The Standardized Visual Communication and Sign Language Checklist for Signing Children

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Abstract

Despite efforts by both U.S. and Canadian Deaf education practitioners, the development of an American Sign Language (ASL) curriculum and related assessments has proceeded by fits and starts over the last thirty years. Using existing spoken language assessments as models, a number of checklists and assessment measures have been created, but these assessments were never widely distributed by the developers. The standardized Visual Communication and Sign Language (VCSL) Checklist for Signing Children was developed to meet the need for a comprehensive checklist of visual language development so that learning goals can be set, gaps in learning identified, and appropriate materials developed.

Teachers and parents have long used established developmental checklists that were created to help them monitor a child's developmental progress. Researchers design these checklists based on what they recognize as age-typical developmental milestones. Using checklists helps teachers and parents understand how a child should be performing at a specific age. This knowledge helps them determine

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whether the child is on a typical developmental trajectory and, if necessary, helps plan interventions if a child has developmental delays.

Many standardized checklists exist for a variety of purposes. These checklists include the Child Behavioral Checklist (CBCL), which investigates whether a child can manage their own behaviors; the Vineland Adaptive Behavior Scale, which evaluates social maturity; and the Preschool Language Scale-5 (PLS-5), which determines whether a child's language is age appropriate. Other scales measure autism and attention deficit disorder, but there are few such instruments that monitor the language acquisition of deaf and hard of hearing children who are learning a visual language. Therefore, this project focused on the development and standardization of a language acquisition checklist that evaluates typical development in signing children.

This focus was spurred by the rise of bilingual/bicultural education in the early 1990s, when several research teams began studying the tendencies and patterns of children's linguistic acquisition and their sign language developmental milestones. These teams had as a goal the creation of sign language acquisition checklists. Over the years, these checklists were modified and updated as further research on sign language acquisition was completed, and new checklists were created. However, there are no standardized checklists with norms to evaluate deaf and hard of hearing children's success in ASL/English bilingual classrooms. Therefore, we focused on creating a new scale, called the standardized Visual Communication and Sign Language (VCSL) Checklist for Signing Children, referred to as the VCSL Checklist.

The merged VCSL Checklist draws from the information and research included in the Signed Language Developmental Checklist (Mounty 1994), the Language Development Checklist (revised; Evans, Zimmer and Murray 1994), the ASL Development Observation Record (California School for the Deaf–Fremont, n.d.), the American Sign Language (ASL) Developmental Milestones (Marie Philip, the Canadian Cultural Society of the Deaf and the Ontario Cultural Society of the Deaf 2003), the ASL Developmental Checklist (Laurent Clerc Center 2010), the ASL Developmental Stages (Ohio School for the Deaf n.d.), the ASL Linguistic/Cultural Behaviors (Kansas School for the Deaf n.d.), and the Milestones for Language Development (Andrews, Logan, and Phelan 2008). These prior measures were either

teacher developed to use in bilingual classrooms based on the need to access their students' language development or early research-based measures that were long and complex to both administer and score. In addition to these school-based measures, we included research that investigated the development of sign language in deaf and hard of hearing children (Anderson and Reilly 1992; Masataka 1992; Meier and Willerman 1995; Petitto and Marentette 1991).

The VCSL Checklist was designed to clearly document the developmental milestones of children from birth to age 5 who are visual learners and are acquiring sign language in a user-friendly format that is accessible to parents and teachers, not just specialists and experts. Working in collaboration with Gallaudet University's Science of Learning Center on Visual Languages and Visual Learning (VL2), the authors reviewed the common features and varying elements shared by the above mentioned checklists and investigated the reliability, validity, and efficacy of the milestones on each of the checklists. The earlier checklists were then unified into one standardized checklist. The ultimate goal was to identify norms and create a standardized assessment tool to assist in tracking young deaf and hard of hearing children's language development.

Method

Procedure

After being developed, the VCSL Checklist went through several phases to ascertain its effectiveness, accuracy, and success. During the first phase, teachers at the Laurent Clerc Center's Kendall Demonstration Elementary School (KDES) on the campus of Gallaudet University piloted the VCSL Checklist for two years with children who were deaf or hard of hearing without additional known disabilities. These children had typical ASL development and no language delays. Each milestone was listed in age-based groups with developmentally appropriate use of ASL grammatical structures for each age. Each child's sign language acquisition was marked as "not yet emerging," "emerging," "inconsistent use," or "mastered."

