

Practical Strategies for Working with Stroke Patients with Cognitive Impairments

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School of Rehabilitation Sciences
McMaster University



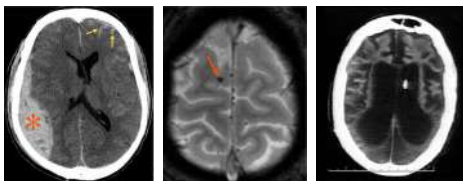
1

DISCLOSURE



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A General Comment: Stroke vs. Other Etiologies of ABI



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Learner Outcomes

- Summarize common cognitive impairments in individuals with stroke/acquired brain injury (ABI), across severity levels and stages of recovery.
- Identify practical strategies to work effectively with patients with stroke/ABI-related cognitive impairments.
- Critique your own style of interacting with patients with cognitive impairments, and generate one personal interaction goal to attempt on your next work day.

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Agenda

- Self-assessment of communication style
- Review common cognitive impairments in individuals with stroke and other ABI etiologies
- Revisit self-assessment
- Summarize evidence-based rehabilitation and interaction practices for patients with cognitive impairments

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Communication Style Self-Assessment

Communication Style Identification Chart

As completely as possible, describe your own communication manner and style in the categories listed in the table below.

In the third column, indicate whether each personal characteristic might have a positive or negative effect on an individual with a communication disorder.

Based on your answers, determine what changes you might make that would have a positive effect on the other person's interactions with you in learning, working, or social interactions.

Communication manner and style characteristics	Description of your personal characteristics	[+] or [-]
Average rate of speech		
Typical length and complexity of your sentences		
Use of sarcasm, humor, or implicature		

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Common Cognitive Impairments

- Memory
- Executive functions
- Social cognition

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Practical Strategy #1

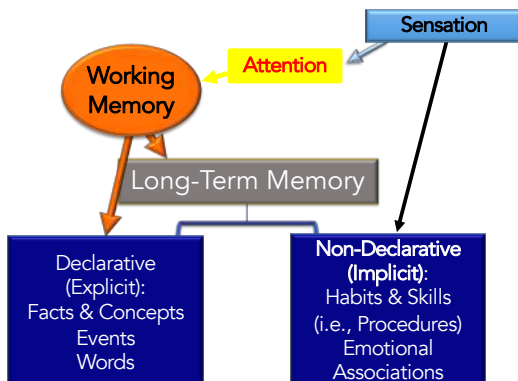


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Not...



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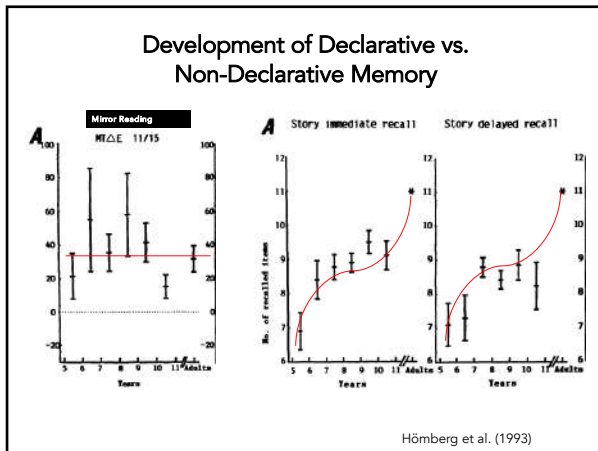


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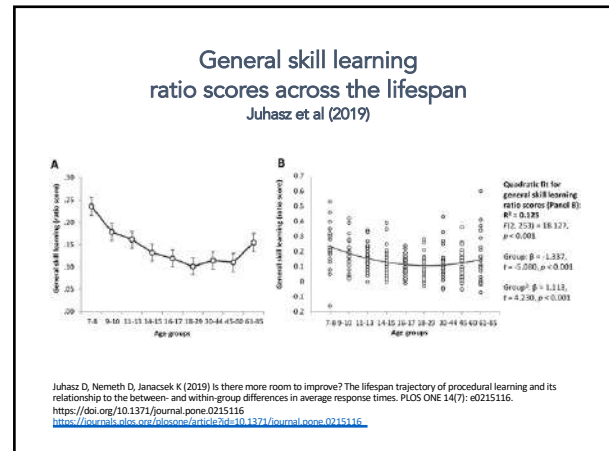
Two Different Types of Long-Term Memory

