the home and their environment because of increased exposure. This is similar to children who are born deaf with Deaf parents. They also acquire their parent's native language -American Sign Language- at a similar rate and manner, compared to their hearing peers acquiring oral language. However, children who are born deaf to hearing parents often do not have the exposure to ASL in the home. The majority of deaf children are born to parents who are hearing who usually do not possess knowledge of American Sign Language (Maller, 1999).

While we know the language experiences of deaf children are diverse, less is known about the language skills of children considered *bimodal bilingual*. For the purpose of this research, bimodal bilingualism refers to competency in both ASL and spoken English. Both individuals who are d/hh and individuals with typical hearing achieve proficiency in ASL and spoken and or written English. While a considerable amount of research has been done in regard to language development milestones in children who are born with a hearing loss, the use of the term bilingual when referring to the language abilities of individuals who use ASL and English is unknown. The primary aim of this study was to examine the operational definition of bilingualism, specifically related to English and ASL, within the scholarly journals of professions that work with people who are Deaf. The goal of this research was to better understand if research conducted within the field of deaf education uses similar terminology to describe the characteristics of bimodal/bilingual individuals who communicate using ASL and English.

American Sign Language (ASL)

American Sign Language (ASL) is a language that uses manual and visual representations, including hand signs and facial expressions, to communicate. There are many examples of manual forms of communication. Martha's Vineyard, an island of the coast of Massachusetts, has a history of many deaf individuals in their village. Because of this, most residents of the island were fluent in sign language, limiting the communication barrier between the hearing and deaf residents. French Sign Language was then established in 1760. A deaf man from France, Laurent Clerc, travelled with Thomas Galludet to create an institute for the Deaf in the United States. This was when American Sign Language was founded. The origins of ASL are not completely known, but it is hypothesized to have derived from a form of French Sign

Language and Martha's Vineyard Sign Language ("Deaf History Timeline," n.d.). ASL consists of the five properties of language, evolves and undergoes many different changes, and is susceptible to extinction if not used by a critical mass of individuals. In these ways, American Sign Language is similar to other signed and spoken languages.

Properties of Language

Language contains five properties- semantics, syntax, phonology, morphology, and pragmatics - each of which contributes to the acquisition and development of a language. Listed below are a brief description of each property of language and how it is representing in American Sign Language.

Semantics

Semantics is a property of language that represents the meaning of words and how they relate to create that meaning. Semantic understanding begins to emerge around eight and a half months of age. Infants usually begin with single-sign production, increasing to ten, and then to two-sign production. However, there are instances in which the child may produce these signs without any actual meaning behind them. In spoken English, we begin to associate words at a young age with objects and through observation of our surroundings. This is quite similar with the development of ASL in that children begin to associate hand shapes, movements, location, orientation, and facial expressions with the meaning (Maller, 1999).

Syntax

Syntax is a set of rules that are important for using words to form linguistically correct sentences and phrases. As the semantics of a child developing ASL begins to develop, there is an increase in the complexity of language. Children go from producing sign approximations to single signs, eventually progressing to two-sign productions around the age of 17 months. These

two-sign productions could be an indication of the development of syntactic properties (Maller, 1999). For ASL, there are some non-manual markers that assist in both semantics and syntax. The four non manual markers are as follows: (1) yes/no questions, (2) wh-questions, (3) topics, and (4) conditionals. Each of these markers involves altering the face to convey meaning through an expression. In the context of syntax, the facial expression that is produced is continued throughout the entire sentence (Maller, 1999). To further add to the development of syntactic properties, the child will develop indexing in which they are able to point and sign with linguistic intent. It begins around the age of 20 months with being able to point to themselves, and later developing around 22 months is the ability to point to another.

Phonology

Phonology consists of rules explaining how speech sounds or phonemes combine to create intelligible speech. In spoken languages, phonemes are speech sounds produced using the vocal mechanism. Although ASL is a manual language, it still contains phonological characteristics. In spoken languages, phonemes are represented by the place and voice of the speech sound. For example, if the phoneme is a voiced bilabial, it may be the phoneme /b/ as in “bat.” For sign language, phonemes are produced and distinguished by three categories. The categories consist of hand configuration, location, and movement (Sandler, 2012). Each of the following categories work together to assist in distinguishing each phoneme within a word. Along with the shape of the hands, the location of the sign can change without a single sign, and even more so in a complex sign (Liddell & Johnson, 1989). The manner of which the location of signs move is much like the place of articulation in a spoken language. For example, the place of articulation for the phoneme /t/ is the alveolar ridge. Each sign consists of a specific formation of the sign.