While teachers and parents at KDES conducted the assessments, the authors gathered feedback from participants at the National ASL and English Bilingual Consortium for Early Childhood Education:

Summit II meeting. The participants were placed in groups and asked to review the items on the checklist and to comment on their personal experiences with children in the different age groups. Next, we conducted a literature review of new research findings to ensure that the most up-to-date information had been integrated into the VCSL Checklist. Further, we gathered feedback from linguists and psychologists regarding the VCSL Checklist items.

After these activities were completed and revisions made, the revised VCSL Checklist was sent back to the Clerc Center committee of teachers for further implementation and review. Parents were encouraged to team up with teachers, and all of the participants' feedback, including the children's, was included in the findings. This preliminary work required two years, and during that time the VCSL Checklist was modified to reflect teachers' and parents' feedback. Then it was field-tested by the teachers at the Clerc Center. Again, we gathered input from parents and teachers to modify items that were unclear, and the final version of the VCSL Checklist was created.

After these revisions, the VCSL Checklist was ready for the second phase, which included validation by a broader audience. A recruitment flyer was created to enlist the participation of schools, teachers, and parents in the validation study. An explanation of how to complete the VCSL Checklist and the informed consent form was created in both ASL and English. A signed glossary was developed to provide examples of the grammatical structures. Examples include early ASL signs using simple handshapes (e.g., C, A, S, 1, 5), signs that distinguish nouns (double movement) from verbs (single movement) (e.g., CHAIR/SIT), and the use of topic continuation (holding a sign with one hand and continuing to sign with the other). These videos were posted on YouTube and linked to the corresponding item on the VCSL Checklist.

One final evaluation of the VCSL Checklist was conducted in this data-collection phase. A column labeled "Do Not Understand the Item" was included. In addition, at the end of each section there was an open comment section for participants to suggest any missing items or any other concerns. Review of the data determined that all of the items were understandable as no one had checked the "Do Not Understand the Item" box. Moreover, only twelve comments were included in all of the surveys; importantly, none of these had to do

with the items. Rather, they were more descriptive comments about an individual child's skills and abilities. This mechanism provided a validity check so that teachers and parents who were fluent in ASL could complete the checklist.

The data-collection phase included background questionnaires on teachers, parents, and children. Items asked about ASL knowledge, the types of school programs in which children were enrolled, and family background. Teachers in schools throughout the United States participated and completed the three online background questionnaires.

The VCSL Checklist was uploaded into SNAP (2013), and a front-end registration system was developed to allow participants to log in and complete surveys on individual children. These two systems provide confidentiality to all of the participants as they were managed on separate computers, and only the database manager had access to information that could connect participants' names to individual surveys. When teachers agreed to participate, they were entered into the registration system and sent a password and a login ID to complete the checklist. All of the children included in the study had their own identification number. Teachers, sometimes in conjunction with a child's parents, evaluated the child's language use and completed the online VCSL Checklist based on the child's current skills. After the information was submitted, the data were merged into the database. Data continued to be collected throughout 2012 on children from birth to 5 years 11 months.

Participants

Teachers. A total of thirty-five teachers from twenty-three different schools participated in the study. Teachers had worked on average eleven years as teachers of deaf children, ranging from less than one year to thirty years. Most of the teachers rated their own signing skills at native or near native levels (66 percent), while an additional 30 percent reported that their skills were above average. The vast majority of the teachers believed in an ASL/English bilingual communication philosophy (94 percent). Most of the teachers had a master's degrees (90 percent). A large number of teachers worked at residential schools (48 percent); others settings included state agencies (15 percent), special schools (5 percent), public schools (2 percent), and other (30 percent).

The teachers had a variety of job titles, including early intervention specialist (12 percent), parent-infant teacher (5 percent), prekindergarten teacher (45 percent), kindergarten-to-third-grade teacher (19 percent), elementary teacher (5 percent), ASL specialist (10 percent), while a few others worked as a deaf mentor or school administrator.

Parents. A majority of the parents were deaf or hard of hearing (65 percent of mothers and 68 of fathers) and reported ASL as their home language (69 percent of the mothers and 71 percent of the fathers). Many parents' education ranged from "at least some college" to a doctorate (48 percent of the mothers and 44 percent of the fathers). Most of the parents were Caucasian (71 percent of the mothers and 61 percent of the fathers).

Children. Because the goal was to ensure that children were exposed to sign language beginning at birth, we requested that only native children be included in the study. The primary language of the home for 79 of the children was ASL, and 76 of the children were in ASL/English bilingual school programs. There was a total of 83 children: 6 between 1 month and 12 months, 8 between 1 year and 2 years, 11 between 2 years and 3 years, 11 between 3 years and 4 years, 25 between 4 years and 5 years, and 23 between 5 years and 5 years 11 months. There were 48 girls and 35 boys. The majority of the children were reported as Caucasian, with 10 African American, 8 Latino, 2 Native American, 2 Asian Americans, and 1 child was reported as "unknown."

