Both language and cognition affected in traumatic etiologies

- **TBI**
  - Approx 20% of individuals with TBI have specific language impairment (i.e., aphasia) (Safaz et al, 2008)
  - 55-80% of TBI patients demonstrate cognitive impairments (De Guise et al, 2005)
    - Sample of consecutive admissions to a TBI unit over two years (348 patients)
    - Most frequent impairments:
      - Mental fatigability (83% of patients)
      - Mental flexibility (62% of patients)
      - Mental slowness (57% of patients)
      - Attention (56% of patients)
      - Memory (55% of patients)

Both language and cognition affected in degenerative etiologies

- **MCI** (Hanfelt et al, 2011)
  - 36% of MCI patients showed language and other cognitive features
- **Dementia**
  - Although memory symptoms are the most common factor in diagnosing dementia, language can also be impaired
- **Parkinson’s**
  - Between 30-40% of Parkinson’s patients meet diagnostic criteria for dementia; this increases with years after diagnosis, up to 80% 20 years after diagnosis (Pagonabarraga et al, 2012)
- **ALS** (Taylor et al, 2013)
  - Language impairment: 43% of patients
  - Executive function impairment: 31% of patients

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• So, language impairments (including aphasia) and cognitive impairments frequently co-occur
• Cognitive impairments affect our treatment selection and prognosis

• Cognitive impairment is one important factor in adherence to medications among stroke patients (Coetzee et al, 2008). Prospective memory impairment is a threat to adherence (Zogg et al, 2012).
• Communication impairments are risks to patient safety (Cristian et al, 2012). Cognitive impairment may be linked to fall risk (Campbell &, 2010)

Executive function critical to conversational success in aphasia

Achieving conversational success in aphasia by focusing on non-linguistic cognitive skills: A potentially promising new approach

Gail Ramsberger
University of Colorado – Boulder, CO, USA
• Successful communication dyads (person with aphasia and partner)...
  – Confirm shared knowledge
  – Establish communication strategy (yes/no, drawing, writing, etc.)
  – Confirm understanding
  – Request clarifications
• All of these place demands on the management of multiple tasks, simultaneously

Ramsberger, 2005

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Why should we assess cognition in aphasia?

• Cognition affects health risks such as
  – Death rate
  – Independence/activity
  – Compliance/adherence
  – Fall risk

• Cognition affects treatment and treatment outcome
  – Strategy use and deployment affected by cognitive aspects such as attention and executive function
  – Generalization and transfer require other cognitive abilities like executive function

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How can we assess cognitive ability in aphasia?

Three cognitive assessments appropriate for aphasia

• Cognitive-Linguistic Quick Test (CLQT)
• Scales of Cognitive and Communicative Ability for Neurorehabilitation (SCCAN)
• Global Aphasia Neuropsychological Battery (GANBA)
Multi-component cognitive assessment: Cognitive-Linguistic Quick Test  
(Helm-Estabrooks, 2001)

- 10 subtests--comprehensive
- Encompasses all cognitive domains
- Gives severity rating for each domain and overall composite score
- Less than 30 minutes to give, easy scoring

Clock Drawing – CLQT

![Clock Drawing Image]

FIGURE 4.18 Clock Drawing Task Results of Case H. C.
Symbol cancellation: contributes to attention and visual-spatial assessment

Design memory – CLQT
CLQT: Language-related measures

- Word memory
- Verbal fluency
  - Animal Naming
  - Category Naming

Design fluency – CLQT

FIGURE 4.19 Design Generation Task Results for Case H. C.
Mazes-CLQT

FIGURE 4.8 Maze Task Results for Case O. T. Showing Neglect of the Left Side

Trail-making – CLQT

FIGURE 4.10 Symbol Trails Task Results for Case P. T.
Scales of Cognitive and Communicative Ability for Neurorehabilitation (SCCAN)

(Milman et al, 2008)

• Provide overview of cognitive AND communicative abilities (not diagnosis- or domain-specific)
• Assesses impairment and functional activity
• Could be completed in relatively brief period (approx 30 minutes)