Morphology

Morphology consists of the rules that govern how morphemes are used in language. Many sign languages, including ASL, have similar morphological components. Single signs represent the same as words in a spoken language. Signed languages often consist of monosyllabic signs, which results in simultaneous sign (Johnston, 2006). In simultaneous production, the production is superimposed both visually and spatially. The explanation for this is that a single hand shape represents a single morpheme (Aronoff, Meir, & Sandler, 2005). The movements of the signs, where they start and end, can show certain aspects of morphological development. Different points in the signing space are used to “refer to people, things, and places that are not present” (Evans, & Seifert, 2000, p. 5).

Pragmatics

Pragmatics is the study of rules that govern how language is used in social contexts. ASL is similar to spoken language in that it “allows people to request, command, argue, persuade, and tell jokes” (Evans, & Seifert, 2000, p. 5). Language is expressed through a type of medium. For example, spoken language is expressed through the acoustic medium, but sign languages are through an optic medium. This essentially means that signed languages are perceived through visual observation. American Sign Language is produced through the use of the hand, arm, and upper torso movements in addition to facial expressions (i.e., movements of the mouth, eyes, forehead or brow, and head). The subjectivity of ASL constitutes the use of language to express perceptions, feelings, and opinions. These expressions are used in social contexts of various discourses, and it is through these interactions that the speaker or signer conveys their “mental state, affect, preference, perception, and evaluation of what was said” (Janzen, Shaffer, & Wilcox, 2011, p. 279-280).

In summary, bimodal bilingualism is the use of both an oral and a sign language. The primary focus of this research was to examine the operational definition of bilingualism, specifically when English and ASL are the two languages used, within the scholarly journals in the related field of deaf education. This study uses a content search of scholarly literature in the fields of speech-language pathology and deaf education to provide descriptive information of the operational definitions used in research when referring to individuals who are bilingual in ASL and English.

Methods

In order to begin constructing an operational definition, a content review was conducted on what is known about bimodal bilingualism in the discipline of deaf education. Table 1 contains an overview of the methods used to conduct research. Data was gathered from the database of CINAHL Complete, given access through the University of Arkansas Library. Content and research were retrieved from three journals: American Annals of the Deaf, Deafness and Education International, and Journal of Deaf Education and Deaf Studies. Specific search terms were used to assist in narrowing down the results found. The search terms used for each journal are as follows: 1) “Bilingual AND Bilingualism”, 2) “Spoken English AND American Sign Language”, 3) “Bilingual OR Bilingualism AND Deaf”, 4) “Bilingual OR Bilingualism AND Deaf AND Bimodal”, 5) “Bilingual OR Bilingualism AND Bimodal.” Exclusionary criteria were developed to further narrow the results to articles that included useful and relevant information to the research question. The following is the exclusionary criteria used: research articles not focused on children (0-21), published articles that were not peer-reviewed, articles published before 2000, articles that contained participants who had additional disabilities present along with deafness/hard of hearing children, research pertaining to hearing bimodal bilingual

learners, bilingualism not in reference to ASL/English, obituaries, book reviews, and lastly, if the articles did not contain empirical data or review empirical data.

Table 1

Research Methodology

Databases	Journals	Search Terms
CINAHL Complete	American Annals of the Deaf	Bilingual AND Bilingualism
	Deafness and Education International	Spoken English AND American Sign Language AND Children
	Journal of Deaf Education and Deaf Studies	Bilingual OR Bilingualism AND Deaf AND Children
		Bilingual OR Bilingualism AND Deaf AND Bimodal
		Bilingual OR Bilingualism AND Bimodal

Data Analysis

All articles found in the initial search were analyzed for terminology from the search function related to the use of more than one language, including: bilingualism, multilingualism, bilingual, dual language, or multilingual. Each article was first reviewed by one member of the research team (the honors student) to determine if it met the inclusionary criteria. Twenty percent of the articles were then reviewed by the faculty mentor with a 100% agreement on inclusionary criteria. A qualitative thematic coding approach was used to analyze the content of the definitions used for language for the articles that met inclusionary criteria. The search function

was used to find relevant terminology within the article. Once a term was located, the article was read in context to find if an operational definition of term(s) was included in each article. Two reviewers (one honors student and faculty mentor) independently assessed the full texts of included articles and independently extracted the operational definition from each article. Differences on three articles (85% interrater reliability) were resolved by reference to the article and discussion until a consensus was reached.

