NEUROGENIC COMMUNICATION DISORDERS:
Evidence-Based Interventions For Right Hemisphere Disorders, TBI, Dementia And Aphasia

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Evidence-Based Practice for Right Hemisphere Brain Damage

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Northern Speech Services - San Antonio - April 3, 2011

Outline

- Evidence-Based Practice
  - EBP and RHD
- RHD overview and general issues
- Review of RH disorders & existing treatment
  - attention
  - communication
  - cognition
- Treatment in the absence of evidence
  - theoretically-based treatment
  - selecting treatments based on deficit (not etiology)
EBP Triangle

Current Best Evidence

Evidence-Based Practice

Clinical Expertise

Client/Patient Values

RHD & EBP: Expertise

- Learn from experts
  - Tompkins, Myers, Halper, Cherney, Joanette, Brownell
- Talk with colleagues
  - ASHA SIG 2: Neurogenics/Neurophysiology
- Boost referrals to SLP (educate others!)
RHD & EBP: Client/Patient Values

- Education
- Empowerment
- Encourage ownership of treatment/goals

RHD & EBP Current Best Evidence

- Attention
  - general attention: few studies of RHD
  - neglect: many studies

- Communication
  - prosody: some recent studies
  - discourse/pragmatics: no direct studies of RHD

- Cognition
  - executive function: no direct studies of RHD
RHD & EBP: Why so few treatment studies?

- Difficulties objectively assessing deficits
  - (more studies of neglect than other deficits)
- Fuzzy understanding of underlying deficits
- Complexity of deficits
  - difficult to define and test
  - wide range of “normal” ability
- Few people working on the problem

SLP & EBP: Does it matter?

- Why does it matter?
  - We know what we were taught
    - Yes – But was that right?
  - We’ve learned things along the way by practicing SLP.
    - Yes – but how well do those treatments work?
  - We know what we’re doing
    - Yes – but does it really work & can we justify it?
RHD & EBP: Do It Yourself

- PICO Question
  - Population
  - Intervention
  - Comparison
  - Outcome

- Do external cues (e.g., “look to the left”) result in better scanning during reading tasks than a computerized attentional task for adults with neglect due to RHD?

RHD & EBP: What to look for

- Treatment studies
  - Randomized Controlled Trials
  - Group studies (non-randomized controlled trials)
  - Case studies/case series
- Systematic Reviews
  - Review of published studies
- Meta-analysis
  - Statistical analysis of results from multiple studies
RHD & EBP:
Where to find the studies

- **PsycBite**  [http://www.psycbite.com/](http://www.psycbite.com/)
  - Psychological database for Brain Injury Treatment Efficacy
- **ASHA**  [http://www.asha.org/research/](http://www.asha.org/research/)
  - Evidence Based Practice
  - National Center for Evidence-Based Practice in Communication Disorders (N-CEP)
  - Evidence Maps
  - Treatment efficacy summaries
- **ANCDS**  [http://www.ancds.org/](http://www.ancds.org/)
  - Practice guidelines

Deficits associated with RHD

- Not all adults with RHD have cognitive/communicative deficits
  - 50% of all patients with RHD
  - 80-90% of patients in rehab
  - Diagnosis depends on who does the evaluation
    - Neglect/attention most commonly diagnosed
    - Communication/pragmatic deficits not "seen" by clinicians other than SLPs

Blake, Duffy, Myers & Tompkins, 2002; Blake, Duffy, Tompkins & Myers, 2003
What we know today

- No clear or consistent patterns of deficits
  - attention + learning/memory often appear together
  - neglect seems to “worsen” other cognitive/language abilities

- No clear localization of functions in RH
  - neglect: primarily parietal, also frontal, subcortical
  - executive functions: primarily frontal
  - cognitive-communication: frontal, parietal, temporal

General Assessment Issues

- RHD or cognitive batteries
- Many non-standardized tests/tasks

- No clear demarcation between “normal” and “abnormal”
  - especially for cognition, pragmatics
  - discourse: overlap with normal aging changes
General Assessment Issues

- SLP Biases
  - Family vs. SLP ratings of behaviors
    - 43% disagreement
      - most: SLP = Inappropriate; family = same as before CVA
      - some: SLP = Appropriate; family = very different
  - Ratings of discourse production
    - 1/3 SLPs: overly liberal, everyone = normal
    - 1/3 SLPs: overly conservative, everyone = RHD
    - 1/3 SLPs: accurately identified RHD vs. normal
    - Not related to certainty of response; years in practice; familiarity with RHD

Baron et al., 1999; Blake 2006

General Treatment Issues

- Treatments are based on intuition & logic, but little data
  - Neglect:
    - many treatment studies
    - several types of treatments assessed
  - Cognitive-communication deficits:
    - Aprosodia: recent studies
    - NO OTHER COMPLETED, CONTROLLED TREATMENT STUDIES
General Treatment Issues

- ASHA NOMS data (2005)
  - National Outcome Measurement System
  - Functional Communication Measures (FCM)
    - 7-point scale (1=least functional; 7=most)
  - Right CVA
    - 73% improved in problem solving
    - 80% improved in attention
    - 74% improved memory
    - 77% improved pragmatics
  - Questions: amount of time, amount of improvement, type of therapy, type of site

Attention

- Attention
  - Intact RH more involved than LH in attention
    - LH controls attention to R side only
    - RH controls attention to R & L sides
    - LHD: RH able to compensate
      - Right neglect possible, but less severe
    - RHD: inattention to L side
  - All attention types can be affected in RHD
    - divided > alternating > sustained > focused

Filey, 2002
Assessment of Attention

- Test of Everyday Attention (Robertson et al.)
- Attention Process Training (Sohlberg & Mateer)
- Neuropsychological Tests
  - Paced Auditory Serial Attention Test
  - Digit-Symbol Test
  - Trail-Making Test
  - Stroop Test
- Subtests of SLP cog/comm batteries
  - Cognitive-Linguistic Quick Test; SCATBI

Assessment of Attention

- Observation
  - different settings (quiet room vs. PT gym)
- questionnaires
  - specific questions better than general
    - general: “problems concentrating?”
    - specific: “problems keeping track of characters/themes in ½ hour TV show?” or “problems remembering details from newspaper article?”
Treatment: Attention