Results

Analytic Plan

Frequencies were calculated for each item. Age range groups followed the VCSL Checklist. These groups were birth to 1 year, 1 year to 2 years, 2 years to 3 years, 3 years to 4 years, and 4 years plus (ending at 5 years and 11 months). Using the previously described groups, quartiles were calculated for each item within each age range. Items, where 75 percent of the participants within a targeted age-range had been reported as mastering the item, were retained. If participants within that age group had not reached a criterion of 75 percent mastery, the item was recalculated for participants in the next age range. All of the

ages shown in table 1 were rounded off, using 5 as the rounding rule for the next highest age, reported in months.

Norms

Items are ordered based on the ages found for each quartile, from youngest to oldest. Norms report the ages found for each quartile (see table 1). The range of ages across the quartiles tends to be small, varying from less than a 1-month variation to an 8-month variation. Most items have ranges of 3 to 5 months between the 5th and the 75th percentiles. All items were reported as mastered within the age range of the VCSL Checklist.

Administration

To use the VCSL Checklist (see the appendix), start at the first item of the child's current age. For example, if the child is 1 year and 11 months, begin at the section for those who are 1 to 2 years old.

Determining Basal Age

To obtain the basal age for a child, you need to have 10 items in a row reported as mastered. If the child has not yet mastered 10 items in a row at the current age level, work backward into the next earlier age level until you have obtained 10 items in a row at the mastered level of language acquisition. The tenth, or last, item in this group of mastered items (i.e., the one that has the highest age in the norms) represents the child's *basal age,* or current level of linguistic mastery.

After obtaining the basal age, continue until the child's linguistic repertoire is reported as "not yet emerging" for 10 items in a row. The last item, prior to these 10 items that are not yet emerging, is the child's *ceiling level,* or the highest level of current linguistic development. The range between the basal and the ceiling levels show the current focus of linguistic acquisition. This range is the zone of proximal development, where scaffolding can benefit the child's linguistic acquisition.

Using the Norms

Use the item found for the basal age to enter the norm table. Compare the child's chronological age to the ages listed for the 25th and

TABLE 1. Norms for the VCSL Checklist

Item	⋆25% Mastered	⋆50% Mastered	⋆75% Mastered
Birth to 12 Months			
Looks in direction to which the signer is pointing	4 months	9 months	10 months
Hand babbling emerges (ex: opens and closing hands) wiggles fingers, wrist twist)	4 months	9 months	10 months
Waves bye-bye	4 months	9 months	10 months
Copies physical movements involving the arms, hands, head, and face	4 months	9 months	10 months
Enjoys finger-plays and finger-games	4 months	9 months	10 months
Follows the eye gaze of the signer	5 months	8 months	10 months
Attends to signed motherese (ex: Sign with slow tempo, repetitions, and exaggerated movements)	5 months	8 months	10 months
Distinguishes facial expressions (ex: anger or friendliness	5 months	9 months	10 months
Joint reference (ex: parent and child look at same object)	5 months	9 months	10 months
Participates in communicative play (ex: peek-a-boo)	5 months	9 months	10 months
Enjoys holding and cuddling	6 months	7 months	10 months
Enjoys hand play: Plays with hands and fingers	6 months	9 months	10 months
Looks attentively at a person's face	6 months	9 months	10 months
Looks at the visual environment with alertness	6 months	9 months	10 months
Smiles when sees a familiar person	6 months	9 months	10 months
Laughs when seeing fingers approaching to tickle	6 months	9 months	10 months
Turns head in response to attention getting behaviors (ex: hand waving, lights on and off, or foot stomping)	6 months	9 months	10 months
Smiles, makes eye contact, and laughs	6 months	9 months	10 months
Expresses excitement and displeasure	6 months	9 months	10 months
Eyes track/following movement with alertness	6 months	9 months	10 months
Fixates on the face	6 months	9 months	10 months
1 year to 2 years			
Recognizes own name sign	1:1	1:5	1:8
Recognizes names signs of family members (ex: siblings)	1:1	1:5	1:8
Finger babbles back to conversations or to self	1:2	1:4	1:7
Points to self and objects in his/her environment	1:2	1:4	1:7
Uses negative headshake alone or with sign	1:2	1:4	1:7
Responds to simple commands (ex: COME HERE; EAT DINNER)	1:2	1:5	1:8
Uses gestures to communicate (ex: come here)	1:3	1:4	1:8
Communicates wants (ex: SLEEPY, HUNGRY, THRISTY)	1:3	1:4	1:8
First ASL signs using simple handshapes (ex: C, A, S, 1, 5)	1:3	1:4	1:8
Uses name signs to refer to others	1:3	1:7	1:8
Repeats what others sign	1:3	1:5	1:8
Forms two-sign sentences (ex: EAT MORE)	1:3	1:7	1:8
Answers questions (ex: WHERE, WHAT)	1:3	1:7	1:8
Identifies pictures of objects/animals/people in child's environment	1:5	1:7	1:8

