

# Access Methods in AAC

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# Introduction

- Today's Demonstrations are on PRC Devices
- While settings are specific to PRC devices...
- Concepts can be generalized to other AAC devices and assistive technologies



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# Access Methods

- Touch
- Scanning
- Alternative Mouse/Joystick
- Headtracking
- Eyepointing



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## Access Methods

- Helpful Terminology
  - Direct Selection
    - Usually any type of access that isn't scanning
  - Indirect Selection
    - Involves switches and scanning
  - More or less "Directive"
    - Also referred to as 'degree of control'



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## Touch

- Direct Selection with Touchscreen
  - Acceptance time adjustment (mis-hit control)
  - Release time adjustment (multiple-hit control)
  - Activate key when pushed vs. when released
  - Keyguard
    - Helpful for coordination difficulties
    - Strength issues
    - Visual challenges



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## Scanning

- An indirect access method that requires the user to wait while the device steps through various choices that are displayed in a matrix of sections. The user then activates a switch to indicate a choice is being made.
- Auditory scanning requires the user to listen to auditory cues in order to follow the scanning pattern; visual scanning requires the operator to follow visual cues such as lights or highlights.



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## Scanning Types

- Automatic Scanning:  
A switch activation starts the sequence, which then proceeds automatically. When the desired selection is highlighted a second switch activation selects that choice.
  - Least number of hits required
  - Largest timing requirement
    - Selections must be made within the pre-set time
  - Minor adjustments can impact timing requirement



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## Scanning Options

- Scan direction
  - Linear or Circular for smaller overlay
  - Row/Column or Quarter R/C for larger overlay
- Scanning Speed
- Other options to help a scanner
  - Automatic restart
  - Acceptance & Release time (same as direct sel.)
  - Adding switch hits
- Number of Re-scans
  - Depends on timing and propensity for mis-hits



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## Switches & Scanning

- Inverse Scanning  
A method of indirect selection in which the user must activate a switch to maintain movement of the scanner rather than the scanner moving automatically through the choices. Also called 'hold scan'
  - Reduces timing requirement
  - Used when the release is the more coordinated action
    - When maintaining a position is easier than repeating it
    - Timing primary issue to consider



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## Switches & Scanning

- Step Scanning  
A method of indirect selection in which the user activates a switch each time he wants the system to move to the next selection.
  - Largest physical requirement
  - Need a consistent, repeatable movement
  - Consider Fatigue factor & type of muscle group
  - A second switch is often added to this method of scanning



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## Multiple Switch Scanning

- One switch for scanning, the other for selection
- Significant motor requirement
- Completely directive, less passive
- Minimal timing requirement
- 2 Switches may reduce cognitive load
  - Each switch has specific function

[Linda Burkhart: Two Switches for Success](#)



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## Directed Scanning

- Direct Scan matches separate directional switches with moving the highlight across individual keys. These switches are used in a step or inverse fashion.
  - The directed scan is often controlled by a joystick
  - Requires solid switch skills or joystick control
  - Usually very efficient method



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## Considerations for Switches & Scanning

- Type of Scanning
  - Is there more than one access point for multiple switches
  - Repeatability, fatigue associated with movement(s)
  - Timing, attention
- Number of Switches
  - Generally more switches = more directive
  - More switches affects timing requirement
  - Two switches reduces cognitive load



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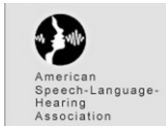
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## Language Consideration for Indirect selectors

- *“Communication is based on the use of the individual words of our language. True communication is spontaneous and novel. Therefore, communication systems cannot be based significantly on pre-stored sentences. Communication requires access to a vocabulary of individual words suitable to our needs that are multiple and subject to change. These words must be selected to form the sentences that we wish to say.”*



ASHA's AAC Glossary



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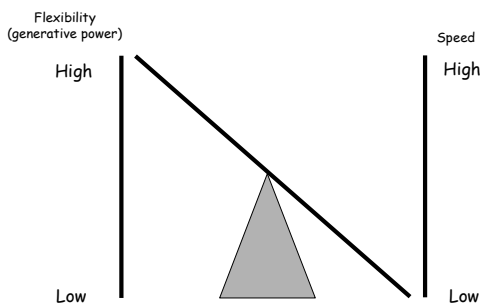
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## Spelling



Goossens, C., & Crain, S. (1992). Utilizing switch interfaces with children who are severely physically challenged. Austin, TX: Pro-Ed.