- Computerized Treatment
  - Participants with unilateral lesions (not TBI)
  - Target specific level of attention
    - alertness, vigilance, selective, divided attention
    - Initial gains, maintained up to 6 weeks
    - Gains only on type of attention treated
    - No generalization to functional tasks

  Sturm & Willmes, 1991; Sturm et al., 1997

Treatment: Attention

- Most studies focus on individuals with TBI
- Direct attention training
  - attentional drills
  - hierarchical organization
- Compensatory treatments
- Environmental manipulation

Sohlberg et al. (2003)
Attention treatment:  
Attention Process Training (APT)

- **Purpose:**
  - Improve underlying attentional processes

- **Repetitive drills:**
  - Automatize attentional processes
  - Change cognitive functioning

- **Tasks:**
  - Non-functional, target isolated components of attention
    - Sustained, selective, alternating, divided attention

Attention treatment:  
Direct Treatment (APT)

- **Principles of direct treatment**
  - theoretical: based on theory of attention
  - hierarchical treatment regimen
  - sufficient number of repetitions
  - performance-based treatment decisions
  - plan for generalization
    - Allow patient to apply gains to functional activities
    - sustained attention: read paper for X minutes
    - selective attention: pay bills with radio on
  - flexible treatment plan
Attention treatment: Direct Treatment (APT)

- effectiveness
  - performance on treatment tasks:
    - Improves with treatment
  - performance on related skills:
    - Mixed results
  - functional gains:
    - Mixed results, generally OK
  - maintenance of gains:
    - Not much data available

Attention treatment: Compensatory Strategies

- Metacognitive Strategies
  - goals: improve attention & goal-completion

- Self-instructional statements:
  - focus on what is being said; ignore intrusive thoughts
  - do not get distracted by irrelevant sounds
  - try to imagine things that are said
Attention treatment: Metacognitive strategies

- **Time Pressure Management**
  - ID time pressure
    - more things to do than time allows
  - prevent time pressure
    - make plan for what to do before acting
  - make emergency plan
    - deal with time pressure
  - use the plan (self-monitoring)

Fasotti et al., 2000

Attention treatment: Metacognitive strategies

- **task-preparation strategies**
  - warm up my brain, personal best, use of magic/special words

- **on-task strategies**
  - talk to self, mark my place, start at the top, one row at a time, ask for a hint

- **post-task strategies**
  - check work, ask for feedback, reward yourself

Butler & Copeland, 2002
Attention treatment: Metacognitive strategies

- Efficacy
  - All showed clients could learn the strategies
    - improvement on therapy tasks
  - mixed results of effectiveness
    - improvement at the impairment level
      - speed/memory/attention tasks
    - mixed generalization to activity-level
      - achievement test

Attention treatment: Other Compensatory Strategies

- Pacing: Helps with fatigue or poor concentration
  - Set goals for what to do within time limits
  - Create realistic expectations for productivity
  - Work with natural “good” times
Attention treatment:
Other Compensatory Strategies

- Orienting:
  - Establish focus; ask questions about situation & task
- External devices
  - Calendars, checklists, organizers, message recorders, alarms
- Key ideas log
  - Maintain focus, limit interruptions
  - Write down ideas/questions as they come

Compensatory Strategies
General recommendations

- Match strategy to deficit
  - Type of attentional problem & when it occurs
- Measure effectiveness
  - Change as necessary
- Joint selection of strategies
  - Give client “ownership” of treatment plan
- Consider other cognitive problems
  - Match strategy to abilities
Environmental Manipulation

- Goal: Minimize effects of poor attention
- Task management
  - ID tasks/situations/environments when problems occur
  - Avoid those that cause the most problem
- Alter instructions and/or expectations
  - more instructions, simplify instructions
  - lower expectations
- Provide supports to aid task completion

Environmental support

- Environmental modification
  - Organize personal space
  - Remove distractors
  - Add signs to alert others
    - (Do not disturb)
  - Provide breaks as needed
- Successful treatment
  - Careful diagnosis
  - Evaluation of efficacy
Attention: Neglect

- Neglect
  - hemispatial, left, or visuospatial neglect, hemineglect
  - inattention to the left side
    - “ignore” things to the left
    - BE CAREFUL with terminology that suggests the problem is volitional/intentional
  - NOT visual deficit
    - can co-occur with hemianopsia

Attention: Neglect

- Motor neglect
  - reduced use of left side of body (less than capable)
- Tactile neglect
  - reduced response/recognition of tactile stimulation (greater than sensory deficit)
- Auditory neglect
  - reduced processing of auditory stimuli from left
    - poorer localization of sounds from left
    - severity correlates with visuospatial neglect
Attention: Neglect

- Visuospatial neglect
  - Occurs in 13-80% of patients with RHD
- Extinction
  - failure to respond to left-sided stimulus when right & left are stimulated together
    - Double Simultaneous Stimulation
- “Magnetic Attraction” to right side
  - unable to disengage to move attention to left
- Unconscious Perception
  - unconsciously process things not reported on left

Neglect: where in space?

- Personal space: on one’s body
  - neglect to shave, comb, dress on Left side
- Peri-personal space: within reaching distance
  - neglect of items scanning/drawing/copying tasks
  - neglect of left-placed items on food tray
  - most common (also most commonly tested)
- Extra-personal space: beyond arm’s reach
  - neglect of people on left side of room
  - neglect of items (e.g., TV) on left side of room
**Neglect: frame of reference**

- **Viewer-centered: “left” shifts with client’s visual focus**
  - 28% of cases
  - egocentric neglect

- **Stimulus/Object-centered: “left” of objects**
  - 5% of cases
  - allocentric neglect
  - neglect left side of items regardless of placement

- Caution: putting things on the right side won’t always help

**Attention: Neglect**

- Often resolves within first few weeks
- Usually accompanied by unawareness of deficit
- Presence of neglect → more likely to have other cognitive/communicative deficits
  - reduced performance on language tasks
Attention: Neglect