TABLE 1. *Continued*

Item	⋆25% Mastered	⋆50% Mastered	⋆75% Mastered
2 years to 3 years			
Uses descriptive classifier (ex: CL: F spots)	2	2:2	2:5
Begins to use non-manual makers (facial expressions such as raises/squinted eyebrows)	2	2:6	2:8
Points to common areas in house when asked question (ex: MOMMY GO?)	2	2:4	2:8
Requests help when needed	2	2:5	2:8
Uses pronouns (ex: HE, SHE, IT)	2	2:6	2:8
Names objects/animals/people in pictures when asked	2:1	2:5	2:8
Expanded use of handshapes (ex: B, F, O)	2:1	2:4	2:8
Uses possessives (ex: MY, YOUR)	2:1	2:4	2:8
Uses non-manual /facial adverbs (ex: mm; regular—DRIVE; th; without paying attention—READ)	2:1	2:6	2:8
Names at least 3 colors	2:1	2:6	2:8
Vocabulary range of > 150 signs	2:1	2:5	2:8
Uses lexicalized fingerspelling (ex: #BUS, #ICE)	2:1	2:6	2:8
Produces three/four sign sentences	2:1	2:6	2:8
Count from 1 to 5	2:1	2:7	2:8
Uses emotion signs (ex: SAD, HAPPY, SCARED)	2:2	2:7	2:8
Uses commands with two-steps (ex: YOU GO TO ROOM, BRING BOOK)	2:2	2:7	2:8
Understands conversation turn taking	2:2	2:7	2:8
Expressive vocabulary range of 250-350 signs	2:2	2:7	2:8
Points to object and labels; combing nous and verbs (ex: FROG JUMP)	2:2	2:7	2:8
Answers/responds to questions (ex: WHO, WHICH, FOR+FOR)	2:2	2:7	2:8
Asks two word questions (ex: DOGGIE WHERE?)	2:2	2:7	2:8
Preliminary/Some understanding of timeline (ex: TODAY, YESTERDAY)	2:2	2:8	2:8
Identifies/matches colors	2:3	2:6	2:8
Uses simple descriptors (ex: HOT, COLD, BIG, LITTLE)	2:3	2:6	2:8
Enjoys signed stories and imitates the actions/facial expression of characters in the story	2:3	2:6	2:8
Begins to make multi-word productions (ex: COOKIE WANT)	2:3	2:6	2:8
Understands simple fingerspelled words (ex: own name)	2:4	2:6	2:8
Uses possessive pronouns (ex: HIS, HER)	2:3	2:8	2:8
Uses classifier (ex: CL:3 car driving forward)	2:3	2:8	2:8
Begins using simple, descriptive classifiers (ex: CL: O for pole)	2:3	2:8	2:8
Begins to tell stories about present situations	2:4	2:8	2:8
Uses negatives (ex: DON'T LIKE; DON'T KNOW; NOT-YET)	2:4	2:8	2:8