- Declarative
 - Dependent on conscious experience to encode and recall
 - Stored by semantic associations
 - Role of errors is dependent on factors such as consequences and meaning
 - May generalize with conscious effort
 - May be learned with a single trial
- Non-Declarative
 - Often not accessible to conscious recall
 - Stored by surface features
 - Highly context-specific
 - Learning is probabilistic
 - Requires multiple repetitions but durable over time

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In everyday cognition, LTM types are difficult to dissociate...

Task	Learn it?	Know it?
Saying "please"		
Knowing that "How's it going?" is an acceptable greeting		
Answering a phone and taking messages		
Behaving appropriately in a zoom webinar		

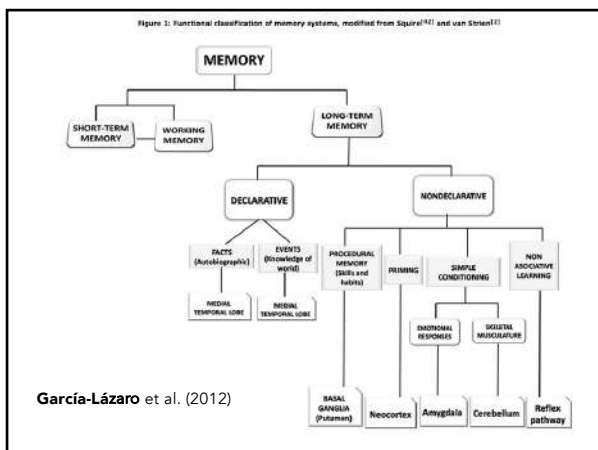
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In patients with stroke and other etiologies of ABI...

- *Declarative* learning often impaired
- *Non-declarative* learning mostly preserved

Why?

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How do we interact with patients with declarative learning and memory impairments?

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Valitchka & Turkstra
Seminars in Speech and Language (2014)

	Participants				
	A	B	C	D	E
Questions asked	46	51	21	48	47
Questions with verifiable answers	28 (60.9%)	17 (33.3%)	13 (61.9%)	29 (60.4%)	34 (72.3%)
Answers verified as correct	17 (60.71%)	11 (61.1%)	1 (7.7%)	19 (65.5%)	24 (70.6%)
Answers verified as incorrect, questions with no response, or "I don't know"	11 (39.3%)	6 (35.3%)	12 (92.3%)	10 (34.5%)	10 (29.4%)
Incorrect answers immediately corrected by communication partner	7 (63.6%)	3 (50%)	9 (75%)	5 (50%)	4 (40%)

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MRRI
MOSS REHABILITATION
RESEARCH INSTITUTE


Tessa Hart
Amanda Rabinowitz
Mary Ferraro

The Traumatic Brain
Injury Model System



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BRAIN INJURY
2020, VOL. 34, NO. 11, 1518-1524
<https://doi.org/10.1080/02699952.2020.1889710>

 Taylor & Francis
Taylor & Francis Group

Improving communication with patients in post-traumatic amnesia: development and impact of a clinical protocol

Tessa Hart*, Mary Ferraro^{a,b}, Amanda Rabinowitz^c, Eileen Fitzpatrick DeSalme^c, Lauren Nelson^c, Elizabeth Marcy^c, Stephanie Farm^c, and Lyn Turkstra^a

^aMoss Rehabilitation Research Institute, Elkins Park, Pennsylvania, USA; ^bDrucker Brain Injury Center, MossRehab Hospital, Elkins Park, Pennsylvania, USA; ^cDrexel University College of Medicine, Philadelphia, Pennsylvania, USA; ^dSchool of Rehabilitation Science, McMaster University, Ontario, California, USA

