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The English Language and Reading Abilities of a Cohort of Deaf Students Speaking and Signing Standard English

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 St. Louis, Missouri
 February 2015

Our presentation today will present a study . . .

» . . . on how explicit attention to the morphemes of words can foster the reading achievement of Deaf/hard of hearing (D/HH) students.

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First, some background . . .

Historically, D/HH students do not achieve the same level of reading achievement as their hearing peers (Spencer & Marschark, 2010).

Cochlear Implants have not closed the gap for students who are D/HH (e.g. Spencer & Marschark, 2010)

- » the early linguistic gains of young CI users dissipated at higher grade levels and
- » reading achievement continues to plateau around the fourth grade level when students reach the intermediate-grades through high school years (Geers et al., 2007; Spencer & Marschark, 2010; Traxler, 2000)

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Background . . .

Potential reasons for the plateau

- > It is difficult for students who are D/HH to hear grammatically-accurate English, especially the audibly insalient words (e.g., pronouns, articles, etc.) and bound morphemes of English. (Guo, Spencer, & Tomblin, 2013).
- > As students move beyond primary-grade reading materials, the words get longer and the demands of vocabulary increase; such changes make comprehension more challenging (Carlisle, 2004; RAND Reading Study Group, 2002).

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Background: Role of MA

Morphological awareness (MA):

»> A student's understanding that words are made up of meaningful units
 that is, when a student takes a complex word apart to make sense of it and to uncover the relationship between this word and others.

Proficient readers do this automatically, which helps them learn more words and comprehend new information (Carlisle, 2004).

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Background: Effect of MA

Ability to use the morphology of words:

- > Expands students' vocabulary and comprehension (e.g. Nagy, et al., 2008)
- > Predicts reading achievement of English speakers (Nagy, Berninger, & Abbott, 2006), English Language Learners (Kieffer & Lesaux, 2008) and students who are D/HH (Gautstad, Kelly, Payne, and Lyak (2002; 2004).

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Background: Effect of MA

Nagy et al's (2006) study with 4th/5th, 6th/7th, 8th/9th graders and the role of MA in decoding, spelling, vocabulary and reading comprehension reported:

MA made significant and unique contributions to:

- » decoding rate of the eighth/ninth graders;
- » vocabulary and spelling for all groups; and
- » the reading comprehension of all groups, even "above and beyond that of reading vocabulary" (p. 134)



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Background: MA development

Berninger, Abbott, Nagy, and Carlisle (2010) investigated the growth of phonological, orthographic, and morphological awareness from Grades 1–6 and reported:

- » Word-level phonological and orthographic awareness - greatest growth during the primary grades but some additional growth afterwards
- » Morphological awareness shows greatest growth in the first three or four grades but one kind of MA - derivational—continues to show substantial growth grade 4

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MA Studies: D/HH students

Only a few MA-related studies with D/HH students and most conducted with teens (Moore & Sweet, 1990) or college-aged students (Gaustad and colleagues)

Findings (Gaustad, et al., 2002; 2004)

- > morphemic awareness is underdeveloped for many students, even those who have been in school for many years
- > higher morphemic awareness corresponded to higher reading achievement.



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Morphemes: Common in Text

Luetke (2013) analysis of basal stories (Harcourt, 2001)

- > Grade 1 - 10 bound morphemes: dis-, -ed, -en, -ly, -ful, -ing, plural -s, possessive -s, third person -s, and -y
 - > Grade 3 - 21 additional: -able, -an, -ant, -en, -er, -ible, -ic, -ice, in-, -ion, -ious, -its, -ity, -ment, mis-, -or, re-, -sion, -th, -tion, and un-
 - > Grade 5 - 9 additional bound morphemes, all derivational
- Difficulty for readers who are D/HH
- > Difficult to hear (Easterbrooks, et al., 2008)
 - > No access unless finger spelled or signed during instructional and social conversations (Luetke, 2013)

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Importance of MA Instruction

Morphology "relates differently to reading and writing in different languages... Nonetheless across languages, the central role of morphemes in word formation and lexical processing constitutes an initial argument for the potential value of instruction in morphological awareness" (Carlisle, 2010, p. 485).