- Can affect reading & writing
  - neglect dyslexia
    - omit, substitute left-most letters/parts of words or words on a line
    - painting → thing
    - looking → king
  - neglect dysgraphia
    - write on R side of page
    - letter perseverations

Assessment of Neglect

- Behavioural Inattention Test (Wilson, et al.)
  - conventional subtests
    - cancellation, copying, drawing, line bisection
  - functional subtests
    - reading a menu, clock, counting change

- Verbal & Nonverbal Cancellation Tasks
  (Weintraub & Mesulam)
Assessment of Neglect

- Cautions – assessment sensitivity
- Test sensitivity: 13-100%
  - most = ID 50% of neglect
  - representational drawing (clock, person) = 6%
- Biases
  - most tasks assess peri-personal neglect
    - paper/pencil tasks

Treatment of Neglect

- Top-Down treatments: teach strategies
  - scanning tasks
- Bottom-Up treatments
  - manipulate stimuli or attentional system to increase processing
    - visuo-motor
    - expanding attentional window
    - external stimulation: caloric, neck vibration, prism glasses
Current Best Evidence
Neglect

- Scanning treatments
  - anchors, tracing periphery
  - scanning/cancellation/reading tasks
  - Results: (after 30+ hours of treatment)
    - improve scanning ability initially
    - some generalization to functional communication tasks (e.g., reading/writing)
    - maintenance

Antonucci et al., 1995; Pizzamiglio et al., 1992; Paul, 1996

Treatment for Neglect

- Scanning training - manipulations
  - initial target on left side to serve as “anchor”
  - moving from relatively few to many stimuli
  - pacing the patient
  - track target around perimeter
  - search for random targets
  - cancellation tasks
  - reading tasks

move from gross to refined scanning
Current Best Evidence
Neglect

- Visuo-spatio-motor Treatment
  - Limb Activation treatment
    - move left limb while completing scanning task
      - activate right hemisphere, “spills” into attentional regions
    - variable results
      - some = improve movement only
      - some = improve neglect only
      - some = improve neglect & reading
    - some improvement in reading and/or neglect
      - no mention of maintenance

Bailey et al., 2002; Brunila et al., 2002; Robertson et al., 2002

Current Best Evidence
Neglect

- Visuo-spatio-motor Treatment
  - Lighthouse Strategy
    - move head left to right while scanning
    - emphasize imagery of lighthouse beam
    - improvements in negotiating environment
      - less often bump into walls
    - generalization to problem solving (FIM)
    - no measure of maintenance

Niemeier et al., 2001
Current Best Evidence
Neglect

- Sustained Attention training
  - treat general attention along with neglect
  - attention (sorting) tasks
  - examiner says “ATTEND”
    - gradually transfer external cue to patient
- results
  - improvements in sustained attention & neglect
  - no measure of generalization
  - effects lasted 24 hours to 14 days

Robertson et al., 1995

Current Best Evidence: Neglect

- External cues
  - Red line, ribbon, velcro on left side of page
  - Verbal reminders: “Look to the left”
  - Little evidence of efficacy
  - Seem unlikely to generalize; removal of cue => lose benefits
    - anecdotal reports of maintenance with fading of cues
  - “Rules” (e.g., “look to the left”)
    - may not know when to use the rule, unable to do so
  - Won’t help for object neglect
Current Best Evidence: Neglect

- Characteristics of successful therapies
  - clear, yet narrow focus
  - clear rationale for goal and tasks
  - intensive treatment
    - 5 hours/week for at least 4 weeks
  - external cues not as beneficial
    - benefits lost when cues are removed
  - client actively participates in therapy
    - does not ensure generalization

Calvanio, 1993

Current Best Evidence: Neglect

- External stimulation
- Left neck vibration; caloric stimulation
- Half-field eye patch
- Prism glasses
- Repetitive transcranial magnetic stimulation (rTMS)

Hauer & Quirbach, 2007; Hillis, 2006; Koch et al., 2008
Current Best Evidence Summary: Neglect

- Treatment works: good initial results
  - but often not described in detail
  - most severe neglect → most gains
- Generalization: sometimes
  - benefits most often on tasks similar to treatment tasks
- Maintenance: not always tested
  - little data
  - better with intensive treatment

Suggested treatments: Neglect

- Other treatments
  - suggested by experts & clinical experience
  - NO DATA regarding efficacy/effectiveness

- Copying tasks
  - pictures, words, paragraphs
Suggested treatments: Neglect

- Attentional window
  - treatment of object-centered neglect
  - increase size of “attentional window”
  - large & small stimuli
    - → improvement on small items
  - irrelevant items on left → shift attention leftward

Hillis, 2006

Suggested treatments: Neglect

- Stimulate unconscious perception of leftward items
  - name pictures that span the midline
    - symmetrical vs. asymmetrical pictures
  - read words that span the midline *hiking* vs. *mountain*
  - count or describe intersecting, contiguous or separate items
  - describe pictures with left & right sided information
Suggested treatments: Neglect

- Stimulate leftward shifts of attention
  - Edgeness task (Myers & Mackisack)
    - outline item with finger to establish boundaries
  - right/left alternating
  - reading & writing tasks

- Perceptual grouping
  - Use connectors between items
  - Peripheral border

Suggested treatments: Neglect

- Limit use of explicit reminders
  - “anchors” on left side
  - “look to the left”

- External cues: Not very effective
Outline

- Review of RH disorders & treatment
  - attention
  - communication: prosody, discourse, pragmatics
  - cognition

- Treatment in the absence of evidence
  - theoretically-based treatment
  - selecting treatments based on deficit (not etiology)

Prosody & Affective disorders

- Prosody
  - intonation, melody, stress, rate, duration
  - linguistic prosody
    - signals word boundaries, sentence/clause boundaries, sentence type, salient items
  - emotional prosody
    - emotional content, speaker attitudes/intent

- aprosodia
  - production: flat, monotone speech, rate sounds fast
    - dysarthria may affect prosodic characteristics
  - comprehension: problems interpreting prosody
Prosody & Affective disorders

