Right Hemisphere Communication Disorders: Apragmatism

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Overview of presentation

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- Language & Communication
  - Definition of apragmatism
  - Description of production and comprehension deficits
- Social cognition impacts on communication
  - Theory of mind, empathy, humor
- Impact on social engagement

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International Right Hemisphere Collaborative & ANCDS RHD Writing Group

3

- Peggy Blake, University of Houston
- Petrea Cornwell, Griffith University, AU
- Ronelle Hewetson, Griffith University, AU
- Melissa Johnson, Nazareth College
- Jamila Minga, Duke University
- Alexandra Durfee, Towson University
- Laura Murray, University of Ottowa
- Perrine Ferre, McGill University

Academy of Neurologic Communication Disorders & Sciences (ANCDS)

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Form, content & use

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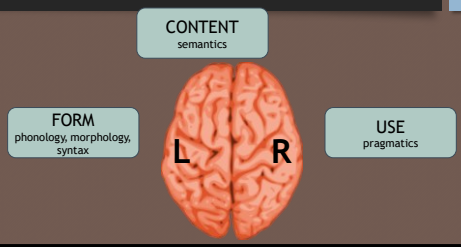

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Pragmatics

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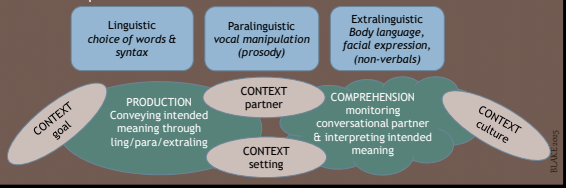
- Pragmatics is a domain of language; conveying meaning or intent within a specific context



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Pragmatics

- How do you change how you communicate
  - Words, grammar, content, etc.
  - Prosody & tone of voice
  - Non-verbals
- To different people?
- In different settings?
- For different purposes?

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Contextual cues

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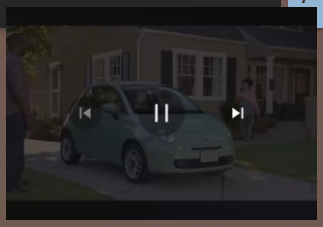
- Linguistic
- Paralinguistic
- Extralinguistic
- Other contextual cues



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Apragmatism

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- A disorder in conveying or comprehending meaning or intent through linguistic, paralinguistic, and/or extralinguistic modes of context-dependent communication.
  - Context = partner, situation, environment, culture, goal of interaction (among other things)
- Associated disorders (NOT apragmatism)
  - unilateral neglect
  - executive function
  - attention
  - memory

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RHD language & communication disorders

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Production

- discourse coherence
- topic maintenance or relevance
- use of questions
- emotional prosody and facial expression

Comprehension

- non-literal and figurative language
- contextual cues
- inferences
- emotional prosody discrimination & identification

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ANCDS RHD Writing Group 54 years of research

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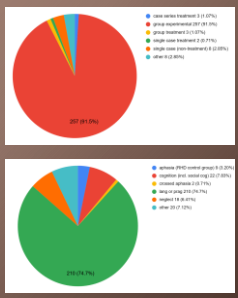
- Systematic Review of language & pragmatics
- 1970-2024
- Focus: Right Hemisphere stroke
- Limited to English language publications



Linguistic
choice of words & syntax

Components of apragmatism

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Linguistic apragmatism

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Linguistic apragmatism: Production

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- Common description of RHD
  - Discourse most often affected
  - Tangential, off-topic
  - Coherence & cohesion
  - Too much (verbosity) or too little (paucity)

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Linguistic apragmatism: Production

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- Microlinguistic Features
  - Morphology, syntax, phonology, lexical semantics
- Macrolinguistics
  - Cohesion & coherence
  - Structure (organization, topic maintenance)
  - Content (accurate, relevant)
  - Productivity (amount of information, number of words)
  - Appropriateness (given environment, partner, etc)

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Linguistic apragmatism: Production Discourse level

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- Microlinguistic Features
  - Morphology, syntax, phonology, lexical semantics
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Linguistic apragmatism: production Word level

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- Word level group differences (RHD vs. NBD)
  - Verbal fluency: lower productivity than control group
    - Semantic fluency (animals, tools, etc)
    - Phonemic fluency (F, A, S or other letters)
  - Object/picture naming: some studies (5 of 12) show deficits
- Need to consider individual performance vs. group differences

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Linguistic apragmatism: production Sentence level

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- Sentence level group differences (RHD vs. NBD)
  - Sentence anagram tasks: consistently poorer than control group
    - re-order words into syntactically correct sentence
    - Create a sentence given 3-4 words'
  - Scenario tasks: consistently poorer than control group
    - Create a response based on scenario
      - *What would the character say next?*
      - *Produce an indirect response*
      - *What is your reaction to the scenario?*

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Linguistic apragmatism: Production Discourse level

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- Lots of different genres
  - Narrative, descriptive, autobiographical, conversation, procedural, etc.
- Lots of different tasks
  - Picture description, story retelling, interviews, spontaneous, etc.
- Key findings from 52 studies reporting on over 240 variables
  - Macrostructure affected more than microstructure
  - Coherence & cohesion often affected
  - Deficits commonly seen in conversation & descriptive tasks

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Linguistic Apragmatism: Comprehension

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- Discourse comprehension
  - Focus on details, miss gist/main idea
  - Difficulties with inferencing
  - Misinterpret intent
  - Difficulties interpreting non-literal language
  - Inefficient or ineffective in using contextual cues

