Learning Objectives

- Discuss the relationship between core vocabulary and typical language development
- Explain how to select and implement core and fringe vocabulary words in a low-tech AAC system and visual schedule
- Describe the benefits of removable and returnable icons to increase motor automaticity for language
Review of Typical Language Development

**First 20 words that a child says are primarily nouns**
- Nouns used between 15-18 months of age
- At 24 months, child has 150-300 words and nouns no longer dominate
- At 2 years, should have 2-word combinations, this includes core words
- By 26 months, child uses 80% core

Consistent across age, race, socioeconomic status

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**Typical Language Development: Semantic Structure**

<table>
<thead>
<tr>
<th>Semantic Structure</th>
<th>Syntactic Structure</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent-action</td>
<td>Noun-Verb</td>
<td>Evan go, Daddy sleep, Mommy come</td>
</tr>
<tr>
<td>Action-object</td>
<td>Verb + noun</td>
<td>Eat cookie, Drink juice, Read book</td>
</tr>
<tr>
<td>Demonstrative entity</td>
<td>half/this + noun</td>
<td>That car, this one, this phone</td>
</tr>
<tr>
<td>Possessor – possession</td>
<td>Noun + Noun</td>
<td>Mommy sock, Daddy shoe, Charlie train</td>
</tr>
</tbody>
</table>

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Brazas, 2018
Typical Language Development: Semantic Structure

<table>
<thead>
<tr>
<th>Entity – attribute</th>
<th>Verb + noun</th>
<th>Do-again</th>
<th>&quot;No kitty/ &quot;All gone juice&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Recurrence</td>
<td>More + noun</td>
<td>&quot;More juice&quot;</td>
<td></td>
</tr>
<tr>
<td>2. Nonexistence</td>
<td>All gone + noun</td>
<td>&quot;Big ball&quot;</td>
<td></td>
</tr>
<tr>
<td>3. Attribute</td>
<td>Adjective + noun</td>
<td>&quot;Silly dog&quot;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Entity – locative</th>
<th>Verb + noun</th>
<th>&quot;Sit chair&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. More + noun</td>
<td>&quot;Go home&quot;</td>
<td></td>
</tr>
<tr>
<td>2. All gone + noun</td>
<td>&quot;Sit floor&quot;</td>
<td></td>
</tr>
<tr>
<td>3. Adjective + noun</td>
<td>&quot;Hat coat&quot;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Agent – object</th>
<th>Noun + noun</th>
<th>&quot;Mommy sock&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Mommy + noun</td>
<td>&quot;Daddy shoe&quot;</td>
<td></td>
</tr>
<tr>
<td>2. Daddy + noun</td>
<td>&quot;Silly dog&quot;</td>
<td></td>
</tr>
<tr>
<td>3. Doggy + noun</td>
<td>&quot;Good boy&quot;</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Conjunction</th>
<th>Noun + noun</th>
<th>&quot;Put car&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hat + coat</td>
<td>&quot;Put ball&quot;</td>
<td></td>
</tr>
<tr>
<td>2. Sock + shoe</td>
<td>&quot;Put ball&quot;</td>
<td></td>
</tr>
<tr>
<td>3. Kitty + mouse</td>
<td>&quot;Put ball&quot;</td>
<td></td>
</tr>
</tbody>
</table>

References:

Typical Language Development: 3 Word Utterances

<table>
<thead>
<tr>
<th>Semantic Structure</th>
<th>Syntactic Structure</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agent-action-object</td>
<td>Noun + verb + noun</td>
<td>&quot;Mommy drink milk&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Daddy eat cookie&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;I play puzzle&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;You do it&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;I do it&quot;</td>
</tr>
<tr>
<td>Agent-action-location</td>
<td>Noun + verb + noun</td>
<td>&quot;Mommy sit chair&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Daddy go work&quot;</td>
</tr>
<tr>
<td>Action-object-locative</td>
<td>Verb + noun</td>
<td>&quot;Throw ball floor&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Put car table&quot;</td>
</tr>
<tr>
<td>Agent-object-locative</td>
<td>Noun + Noun + Noun</td>
<td>&quot;Doggie ball table&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&quot;Daddy sock chair&quot;</td>
</tr>
</tbody>
</table>

Communicative Functions

- Dore’s Primitive Speech Acts have widely been accepted as a means to classify children’s communicative functions.
- Dore (1974): the speech act is proposed as the unit of analysis for studying the pragmatics of early child language. The results of a study of children’s uses of single-word utterances are reported, and the data are analyzed in terms of “primitive speech acts.”
- Dore’s Primitive Speech Acts classifies how a child acquires linguistic conventions to express his/her intentions.