Results

The purpose of this study was to determine if there is an operational definition of bimodal/bilingual used within the literature of the field of Deaf Education and Deaf individuals. Using the CINAHL Complete database, three journals were included in the search for terminology related to bilingual/bimodal language use of ASL and English. Results are presented in Table 2. The final results yielded 338 articles within the three journals, with 19 of those articles meeting the inclusionary criteria. The 319 articles were excluded due to the following reasons: age groups not within our criteria, languages were not spoken English and American Sign Language, articles published before 2000, participants were hearing, obituaries and book reviews, lack of empirical data or a review of empirical data, and lastly, if the article focused on a topic not relevant for this study.

Table 2

Results from Search

Articles Reference:	Terminology found in article:	Operational Definition:
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-
- Andrews, J. F., & Rusher, M. (2010). Code switching techniques: Evidence-based instructional practices for the ASL/English bilingual classroom. *American Annals of the Deaf*, 155(4), 407-24.
doi:<http://dx.doi.org/10.1353/aad.2010.0036>
- Spoken English, American Sign Language, Children
- “The authors present a perspective on emerging bilingual deaf students who are exposed to, learning, and developing two languages—American Sign Language (ASL) and English (spoken English, manually coded English, and English reading and writing).” (p. 407)
- Pizzo, L. (2016). d/Deaf and hard of hearing multilingual learners: The development of communication and language. *American Annals of the Deaf*, 161(1), 17–32.
<https://doi.org/10.1353/aad.2016.0017>
- Bilingual, Bilingualism, Deaf, Children
- “d/Deaf and Hard of Hearing Multilingual Learners (DMLs).” (p. 17)
- Evans CJ. (2004). Literacy development in deaf students: Case studies in bilingual teaching and learning. *American Annals of the Deaf*, 149(1), 17–27.
<https://doi.org/10.1353/aad.2004.0011>
- Bilingual, Bilingualism, Deaf, Children
- “Bilingual model has been applied to educating deaf students who are learning American Sign Language (ASL) as their first language and written English as a second.” (p. 17)
- Mayer, C., & Trezek, B. J. (2020). English literacy outcomes in sign bilingual programs: Current state of the knowledge. *American Annals of the Deaf*, 164(5), 560–576.
<https://doi.org/10.1353/aad.2020.0003>
- Bilingual, Bilingualism, Deaf, Children
- “These programs represented a move from monolingual education (e.g., English only) to a bilingual model, in which a natural signed language (e.g., American Sign Language [ASL]) would be seen as the first language (L1) of deaf students and serve as their primary language of instruction.” (p. 560-561)
- Hamilton, H. (2012). The efficacy of dictionary use while reading for learning new words. *American Annals of the Deaf*, 157(4), 358–372.
<https://doi.org/10.1353/aad.2012.1627>
- Bilingual, Bilingualism, Deaf, Children
- “The three types of dictionaries were (a) online bilingual multimedia English-American Sign Language (ASL) dictionary (OBMEAD), (b) a paper English-ASL dictionary (PBEAD), and (c) an online monolingual English dictionary (OMED).” (p. 358)