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Linguistic Apragmatism: Comprehension Word level

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- Word comprehension group differences (RHD vs. NBD)
- 42 different studies
  - Picture naming or word-picture matching
    - No deficits on aphasia battery tasks; some on other tests (e.g., RHD batteries)
  - Figurative language
    - Deficits reported in all studies
  - Similarities
    - Identify synonyms or semantic categories
    - Deficits reported in about 55% of studies

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Linguistic Apragmatism: Comprehension Sentence level

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- Sentence comprehension group differences (RHD vs. NBD)
- 57 different studies, 119 experiments
  - Figurative language: consistently impaired
    - Idioms, metaphors
  - Commands: unclear
    - Deficits reported in 45% of studies
  - Others – evidence is equivocal
    - Speech acts, questions, emotional interpretation, syntactic comprehension

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Linguistic Apragmatism: non-literal language

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- Metaphors: comparisons
  - Life is a bowl of cherries; life is a stage
- Metaphor processing: bilateral network
- RHD
  - Metaphor comprehension can be impaired
  - Most likely when metaphors are
    - Unfamiliar
    - Unlikely (*the bus was a cheetah*)
    - Presented without context

Blake 2018; Brownell 1990; Giora 2000; Rinaldi 2004; Yang 2014; Zaidel 2002

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Linguistic Apragmatism: non-literal language

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- Idioms: phrases with intended non-literal meanings
  - Geographical, cultural
  - Various types
    - Literal/ambiguous: have 2 meanings
      - Kick the bucket
    - Decomposable: meaning derived from words
      - He understands only the train station
    - Transparent: meaning derived from semantics
      - She's on cloud nine

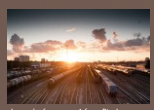

Image by fancycrave1 from Pixabay

Blake 2018

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Linguistic Apragmatism: non-literal language

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- Idioms: phrases with intended non-literal meanings
- RHD
  - Results inconsistent
  - Can impair idiom comprehension
    - Most data from picture-idiom matching or definitions
  - May depend on task, familiarity & type

Blake 2018; Tompkins 1992; Papagno, 2006; Myers 1986

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Linguistic Apragmatism: non-literal language

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- Sarcasm/Irony: intended meaning is opposite of literal meaning
- RHD
  - Results fairly consistent
  - RHD can impair sarcasm interpretation
  - May ID falsehood, but misinterpret intent: lie vs. sarcasm

Blake 2018; Bihrle 1986; Giora 2000; Kaplan 1990; Shamay-Tsoory 2005

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Linguistic Apragmatism: Comprehension Discourse level

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- Work in progress

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Linguistic Apragmatism: Comprehension

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- Problems integrating multiple cues to arrive at correct interpretation
  - Discourse
    - Story comprehension
    - Sarcasm?
  - Visual scenes

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Pragmatics: Contextual cues

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- Identify & integrate cues from scenes
  - Wearing uniforms
  - Have brochures
  - Posing in front of building
  - In Asia

Girls on a school field trip

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Pragmatics: Contextual cues

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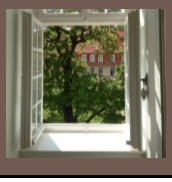
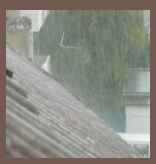
- Identify & integrate cues to interpret sarcasm

It's a beautiful day for our picnic





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Paralinguistic
vocal manipulation (prosody)

Components of apragmatism

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Paralinguistic apragmatism

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Paralinguistics: Prosody

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- Prosody: manipulation of pitch, loudness, timing to convey meaning
- Used at various levels
  - Linguistic prosody: word level, syntax

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Paralinguistics: Prosody

- Prosody: manipulation of pitch, loudness, timing to convey meaning
- Used at various levels
  - Pragmatic prosody: Intended meaning
    - Emphatic stress, speech acts (question/statement)

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Paralinguistics: Prosody

- Prosody: manipulation of pitch, loudness, timing to convey meaning
- Used at various levels
  - Emotional prosody

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Paralinguistics: Prosody

- No single component (pitch, timing, loudness) consistently affected after RHD

Linguistic prosody: word level, syntax	RHD: rarely affected
Pragmatic prosody: Intended meaning	RHD: might affect comprehension
Emotional prosody	RHD: commonly affected

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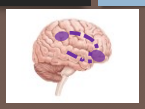
Paralinguistic Apragmatism: Aprosodia

- Emotional aprosodia
  - Present in up to 70% of acute RH stroke patients
  - RHD affects production of emotional prosody
  - RHD affects discrimination & identification of emotions

Anterior lesions most often affect production



Posterior lesions most often affect identification

Durfee et al., 2021; Stockbridge et al., 2021; Ukaegbe et al. (2022)

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Paralinguistic Apragmatism: Aprosodia

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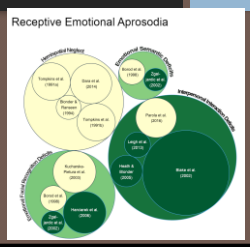
- Co-occurrences
- Receptive emotional aprosodia
  - Associated with deficits in interpersonal interactions
  - May be related to affective semantic and facial expression identification
  - Is not related to unilateral neglect



Sheppard et al., 2021

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Extralinguistic
Body language, facial expression, (non-verbals)

Components of apragmatism

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Extralinguistic apragmatism

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ANCDS RHD Writing Group: Extralinguistic Gestures