- Emotion and nonverbal communication
- Production
  - use fewer emotionally-charged words
  - reduced facial expressions
  - reduced animation or hyper-animated
  - flat affect
    - reduced animation, reduced prosody/intonation
- Comprehension
  - misinterpretation of emotional cues
    - e.g., facial expression, intonation

Prosody & Affect Assessment

- Comprehension:
  - Profile of Nonverbal Sensitivity (PONS) (Rosenthal et al.)
  - Florida Affect Battery (Blonder, Bowers & Heilman)
  - Aprosodia Battery (Ross)

- Production:
  - Aprosodia Battery (Ross)
Current Best Evidence: Aprosodia

- Rosenbeck & colleagues
- motoric-imitative
  - aprosodia = motor speech theory
- cognitive-affective
  - aprosodia = poor access to emotional words & prosody
- 20 sessions; 6-step hierarchies


Current Best Evidence: Aprosodia

- Motoric-imitative Goal: Produce sentences with appropriate prosody
  1. prosody + facial cue $\rightarrow$ unison
  2. prosody + facial cue $\rightarrow$ repetition
  3. prosody only $\rightarrow$ repetition
  4. neutral intonation $\rightarrow$ produce
  5. ask question $\rightarrow$ produce
  6. imagine speaking to family member

Current Best Evidence: Aprosodia

- Cognitive-affective Goal: learn the characteristics of emotional prosody & use them
  1. written description of tone of voice → explain back
  2. match name of emotion to description, match face to description
  3. read sentence with prosody (description, name & face available)
  4. read sentence (name & face available)
  5. read sentence (face available)
  6. read sentence (no cues)


Current Best Evidence: Aprosodia

- Results: improvements with both therapies
  - most improvement from 1st therapy (regardless of type)
- Generalization: to new sentences of trained emotions
  - not to un-trained emotions
- Maintenance: over 50% maintained gains for 3 months
Suggested Treatments: Aprosodia

- production: contrastive stress drills
  - compound words with differing stress
  - using stress to convey meaning with a single sentence
  - using intonation to differentiate questions from statements
- compensatory strategies
  - label/announce emotional state when in conversation

Suggested Treatments: Aprosodia

- comprehension: interpret others’ intentions/meanings
  - similar to non-literal language tasks
  - identify possible interpretations
  - identify contextual cues
    - facial expression, content, world knowledge
    - identify others’ emotions based on semantics/word choice
Communication after RHD

- Themes in RHD language disorders
  - Multiple meanings, distantly-related meanings
    - generating multiple meanings
    - generating distantly-related meanings
    - generating non-literal meanings
  - Using context
    - to generate inferences
    - to select the most relevant meaning
    - integration of multiple contextual cues

Communication after RHD
“Normal” comprehension

- General comprehension processes
  - Phase I: construction
    - generate many potential meanings
  - Phase II: integration
    - meanings integrated with context
    - irrelevant or less-appropriate meanings suppressed
Communication after RHD
“Normal” comprehension

- **Phase I: construction**
  SPRING

- **Phase II: integration**

  He went fishing in the spring.
  The ice had melted and the trees were budding.

**Fine vs. Coarse-coding hypothesis**

<table>
<thead>
<tr>
<th>Left hemisphere: fine coding</th>
<th>Right hemisphere: coarse coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>* activate specific word meanings</td>
<td>* activate broad word meanings</td>
</tr>
<tr>
<td>* quickly select most appropriate</td>
<td>* maintain activation of meanings (to be selected by left hemisphere)</td>
</tr>
<tr>
<td>meaning</td>
<td></td>
</tr>
</tbody>
</table>

Beeman, 1998, 2000; Jung-Beeman 2005
Communication after RHD

- **RHD → problems with which phase?**
  - **Phase I: construction**
    - Difficulty generating alternative meanings
  - **Phase II: integration**
    - Difficulty selecting correct meaning

Communication after RHD

- **Construction deficit**
  - Based on normal RH function, RHD →
    - difficulties activating multiple meanings
    - problems generating or understanding main ideas
    - problems integrating across sentences
  - Fits with typical reports of RHD deficits
  - Some evidence from adults with RHD
    - for DISTANTLY related meanings
      - (apple, rotten)

Tompson et al., 2008; Beeman
Communication after RHD Integration deficit

- Suppression deficit hypothesis
  - adults with RHD can generate multiple meanings (lexical ambiguities)
    - ambiguous sentence → understand both meanings
  - problems selecting the “best” one
    - slow to suppress (inhibit) less appropriate meanings

Tompkins et al., 2000, 2002, 2004
Communication after RHD
Integration deficit

- Suppression deficit hypothesis
  - adults with RHD can generate multiple meanings
  - problems selecting the “best” one

Tompkins et al., 2000, 2002, 2004

Communication after RHD
Integration & Context

- Using semantic context: intact processes
  - Performance reflects use of semantic context
    - They were relieved to find that a store was near.
    - They were impressed to feel that a store was gradual.
  - Pronoun anaphora:
    - Henry spoke at a meeting while John drove to the beach. He lectured on the administration.
    - (He = Henry)
    - Henry spoke at a meeting while John drove to the beach. He brought his surfboard (He = John)

Leonard et al.
Communication after RHD  
Context & Inferencing

- Inferences: implicit information  
  - not directly stated
- Bridging/coherence inferences  
  - link adjacent sentences
- Sandy held Francis’s hand as they crossed the street. She and her son were walking to the park.”
  - pronoun anaphora: She = Sandy
  - inference: Francis is Sandy’s son
  - inference: Francis is a child

Communication after RHD  
Context & Inferencing

- Inferences
- Elaborative inferences: add information, but aren’t necessary for comprehension
  - Joe put his rod in the car & drove to the lake.
    - predictive inference: Joe’s going fishing
  - Patrick pounded the nail firmly into the wood. He set down his screwdriver and wiped his brow.
    - elaborative (tool) inference: hammer
Communication after RHD
Context & Inferencing

- Inferencing: Early theories
- Inference failure
  - literal interpretations
    - overly literal, can’t interpret non-literal language
    - BUT: data suggests they make inferences
      - often partially correct
      - Don’t count your chickens before they hatch → “don’t count them because you don’t know if they are male or female”