References:
Communicative Functions

Communicative functions develop between 8-18 months of age in typically developing toddlers via:

- Gesture (8-12 months) - Prelinguistic
- Vocalization or Word (12-18 months)
- Word (18-24 months)

In a non-speaking individual, intervention should focus on a variety of communicative functions that are modeled and elicited across syntax structures.

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First 100 Words: What is Core Vocabulary?

- Concept relating to typical language development
- Our generative language system is based upon Core Words
- About 80% of what we say comes from a small set of 400-500 words
  - Used in most messages across all environments and situations by children and adults
  - Includes social function words, common action words, prepositions, adjectives/adverbs, early pronouns
- 20% of what we say comes from a bank of thousands of fringe words
  - Huge number of words, mostly nouns, infrequently used, and activity specific

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Core Vocabulary Is Typical Language Development

- Core Vocabulary is not a separate entity from typical language development. It is a concept that demonstrates that children (and adults) use some words more frequently than others. We can predict that an individual may use a relatively small lexicon, but will spontaneously use words within this lexicon to combine syntactic and semantic structures.
- Core Vocabulary is typical language development as it encompasses the parts of speech used on a daily basis in communicative exchanges
  - Pronouns, verbs, adjectives, prepositions, conjunctions, social phrases
Typical Language Development: Core Vocabulary


<table>
<thead>
<tr>
<th>a</th>
<th>all</th>
<th>done</th>
<th>finished</th>
<th>go</th>
<th>help</th>
<th>here</th>
</tr>
</thead>
<tbody>
<tr>
<td>i</td>
<td>in</td>
<td>is</td>
<td>it</td>
<td>mine</td>
<td>more</td>
<td>my</td>
</tr>
<tr>
<td>no</td>
<td>off</td>
<td>on</td>
<td>out</td>
<td>some</td>
<td>that</td>
<td>the</td>
</tr>
<tr>
<td>want</td>
<td>what</td>
<td>yea</td>
<td>yes</td>
<td>you</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Minspeak Core Vocabulary Lists

- Bruce Baker has compiled several core vocabulary lists from the following research studies:
  - Banajee list of 26 toddler core words
  - Marvin list of 333 alphabetized preschool core words
  - Balandin list of 347 core words used by adults
  - Stuart list of 174 core words used by seniors
  - Hill list of the top 100 core words used by fluent augmented communicators


Core Vocabulary Research Studies

- **It should be noted that the study of core vocabulary has been completed primarily on toddlers aged 2-5 years, where the population is not that of emergent communicators.**
Do We Model Core Words for Children Who Are Prelinguistic?

Typically developing children often develop “first words” around their first birthday. By that time, they have had approximately 12 months of exposure to language in context. It is difficult to calculate the number of verbal models that children will have heard by then, but a conservative estimate is in the hundreds of thousands of models. In contrast, children who require AAC often receive far fewer models of the language form that they are expected to use, if any. There are far more limited opportunities to observe another person using AAC to communicate.


Aided Language Research

Review of 10 studies examining aided AAC modeling determined:

- Improved pragmatic, semantic, syntactic, and morphological development for young children who are beginning communicators
- With appropriate models within naturalistic contexts, paired with interactional techniques (time delay and recasting), individuals made gains in expressive and receptive language
- Positive findings of impact of AAC modeling align with major acquisition theories regarding the importance of language input (Gerken 2008, Hirsh-Pasek & Golinkoff 1996)
Communication is Reciprocal

(Sevcik & Romski, 2002).