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- Few studies, lots of different tasks = MESSY!
- Gesture group studies RHD vs. NBD
- 10 studies total
  - 6 spontaneous production: 2 no deficit, 2 fewer gestures, 2 more gestures
  - 1 imitation: ~36% RHD participants showed deficits
  - 3 comprehension: all showed RHD deficits

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ANCDS RHD Writing Group: Extralinguistic Body language & Eye contact

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- Few studies, lots of different tasks = MESSY!
- Body language group studies RHD vs. NBD
- 1 study each
  - RHD deficit in interpreting emotional expression conveyed through body language
  - RHD different pattern of eye contact watching emotionally-laden stories (but ID of emotions was OK)

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Extralinguistic Apragmatism

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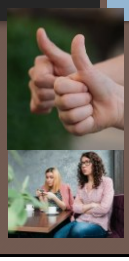
- Reduced use of facial expression, gesture, body language
  - Fewer, less expressive facial expressions
    - Spontaneous (Borod, 2002)
    - Imitative (Charbonneau et al., 2003)



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Extralinguistic Apragmatism

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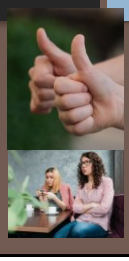
- Disruption in interpretation of facial expression, gesture, body language
  - Less accurate ID of emotional expressions
    - (Abbott et al., 2014; Borod et al., 2002; Harciarek et al., 2006; Nijboer & Jellema, 2013)
  - Facial expression discrimination related to marital satisfaction (Blonder et al., 2012)



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Apragmatism Summary

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- A disorder in conveying or comprehending meaning or intent through linguistic, paralinguistic, and/or extralinguistic modes of context-dependent communication.
- **Key concepts: apragmatism includes:**
  - **Language production & comprehension deficits**
    - Tangential, disorganized discourse
    - Reduced verbal fluency production
    - Consistent deficits with figurative language
    - Ideation and sentence construction
  - **Emotional aprosodia (receptive & expressive)**
  - **Reduced use & interpretation of non-verbal communication/cues**
    - Facial expression & gestures

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ANCDS RHD Writing Group 54 years of research

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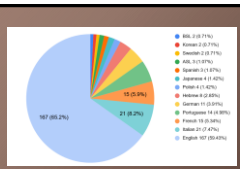
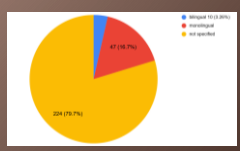
Missing pieces of the puzzle

- 60% of studies were conducted in English
- Only 20% reported language background of participants
- Very few reported cultural background





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Timothy Omundson videos

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https://www.brainandlife.org/podcast/timothy-omundson-stroke-recovery-return-television

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Apragmatism: discussion

- Identify aspects of apragmatism in Timothy Omundson's interviews
- Which areas most impact communication?
- Would you recommend further treatment?
- What else would you want to know to guide your recommendations?

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Social Cognition & Pragmatics

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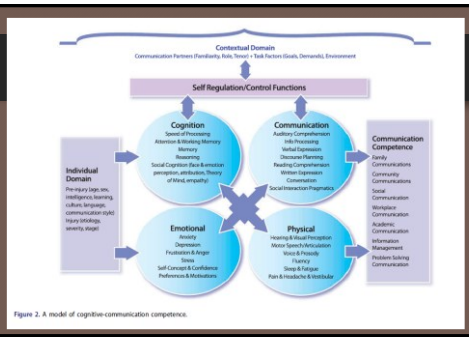

Figure 2. A model of cognitive-communication competence.

MacDonald, 2017

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Theory of Mind

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- Theory of Mind: knowledge of another's thoughts, ideas, beliefs, point of view; it can differ from your own
  - First order beliefs: what a person knows
  - Second order beliefs: what a person knows about another person's knowledge/beliefs
    - Important for persuasion, sarcasm, deception

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Theory of Mind

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- Cognitive ToM
  - Beliefs about another person's knowledge/beliefs

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Theory of Mind

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- Affective ToM
  - Beliefs about another person's feelings or emotions

Photo from Pixabay

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Theory of Mind

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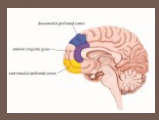
- ToM: controlled by frontal networks
  - May be more RH than LH (especially affective ToM)
  - Regions involved in cognitive (cool colors) and affective (warm colors) Theory of Mind.
    - networks are bilateral



Blake, 2018; Images from Blake & Hoepner, 2022, Plural Publishing

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Theory of Mind and acute stroke

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- Acute stroke (tested within 72 hours)
- Theory of Mind video task
  - Person puts object in box, observer leaves room, boxes switched
  - Question: where is the object?
- Results
  - 54% of participants had ToM deficit

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Theory of Mind: functional impact

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- Reduces communication interactions & social networks
  - "I don't know what they are saying or even thinking" (man with RHD, talking about grandkids)
  - "He thinks that I am thinking with him and doesn't give the whole picture" (spouse)
  - "He will change the [TV] channel half-way through, even when I am enjoying it program" (spouse)

Hewetson, 2021, p. 7-8)

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Empathy

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- Empathy: extension of emotion & ToM
  - Make inferences about another's emotional state
    - Cognitive empathy: understanding another's emotions
    - Affective empathy: feeling/sharing another's emotions
  - Large bilateral network for empathy; overlaps with ToM network
    - LH - more involved in cognitive
    - RH - more involved in affective