Communication after RHD
Context & Inferencing

- Inferencing: Current Views
  - OK with strong/necessary context
    - strong contextual cue → generate outcome
  - Rely on clear, straight-forward context
    - difficulties when ambiguity occurs prior to disambiguating context
  - Problems with inference revision
    - difficulty revising initial interpretations

Blake, 2001; Leonard et al., 1997
Communication after RHD
Integration deficit

- Humor – inference revision
- Inappropriate use of humor
  - not appropriate for situation/conversation partner
  - may be drawn to physical humor
- Difficulty interpreting humor
  - (1) ID ambiguity
    - some deficits may appear here
  - (2) re-interpret meaning
    - more problems here (as with inferencing)

Communication after RHD
Using context

- Problems integrating multiple cues to arrive at correct interpretation
  - Discourse
    - non-literal language
    - sarcasm
  - Visual scenes
Communication after RHD
Using context

Predictive Inferencing Task
Context: Man shopping for birthday gift. Target inference = STEAL

<table>
<thead>
<tr>
<th>HIGH</th>
<th>LOW</th>
<th>CONTROL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lost job</td>
<td>Just started new job</td>
<td>Good job</td>
</tr>
<tr>
<td>No money</td>
<td>Not much money</td>
<td>Money not an issue</td>
</tr>
<tr>
<td>Ring on counter</td>
<td>Ring on counter</td>
<td>Ring on counter</td>
</tr>
<tr>
<td>Make sure no one watching</td>
<td>Didn’t see anyone nearby</td>
<td>Wanted better view</td>
</tr>
<tr>
<td>Quietly stepped closer to counter</td>
<td>Quietly stepped closer to counter</td>
<td></td>
</tr>
</tbody>
</table>

He’s going to steal it
(repeated several times)
Many alternatives

He might steal it
(repeated 1-2 times)
Many alternatives

He won’t steal it
(rarely repeated)
Some alternatives

Summary: Communication after RHD

- Multiple meanings
  - Primary difficulty with selecting/suppressing meanings
  - NOT completely UNABLE to process them

- Inferencing
  - OK with basic/necessary/strongly-supported inferences

- Context
  - can use context for basic processes
  - can use straight-forward context
  - difficulty with inference revision
  - difficulty integrating multiple cues
Discourse production

- **verbosity:**
  - excessive output, detailed, tangential, possibly confabulatory

- **paucity of speech:**
  - minimal/limited output, reduced initiation

- **cohesion:**
  - may not clarify referents

Discourse production

- **coherence:**
  - disjointed, confusing story
    - tangential remarks, equal emphasis for each item

- **appropriateness:**
  - may be inappropriate for situation, partner

- **intentionality:**
  - purpose not always clear; may change w/o warning
Discourse production

- topicality:
  - not always clear, may change suddenly
  - tangential remarks take away from clear topic
- informativeness:
  - may be too detailed or too vague

Pragmatics

- may not establish common background
- reduced sensitivity to listener
- change topic without warning; tangential remarks
- reduced eye contact
- take more turns, talk more per turn than NBD adults
- egocentric conversations
### Communication Assessment

#### Pragmatic Components

<table>
<thead>
<tr>
<th>Assessment Protocol of Pragmatic-Linguistic Skills</th>
<th>Gerber &amp; Gurland, 1989</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discourse Abilities Profile</td>
<td>Terrell &amp; Ripich, 1989</td>
</tr>
<tr>
<td>Edinburgh Functional Communication Profile</td>
<td>Skinner et al., 1984; Wirz, et al., 1990</td>
</tr>
<tr>
<td>Pragmatic Protocol</td>
<td>Prutting &amp; Kirchner, 1987</td>
</tr>
<tr>
<td>Profile of Communicative Appropriateness</td>
<td>Penn, 1985</td>
</tr>
</tbody>
</table>

### Communication Assessment

#### Functional Comm. Measures

<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment of Language-Related Functional Abilities</td>
<td>Baines et al., 1999</td>
</tr>
<tr>
<td>Amsterdam-Nijmegen Everyday Language Test</td>
<td>Blomert, 1990</td>
</tr>
<tr>
<td>Checklist of Adaptive Listening Skills</td>
<td>Morreau &amp; Bruininks, 1991</td>
</tr>
<tr>
<td>Communicative Adequacy in Daily Situations</td>
<td>Clark &amp; Witte, 1995</td>
</tr>
<tr>
<td>Communicative Competence Evaluation Instrument</td>
<td>Houghton, Pettit &amp; Towey, 1982</td>
</tr>
<tr>
<td>Communicative Effectiveness Index</td>
<td>Lomas et al., 1989</td>
</tr>
</tbody>
</table>
## Communication Assessment

### Functional Comm. Measures

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everyday Communication Needs Assessment</td>
<td>Worrall, 1995</td>
</tr>
<tr>
<td>Functional Assessment of Communication Skills for Adults (ASHA FACS)</td>
<td>Frattali et al., 1995</td>
</tr>
<tr>
<td>Functional Communication Profile</td>
<td>Klein, 1994</td>
</tr>
<tr>
<td>Functional Communication Profile</td>
<td>Sarno, 1975</td>
</tr>
<tr>
<td>Functional Linguistic Communication Inventory</td>
<td>Bayles &amp; Tomoeda, 1995</td>
</tr>
<tr>
<td>Questionnaire for Surveying Personal and Communicative Style</td>
<td>Swindell et al., 1982</td>
</tr>
<tr>
<td>Rating of Functional Performance</td>
<td>Wertz et al., 1981</td>
</tr>
<tr>
<td>The Communication Profile: A functional skills survey</td>
<td>Payne, 1994</td>
</tr>
</tbody>
</table>

## Communication Assessment: Comprehension

<table>
<thead>
<tr>
<th>Test</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discourse Comprehension Test</td>
<td>Brookshire &amp; Nicholas, 1993</td>
</tr>
<tr>
<td>The Awareness of Social Inferences Test (TASIT) video vignettes</td>
<td>McDonald &amp; Flanagan, 2002</td>
</tr>
<tr>
<td>Functional Assessment of Verbal Reasoning and Executive Strategies</td>
<td>MacDonald, 2005</td>
</tr>
<tr>
<td>Paragraph-level subtests of aphasia batteries</td>
<td></td>
</tr>
</tbody>
</table>
Communication Assessment
Ideal Components