Explicit morphology instruction = Significant gains made by:

- > Hearing students (see Carlisle, 2010 for review)
- > ELLs (e.g. Lesaux, Kieffer, Faller, & Kelley, 2010)
- > D/HH students (Bow, Blamey, Paatsch, & Sarant, 2004)



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Access to Morphemes of English

Mayer (2007) concluded as she discussed the literacy abilities of deaf children, "it is not the presence of ASL but the absence of some form of face-to-face English that is at issue and the challenge for educators" (p. 416).

Gaustad, Kelly, Payne & Lylak (2002) suggested SEE as a way to improve the "insufficient morphographic skills of deaf students" (p. 17)



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Background: Potential of SEE

- Signing Exact English (SEE) (Gustason & Zawolkow, 1993)
- > A system of signing English designed so that the morphology of words is made visible to those who might not be able to hear them
 - > Includes signs to code audibly insalient English words (i.e., articles, pronouns, conjunctions) and bound morphemes (the difficulty substantiated empirically in Guo et al., 2013).
 - > Provides signs for root words and about 80 affixes (e.g., -al, -ity, -re-, un-, -ness, non-, etc.).
 - > Different signs exist for different bound morphemes in SEE, thus possible to sign, for example, derivations of the word "electric" (e.g., "electrical," "electrician," "electricity," "electrify," and "nonelectrical").

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Purpose and Research Questions:

- To investigate the English-language abilities and reading achievement of a sample of students who were D/HH and attended a school where staff and students communicated simultaneously in grammatically accurate Standard English via speech and Signing Exact English (SEE).
- » Do the participants demonstrate Standard English-language proficiency as measured by informal and formal tests?
 - » Do the participants demonstrate reading achievement within the average range of their hearing peers?
 - » Are there significant correlations between the participants' English-language and reading scores?
 - » Do participants' scores on English-language measures predict reading achievement as measured on a standardized assessment of reading achievement?

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Participants

17 students who are D/HH (8 boys, 9 girls) all attend school for the D/HH (PreK-8), in metro area northwest US (population of the school: 45 students PreK (age 3)-grade 8)

- > 7;6 years (2nd grade) to 13;9 years (8th grade)
- > Diversity among the participants
 - + Racially: 11 Caucasian, 3 Asian, 3 biracial
 - + Socio-economic status: Varied
 - + Other background variables: family structure, factors related to the parents (level of education and signing with their child, and school involvement).

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Data collected on:

Table 1
Student age, information on hearing, and language assessment (CELF) scores

Student	Age	Unaided Hearing Loss	Aided PTA	Equip. (number of years with it)	CELF Core Lang.	CELF Escap. Lang.	CELF Exp. Lang.
1	7;6	Moderate to severe	43	HA (6)	78	86	77
2	8;11	Severe to profound	83	HA (6)	54	73	55
3	9;3	profound	10	CI (9)	64	76	71
4	9;5	profound	20	CI (6)	62	83	61
5	9;11	profound	20	HA (8)	112	116	110
6	10;7	severe	20	HA (6)	97	96	96
7	10;8	profound	20	CI (5)*	96	102	96
8	10;9	profound	13	CI (8)*	72	79	77
9	10;11	profound	75	HA (7)	94	90	101
10	11;2	profound	20	CI (10)	98	90	99
11	11;5	profound	27	CI (9)*	62	67	53
12	11;8	profound	20	CI (5)*	91	96	89
13	11;8	profound	20	CI (6 **)	64	79	57
14	11;11	profound	13	CI (8)*	58	76	61
15	12;5	profound	15	CI (10)*	69	85	63
16	13;7	profound	10	CI (12)*	112	121	108
17	13;9	severe to profound	40	HA (12)	118	107	110

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Context

- » School philosophy: All staff and students use grammatically-accurate English, simultaneous speaking and signing English with SEE.
- » English skills of all students & staff are regularly assessed.
- » Goals and objectives set are based on age-appropriate skills.
- » Reading curriculum (Harcourt, 2001)
- » Assessment information is used to place students for daily reading instruction: 45 min small group, 15 minutes 1-to-1 tutoring - speech, vocab., grammatical constructions from the weekly basal selection, found to challenge the student in small group instruction.