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Empathy: functional impact

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- Caregiver survey ~22 mpo
- Emotional empathy (impaired recog of others' emotions) = most frequently reported

Domain	RHD Caregiver Top 5 or moderate+	LHD caregiver Top 5 or moderate+
Word retrieval	0	57
Reading	36	50
Writing/spelling	43	71
Memory	43	50
Energy/fatigue	43	50
Mood	43	57
Walking	29	36
Prosody	29	0
Empathy	50	0
Spatial attention	29	0
Other cognitive	43	0
Personality/behavior	43	0

Hillis & Tippett., 2014

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Humor

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- Revolves around identifying ambiguity & resolving it

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Humor & theory of mind

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Paul and June were getting ready to host the bridge club at their house. June was arranging cookies and fruit on a tray. She asked Paul to take the tray to the living room, but not to eat any cookies. Paul picked up the tray and once he was in the other room, he popped a cookie into his mouth.
As he chewed, he saw June had followed him into the living room and watched him take the cookie. "AHA! I knew I couldn't trust you not to eat a cookie!" June said. "No," said Paul. "I didn't eat a cookie. It was a grape."

TRUE BELIEF: Paul knows that June knows he ate a cookie

INTERPRETATION: JOKE – Paul realizes he's been caught, so makes a joke of the situation.

Blake, 2018

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Humor & theory of mind

57

Paul and June were getting ready to host the bridge club at their house. June was arranging cookies and fruit on a tray. She asked Paul to take the tray to the living room, but not to eat any cookies. Paul picked up the tray and once he was in the other room, he popped a cookie into his mouth.
As he chewed, he didn't see June follow him into the living room and watch him take the cookie. "AHA! I knew I couldn't trust you not to eat a cookie!" June said. "No," said Paul. "I didn't eat a cookie. It was a grape."

FALSE BELIEF: Paul does not know that June knows he ate a cookie

INTERPRETATION: LIE – Paul doesn't realize he's been caught, so he lies about eating the cookie.

Blake, 2018

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Social Cognition & Apragmatism

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Treatment

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Treatment of components of cog-comm (linguistic apragmatism)

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- Most information about cog-comm from TBI
- No standard measure of abilities
  - Most research on production, not comprehension
    - ID/interpret prosody, facial expression, etc.
- No standard measure of outcomes
  - activity, participation level
  - functional measures
  - quality of life

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Treatment: Pragmatics & Social Cognition

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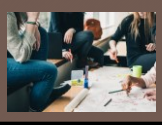
- Group Interactive Structured Treatment – Social Competence
  - Leaders: SLP & Social Worker
  - Emphasized self-awareness/self-assessment
  - Communicating needs/thoughts, listening, non-verbal communication, regulating emotions, respecting social boundaries, working with others
  - Group setting for feedback, interaction, problem solving
  - Involved family to boost generalization



Dahlberg et al, 2007; Braden et al., 2010; http://www.braininjurysocialcompetence.com/

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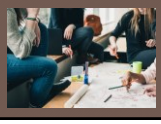
Treatment: Pragmatics & Social Cognition 61

- Group Interactive Structured Treatment – Social Competence
- Results:
  - Improvements (maintained 6 mo) in areas on Profile of Pragmatic (Functional) Impairment in Communication
  - Improvements on ratings of social communication



Dahlberg et al, 2007; Braden et al., 2010; http://www.braininjurysocialcompetence.com/

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Treatment: Pragmatics & Social Cognition 62

- Cognitive Pragmatic Treatment
  - Group treatment for TBI
  - Linguistic, paralinguistic, extralinguistic communication
  - Conversation, theory of mind, planning activities
  - Results:
    - Improvement in comprehension and production of linguistic, extralinguistic, paralinguistic, and social appropriateness abilities

Gabbatore et al., 2014

Image by Gerd Altmann from Pixabay

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Treatment: Pragmatics & Social Cognition 63

- TBI Express
  - Conversation training: clients & partners
  - Checklists
  - Video demonstrations
  - http://sydney.edu.au/health-sciences/tbi-express/index.shtml

Togher et al 2016

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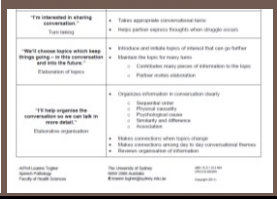
Treatment: Pragmatics & Social Cognition 64

Communication Strategies Toolkit



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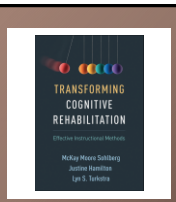
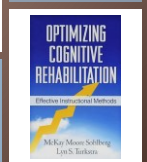
Cog-comm Rehab Resources





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Treatment: Pragmatics & Social Cognition 66

- Key factors
  - Treatment must be individualized
  - Treatment must involve functional skills in real contexts
    - Training discrete skills probably won't automatically generalize to untreated skills/contexts
  - Many repetitions needed to change automatic or routine behaviors

Sohlberg & Turkstra, 2011

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Treatment: Pragmatics & Social Cognition 67

- Planning treatment: WHO-ICF structure
  - Functions – cognitive deficits & strengths
    - planning, organization, difficulty recognizing social cues, reduced awareness
  - Activities (social) – daily activities affected
    - Conversations, sharing stories
  - Participation (social roles) – social, vocational
    - Work, socialization, family roles