SCCAN

• Oral Expression
• Orientation
• Memory
• Speech Comprehension
• Reading Comprehension
• Writing
• Attention
• Problem Solving

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SCCAN

• Functional assessment examples:
  – Reading: understanding signs, newspaper caption, schedule, phonebook, medication label
  – Memory: Recall name, message, faces, places, and medications

• Compared to CLQT:
  – Includes reading and writing assessment
  – All language modalities assessed

Global Aphasia Neuropsychological Battery (GANBA) (van Mourik et al, 1992)

Consists of:
  Visual cancellation
  Face and object recognition subtests of Rivermead Behavioral Memory
  Raven’s Colored Progressive Matrices
  Visual-perceptual test
  Nonverbal auditory sounds recognition (from CADL, 1st edition, 1980)
Rivermead Behavioral Memory Test: Object Recognition (Immediate and Delayed Recall)

Raven’s Coloured Progressive Matrices: a measure of visual analogue reasoning
Cognitive Task Analysis (CTA)

**Step 1 of CTA:** Determine the specific steps required for task completion.

**Step 2 of CTA:** For each specific step in the task, you consider the cognitive and language requisites. Consider: attention (different types), memory (different types), executive functions, visuospatial skills, language skills.

---

Table 1

<table>
<thead>
<tr>
<th></th>
<th>Young et al. (1992)</th>
<th>Hinchley &amp; Nash (this study)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visual cancellation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe aphasia (n = 17)</td>
<td>63.8</td>
<td>96.25</td>
</tr>
<tr>
<td>0-100</td>
<td>(4.35)</td>
<td>(1.42)</td>
</tr>
<tr>
<td>Recognition memory (RBMT)</td>
<td>66.0</td>
<td>94.41</td>
</tr>
<tr>
<td>0-100</td>
<td>(30.0)</td>
<td>(8.99)</td>
</tr>
<tr>
<td>Non-verbal reasoning (RCM)</td>
<td>24.8</td>
<td>91.50</td>
</tr>
<tr>
<td>0-100</td>
<td>(2.08)</td>
<td>(16.51)</td>
</tr>
<tr>
<td>Visual perceptual abilities</td>
<td>75.6</td>
<td>89-94</td>
</tr>
<tr>
<td>53-100</td>
<td>(20.05)</td>
<td>(8.30)</td>
</tr>
<tr>
<td>Non-verbal auditory recognition</td>
<td>58.6</td>
<td>87.76</td>
</tr>
<tr>
<td>10-100</td>
<td>(14.15)</td>
<td>(5.45)</td>
</tr>
</tbody>
</table>

Performance scores are in percentage correct.
Example 1: “Skill-based” training: picture naming therapy as an example.

<table>
<thead>
<tr>
<th>Clinician behavior</th>
<th>Client response</th>
<th>Presumed cognitive requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>“What is this called?” (shows picture)</td>
<td>“It’s a……a….. I know it….um…..”</td>
<td></td>
</tr>
<tr>
<td>Provides semantic cue “you eat it”</td>
<td>“Yes I know, but….well….it is…..”</td>
<td></td>
</tr>
<tr>
<td>Provides a phonemic cue “It’s a ba…”</td>
<td>“A banana!”</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinician behavior</th>
<th>Client response</th>
<th>Presumed client’s cognitive requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>“What is this called?” (shows picture)</td>
<td>“It’s a……a….. I know it….um…..”</td>
<td>Language: Oral language comprehension Visuospatial abilities: Perceive picture Attention Executive functions: Retrieve and deploy strategy (task expectations) Memory</td>
</tr>
<tr>
<td>Provides semantic cue “you eat it”</td>
<td>“Yes I know, but….well….it is…..”</td>
<td>Language: Oral language comprehension, semantic abilities Executive functions Attention Memory</td>
</tr>
<tr>
<td>Provides a phonemic cue “It’s a ba…”</td>
<td>“A banana!”</td>
<td>Language: Oral language comprehension, phonemic abilities Executive functions Attention Memory</td>
</tr>
</tbody>
</table>
Example 2: Strategy training