- DeLana M, Gentry MA, & Andrews J. (2007). The efficacy of ASL/English bilingual education: considering public schools. *American Annals of the Deaf*, 152(1), 73–87. <https://doi.org/10.1353/aad.2007.0010>
- Bilingual, Bilingualism, Bimodal
- “The study investigated the efficacy and viability of American Sign Language (ASL)/English bilingual education for public schools serving deaf and hard of hearing children.” (p. 73)
- Priestley, K., Enns, C., & Arbuckle, S. (2018). Altering practices to include bimodal-bilingual (ASL-Spoken English) programming at a small school for the Deaf in Canada. *Journal of Deaf Studies & Deaf Education*, 23(1), 82–94. <https://doi.org/10.1093/deafed/enx040>
- Bilingual, Bilingualism
- “bimodal-bilingual (ASL and spoken English)” (p.82)
- “(a) bimodal—input and output in two modes (signed and spoken), (b) bilingual—the understanding and use of two languages, such as ASL and English.” (p.83)
- Goodwin, C., & Lillo-Martin, D. (2019). Morphological accuracy in the speech of bimodal bilingual children with CIs. *Journal of Deaf Studies & Deaf Education*, 24(4), 435–447. <https://doi.org/10.1093/deafed/enz019>
- Bilingual, Bilingualism
- “Spoken and signed language (bilinguals).” (p. 435)
- “Bimodal bilingual (signing-speaking).” (p.435)
- Scott, J. A., & Hoffmeister, R. J. (2018). Superordinate precision: An examination of academic writing among bilingual Deaf and hard of hearing students. *Journal of Deaf Studies & Deaf Education*, 23(2), 173–182. <https://doi.org/10.1093/deafed/enx052>
- Bilingual, Bilingualism, Deaf, Children
- “A bilingual model of education for DHH students whose first language is ASL, which has no written form, the evidence identifying a relationship between ASL and English literacy is mounting.” (p.174)
- Scott, J. A., & Hoffmeister, R. J. (2017). American Sign Language and academic English: Factors influencing the reading of bilingual secondary school Deaf and hard of hearing students. *Journal of Deaf Studies & Deaf Education*, 22(1), 59–71. <https://doi.org/10.1093/deafed/enw065>
- Bilingual, Bilingualism, Deaf, Children
- “American Sign Language (ASL)/English bilingual schools for the deaf” (p. 59)

- Hrastinski, I., & Wilbur, R. B. (2016). Academic achievement of Deaf and hard-of-hearing students in an ASL/English bilingual program. *Journal of Deaf Studies & Deaf Education*, 21(2), 156–170.
<https://doi.org/10.1093/deafed/env072>
- Bilingual,
Bilingualism, Deaf,
Children
- “bimodal bilinguals, such as deaf individuals who acquire sign language (e.g., ASL) early and then learn English as a second language” (p. 157)
- Mounty, J. L., Pucci, C. T., & Harmon, K. C. (2014). How Deaf American Sign Language/English bilingual children become proficient readers: An emic perspective. *Journal of Deaf Studies & Deaf Education*, 19(3), 333–346.
<https://doi.org/10.1093/deafed/ent050>
- Bilingual,
Bilingualism, Deaf,
Children
- “children raised and educated bilingually in American Sign Language (ASL) and English” (p. 333)
- Davidson, K., Lillo-Martin, D., & Chen Pichler, D. (2014). Spoken English language development among native signing children with cochlear implants. *Journal of Deaf Studies & Deaf Education*, 19(2), 238–250.
<https://doi.org/10.1093/deafed/ent045>
- Bilingual,
Bilingualism, Deaf,
Children
- “exposure to a full natural sign language (American Sign Language, ASL) from birth, in addition to spoken English after implantation.” (p. 238)
- Crume, P. K. (2013). Teachers’ perceptions of promoting sign language phonological awareness in an ASL/English bilingual program. *Journal of Deaf Studies & Deaf Education*, 18(4), 464–488.
<https://doi.org/10.1093/deafed/ent023>
- Bilingual,
Bilingualism, Deaf,
Children
- “ASL/ English bilingual education program” (p. 465)
- “The school emphasized ASL as the primary language and written English as the second language.” (p. 469)
- Lange, C. M., Lane-Outlaw, S., Lange, W. E., & Sherwood, D. L. (2013). American Sign Language/English bilingual model: A longitudinal study of academic growth. *Journal of Deaf Studies & Deaf Education*, 18(4), 532–544.
<https://doi.org/10.1093/deafed/ent027>
- Bilingual,
Bilingualism, Deaf,
Children
- “American Sign Language (ASL)/English bilingual instruction.” (p. 532)
- Haptonstall-Nykaza T.S., & Schick B. (2007). The transition from fingerspelling to English print: facilitating English decoding. *Journal of Deaf Studies & Deaf Education*, 12(2), 172–183.
<https://doi.org/10.1093/deafed/enm003>
- Bilingual,
Bilingualism, Deaf,
Children
- “bilingual in English and ASL.” (p. 172)
- “ASL