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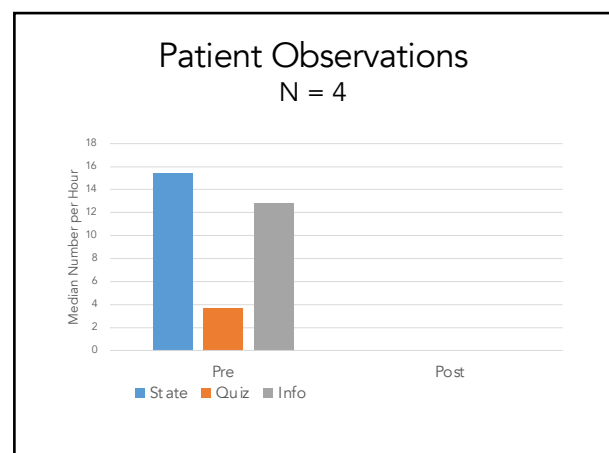
 **MossRehab**
EINSTEIN HEALTHCARE NETWORK

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Question Types

- **S-type questions** are those pertaining to the here-and-now (current state).
 - Conversational greetings, asking the patient to report on their current state—sensations, preferences, what is perceived in the environment; therapy directions expressed as questions
- **Q-type questions** are asked to quiz the patient (test their memory). It is assumed that the questioner knows the answer.
- **I-type questions** ask the patient to retrieve information from recent or remote memory. It is assumed that the questioner does not know the answer.


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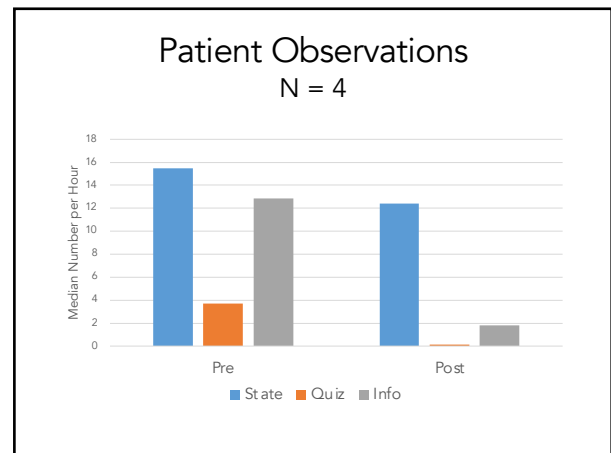
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PTA Protocol Chapter 1

Brain Injury Center
education
April 2019



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What should be our intervention model for cognition in acute care?

J Head Trauma Rehabil
Vol. 28, No. 4, pp. 332-336
Copyright © 2013 Wolters Kluwer Health | Lippincott Williams & Wilkins

Commentary

Inpatient Cognitive Rehabilitation: Is It Time for a Change?

Lyn S. Turkstra, PhD


Aphasia Management During the Early Phases of Recovery Following Stroke

Audrey Holland
Julius Fehrmann
University of Alberta, Canada

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Practical Strategy #2

- Ask one question: does the patient have declarative learning and memory impairments?
- If yes, consider not asking more questions!



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Practical Strategy #3




If the patient has declarative learning and memory impairments and is having "a bad day", consider non-declarative emotional associations:

How did the patient form them, and how can you form positive emotional associations?

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Executive Functions



inhibition, insight, organization, sequencing, abstraction, switching, attention, metacognition, planning, self-control

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Executive Functions

- Flexibility
- Control
- Working Memory (the mental workspace for executive functions)

Diamond 2013

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EF development parallels brain development

- 1) Variable in the general population
- 2) Interruption can = failure to develop
- 3) "Last in/first out" ☹

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Executive Functions

- Flexibility
- **Control**
- Working Memory

Self-Regulation

Diamond 2013

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Self-Regulation is "Fatigable"



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Self-Regulation is "Fatigable"

- Self-regulation fatigue is a common problem in people with EF impairments
 - Running out of "thinking energy" part-way through the day
 - Having more behavior problems when tired, stressed, or multi-tasking
- Consider that we all have SR fatigue at one time or another: what would it be like if you already had SR impairments and *then* had to control yourself?!