- Conducted in social/communicative environment
- Evaluate language, cognition & communication
- Check ability to adapt to environment
- Assess effects of communication deficit on interactions & on others

Penn, 1999

Current Best Evidence
Discourse/Pragmatics

- Minimal evidence specific to RHD
- Intensive day-program
  - speech/language, cognition, behavior, pragmatics
- Only general description of pragmatic therapy
- No data collected on pragmatics
- Results (based on observation):
  - Some change in pragmatics, some persisting (and debilitating) deficits

Klonoff et al. (1989, 1990)
Theoretical treatment of RHD

- Based on theories of RHD
- Difficulties using context
  - suppressing unwanted/inappropriate meanings
- Social inferences
- Executive function / Frontal lobe
- Cognitive resources

Theory: Using Context
Treatment

- Treatment:
  - emphasize context
  - facilitate use of context
  - discuss effect of context
Theory: Using Context
Treatment

- Ambiguous words
  - homographs, homophones
    - BANK, SPRING, BALL
  - discuss alternate meanings
  - place item in context
    - discuss plausible meanings
    - identify cues that lead to different interpretations

Theory: Using Context
Treatment

- Ambiguous contexts
  - Discuss potential meanings
  - Add context to clarify meaning

- Huck Finn went fishing in the **spring**.
  - *It was his favorite time of year.*
  - *There were more fish there than in the lake.*

- In the **spring** there are many tadpoles.
Theory: Using Context
Treatment

- Idioms, metaphors
  - Put into context
    - Christopher's Dad is an amazing mechanic, Christopher is a chip off the old block.
- Humor, jokes, puns, cartoons
- Ask about familiarity
  - especially with multicultural society
- Client’s own language
  - Discuss intended meaning vs. literal meaning

Theory: Social Inferencing
Effects of RHD

- Social Inference theory
  - social inferences → understand others
    - behaviors
    - beliefs
    - intentions

- Theory of Mind: belief about what another person thinks

Martin & McDonald, 2003
Theory: Social Inferencing
Effects of RHD

- Social Inferences/Theory of Mind

*Ben isn’t supposed to eat the brownies, but he does. Abbie sees him and accuses him of eating them. Ben says: “No, it wasn’t me.”*

- Ben doesn’t know that Abbie saw him = LIE
- Ben knows that Abbie saw him = JOKE

Theory: Social Inferencing
Effects of RHD

- RHD → (selective) problem with social inferences

- Social inferences: complex
  - difficulties linked to complexity
  - difficulties may not be specific to social inferencing
Theory: Social Inferencing
Treatment

- Scenarios
  - manipulate who knows what
  - manipulate relationships
    - boss vs. co-worker
    - wife vs. sister
  - group treatment/discussions
    - intent of statements
    - potential interpretations
    - point of view

Brownell et al., 1991

---

Theory: Social Inferencing
Treatment

- Discuss scenario & response:

  *Al & Rob are taxi drivers and good friends; Rob drove well and received many tips.*

  *Al: “You’re a good driver”.*

  - What did Al mean? (compliment? sarcasm?)
  - What if Al was jealous of Rob?
  - What if Al & Rob were not friends, but competitors?

Brownell et al., 1991
Theory: Executive Function
Effects of RHD

- Frontal Lobe/Executive Function model
  - Deficits due to frontal lobe damage
    - integration/inferencing
    - novel & challenging tasks
    - mental flexibility
  - Relation to discourse/pragmatics
    - conversation: rules differ with each setting/partner
    - cognitive characteristics reflected in language
      - disorganization, impulsivity, etc.

Martin & McDonald, 2003

Theory: Executive Function
Treatment

- Suggestions: Treat executive function deficits
  - organization
  - planning
  - problem solving
- Treat with general cognitive stimuli
  - visuoperceptual, categorization, planning events, etc.
  - no evidence that these translate to functional tasks
    - difficult to get generalization across cognitive tasks
- Discuss in relationship to communication
Theory: Cognitive Resources

Effects of RHD

- Cognitive Resources Hypothesis
  - Performance linked to task difficulty

- Doesn’t REPLACE other theories

Monetta & Joanette, 2003

Theory: Cognitive Resources

Treatment

- Use to modify treatments
- Alter complexity
  - number of cues
    - relevant vs. irrelevant
  - number of distractors
  - length of passage
  - distance between cues & intended meaning
  - number of people in situation
    - (social inferences)
Treatment: pragmatics

- No efficacy data for RHD exclusively
- Some data for TBI (and/or mixed groups)
- Results: generally positive

Helffenstein & Wechsler (1982)
- Interpersonal Process Recall (IPR)
  - 20 hours treatment
    - videotaped interactions
    - structured review with feedback
    - develop alternative skill – modeling, practice
  - reduced anxiety, improved self-concept
  - improved interpersonal communication
  - generalization outside of clinic noted
  - gains maintained at 1 month follow-up
Treatment: pragmatics

- Components of effective treatments
  - Structured feedback
  - Videotape interactions
  - Modeling, rehearsal
  - Self-monitoring
- Activities:
  - Role-playing
  - Group treatments (social interaction with peers)
  - Facilitate interactions with different people; different situations

Outline

Review of RH disorders, assessment, treatment
- attention
- communication
- cognition

- Treatment in the absence of evidence
  - theoretically-based treatment
  - selecting treatments based on deficit (not etiology)
Cognition: Anosognosia

- Decreased awareness of deficits
  - lack of awareness of deficit
  - underestimation of specific deficit(s)
  - estimates: 7-77% of patients with RHD

- Causes
  - general deficit in cognition may contribute
  - interruption of feedback loop
    - Comparing intention vs. actual movement

Orfei et al., 2007; Barrett et al., 2006

Cognition: Anosognosia

- Causes
  - problems encoding sensorimotor memories into long-term memory
    - recognize problem as it happens, but don’t encode it; can’t remember it later
    - don’t integrate deficits into body self-image
  - Inconsistencies
    - try to stand despite acknowledging paralyzed leg
    - deny paralysis but do not attempt to stand