Sohlberg & Turkstra, 2011

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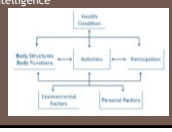
Treatment: Pragmatics & Social Cognition 68

- Planning treatment: WHO-ICF structure
  - Environmental – external factors that help/hinder
    - access to social activities or people
  - Personal – internal factors that help or hinder
    - Pre-morbid personality, presence of depression, pre-morbid intelligence



Sohlberg & Turkstra, 2011

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Treatment: Pragmatics & Social Cognition 69

- Planning treatment
  - Identify strengths & weaknesses
    - language, cognition, pragmatics
  - Select target & how to address it
    - Clients' needs
    - Target environment
    - When to use strategy
    - Purpose of treatment – change behavior? Environmental adaptations?
  - Define desired outcome

Sohlberg & Turkstra, 2011

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Treatment: Pragmatics & Social Cognition 70

- Methods
  - Recognition of target behavior
    - Verbal, video
  - Identify contexts in which it occurs; triggers
  - Teach social rules & provide practice using them
  - Metacognitive strategies
    - WSTC (what, strategy, try, check)
  - Fade cues
  - Variable practice (people, contexts, situations)

Sohlberg & Turkstra, 2011

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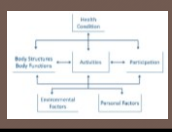
Treatment Example: Pragmatics & Social Cognition 71

- EXAMPLE: WHO-ICF structure
  - Functions
    - executive function deficits, difficulty recognizing some social cues, distractible
    - Good awareness of deficits in general, difficulty recognizing & monitoring
  - Activities
    - inappropriately start or continue conversations
  - Participation
    - loss of friends



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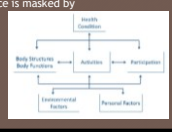
Treatment Example: Pragmatics & Social Cognition 72

- EXAMPLE: WHO-ICF structure
  - Environmental
    - lives with spouse & 3 teen children (family style = commonly interrupt)
  - Personal
    - 55 years old, previously very social, frustrated that intelligence is masked by deficits



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Treatment Example: Pragmatics & Social Cognition

73

- EXAMPLE: Planning treatment
  - Identify strengths & weaknesses
    - Sense of humor, intelligent, general awareness
    - Distractibility, reduced recognition of social cues

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Treatment Example: Pragmatics & Social Cognition

74

- EXAMPLE: Planning treatment
  - Select target & how to address it
    - Clients' needs – interpersonal interactions
    - Target environment – social settings
    - When to use strategy – initiating & ending conversations
    - Purpose of treatment – increase identification of social cues

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Treatment Example: Pragmatics & Social Cognition

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- EXAMPLE: Planning treatment
  - Define desired outcome
    - Increase appropriate interactions

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Treatment Example: Pragmatics & Social Cognition

- What treatment activities, goals, tasks could you use for this client?

76

76

Treatment Example: Pragmatics & Social Cognition

77

- EXAMPLE: Implementation
  - Distractibility
    - Write down questions, items prior to beginning session
  - Conversations
    - Identify & interpret social cues
      - Making & holding eye contact vs. turning away
      - Stopping in hallway vs. continuing to walk
      - Body turned toward him vs. turning away
    - Strategy
      - "do you have time to talk?" "are you in a hurry?"
      - "stop/tell me when you have to go"

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Gist Reasoning treatment

78

- Gist reasoning: abstracting the "gist", main ideas rather than the details
- Targeted processes
  - Inhibition
  - Organizing
  - Inferencing
  - Paraphrasing
  - Synthesizing
  - Integrating
  - Abstracting & generalizing

Chapman et al., 2015; Cook et al., 2014; Vas et al., 2011

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Treatment Example: GIST reasoning

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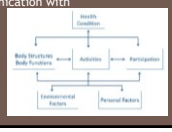
- EXAMPLE: WHO-ICF structure
  - Functions – executive function deficits, distractible
  - Activities – reading comprehension; conversations (generally superficial)
  - Participation (social roles) – loss of friends, reduced communication with family



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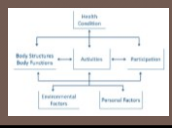
Treatment Example: GIST reasoning

80

- EXAMPLE: WHO-ICF structure
  - Environmental – lives with spouse & 3 teen children (family style = commonly interrupt)
  - Personal – 55 years old, previously very social, frustrated that intelligence is masked by deficits



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Treatment Example: GIST reasoning

81

- EXAMPLE: Gist reasoning treatment
  - Inhibition (unimportant, irrelevant details)
    - Identify, cross out irrelevant details
  - Organizing (chunking)
    - Put related details together
  - Inferencing (generate deeper meaning)
    - Find commonalities in chunks; generate inferences to create additional links

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Treatment Example: GIST reasoning

82

- EXAMPLE: Gist reasoning treatment
  - Paraphrasing (put into one's own words)
  - Integrating (world knowledge & text-based information)
    - Relate to own life; world knowledge; identify own biases
  - Abstracting & generalizing (generalize beyond immediate context)

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Treatment Example: GIST reasoning

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- Results of treatment
  - Discourse comprehension – at ceiling at baseline, no change post-treatment
  - Executive functions – remained stable overall
  - Verbal reasoning (FAVRES) – improved after treatment
    - Accuracy, rationale, eliminating irrelevant details, weighing facts, flexibility
  - RBANS language subscale – improved after treatment
    - Verbal fluency

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Treatment based on theories

84

- RHD strengths/weaknesses
  - Difficulties using context; but better with strong cues
  - Difficulties with Social inferences

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Treatment based on theories: Using Context

85

- Treatment
  - Emphasize context
  - Facilitate use of context
  - Discuss effects of context
- Stimuli
  - Novel idioms or metaphors
  - Ambiguous words/phrases
  - Jokes & cartoons

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Contextualization treatment: idioms

86

- Novel idioms: *to spit the toad*
- Have you ever heard this phrase?