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Practical Strategy #4

Ask if it's possible that the patient has self-regulation fatigue. If yes, can you:

- Provide environmental supports to reduce self-regulation demands
- Identify a "replenisher" or break specific to that patient



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Social Cognition

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Social Building Blocks Study
University of Wisconsin-Madison / University of Texas



Communication
and Cognition
LABORATORY
UNIVERSITY OF NEBRASKA-LINCOLN

Acknowledgements

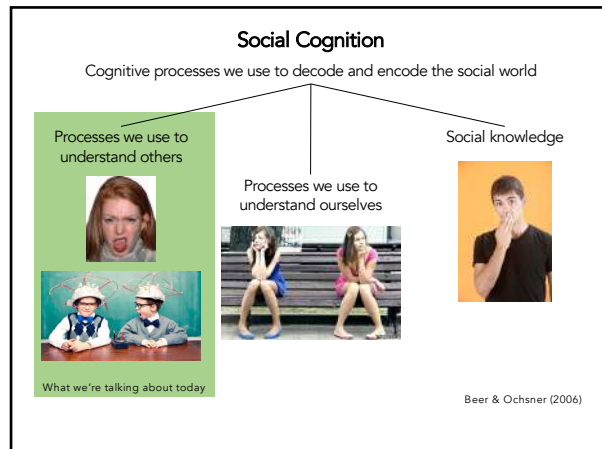
Melissa Duff, PhD	Lindsey Byom, PhD	Sara Vandenheuveel, MS
Bilge Mutlu, PhD	Caitlin Ryan, MS	Sarah Riedeman, MS
Kristina Visscher, PhD	Peter Meulenbroek, PhD	Sarah Kraning, MS
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Processes we use to understand others include, at minimum...

- **Emotion recognition:** "reading" emotions from others' facial expression (affect) and voice
- **Theory of Mind:** understanding that others have thoughts different from ours and that their thoughts influence their behaviors
 - In saying that an individual has a theory of mind, we mean that the individual imputes mental states to himself and to others (either to conspecifics or to other species as well). A system of inferences of this kind is properly viewed as a theory, first, because such states are not directly observable, and second, because the system can be used to make predictions, specifically about the behavior of other organisms.

(Premack & Woodruff, 1978)

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Other terms for ToM-related functions:

- Mentalizing
- Social thinking
- Perspective-taking
- Social intelligence
- Belief reasoning

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Why is social cognition at risk for impairment in ABI?

1. Damage to structures involved in processing social information

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Why is social cognition at risk for impairment in ABI?

2. Damage to structures that support information processing in general, including social information

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How Do We Test Emotion Recognition?

The Karolinska Directed Emotional Faces (KDEF).
Lundqvist D, Flykt A, Ohman A. Stockholm
Sweden: Department of Clinical Neuroscience, Psychology section,
Karolinska Institute; 1998.

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Emotion Recognition Task (ERT)

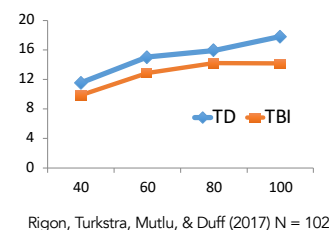
Frigerio, Burt, Montagne, Murray, & Perrett, 2002

Happy, Sad, Surprised, Angry, Fearful, Disgusted

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Emotion Recognition in TBI

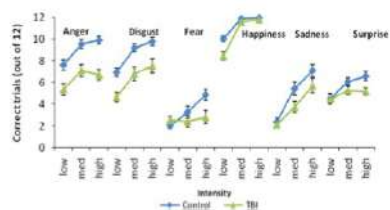
- Estimated that about 30% of adults with moderate-severe TBI have impairments in emotion recognition
- More information \neq better performance



Rigon, Turkstra, Mutlu, & Duff (2017) N = 102

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Not all emotions are equally affected:



Rosenberg et al. (2014)

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Emotion Recognition in Stroke

Review of Emotion Recognition in Stroke Patients

Yuvaraj R,^a Murugappan M,^a Norlinah M,^b Sundaraj K,^a Khairiyah M,^b
^a Author affiliations