Orfei et al., 2007; Barrett et al., 2006
Cognition: Anosognosia

- Hemispheres dealing with discrepancies
  - LH = ignores discrepancies, pretends they are not there
  - RH = anomaly detector, highly sensitive to discrepancies
    - RHD → impairs the anomaly detector
    - Intact LH ignores the apparent problems = anosognosia

V. Ramachandran

Cognition: Anosognosia

- Terminology considerations
  - anosognosia: reduced awareness of deficits
    - feedback → patients surprised/puzzled
  - denial of deficits: suggests a psychological problem
    - awareness with failure to accept existence
    - feedback → patients show anger, resistance
  - anodiasphoria: reduced concern about deficits
### Assessment of cognition

#### Awareness

<table>
<thead>
<tr>
<th>Test Description</th>
<th>Reference(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anosognosia for Hemiplegia Questionnaire</td>
<td>Feinberg et al., 2000</td>
</tr>
<tr>
<td>anosognosia evaluation</td>
<td>Berti et al., (1996)</td>
</tr>
<tr>
<td>Anosognosia Questionnaire</td>
<td>Starkstein et al., 1992</td>
</tr>
<tr>
<td>Awareness Questionnaire</td>
<td>Sherer et al., 1998</td>
</tr>
<tr>
<td>Bisiach’s scale</td>
<td>Bisiach et al., 1986</td>
</tr>
<tr>
<td>Clinician’s Rating Scale for Evaluating Self-Awareness and Denial of Disability</td>
<td>Prigatano &amp; Klonoff, 1998</td>
</tr>
<tr>
<td>Levine’s Denial of Illness Scale</td>
<td>Levine et al., 1987</td>
</tr>
</tbody>
</table>

### Assessment of cognition

#### Awareness

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<tr>
<th>Test Description</th>
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<tbody>
<tr>
<td>Patient Competency Rating Scale</td>
<td>Prigatano et al., 1986</td>
</tr>
<tr>
<td>Post Stroke Depression Rating Scale – subscale of awareness of illness</td>
<td>Gainotti et al. 1995</td>
</tr>
<tr>
<td>Self-Awareness of Deficits Interview</td>
<td>Fleming et al., 1996</td>
</tr>
<tr>
<td>Structured awareness Interview</td>
<td>Marcel et al., 2004</td>
</tr>
<tr>
<td>Structured Interview</td>
<td>Anderson &amp; Tranel (1989)</td>
</tr>
<tr>
<td>Structured Questionnaire</td>
<td>Starkstein et al. (1993)</td>
</tr>
</tbody>
</table>
Assessment of cognition
Awareness

- Tools: most refer to hemiplegia, some to neglect, few to other cognitive deficits
  - Most rely on verbal report
- Typical questions:
  - why are you here (in the hospital/rehab center)?
  - what is the matter with you?
  - is there anything wrong with your arm or leg?
  - is there anything wrong with your eyesight?
  - is your limb weak, paralyzed or numb?
  - how does your limb feel?

Assessment of cognition
Awareness

- Follow-up questions:
  - (pick up/point to arm): what is this? can you lift it?
  - (finger movements in & out of affected visual field): can’t you see that you have a problem with your eyesight?
- Perform bimanual tasks, drawing/copying
- Opinions about performance, ability to do daily activities
  - predictions & responses to performance
  - How would I do if I had a condition similar to yours?
Treatment considerations

Awareness

- Anosognosia (reduced awareness)
- Treatment decisions
  - medical indications (diagnosis, prognosis)
  - patient preferences
    - dependent upon level of understanding & decision-making ability
  - quality of life
  - contextual features
    - social, economic, legal circumstances

Cherney, 2006

Cognition: Executive Functions

- Executive Function: goal-directed behavior
  - Integration
    - visual, discourse items
  - Planning, organization
  - Problem solving, reasoning
  - Awareness/insight (anosognosia)
Cognition: Executive Functions

- Executive Function: goal-directed behavior
  - all areas can be affected
  - difficult to isolate components
  - little data available – generalizations only

Cognition: Executive Functions

- Generalizations – Frontal Lobe Injuries
  - Generative tasks
    - reduced performance in:
      - verbal fluency
      - "alternative use" tasks (divergent thinking)
      - homophone meaning generation (e.g., tick, slip, right)
  - Verbal problem solving
    - slower to ID missing information
    - poor judgment of adequacy and completeness of responses
    - poor self-monitoring (checking work)
Cognition: Executive Functions

- Generalizations – RHD
  - organization difficulties
    - especially with complex stimuli or situations
    - causes difficulties with planning
  - planning deficits (e.g., Tower of London)
    - particularly right temporal lesions

Cognition: Executive Functions

- Generalizations – RHD
  - Picture arrangement
    - scores lower than control group
  - Finding humor in pictures/cartoons
    - poorer than control group or Ss with aphasia
    - difficulty integrating components of pictures
  - Productivity
    - lower on novel design generation
    - perseverative responses
Cognition: Executive Functions

- Generalizations – RHD
  - Judgment & reasoning deficits
  - poor judgment (particularly in social or everyday situations)
    - verbal judgment/reasoning doesn’t match everyday performance

Cognition: Executive Functions

- Behavioral manifestations
  - impulsivity
  - distractibility
  - slowed responses and/or processing
  - difficulty switching between tasks
Assessment of cognition

- Neuropsychological Tests
  - Wechsler Adult Intelligence Scales (WAIS)
  - Wisconsin Card Sorting Test
  - Stroop Test
  - Raven’s Colored Progressive Matrices

<table>
<thead>
<tr>
<th>Assessment of cognition</th>
<th>Reference</th>
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</thead>
<tbody>
<tr>
<td>Behavioral Assessment of Dysexecutive Syndrome</td>
<td>Wilson, et al., 1996</td>
</tr>
<tr>
<td>Cognitive-Linguistic Quick Test</td>
<td>Helm-Estabrooks</td>
</tr>
<tr>
<td>Speed and Capacity of Language Processing Test</td>
<td>Baddeley et al.</td>
</tr>
<tr>
<td>Ross Information Processing Assessment</td>
<td>Ross-Swain, 1996</td>
</tr>
<tr>
<td>Functional Assessment of Verbal Reasoning and Executive Strategies</td>
<td>MacDonald, 2005</td>
</tr>
</tbody>
</table>
Assessment of cognition