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Contextualization treatment: idioms

87

- *to spit the toad*
  - Susie had promised Jay that she wouldn't tell anyone that he was planning to leave the company. He had been offered a great position with better pay. That night she went out to dinner with her co-worker Evelyn. They started talking about Jay, and Susie just couldn't help it. She *spit the toad* and told Evelyn everything.
- What does *to spit the toad* mean?

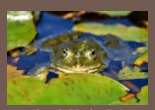

Image by Ralph from Pixabay

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Contextualization treatment: idioms

88

- *to spit the toad*
- What words/phrases helped you figure it out?
  - Susie had promised Jay that she wouldn't tell anyone that he was planning to leave the company. He had been offered a great position with better pay. That night she went out to dinner with her co-worker Evelyn. They started talking about Jay, and Susie just couldn't help it. She SPIT THE TOAD and told Evelyn everything.

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Contextualization treatment: idioms

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- Novel idioms: *leading a dog in the yard*
- Have you ever heard this phrase?

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Contextualization treatment: idioms

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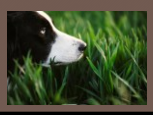
- Sam and Janet were watching the political candidates debate. They were frustrated that neither of the candidates seemed to answer the questions. Neither of them would give a clear answer about their plans for the economy. "It seems like they're LEADING A DOG IN THE YARD" complained Janet. How am I ever going to figure out what he really plans to do?
  - What does *leading the dog in the yard* mean?
  - What words/phrases helped you figure it out?



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Contextualization treatment (*not empirically tested)*

91

STEP 1	
Present idiom in isolation to check for familiarity. Do not ask for an interpretation, as this can lead to activation of an incorrect meaning that may then interfere with the correct interpretation.	Have you ever heard of this phrase?
She has salt in her pumpkin	
STEP 2	
If the client is unfamiliar with the idiom, then present it embedded in a strongly biasing context.	I've put the phrase into a short context. Now what do you think it means?
Ashley was the top student in her class. She was a quick learner and earned high grades on all of her exams. ***She had salt in her pumpkin.***	
STEP 3	
Regardless of accuracy, ask how they figured out the meaning	Tell me (highlight/underline) the cues that you use.
Ashley was the top student in her class. She was a quick learner and earned high grades on all of her exams. *She had salt in her pumpkin.*	

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Contextualization treatment: homonyms

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- *Back*
- Tell me all the meanings you can think of for the word *back*

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Contextualization treatment: homonyms

93

- *Back*
- Which meaning is intended in these sentences?
  - I hurt my *back*.
  - The shirt didn't fit so I took it *back*.
  - He said that he would *back* my new venture.
  - I went *back* to the investors to ask if they'd *back* my new pillow designed to provide better *back* support.

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Contextualization treatment: homonyms

94

- *Back*
- Which words in each sentence led you to the right meaning?
  - I hurt my *back*.
  - The shirt didn't fit so I took it *back*.
  - He said that he would *back* my new venture.
  - I went *back* to the investors to ask if they'd *back* my new pillow designed to provide better *back* support.

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Contextualization treatment: homonyms

95

- *Back*
- Create a new sentence for each meaning of the word
  - Anatomy
  - Return
  - Support

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Contextualization treatment (*not empirically tested)*

96

STEP 1	
Present ambiguous word and ask for different meanings	Tell me all the meanings you can think of for this word.
SPRING	

STEP 2	
Put the word into different sentence contexts & discuss which meaning(s) would be contextually appropriate. Use some contexts in which the meaning is not completely disambiguated.	I've put the word into a sentence. Which meaning is correct?
When he took apart the watch he lost the *spring*. He went fishing in the *spring*. He like to hunt in the winter but he went fishing in the *spring*.	

Blake, 2018

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Contextualization treatment (*not empirically tested*)

97

STEP 3	
Ask the client to identify the cues that led to his/her interpretation.	Which words/phrases helped you figure out which meaning was intended?
When he took apart the watch he lost the *spring*. He went fishing in the *spring*. He like to hunt in the winter but he went fishing in the *spring*.	

STEP 4	
Provide ambiguous words and ask the client to generate sentences that provide appropriate contextual cues to indicate meaning.	Create sentences that convey different meanings of these words
BAT - make up a sentence for the animal / baseball meaning YARD - make up a sentence for the measurement / property meaning	

Blake, 2018

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Treatment based on theories: Social inferences

98

- RHD may cause specific deficit with social inferences/theory of mind
- Social inferences = complex!
  - Difficulties may be related to complexity
  - Difficulties may be specific to social inferences

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Treatment based on theories: Social inferences

99

- Scenarios
  - manipulate who knows what
  - manipulate relationships
    - boss vs. co-worker
    - wife vs. sister
  - Discuss possible interpretations based on the contextual cues
    - Can use contextualization treatment format

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Treatment based on theories: Social inferences

100

- Discuss scenario & interpretation
  - *Alma and Marisol often play Scrabble. Alma didn't like Marisol because she would often cheat. One day, Marisol played poorly. At the end of the game, Alma said "You sure played a great game."*
    - What did Alma mean? (compliment? Sarcasm?)
    - What cues did you use to figure it out?
    - What if Alma & Marisol were friends?
    - If you were in the room,
      - what other cues would you look for to figure it out?