<table>
<thead>
<tr>
<th>Clinician behavior</th>
<th>Client response</th>
<th>Presumed cognitive requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>“What can you do if you don’t know where your room is?”</td>
<td>“Well, I don’t know. Wander around I guess.”</td>
<td>Language: Oral language comprehension</td>
</tr>
<tr>
<td>“Do you have anything that would help you find out where your room is?”</td>
<td>“Well, I guess I do. I think I have a card.”</td>
<td>Attention</td>
</tr>
<tr>
<td>“Yes you do. Where is the card?”</td>
<td>“Oh, here it is!”</td>
<td>Executive functions</td>
</tr>
</tbody>
</table>

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What are the cognitive and linguistic requirements of these two therapy tasks (naming vs. strategy training)?

<table>
<thead>
<tr>
<th>Cognitive Requirements of Two Types of Therapy Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stimulus training</strong></td>
</tr>
<tr>
<td>Language domains: processing of stimulus and required response</td>
</tr>
<tr>
<td>Attention: Alertness, orient and select, executive</td>
</tr>
<tr>
<td>Executive functions: Task management</td>
</tr>
<tr>
<td>Visuospatial abilities: Picture processing</td>
</tr>
<tr>
<td>Memory: Retrieval of lexical information</td>
</tr>
<tr>
<td><strong>Strategy training</strong></td>
</tr>
<tr>
<td>Language domains: processing of stimulus and required response</td>
</tr>
<tr>
<td>Attention: Alertness, orient and select, executive</td>
</tr>
<tr>
<td>Executive functions: Retrieve appropriate strategy based on context, deploy strategy</td>
</tr>
<tr>
<td>Visuospatial abilities: Perceive immediate objects</td>
</tr>
<tr>
<td>Memory: Retrieval of previously stored strategy, search for requested information</td>
</tr>
</tbody>
</table>

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Cognitive Task Analysis applies to...

• Identifying the cognitive and language abilities required in a personally relevant activity
• Breaking down the cognitive components of a particular treatment

Section 3: Selecting from among evidence-supported treatments
Aphasia treatments that meet these criteria
(Hinckley, 2011; Salter et al, 2012; Allen et al, 2012)

**Oral expression focus**
- Phonological/semantic cueing
- Task-specific training (phonological/semantic cueing)
- PACE
- Verb Network Strengthening Treatment
- Response Elaboration Training
- Constraint-induced aphasia tx
- Melodic Intonation Training
- Semantic Feature Analysis
- Script training

**Reading/writing focus**
- Multiple Oral Re-reading/ORLA
- Anagram Copy and Recall Treatment

**Multi-modality**
- PACE
- Task-specific training
- Communication Partner Training
- Spaced retrieval
Let’s start with a personally relevant activity: Ordering in a restaurant

<table>
<thead>
<tr>
<th>Examiner Item</th>
<th>Response Latency</th>
<th>Response</th>
<th>Score (0, 1, 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can I get you something to drink?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. What would you like?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. What sides would you like with that?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Would you like anything for dessert?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. OK, thank you.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cognitive Task Analysis (CTA)

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(Hinckley, 2011; Salter et al, 2012; Allen et al, 2012)

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- Task-specific training (phonological/semantic cueing)
- PACE
- Verb Network Strengthening Treatment
- Response Elaboration Training

- Constraint-induced aphasia tx
- Melodic Intonation Training
- Semantic Feature Analysis
- Script training
Task-specific word retrieval cueing

- Task-specific vocabulary
- Can be trained within role-play

Aphasia treatments that meet these criteria
(Hinckley, 2011; Salter et al., 2012; Allen et al., 2012)

**Oral expression focus**
- Phonological/semantic cueing
- Task-specific training (phonological/semantic cueing)
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- Script training