Young children use language for many purposes, including to meet their wants and needs, to gain knowledge about the world around them, to develop and maintain social relationships, and to exchange information with others. In order for young children to develop functional language and communication skills, they must be able to comprehend and produce language so that they can take on the reciprocal roles of both listener and speaker in conversational exchanges.

CVES Approach to Language Learning

An analysis of the words that infants are able to produce is not reflective of the words that children comprehend.

- Environment provides opportunity for comprehending and producing language within different contexts
- For infants or children who are not able to perceive speech production, an augmentative means to teach speech perception can be provided to augment understanding (and use)

Foundational Principle: simultaneously providing receptive input while targeting expressive vocabulary. Create a communication loop and teach reciprocity of language.

Autism Spectrum Disorder and Core Vocabulary Intervention

- Autism spectrum disorders are neurodevelopmental disorders
  - Patches of disrupted cortical tissue
  - Problems with brain connectivity
  - Imbalance in neural excitation and inhibition
  - Pruning deficits (over and under pruning)
  - Multisensory Integration Problems

See Martha Burns, PhD., CCC-SLP, Speech-Language Pathologist
Autism and Pruning

- With ASD there are connectivity deficits in the brain (Structural framework in which altered brain connectivity exists)
- For an individual with Autism, pruning deficits impact development over time, including overpruning of some areas of the brain, and underpruning of others (J. L. R. Rubenstein and M. M. Merzenich (2003) Model of autism: increased ratio of excitation/inhibition in key neural systems, Genes and Behavior)
- Over and underpruning alters network development and function
  - Overpruning of one area can decrease function

Dean et al., Investigating the Microstructural Correlation of White Matter in Autism Spectrum Disorder, Brain Connectivity, Volume 6, 2016.

Autism: Connecting The Structures

Pave the road between the houses

- Brain structures are present, connection may be poor
- Create connections for:
  - Social language
  - Reciprocal interactions
  - Parts of speech
  - Grammar
  - Vocabulary

Dean et al., Investigating the Microstructural Correlation of White Matter in Autism Spectrum Disorder, Brain Connectivity, Volume 6, 2016.

Autism and Core Vocabulary

- What do we want the brain to retain?
- How are we using experiences that are relevant in an individual’s life to map core words and make connections?
- Am I providing experiences that will drive acquisition of language?
- Am I limiting a child’s language development by lack of exposure (Think: Receptive Input)?

Intervention drives white matter development and may facilitate homeostasis of over and under pruning.

Intervention increases connectivity.

Create white fiber tracts for a variety of communicative functions.
Although there has been much debate over the content of children's first words, few large sample studies address this question for children at the very earliest stages of word learning. Fletcher et. al report data from comparable samples of 265 English, 336 Putonghua (Mandarin), and 369 Cantonese-speaking 8- to 16-month-old infants whose caregivers completed MacArthur-Bates Communicative Development Inventories and reported them to produce between 1 and 10 words.

With the exception of people words, there were strong similarities in the types of words that appeared. Although one cannot make generalities at the level of word class (e.g., children learn nouns or verbs), one can make generalities within word classes—children learn terms to describe people (whether kinship terms or individual names), concrete, manipulable object nouns, action verbs, and so on. In all three languages, the common nouns that children learned were manipulable objects that children encountered in their homes, or animals, rather than larger household objects or outside things, echoing Nelson (1973).

What is SNUG?

- **Spontaneous Novel Utterance Generation**
- Snug is based on access to the individual words, collocations, and commonly used phrases of our language. SNUG allows a person to say anything anytime.” (Katya Hill)
- Typical children do not predict what they are going to say across situations, they use SNUG when communicating
- SNUG implies that an individual has access to single words
- SNUG implies that an individual has access to a variety of words including verbs, descriptors, demonstratives

Katya Hill, Achieving Success in AAC: Assessment and Intervention. AACinstitute.org
Language Is Spontaneous

We are using a relatively small set (400-500 core words) to speak to each other, but we combine these words in novel ways across communication partners, contexts, and environments.

How Can We Support SNUG in a Low-Tech System?