Based on Brownell et al., 1992

Image by 4772818 from Pixabay

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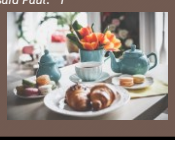
Treatment based on theories: Social inferences

101

- *Paul and June were getting ready to host the bridge club at their house. June arranged cookies and fruit on a tray. She asked Paul to take the tray to the living room, but not to eat any cookies. Paul picked up the tray and once he was in the other room, he popped a cookie into his mouth. As he chewed, he saw June had followed him into the living room and watched him take the cookie. "AHA! I knew I couldn't trust you not to eat a cookie!" June said. "No," said Paul. "I didn't eat a cookie. It was a grape."*
  - What did Paul mean?
  - What cues did you use to figure it out?
  - What if he didn't know June followed him & saw him?
  - What if Paul was June's son instead of her husband?



Based on Brownell et al., 1992

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INCOG treatment recommendations

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- Communication competence varies
  - Partner, environment, demands, priorities, fatigue
- Patients with TBI need SLP evaluation
- Rehab program should consider:
  - Native language & proficiency, literacy, cognitive abilities, communication style (cultural influences)
- Rehab program involves contextually-appropriate practice
  - Workplace, home, social environments, etc

Togher et al.,2014

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INCOG treatment recommendations

103

- Rehab program should include education of family members
- Goals should be identified by patients; participation-level outcomes
- Group settings better than individual treatment

Togher et al.,2014

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Aprosodia Treatment

- Data from 14 patients
- 20 treatment sessions
- motoric-imitative
  - aprosodia = motor speech theory
- cognitive-affective
  - aprosodia = poor access to emotional words & prosody

Leon, Rosenbek, Rodriguez, et al. (2004, 2005, 2007)

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Aprosodia Treatment: Motoric-Imitative

- Motoric-imitative: motor-speech disorder
- Goal: Use appropriate prosody for emotionally-laden sentences
  - 6-step hierarchy of cues

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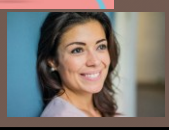
Aprosodia Treatment: Motoric-Imitative

Motoric-imitative: "We just had a new baby"

1. prosody + facial cue → unison
2. prosody + facial cue → repetition
3. prosody only → repetition
4. neutral intonation → produce
5. ask question → produce
6. imagine speaking to family member



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Aprosodia Treatment: Cognitive-Affective

- Cognitive-affective: access disorder
- Goal: learn the characteristics of emotional prosody & use them
  - 6-step hierarchy of cues
    - Description of emotional "tone of voice"
    - Emotional label (angry, sad, happy)
    - Facial expression

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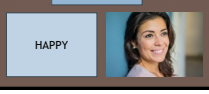
Aprosodia Treatment: Cognitive-Affective

Cognitive-affective: "I just got a new job!"

1. written description of tone of voice → explain back
2. Match label to description, match face to description
3. read sentence with prosody (description, label & face available)
4. read sentence (label & face available)
5. read sentence (face available)
6. read sentence (no cues)



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Aprosodia Treatment

- 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: 6/14 available for post-test
  - 4/6 maintained gains at 3-months

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Aprosodia Treatment: REACT

110

- Recognition and Expression of Affective Communication Treatment (Ally Durfee, Shannon Sheppard)
  - Explicit cues (conceptual, top-down)
    - List prosodic features of an emotion
  - Implicit cues (perceptual, bottom-up)
    - Identify emotion in a scene, repeating a sentence and copying the emotional prosody
  - Expression: produce sentence with emotion then listen & judge accuracy and what adaptations are needed

Durfee & Sheppard, 2022

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Aprosodia Treatment (no empirical evidence)

- 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

Blake, 2018; Myers, 1999; Tompkins 1995

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Aprosodia Treatment (no empirical evidence)

- 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

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Summary of Treatment for RHD communication disorders

- Very little empirical evidence
- Pragmatics & social cognition
  - use the TBI literature
- Language
  - Theoretically-based treatments emphasize use of context & identification of strong contextual cues
- Prosody
  - Motoric-imitative & cognitive affective both have some evidence

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Impact of Cog-Comm Disorders

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Impact of cognitive-communication disorders 115

- Changes related to RH stroke
  - Occupational activities
  - Interpersonal relationships
  - Independent living
  - Questionnaire for participants & proxies
- SLP eval for CCD
  - Lexical semantics, discourse, pragmatics & prosody

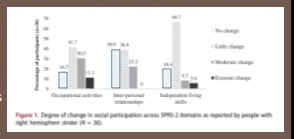

Figure 1. Degree of change in social participation across SPRS-2 domains as reported by people with right hemisphere stroke (N = 36).