continued

Table 1. *Continued*

Item	⋆25% Mastered	⋆50% Mastered	⋆75% Mastered
3 years to 4 years			
Uses plain verbs to connect subjects and objects (ex: HE LIKE ICE CREAM)	3:4	3:6	3:8
Answers questions (ex: HOW, WHY, DO++)	3:4	3:6	3:8
Verb modification (ex: Walk—strolling; Walk—quickly; Walk—long time)	3:4	3:7	3:8
Uses rhetorical questions (ex: FATHER GO HERE? WORK)	3:4	3:7	3:8
Fingerspells own name when asked	3:5	3:6	3:7
Uses topicalization (ex: POPCORN, ME LIKE)	3:5	3:6	3:8
Uses handshapes of increasing complexity (ex: W, D, P, 3, V, H)	3:5	3:7	3:8
Understands part/whole relationships (ex: ARM/BODY; WHEEL/CAR)	3:5	3:7	3:8
Understands quantity (ex: FULL, EMPTY, SOME)	3:6	3:7	3:8
Uses TWO-OF-US; THREE-OF-US	3:6	3:7	3:8
Classifier + action (ex: CL:V man climbing up a pole)	3:6	3:7	3:8
Describes physical needs (ex: ME HUNGRY)	3:6	3:7	3:8
Understands opposites (ex: COLD/HOT; BIG/LITTLE	3:5	3:8	3:8
Uses complex handshapes (ex: X, R, M, N, T, 8)	3:6	3:8	3:8
4 years to 5 years			
Uses complex sentence structures consistently (ex: SUPPOSE TEACHER SHE SICK? CLASS NONE)	4:2	4:3	4:5
Counts from 5 to 10	4:2	4:3	4:7
Can hold a sustained conversation (with at least 3 turn taking components)	4:2	4:4	4:7
Tells a simple story with a beginning, middle, and ending	4:3	4:3	4:7
Can count up to 15	4:3	4:4	4:9
Uses body shift & eye gaze	4:3	4:5	4:7
Tells stories about personal experiences	4:3	4:5	4:7
Answers questions when asked (ex: SUPPOSED DIRTY HANDS, DO++?)	4:3	4:5	4:7
Understands time concepts (ex: DAY – NIGHT)	4:3	4:5	4:7
Expanded sentences involving two traits (ex: MOTHER BEAR BIG, MEAN)	4:3	4:5	4:7
Uses time indicators (ex: FINISH; NOT YET)	4:3	4:5	4:7
Storytelling includes setting up people and objects in space that are not present	4:3	4:5	4:8
Answers WHAT HAPPENED? WHY?	4:3	4:5	4:8

TABLE 1. *Continued*

Item	⋆25% Mastered	⋆50% Mastered	⋆75% Mastered
Verb modifications show intensity (CRY/BAWLED), manner (ex: STANDS? STANDS FOR LONG TIME), distribution (ex: GIVE-all), and temporal aspect (ex: over and over CRY)	4:3	4:5	4:8
Can create categories/groupings from assorted objects or pictures	4:3	4:5	4:8
Distinguishes nouns (dbl movement) from verbs (single movement (ex: CHAIR/SIT))	4:3	4:5	4:8
Understands similarities (ex: things that fly, things you eat, things you wear)	4:3	4:5	4:8
Uses conditionals (ex: SUPPOSE RAIN, UMBRELLA MUST)	4:3	4:5	4:9
When given a category, lists at least six items (ex: farm animals)	4:3	4:5	4:9
Names categories (ex: pizza, French fries, hamburger as food)	4:3	4:5	4:9
Uses qualitative descriptors (ex: HARD; SOFT; YUCKY)	4:3	4:5	4:9
Tells a story in sequence when given a picture prompt	4:3	4:5	4:9
Understands parts (ex: HALF, WHOLE, SOME)	4:3	4:5	4:9
Understands handshape categories (ex: BUTTON, FOX, CAT)	4:3	4:5	4:9
Number distribution (ex: topic leaves; FALL SINGULAR; FALL PLURAL; FALL RANDOM)	4:3	4:6	4:9
Sequences from smallest to largest; shortest to longest	4:3	4:6	4:9
Identifies object that does not belong in a group of objects	4:3	4:6	4:9
Beginning awareness that lexicalized signs are made up of handshapes	4:3	4:7	4:9
WH bracketing (ex: WHERE GO WHERE?)	4:3	4:7	4:9
Uses noun modification to indicate spatial arrangement of objects (ex: trees in a row)	4:3	4:7	4:9
Uses AGENT (ex: FARM+ER; TEACH+ER)	4:3	4:7	4:9
Uses topic continuation (ex: holds a sign without one hand and continues signing with the other)	4:4	4:6	4:9
Understands season of the year	4:4	4:7	4:9

- Ages in the table are in years: and then months
- 2:4 is equivalent to 2 years and 4 months

75th percentiles for that item. If the child's chronological age lies within the age range of the 25th to the 75th percentile, then the child's ASL development is age appropriate. If the child's chronological age is younger than those ages in the item's age range, the child's ASL development is accelerated for his or her age. If the child's chronological age is older that those ages in the item's age range, the child's ASL development is delayed compared to typically developing ASL users.

Discussion

Historically, the use of visual language in Deaf education has been an ongoing issue. Although Deaf students have used signed languages since the early eighteenth century, instruments typically were not standardized to document their visual language development and growth trajectories. Currently, some tests are in development (Allen and Enns, current volume; Hauser et al. 2008; McQuarrie, Abbott, and Spady 2012; Morere, Witkin, and Murphy 2012) but are not yet available for use.