- Practice Guidelines - ANCDS
  - Turkstra et al., (2005) *Journal of Medical SLP*
  - www.ancds.org

- Review of cognitive assessments for TBI

Treatment of Cognition

- No studies specific to RHD
- Theoretically-based treatments
  - few theories about cognitive deficits associated with RHD
    - Frontal lobe/executive function account
- Evaluate/select treatments designed for adults with TBI
  - use questions to assess appropriateness
Selecting Treatment

- Is my patient/client sufficiently similar, in most important ways, to those described in the treatment study?
  - age
  - etiology or location of lesion
  - acute versus chronic stage
  - degenerative versus stable/improving condition
  - symptoms

K.D. Cicerone (2005), based on Sackett et al. (2000)

Selecting Treatment

- Is my patient/client sufficiently similar, in most important ways, to those described in the treatment study? (Helffenstein – IPR)

<table>
<thead>
<tr>
<th>Age</th>
<th>Young (17-35)</th>
<th>Older</th>
</tr>
</thead>
<tbody>
<tr>
<td>Etiology/location</td>
<td>TBI – diffuse</td>
<td>CVA – focal RH</td>
</tr>
<tr>
<td>Acute/Chronic</td>
<td>~2 years post-onset</td>
<td>?</td>
</tr>
<tr>
<td>Course</td>
<td>Stable/improving</td>
<td>Improving</td>
</tr>
<tr>
<td>Symptoms</td>
<td>Not well described; mild-mod language problems at most</td>
<td>?</td>
</tr>
</tbody>
</table>
Selecting Treatment

- Is the nature of my client’s cognitive impairment similar to that targeted in the treatment research?
  - attention
  - executive function
  - discourse/pragmatics
  - Anecdotal similarities only!
    - Only 1 study directly compared RHD & TBI, found differences in awareness of deficits
      - Prigatano, 1996

<table>
<thead>
<tr>
<th>Pragmatics</th>
<th>Not described</th>
<th>?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive function</td>
<td>Not described</td>
<td>?</td>
</tr>
<tr>
<td>Awareness</td>
<td>Not described</td>
<td>?</td>
</tr>
</tbody>
</table>
Selecting Treatment

- Are there coexisting cognitive impairments that are likely to influence the effectiveness of the treatment?
  - anosagnosia
  - memory deficits
  - neglect

K.D. Cicerone (2005), based on Sackett et al. (2000)

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>Probably</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anosagnosia</td>
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</tr>
<tr>
<td>Attention deficits</td>
<td>Not described</td>
<td></td>
</tr>
<tr>
<td>Neglect</td>
<td>None</td>
<td></td>
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<tr>
<td>Memory deficits</td>
<td>Not described</td>
<td></td>
</tr>
<tr>
<td>Executive function</td>
<td>Not described</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reasoning, problem solving,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>organizing, etc.</td>
<td></td>
</tr>
</tbody>
</table>
Selecting Treatment

- Is it feasible to apply the intervention in this setting?
  - access to computers
  - amount of time available
  - intensive day program vs. traditional inpatient therapy
  - groups (appropriate group members)

K.D. Cicerone (2005), based on Sackett et al. (2000)

<table>
<thead>
<tr>
<th>Time</th>
<th>20 1-hour sessions</th>
<th>1-hour blocks?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Setting</td>
<td>Interaction partners</td>
<td>Willing/available partners?</td>
</tr>
<tr>
<td>Materials</td>
<td>Video equipment</td>
<td>Equipment?</td>
</tr>
</tbody>
</table>
Selecting Treatment

- What are the expected benefits & potential costs of applying the intervention?
  - benefits – may be unknown
  - cost (time & money) for treatments with unknown benefits
  - use clinical expertise, client values, and existing theories to help guide recommendations

K.D. Cicerone (2005), based on Sackett et al. (2000)

Selecting Treatment

- What are the expected benefits & potential costs of applying the intervention?

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Improved pragmatics, social interactions, reduced anxiety, improved self-concept</th>
<th>Potential improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs</td>
<td>Time, resources</td>
<td>Time, resources – especially if treatment isn't as effective</td>
</tr>
</tbody>
</table>
Selecting Treatment

- Is the treatment consistent with the patient’s own preferences, values and expectations?
  - Consider anosognosia (reduced awareness)

Selecting Treatment

- Is the treatment consistent with the patient’s own preferences, values and expectations?
  - *evaluate individually for each client*
Suggested Treatment: organizing/planning

- No efficacy data for RHD exclusively
- Treatments based on symptoms
  - start with common/familiar organization principals
    - fade structure
  - relate task to patient’s goals/needs/activities
  - tasks: prioritize, sequence, plan timetable for activities, summarize conversations, stories

Suggested Treatment: Problem solving

- No efficacy data for RHD exclusively
- Based on treatments for TBI
  - some data for a few studies

- Clinician responsibilities:
  - provide information about task/topic
  - provide systematic plan to follow
  - provide (or help develop) subgoals
Suggested Treatment: Problem solving

- General plan of action:
  - ID contradictions, irrelevancies, blocks to solutions
  - search for relationships/analogies
  - reformulate problem
  - physically diagram, verbalize, etc.

Suggested Treatment: Problem solving

- IDEAL
  - Identify problem
  - Define problem
  - Explore alternative approaches
  - Act on the plan
  - Look at the effects

- WSTC (Lawson & Rice, 1989)
  - What should I be doing?
  - Select a strategy
  - Try the strategy
  - Check the strategy
Suggested Treatment: Problem solving

- **GOAL**
- **PLAN**
- **DO**
- **REVIEW**

Ylvisaker & Feeney

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Suggested Treatment: Task-Specific Routines

- Simplify/modify task
  - fewer steps
  - exclude items/situations that cause problems

- Task analysis
  - develop checklist
  - provide practice for each step
  - embed reinforcement into training