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Data Collected on Students

Hearing and assistive device use (i.e. CIs, hearing aids)

- » Age of hearing loss, Unaided and aided hearing
- » Assistive listening device use

Speech – *Photo Articulation Test* (PAT-3; Lippke, Dickey, Selmar, & Soder, 1997)

- » 93 items, each describe a photo to prompt the use of a word with a target sound (initial, medial, or final position).
- » Normed on 3-8 yr. olds children with normal hearing so calculated a raw score (number of correctly pronounced phonemes out of the total possible articulation targets)

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Data Collected on Students (cont.)

Language

Structured and unstructured language samples

- » *Structured Photographic Expressive Language – SPELT*
- » Unstructured – collected in everyday classroom activities
- » *Clinical Evaluation of Language Fundamentals (CELF)*
- » Researcher-created morphemic awareness task (MA)

Reading - Gates-MacGinitie Reading Test (GMRT)
(MacGinitie, MacGinitie, Maria, & Dreyer, 2000)

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Data collected on :

Table 2
Aided hearing: CELF receptive standard score, grade-testing level, and reading assessment standard scores

Aided PTA	Equip. (number of years with ID)	CELF Recog. Lang.	Grade Level & GMRT Test Level	GMRT Vocab	GMRT Comp	GMRT Total	GMRT GEq:15	MA
43	HA (6)	86	2	39	32	28	1.9	12
83	HA (6)	73	3	34	34	33	2.6	36
10	CI (9)	76	3	48	55	52	3.9	31
20	CI (6)	83	3	29	35	32	2.5	18
20	HA (8)	116	4	72	75	75	8.6	40
20	HA (6)	96	4	51	42	46	4.3	38
20	CI (5)*	102	4	54	55	55	5.3	36
13	CI (8)*	79	4	42	51	46	4.3	34
75	HA (7)	90	5	58	68	62	7.4	37
20	CI (10)	90	5	77	81	80	12	37
27	CI (9)*	67	5	32	25	26	3.6	32
20	CI (5)*	96	5	67	68	67	8.4	39
20	CI (6) *	79	5	36	37	31	3.8	38
13	CI (8)*	76	6	24	52	38	5.4	34
15	CI (10)*	82	6	50	38	43	5.8	35
10	CI (12)*	121	8	66	75	74	13	40
40	HA (12)	107	8	71	77	80	13	40

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Results: English Speech and Language

English Language Scores Within Grade Level Bands and Whole Group Averages

	Grades 2-3 (n=4)	Grades 4-8 (n=13)	All Participants
PAT (speech articulation)	98% correct	91% correct	93% correct
SPELT (structured sample)	38% correct	76% correct	67% correct
CELF-4 receptive	79.5 range: 73-86	92.6 range: 67-121	89.5 range: 67-121
CELF-4 expressive	66.0 range: 55-77	86.1 range: 53-110	81.4 range: 53-110
CELF-4 core	64.5 range: 54-78	87.9 range: 58-118	82.4 range: 54-118

Note: Mean standard score for the CELF-4 is 100.

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Results: Significant Correlations Between Language (SPELT, CELF) and Reading

	GMRT Vocab	GMRT Comp	GMRT Total
PAT (speech)	-.316	-.354	-.312
SPELT (struct sample)	.796**	.604*	.718**
Unstruct sample	.860**	.784**	.854**
CELF-4 Receptive	.754**	.709*	.771**
CELF-4 Expressive	.855**	.849**	.882**
CELF-4 Core	.861**	.789**	.859**

Two-tailed Pearson correlations - **significant at .01 level * significant at .05 level

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Results: Reading Achievement (GMRT)

	Grades 2-3 N=4	Grades 4-8 N=13	Total N=17
Vocab. Mean (range)	35 (29-48)	54 (24-77)	49 (24-77)
Comp. Mean (range)	39 (32-55)	57 (27-81)	52 (27-81)
Total Mean (range)	36 (28-52)	56 (26-80)	51 (26-80)