Because of this lack of standardized assessment instruments, obtaining a comprehensive assessment profile of deaf and hard of hearing children's language development has been challenging. All too often, young deaf and hard of hearing children are evaluated using assessments designed for hearing, monolingual children. These instruments, while useful for the assessment and monitoring of spoken language or literacy in some children, do not adequately measure children's visual language abilities. Classroom teachers and early interventionists, in an attempt to document children's visual or signed language development, sometimes resort to modifying existing assessments designed to measure spoken language; however, these attempts often create invalid results.

Not only is the lack of standardized assessments that measure the visual language trajectory in signing young children at issue, but there are also problems with existing assessments. It is often the case that deaf and hard of hearing children are found to be "within the range of typically developing children" when they are young (prekindergarten) but fall precipitously behind after reaching school age (Moores 2008). One can only assume that current assessments are not suffi-

ciently sensitive to adequately identify gaps in language development in young signing deaf or hard of hearing children. To address the need for a standardized measure of language acquisition in signing children, this project created the standardized Visual Communication and Sign Language (VCSL) Checklist for Signing Children.

The VCSL Checklist was developed to be user friendly and to aid in the early assessment of a signing child's mastery of linguistic milestones. Therefore, the checklist serves as a screening tool to determine whether a child's sign language acquisition is age appropriate. To use the checklist, one should be familiar with ASL linguistics; thus, a teacher or an early interventionist would be ideal. Parents can use the checklist, but if they are unfamiliar with the grammar of ASL, they should work with a teacher or an early interventionist, who has more knowledge of ASL grammar. Parents who use the checklist and determine that their child may be behind in ASL acquisition should consult with their team of early interventionists to develop plans to more fully evaluate their child's language development. The VCSL Checklist can point to potential problem areas in a timely manner so that more in-depth remediation can be implemented in order to prevent serious and prolonged language delays. Following the administration and scoring procedures will allow parents, early interventionists, and teachers of deaf children to determine whether a child's ASL development mirrors that of a child who is acquiring spoken language.

The VCSL Checklist is the first standardized instrument to assess the achievement of linguistic milestones in ASL. Based on earlier research (Anderson and Reilly 1992; Masataka 1992; Meier and Willerman 1995; Petitto and Marentette 1991) and the ASL instruments developed and used in bilingual programs, the data confirmed that most of these school-based instruments were fairly accurate at assessing age-appropriate ASL linguistic development. Some of the items from the pilot checklist (mostly related to the development of ASL grammatical structures) were determined to develop a bit later than originally predicted, while some were found to develop a bit earlier. Given the current norms, we can more accurately assess young signing children's linguistic development and determine when potential problems are emerging. The use of these early norms will allow rapid and hopefully more effective linguistic interventions.

Moreover, the VCSL Checklist will allow early interventionists, parents, and teachers to have more accurate data on the linguistic acquisition of signing children. As mentioned earlier, many young children in preschool programs were reported as using age-appropriate language; however, they were not language ready when they entered kindergarten. This failure to have obtained age-appropriate linguistic milestones when entering kindergarten has been disappointing for parents who assumed that their children were on track for academic success. With more concrete and specific instruments we can diagnosis delays not in years but in more fine-grained time frames, which will allow appropriate intervention in time to prepare these signing children to begin kindergarten.

In addition, the VCSL Checklist in combination with tests of spoken language can allow more accurate assessment of very young deaf and hard of hearing children's linguistic development. Educational programs that use total communication or signed English systems can also utilize the tool to document visual language acquisition in children who are learning to listen and speak. Especially when deaf or hard of hearing children are not obtaining age-appropriate spoken language milestones, their visual milestones should be assessed by means of the VCSL Checklist to determine whether they are also experiencing delays in visual communication. If they are showing that they have not achieved typical visual language milestones, such as hand babbling or looking toward where an adult is pointing, it may indicate to parents and early interventionists that ASL should be introduced to the child to help them attain these early visual milestones. For example, it is possible that the child is not attending to verbal attention-getting behaviors but will attend to typical visual attention-getting behaviors such as hand waving, foot stomping, or flashing lights. Therefore, the VCSL Checklist will be an important tool for young children, including those getting cochlear implants, who can benefit from early visual language prior to the surgery, activation, and mapping of their implant.

Exposing all deaf children to ASL early will allow the brain to more easily become bilingual and permit later academic success due to the development of appropriate brain structures (Pénicaud et al. 2013). In addition, research finds that all babies under 10 months re-

spond to ASL visual phonology (Krentz and Corina 2008; Kuhl and Rivera-Gaxiola 2008), which will facilitate their becoming bilingual (Petitto and Kovelman 2003). The checklist can help adults to monitor this language development.