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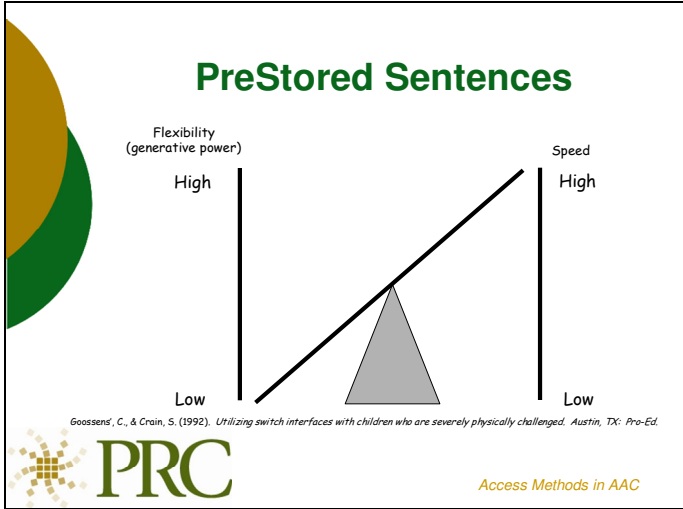
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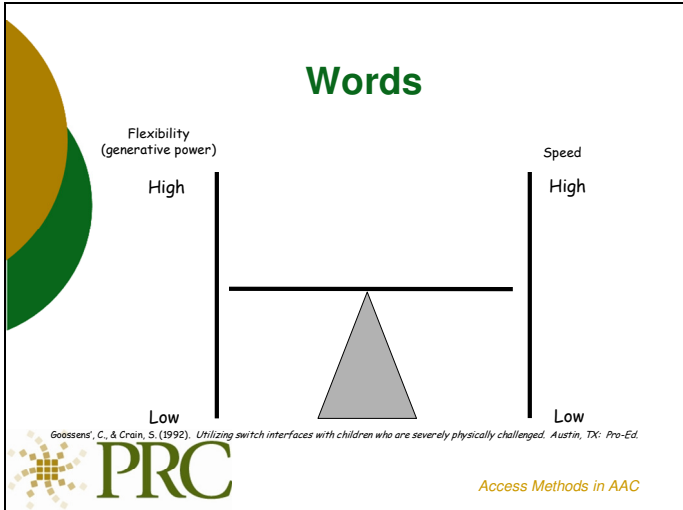
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## A Sensible use for Pre-stored Sentences?

- Efficient for messages that are used repeatedly
- Use as a complement to a single word vocabulary
- Do Not use as a replacement for single word vocabulary

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## Alternative Mouse

- Direct Selection with external device
  - Mouse, Trackball, Joystick
  - Requires different Visuomotor skills than touchscreen
  - Dwell to reduce motor requirement
  - Manual selection can help with timing



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## Headtracking

- Direct Selection Headtracker – Infrared Sensing
  - Dwell or Manual for more directive selection
  - Hiding keys can help during early learning
  - Can accommodate for gross or fine head control
    - Horizontal and Vertical Speed
    - Averaging
    - Visual Feedback Options
    - Field of View



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## Eye pointing

- Also called Eye gaze (refers to the 'gaze point')
- Technical term is 'oculography'
  - In assistive technology 'video oculography'
  - Uses 'point of regard' method
  - Light source creates a reflection in the pupil
    - Allows camera to follow the pupil



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## Headtracking vs. Eyepointing

- Significant Cost difference
- Lighting requirements
- Hardware size
- Calibration requirements
- How tolerate positioning changes
- Fine Motor control (head and neck for HT-spasticity)
- ROM requirements vs. eye physiology
- Effectiveness of movement as user ages
- Fatigue
- Selection rate



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## Helpful Options in PRC Devices

- Modify what can be selected
- Pause access method
- Modify scanning patterns
- One touch to change access method or settings



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## Resources for Switch Users

- [Introduction to Seating and Positioning Webcast](http://mcn.ed.psu.edu/dbm/S_P_AT_pt1/index.htm)
  - [http://mcn.ed.psu.edu/dbm/S\\_P\\_AT\\_pt1/index.htm](http://mcn.ed.psu.edu/dbm/S_P_AT_pt1/index.htm)
- [Two switches for success](http://www.lburkhart.com/hand2sw4s.htm)
  - <http://www.lburkhart.com/hand2sw4s.htm>
- [Introduction to Partner assisted scanning](http://www.lburkhart.com/Isaac_instructional_06.pdf)
  - [http://www.lburkhart.com/Isaac\\_instructional\\_06.pdf](http://www.lburkhart.com/Isaac_instructional_06.pdf)
- [Help kids learn switch games \(free\)](http://www.helpkidzlearn.com/games.html)
  - <http://www.helpkidzlearn.com/games.html>
- [Switch learning software](http://www.judylynn.com/downloads.htm)
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