- Provide a communication system which allows for teaching of functional communication skills
- Target therapy at child’s language level
  - Use of single words before proceeding to phrases and sentences
- Provide an INPUT and OUTPUT mode for SNUG

SNUG in CVES: Access to Single Icons

- Align to Brown’s Morphemes to maximum extent
- Alignment to typical language development in an AAC system will naturally encourage SNUG
- Syntax Structures emerge with alignment to SNUG
- Separation of pronouns/people words and action words
  - I and go as separate entities versus “I go” as a carrier phrase
  - I + want as separate entities versus “I want” as carrier phrase
  - I and want as separate entities versus “I open” as a carrier phrase
SNUG Separation of Pronoun + Action: I and Open

I open
You open
Open it
I open it
You open it
Open that
Hard to open
I can open this
Can you open
Can you open it
Is (place) open?
Are they open or closed?

SNUG Separation of Pronoun + Action: I want

She wants
Mama, want ...
Want
Do you want ...
Do I want ...
You want
They want ...

Access To Core Words to Increase SNUG

- Access to a robust vocabulary
- Access to parts of speech
- Align to Brown's Morphemes
- Create a single word dictionary
- Receptive modeling and expressive output using SNUG to facilitate functional communication skills across functions of communication.
Core Words to Support Behavioral Regulation

Expressing Core Words At Language Level Across Communicative Functions: Facilitate SNUG across functions

Requesting Action:
1. Protesting
2. Cessation
3. Assistance
4. Request Desired Object/Activity

What is CVES™? The Core Vocabulary Foldouts

The Core Vocabulary Foldout contains core vocabulary words (ranging between 105-189 icons) which are removed and sequenced either individually or on the communication card to create a message at the user’s individual language level.

Icons are removed and used during a communicative exchange, and returned to the same location after use, therefore allowing the user to locate vocabulary in a consistent location when formulating a message.

Intermediate 105 or Advanced 189
Language Selection and Icons in CVES

- Based upon the concept of Core Vocabulary and typical language acquisition
- Relationship between core and fringe vocabulary
- Based upon typical language acquisition
  a. First developing core vocabulary words
  b. Access to fringe vocabulary and customized personal core
- Consistent Motor Planning
  ■ Removable and returnable icons

Removable and Returnable Icons for Personal Core and Fringe

The Binder Inserts consist of 8 high frequency categories where personal core and fringe vocabulary words are stored.
1. People
2. Food
3. Health
4. Art
5. Sensory
6. Social
7. Play
8. Miscellaneous

Binder Inserts

- Personal Core and Fringe Vocabulary
- Organized by color and symbol coding system
- Pre-determined fringe vocabulary and blank space for customization
- Personal Core Stickers
- Additional Storage on Back
- Icons remove and return to same location
Insert Appearance

- Grid Appearance similar to high-tech device
- Completed Inserts
  - Pre-determined locations
  - Consistent motor plan for fringe and personal core
  - Option to add and customize personal core in open locations or back

CVES Board Designs: Background History

CVES was designed upon the principles of typical language acquisition, consistent with Brown’s Stages of Syntactic and Morphological Development, where typically developing children progress through primarily single words before advancing to phrase combinations. The creation of CVES is a result of a need for a low-tech communication system that teaches communicative reciprocity, allows children to say whatever they want to say whenever they want to say it (SNUG) while learning the wide range of communicative functions at their language level as they grow and acquire semantic and syntactic structures.

Brown’s Review: [https://www.speech-language-therapy.com/](https://www.speech-language-therapy.com/)

CVES can be used as a low-tech AAC system or language teaching tool to:

1. Increase receptive and expressive joint attention
2. Increase social interaction by teaching reciprocity of language and communication loops
   1. Facilitate a two-way communicative exchange
3. Teach SNUG
   1. Build capacity at single words → two words → three word combinations
4. Increase frequency and expand use of functions of communication
5. Increase understanding of spoken language (receptive) to facilitate expression of language
6. Support behavioral regulation by increasing functional communication skills
7. Increase motor automaticity for language in a low-tech AAC system
CVES can help children who struggle with functional communication learn to:

- Develop functional communication skills
- Practice a variety of communicative functions
  - Protesting
  - Indicating cessation
  - Requesting
  - Asking questions
  - Commenting
  - Assistance
  - Labeling
- Develop Spontaneous Novel Utterance Generation

Use these methods with CVES:
- Aided Language Input
- Backward Chaining
- Reinforcer Assessment
- Visual Schedule and First-Then
- Naturally Occurring Routines and Opportunities
- Set Up/Engineer the Environment
- Multisensory Input

Use CVES to teach:
- SNUG
- Reciprocity and Social Interaction
- Functional Communication: wants, needs, preferences ideas
- Communicative Intent
- Joint Attention
- Behavioral Regulation
- Motor Automaticity

How is CVES™ used expressively?
The user can use the icons expressively in 2 ways:

1. Single Icon
   Use directly off the Core Vocabulary Foldout and Binder Inserts – Recommended for Emergent Communicators

2. Using a Communication Card
   Icons are removed and exchanged individually or sequenced on the communication card to create a message at the user’s language level.
How is CVES™ used receptively?

1. The communication partner initiates communication with the child/user, by taking icons directly off the core vocabulary foldout, saying and modeling the icon verbally. This allows the child/user to increase icon to speech association, as well as take on the role of listener in a communicative exchange. The communication partner can model single words from both the Core Vocabulary Foldout or Binder Inserts.

2. The use of a core communication card allows a communication partner to initiate communication with the child/user, which allows the child to take on the role of listener. The communication partner can build language at the single or multi-word level depending upon the language level of the child/user.

CVES™ and Auditory System

- Keep verbal language consistent (and constant)
  - Pair speech with icon
- Allow for processing time
  - Slow rate of speech
- Increase auditory comprehension of single words by pairing spoken language with visual icon
  - Increase association

CVES™ and Visual System

- Keep verbal language consistent (and constant)
  - Pair speech with visual icon
- Color coding Fitzgerald Key
- Color coded fringe/personal core
- Symbol encoding for fringe/personal core
  - individuals who are color blind
- Visual feedback of seeing icons being manipulated, and transferred to the communication partner
CVES™ and Visual System

- Visual feedback for semantic and syntactic structures
  - Communication partner can correct and model semantic and syntactic structure on the communication card with limited navigation
  - Decrease cognitive load

CVES™ and Touch

- Interactive Hands On
- Physically removing and/or returning icons
- Tactile feedback with icons and velcro removal and attachment
- Physical exchange of the communication card/icon to the communication partner

CVES and Multisensory Input: Establishing a Motor Plan For Core Words by Hiding and Showing of Icons

On a high tech system we consider this “masking” of icons
On a low tech system, we can hide and show icons to target specific core vocabulary words
CVES and Multisensory Input: Establishing a Motor Plan For Core Words by Hiding and Showing of Icons

- Use Masking Icons to hide and show specific core vocabulary words
- If child has difficulty with all icons present on the page or is not using words functionally
- Focus on new vocabulary words
- Increase use of words across communication partners, environment, and contexts

Progress Monitoring: Core Word Acquisition

Questions?
How Can I Get More Information?

- Northern Speech Services
  - https://www.northernspeech.com/cves?q=cves
  - Email: info@northernspeech.com
  - Other: 
    - Megan Brazas meganb@slpathways.com

References and Resources

- https://aadanguageLab.com/resources/core-vocabulary
- Halloran, John. www.aacandautism.com
- Pecsusa.com
References and Resources

- Shirley Cohen, Targeting Autism: What We Know, Don’t Know, and Can Do to Help Young Children with Autism Spectrum Disorders
- Stokes, S. Developing Expressive Communication Skills for Non-Verbal Children with Autism, Susan L. Stokes. "Written by Susan Stokes under a contract with CESA 7 and funded by a discretionary grant from the Wisconsin Department of Public Instruction." Stokes, Susan: http://stokesishas2012.pbworks.com/w/page/35861366/FrontPage
- W.E.B. DuBois Learning Center: http://www.duboislc.org/ED-Watch/Words/1-100.html