Hewetson et al 2017

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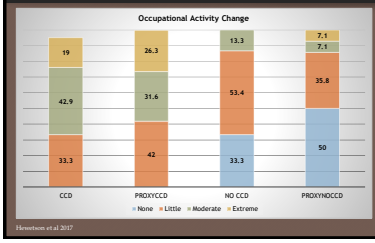
Impact of cognitive-communication disorders 116



- CCD – all reported changes to occupational activities
  - Only 33-50 without CCD
- Participant-proxy agreement
  - CCD = fair
  - noCCD = moderate

Hewetson et al 2017

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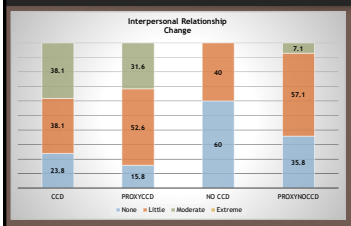
Impact of cognitive-communication disorders 117



- CCD – 77% reported changes to relationships
  - only 40% with no CCD; at most little change
- Participant-proxy agreement
  - CCD = fair
  - noCCD = moderate

Hewetson et al 2017

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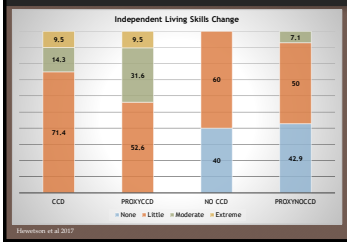
Impact of cognitive-communication disorders 118



- CCD – all reported changes
  - 60% with no CCD; at most little change
- Participant-proxy agreement
  - CCD = fair
  - noCCD = moderate

Hewetson et al 2017

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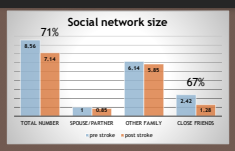
Impact of cognitive-communication disorders 119



N=7 individuals, all with CCD
% = % who reported a change

Hewetson et al 2021

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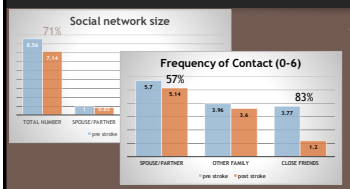
Impact of cognitive-communication disorders 120



N=7 individuals, all with CCD
% = % who reported a change

Hewetson et al 2021

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Impact of cognitive-communication disorders

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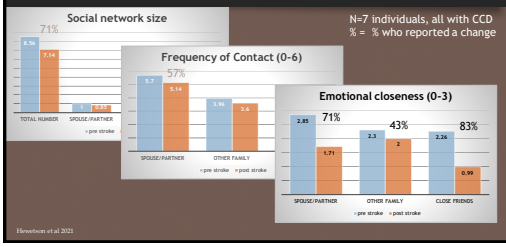

Hewetson et al 2021

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RHD under-identification

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- Under-identification of communication deficits
  - At best 50% of patients get SLP referrals for communication
  - Social communication deficits
    - Referrals ~5% of potential patients

ASHA NOMS 2011; Blake 2002; McDonald 2017; Salter 2012

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RHD under-identification

123

- Under-identification of communication deficits
- Why?
  - Limited options for reliable, valid tests
  - Assessments with poor sensitivity for functional deficits
  - Bias within SLP towards swallowing & aphasia
  - SLPs assess cognition more often than communication

ASHA NOMS 2011; Blake 2002; MacDonald 2017; Salter 2012

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Assessment practices of SLPs

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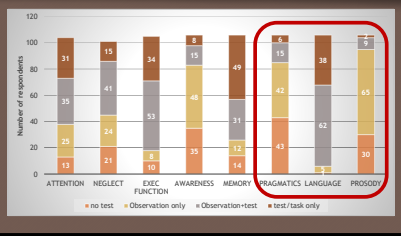

Ramsey & Blake (2020)

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RHD: functional impact

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- Caregiver concerns:
  - LHD = 7 areas
  - RHD = 11 areas

Domain	RHD Caregiver Top 5 or moderate+	LHD caregiver Top 5 or moderate+
Word retrieval	0	57
Reading	36	50
Writing/spelling	43	71
Memory	43	50
Energy/fatigue	43	50
Mood	43	57
Walking	29	36
Prosody	29	0
Empathy	50	0
Spatial attention	29	0
Other cognitive	43	0
Personality/behavior	43	0

Hillis & Tippett, 2014

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Additional resources

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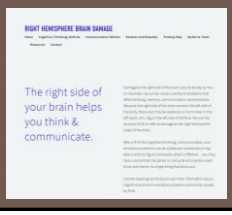
RightHemisphere.org



Talkbank.org
RHDBank

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Additional resources

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- “ RHD HIDDEN DIAGNOSIS Documentary is now available on PBS. Minga J, Jallah, L, Pearce M.(Director). (2024, July 17). RHD Hidden Diagnosis [Film]. PBS distributions.”
- International Cognitive-Communication Disorders Conference (ICCDC)
  - Mid-January 2026

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Additional resources

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- State Farm jacked up commercial https://www.youtube.com/watch?v=0-7Ucg5GKnw
- Timothy Omundson videos
  - Interview with Larry King: Larry King - Timothy Omundson https://www.youtube.com/watch?v=3EVaf8feHsk
  - Interview on KPCS: https://www.youtube.com/watch?v=JfhCQ51uBA8
  - Also - check out This is Us Season 4, Episode 8 “Sorry”. He plays Gregory, a neighbor who has had a stroke and he mentions how people misinterpret his intentions because of his speech production (aprosodia - but not labeled that way in the show).
- Will Shortz - Puzzle Master for NPR and NYT Crossword puzzles
  - Right hemisphere stroke in late 2024
  - 3 months post-stroke https://www.npr.org/2024/04/14/1244610377/sunday-puzzle-a-puzzle-for-the-guest-puzzlemaster-g-reg-p-liska
  - A few months pre-stroke https://www.npr.org/series/4473090/sunday-puzzle

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