<p>Mitchiner, J.C. (2014). Deaf parents of cochlear-implanted children: Beliefs on bimodal bilingualism, <i>The Journal of Deaf Studies and Deaf Education</i>, 20 (1), 51–66. https://doi.org/10.1093/deafed/enu028</p>	<p>Bilingual, Bilingualism, Deaf, Bimodal</p>	<p>immersion school where they received a bilingual education in ASL and written English.” (p.176)</p> <p>“ bimodal bilingualism (defined as using both a visual/manual language and an aural/oral language) in American Sign Language (ASL) and English.” (p. 51)</p>
<p>Trezek, B. J., & Hancock, G. R. (2013). Implementing instruction in the alphabetic principle within a sign bilingual setting. <i>Journal of Deaf Studies & Deaf Education</i>, 18(3), 391–408. https://doi.org/10.1093/deafed/ent016</p>	<p>Bilingual, Bilingualism, Deaf, Bimodal</p>	<p>"sign bilingual setting” (p. 391)</p>
<p>Schwarz, A. L., Guajardo, J., & Hart, R. (2017). How do communication modes of deaf and hard-of-hearing prereaders influence teachers’ read-aloud goals? <i>Deafness & Education International</i>, 19(3/4), 115–125. https://doi.org/10.1080/14643154.2017.1392768</p>	<p>Spoken English, American Sign Language, Children</p>	<p>“Educational programs serving DHH-ASL tend to employ a bilingual/bicultural approach, in which DHH children acquire ASL as their first language and written English as their second language” (p.118)</p>

Discussion

This content review yielded knowledge gathered on bimodal/bilingual Deaf children within Deaf Education journals since 2000. Overall, 338 of articles were found to include the term bimodal/bilingualism, but only 19 met the inclusionary criteria. After further examination of the results, it was found that while all of the articles referred to bimodal/bilingual in similar ways, there were some differences. Four articles defined bimodal/bilingualism as ASL as the first language and written English as the second, seven defined it as acquiring ASL and spoken English simultaneously, one defined it as ASL being the first language and spoken English being the second language, one referred to ASL and English in spoken, manually coded, reading, and

writing form, and lastly six of the articles were vague in their definition. Six articles that did not explicitly define bimodal/bilingualism and thus the definition had to be determined from various parts of the research. Thus, while the term bimodal/bilingualism is used to consistently describe English and ASL as languages, there is variability in the overall use of the term. In addition to the operational definition, we examined the articles for other similarities, including types of research designs, description of hearing status and hearing technology use, and language(s) descriptions.

Types of Research Design

From the articles that included an operational definition (12), four articles were of descriptive designs (e.g., systematic review, literature review, case-study) (Andrews & Rusher, 2010; Evans, 2004; Mayer & Trezek, 2020; Pizzo, 2016), and eight were solely of experimental design (e.g., contained collected data) (Davidson et al., 2014; Goodwin & Lillo-Martin, 2019; Hrastinski & Wilbur, 2016; Lange et al., 2013; Mitchiner, 2014; Mouny et al., 2014; Priestly et al., 2018; Scott & Hoffmeister, 2018). Eight out of the twelve with operational definitions were centered on Deaf Education (academic achievements, classroom teaching strategies) (Andrews & Rusher, 2010; Davidson et al., 2014; Evans, 2004; Hrastinski & Wilbur, 2016; Mayer & Trezek, 2020; Mouny et al., 2014; Priestly et al., 2018; Scott & Hoffmeister, 2018). There was one article that examined the views of bimodal/bilingualism within families of Deaf children with cochlear implants (Mitchiner, 2014).

Description of Hearing Status and Technology Use

The various studies that contained participants were inconsistent in the provision of a description of hearing loss. Five articles described their participants as having a mild, moderate, severe, or profound hearing loss (Davidson et al., 2014; Hamilton, 2012; Haptonstall-Nykaza &