Early exposure to ASL has been demonstrated to increase cognition and executive function skills, which are critical for memory and attention to language input (Crume and Singleton, 2008; Snodden 2012). Importantly, those deaf children who have a strong ASL foundation, with (Hassanzadeh 2012; Preisler, Tvingstedt, and Ahlström 2002; Yoshinaga-Itano 2006) or without cochlear implants (Watkins, Pittman, and Walden 1998), also have better development in both spoken and written language. The VCSL Checklist will become an important evaluative tool to help us understand how bimodal/bilingual children or ASL/English bilinguals leverage early visual language to transition to spoken and written language.

Norms for the VCSL Checklist need additional research. A sufficient number of children are included here to initially validate the instrument and standardize it, but plans are under way to continue collecting data on children's language acquisition as well as background data to recheck these norms. This new data collection will also provide additional findings, such as the sensitive periods for visual language development as compared to spoken language development, as well as the environmental characteristics that result in greater levels of language acquisition.

In conclusion, the VCSL Checklist is the first standardized instrument of its kind and therefore a valuable tool for classroom teachers and parents as they monitor the language acquisition of signing children. Early language development is critical for all children, and when gaps in development are not identified or go unresolved, there can be serious academic consequences later on. The format of the VCSL Checklist is one that can easily be used by parents, early interventionists, and classroom teachers in making curriculum decisions and setting objectives for individual education plans (IEP) and individual family service plans (IFSP). It can be used to determine the zone of proximal development, where scaffolding can benefit children's linguistic acquisition, thus creating a systematic and developmentally appropriate sequence of instruction. Through careful monitoring and

documentation, the language acquisition of young deaf and hard of hearing signing children should be more complete and should lead to their greater success with language and academic endeavors.

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Appendix

VCSL Checklist

Item	Not Yet Emerging	Emerging	Inconsistent Use	Mastered
Birth to 12 Months				
Looks in direction to which the signer is pointing				
Hand babbling emerges (ex: opens and closing hands) wiggles fingers, wrist twist)				
Waves bye-bye				
Copies physical movements involving the arms, hands, head, and face				
Enjoys finger-plays and finger-games				
Follows the eye gaze of the signer				
Attends to signed motherese (ex: Sign with slow tempo, repetitions, and exaggerated movements)				
Distinguishes facial expressions (ex: anger or friendliness				
Joint reference (ex: parent and child look at same object)				
Participates in communicative play (ex: peek-a-boo)				
Enjoys holding and cuddling				
Enjoys hand play: Plays with hands and fingers				
Looks attentively at a person's face				
Looks at the visual environment with alertness				
Smiles when sees a familiar person				
Laughs when seeing fingers approaching to tickle				
Turns head in response to attention getting behaviors (ex: hand waving, lights on and off, or foot stomping)				
Smiles, makes eye contact and laughs				

continued

Item	Not Yet Emerging	Emerging	Inconsistent Use	Mastered
Expresses excitement and displeasure				
Eyes track/following movement with alertness				
Fixates on the face				
1 year to 2 years				
Recognizes own name sign				
Recognizes names signs of family members (ex: siblings)				
Finger babbles back to conversations or to self				
Points to self and objects in his/her environment				
Uses negative headshake alone or with sign				
Responds to simple commands (ex: COME HERE; EAT DINNER)				
Uses gestures to communicate (ex: COME HERE)				
Communicates wants (ex: SLEEPY, HUNGRY, THRISTY)				
First ASL signs using simple handshapes (ex: C, A, S, 1, 5)				
Uses name signs to refer to others				
Repeats what others sign				
Forms two-sign sentences (ex: EAT MORE)				
Answers questions (ex: WHERE, WHAT)				
Identifies pictures of objects/animals/people in child's environment				
2 year to 3 years				
Uses descriptive classifier (ex: CL: F spots)				
Begins to use non-manual makers (facial expressions such as raises/squinted eyebrows)				
Points to common areas in house when asked question (ex: MOMMY GO?)				
Requests help when needed				
Uses pronouns (ex: HE, SHE, IT)				