^b Corresponding Author

Keywords: Emotion recognition, Emotion processing,
 Brain damage patients, Communication channels, Neuropsychology

Dement Geriatr Cogn Disord 2013;36:179-196

<https://doi.org/10.1159/000353440>

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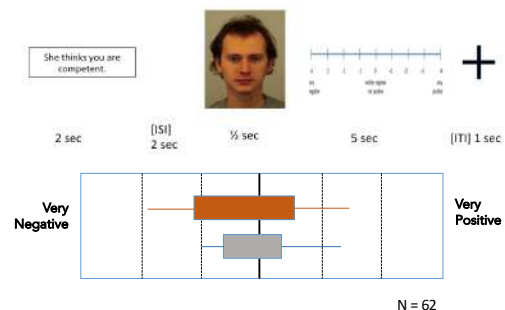
But how often do we need to recognize emotions in isolation?



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Recognition of Emotions in Context

Ryan (2013)



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Practical Strategy #4

- Ask if the patient has impairments in "reading" emotions in others' facial expressions, intonation, and body language
- If yes, consider educating family and team members to "say what they feel"



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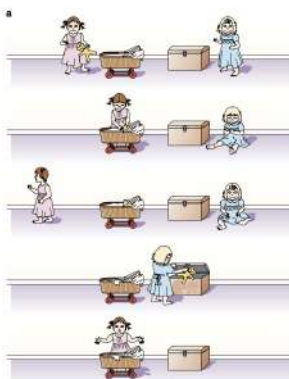
Theory of Mind



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Prototypical ToM Task is False Belief

Sally-Ann Story
Baron-Cohen (2001)



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Theory of Mind in TBI

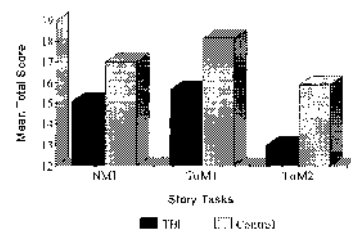
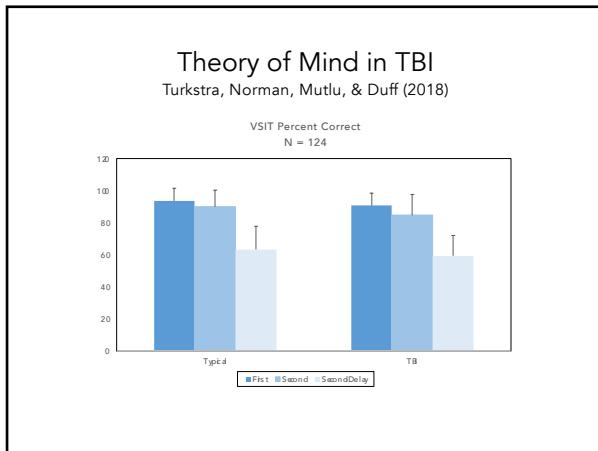


Fig. 1. Mean total score in story tasks for subjects with and without TBI.

Bibby & McDonald (2005)

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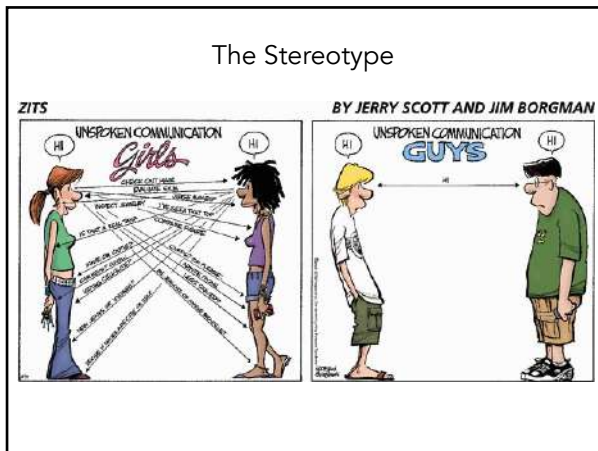