Schick, 2007; Mayer & Trezek, 2020; Trezek & Hancock, 2013). The 10 articles with participants did not provide a specific description outside of stating their participants had a hearing loss (Andrews & Rusher, 2010; Pizzo, 2016; DeLana et al., 2007; Evans, 2004; Goodwin & Lillo-Martin, 2019; Haptonstall-Nykaza, & Schick, 2007; Hrastinski & Wilbur, 2016; Priestly et al., 2018; Scott & Hoffmeister, 2017; Scott & Hoffmeister 2018). Four of the articles did not have d/hh participants, as they were teachers, parents, and one ASL specialist (Crume, 2013; Mitchiner, 2014; Mouny et al., 2014; Schwarz et al., 2017). These articles were focused more on the development of certain skills within Deaf education. Thirteen articles out of nineteen presented information regarding the parent's hearing status, defining the participants parents as either being hearing or deaf (Crume, 2013; Davidson et al., 2014; Evans, 2004; Hamilton, 2012; Haptonstall-Nykaza & Schick, 2007; Hrastinski & Wilbur, 2016; Lange, et al., 2013; Mayer & Trezek, 2020; Mitchiner, 2014; Mouny et al., 2014; Priestly et al., 2018; Scott & Hoffmeister, 2017; Scott & Hoffmeister, 2018). Articles that contained both d/hh children and hearing children provided a description of their parents hearing status.

Just as there was an inconsistency in a description of hearing loss for participants, there was a high degree of variability with the description of hearing technology that was included within the articles. Eight articles out of nineteen provided a description of the hearing technology, if any, that participants used (Davidson et al., 2014; Goodwin & Lillo-Martin, 2019; Hrastinski & Wilbur, 2016; Mayer & Trezek, 2020; Mitchiner, 2014; Priestly et al., 2018; Scott & Hoffmeister, 2017; Scott & Hoffmeister, 2018). The rest either did not indicate if there was hearing technology used or was not specific in what was used. There was a vague statement provided stating that a number of participants utilized hearing technology.

Language Description

Similar to English, ASL is a functional language with its own language properties. Seven of the articles contained information about the properties of language with ASL (Andrews & Rusher, 2010; Crume, 2013; Davidson et al., 2014; Goodwin & Lillo-Martin, 2019; Haptonstall-Nykaza & Schick, 2007; Scott & Hoffmeister, 2017; Trezek & Hancock, 2013). However, some of the information was based on only one property, based on the content of their research. For example, one of the articles elaborated on the morphology of ASL, specifically related to their research. The remaining of the articles did not present any instruction of the properties of language of ASL or spoken English.

Limitations

While the term bimodal/bilingual was used consistently to describe the use of ASL and spoken English, there was some difficulty in deciphering the direct definition used within a specific study. Challenges arose when there was not a direct definition provided. Thus, the definition would have to be obtained from various sections of the article. There were inconsistencies related to the fluency of ASL/spoken English and what level of fluency one must possess to be classified as bimodal/bilingual. Fluency is an indirect component of the definition of bimodal/bilingualism and should be further clarified within an operational definition.

Also, an indirect component of defining bimodal/bilingual is modality. Modality is the mode of which a language is portrayed through. For example, ASL would be considered a manual/visual language. A further description offered within studies, of modality, would be beneficial in better understanding bimodal/bilingualism. An understanding of modality would help provide a foundation in which to transition into a predetermined operational definition of bimodal/bilingualism.

Another limitation to this focus of study is the use of various terms in place of bimodal/bilingual. There were various encounters of the following other terms: “bi/bi,” “bilingual/bicultural,” and “deaf multilingual learners.” It would be suitable to determine the similarities and/or differences of other terms in relation to bimodal/bilingual, to further aid in the consistency of research in this field.

Although there was a consistency of the description of bimodal/bilingualism, there were some limitations presented throughout the articles. Research within this field of study is rapidly developing, which makes it ever more important to establish an operational definition of bimodal/bilingual. This will aid in the reliability and validity of various articles with similar research designs.

Future Directions

While this method of research was not as in depth as a systematic review, it is obvious that there is a plethora of information still to be explored regarding bimodal/bilingualism in Deaf Education. From the current content review, there were enough inconsistencies in the use of the term bimodal/bilingualism that there is a need to establish a consistent operational definition to use when describing the ASL and English. Future research is needed to clarify what level of fluency is required for each language to be considered bimodal/bilingual. In addition, in the future when referring to bimodal/bilingualism modality needs to be addressed for each language and how they are used (spoken, written, signed). There has been an increase in the research conducted on bimodal/bilingualism, both within the hearing and d/hh world. Because of this increase, the need for an operational definition of this term is crucial to future research in order to yield valid and reliable results.

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