Item	Not Yet Emerging	Emerging	Inconsistent Use	Mastered
Names objects/animals/people in pictures when asked				
Expanded use of handshapes (ex: B, F, O)				
Uses possessives (ex: MY, YOUR)				
Uses non-manual /facial adverbs (ex: mm; regular—DRIVE; th; without paying attention—READ)				
Names at least 3 colors				
Vocabulary range of > 150 signs				
Uses lexicalized fingerspelling (ex: #BUS, #ICE)				
Produces three/four sign sentences				
Count from 1 to 5				
Uses emotion signs (ex: SAD, HAPPY, SCARED)				
Uses commands with two-steps (ex: YOU GO TO ROOM, BRING BOOK)				
Understands conversation turn taking				
Expressive vocabulary range of 250-350 signs				
Points to object and labels; combing nous and verbs (ex: FROG JUMP)				
Answers/responds to questions (ex: WHO, WHICH, FOR+FOR)				
Asks two word questions (ex: DOGGIE WHERE?)				
Preliminary/Some understanding of timeline (ex: TODAY, YESTERDAY)				
Identifies/matches colors				
Uses simple descriptors (ex: HOT, COLD, BIG, LITTLE)				
Enjoys signed stories and imitates the actions/facial expression of characters in the story				
Begins to make multi-word productions (ex: COOKIE WANT)				
Understands simple fingerspelled words (ex: own name)				

continued

Item	Not Yet Emerging	Emerging	Inconsistent Use	Mastered
Uses possessive pronouns (ex: his, her)				
Uses classifier (ex: CL:3 car driving forward)				
Begins using simple, descriptive classifiers (ex: CL: O for pole)				
Begins to tell stories about present situations				
Uses negatives (ex: DON'T LIKE; DON'T KNOW; NOT-YET)				
3 year to 4 years				
Uses plain verbs to connect subjects and objects (ex: HE LIKE ICE CREAM)				
Answers questions (ex: HOW, WHY, DO++)				
Verb modification (ex: Walk—strolling; Walk—quickly; Walk—long time)				
Uses rhetorical questions (ex: FATHER GO HERE? WORK)				
Fingerspells own name when asked				
Uses topicalization (ex: POPCORN, ME LIKE)				
Uses handshapes of increasing complexity (ex: W, D, P, 3, V, H)				
Understands part/whole relationships (ex: ARM/BODY; WHEEL/CAR)				
Understands quantity (ex: FULL, EMPTY, SOME)				
Uses TWO-OF-US; THREE-OF-US				
Classifier + action (ex: CL:V man climbing up a pole)				
Describes physical needs (ex: ME HUNGRY)				
Understands opposites (ex: COLD/HOT; BIG/LITTLE				
Uses complex handshapes (ex: X, R, M, N, T, 8)				
4 year plus				
Uses complex sentence structures consistently (ex: SUPPOSE TEACHER SHE SICK? CLASS NONE				
Counts from 5 to 10				

Item	Not Yet Emerging	Emerging	Inconsistent Use	Mastered
Can hold a sustained conversation (with at least 3 turn taking components)				
Tells a simple story with a beginning, middle, and ending				
Can count up to 15				
Uses body shift & eye gaze				
Tells stories about personal experiences				
Answers questions when asked (ex: SUPPOSED DIRTY HANDS, DO++?)				
Understands time concepts (ex: day – night)				
Expanded sentences involving two traits (ex: MOTHER BEAR BIG, MEAN)				
Uses time indicators (ex: FINISH; NOT YET)				
Storytelling includes setting up people and objects in space that are not present				
Answers WHAT HAPPENED? WHY?				
Verb modifications show intensity (CRY/BAWLED), manner (ex: STANDS? STANDS FOR LONG TIME), distribution (ex: GIVE-all), and temporal aspect (ex: over and over CRY)				
Can create categories/groupings from assorted objects or pictures				
Distinguishes nouns (dbl movement) from verbs (single movement (ex: CHAIR/SIT))				
Understands similarities (ex: things that fly, things you eat, things you wear)				
Uses conditionals (ex: SUPPOSE RAIN, UMBRELLA MUST)				
When given a category, lists at least six items (ex: farm animals)				
Names categories (ex: pizza, French fries, hamburger as food)				
Uses qualitative descriptors (ex: HARD; SOFT; YUCKY)				
Tells a story in sequence when given a picture prompt				

continued

Item	Not Yet Emerging	Emerging	Inconsistent Use	Mastered
Understands parts (ex: HALF, WHOLE, SOME)				
Understands handshape categories (ex: button, fox, cat)				
Number distribution (ex: topic leaves; FALL SINGULAR; FALL PLURAL; FALL RANDOM)				
Sequences from smallest to largest; shortest to longest				
Identifies object that does not belong in a group of objects				
Beginning awareness that lexicalized signs are made up of handshapes				
WH bracketing (ex: WHERE GO WHERE?)				
Uses noun modification to indicate spatial arrangement of objects (ex: trees in a row)				
Uses AGENT (ex: FARM+ER; TEACH+ER)				
Uses topic continuation (holds a sign without one hand and continues signing with the other)				
Understands season of the year				