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Discussion

- » Receptive and expressive English language skills correlated to all reading achievement – not surprising (e.g. Catts, Hogan & Adlof, 2005; Moores & Sweet; 1990; Oakhill & Cain, 2012)
- » *As a group*, the reading achievement of the students improved beyond the primary grades and was commensurate with hearing peers in contrast to the the common finding that the gap between age and age-appropriate reading achievement widens as students who are D/HH get older (e.g. Mahoney et al., 2000; Spencer & Marschark, 2010)

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Discussion

Potential Reasons For Students' Achievement

- » Continued achievement grades 4 and up: students know how to represent the morphology of words in everyday communication and can use MA to decode and understand multi-morphemic words in English (Carlisle, 2004).
- » Lack of achievement – less proficiency in language, possibly due to limited access to sign support at home (Something we also studied.)



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Discussion

“The morphological component of conversational competence in English is dependent on the mode and completeness of the models of English to which deaf students are exposed” (Gaustad & Kelly, 2004, p. 283).

Explicit attention to morphemes via SEE in all aspects of the school day at the expectation that students use it.

- » All staff at this school are explicit about the morphology of English through their use of SEE and they are given regular training and supervision to assess and maintain their skills (Mayer, 2013).
- » All staff expect students to use grammatically accurate, standard English. When they do not, the teachers and other staff use the “Again” strategy (Appelman, Callahan, & Lowenbraun, 1980).



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We realize . . .

- » Small sample size
- » Teachers’ sign-to-voice ratios calculated, but no guarantee they consistently used grammatically accurate English
- » In many cases teachers collected the language samples and the CELF for IEPs and their results were not judged by a second rater.
- » Researcher-created MA assessment – while highly correlated to the vocabulary component of the GMRT...
 - > Not subjected to reliability and validity measures
 - > In need of additional and more difficult items - ceiling effect



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And conclude . . .

- » The reading achievement of elementary and middle school students who are D/HH need not plateau and can be commensurate with that of hearing peers.
- » Students who are D/HH need access to the morphology of English in order to decode the many and varied multisyllabic words in particularly prevalent content-area (math, science, social studies) reading materials in order to quickly process more- and-more advanced text.
- » It is imperative that we in the profession examine the variables that may affect the achievement of students who are D/HH and advocate for changes in professional development and instructional practice in order for more students to reach their full potential as readers.



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Background Characteristics of Students Reading within or Above Grade Level

Table 8
Background Characteristics of Students Reading Within or Above Grade Level

Grade	Reading Status	Age Loss ID	Acquisition Age HA or CI	Aided Loss due HA or CI	CELF Core Tests Within Average	Parent Sign Ability	Parent Involvement
3	profound	@ 3 yrs	CI @ 2 yrs	10 CI	No	Medium	High
4	profound	@ 3 yrs	HA @ 3 yrs	20 HA	Yes	Medium	High
4	severe	@ 5 mths	HA @ 5 mths	20 HA	Yes	Medium	Medium
4	profound	@ 13 mths	HA @ 1.5 yrs	20 CI	Yes	High	High
			CI @ 4 yrs (full)				
			CI @ 7 yrs				
4	profound	@ 15 mths	HA @ 2 yrs	13 CI	No	Medium	Medium
			CI @ 4 yrs				
5	profound	@ 4 yrs	HA R @ 4 yrs	72 HA	Yes	Low	Medium
			HA L @ 5 yrs				
5	profound	13 mths	HA @ 15 mths	20 CI	Yes	High	High
			CI @ 2 yrs				
5	profound	2 mths	HA @ 4 mths	20 CI	Yes	Medium	Medium
			CI @ 8 yrs				
8	profound	9 mths	HA @ 9 mths	10 CI	Yes	High	High
			CI @ 2 yrs				
			CI R @ 11 yrs				
8	severe to profound	4 mths	HA @ 8 mths	40 HA	Yes	High	High



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Questions



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