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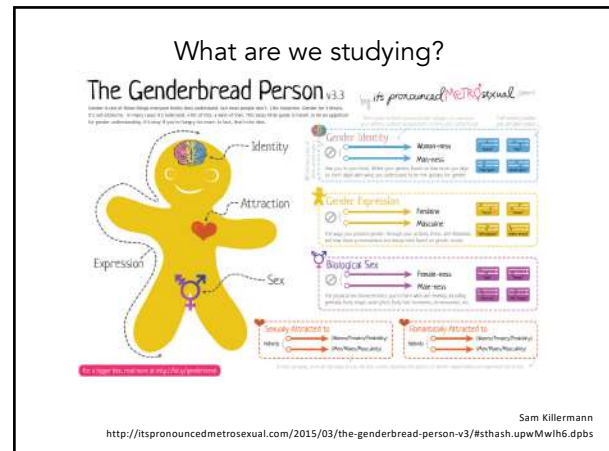
Theory of Mind in Stroke

- Right hemisphere lesions (Hamilton et al., 2017; Balaban et al., 2016)
- Right- and left-hemisphere lesions (Adams et al., 2019)
- Lesions affecting bilateral distributed networks involved in mentalizing (Dominguez et al., 2019)
- Social cognition impairments not associated differentially with focal frontal-lobe pathology (Buunk et al., 2017)

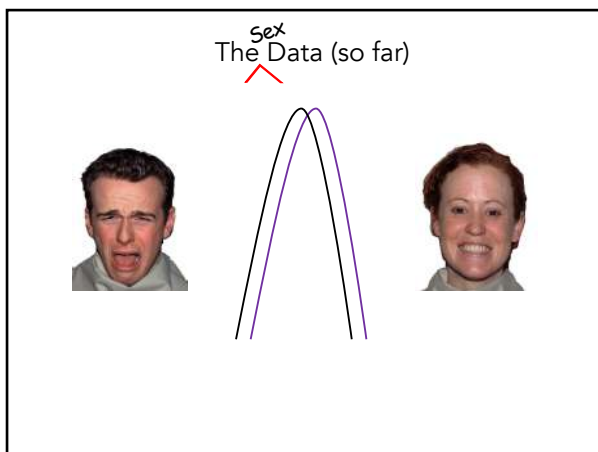
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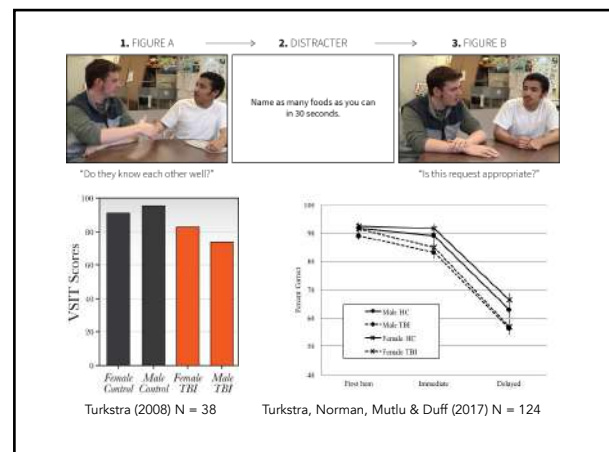
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BUT...
Men and women might have different
expectations for social skills
(and social behaviour)

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La Trobe Communication Questionnaire

Please answer the following questions about _____ 's communication behaviors before the TBI and now.

1=Rarely/Never 3=Often	2=Sometimes 4=Usually/Always	Before the TBI	Now
When talking to others, how often does your child:			
		1 2 3 4	1 2 3 4
Leave out important details		1 2 3 4	1 2 3 4
Use a lot of vague or empty words such as 'you know what I mean' instead of the right word		1 2 3 4	1 2 3 4
Go over and over the same ground in conversation		1 2 3 4	1 2 3 4
Switch to a different topic of conversation too quickly		1 2 3 4	1 2 3 4
Need a long time to think before answering the other person		1 2 3 4	1 2 3 4
Find it hard to look at the other speaker		1 2 3 4	1 2 3 4
Have difficulty thinking of the particular word you want		1 2 3 4	1 2 3 4

Douglas, J., O'Flaherty, C., & Snow, P. (2000)

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Women Expected More

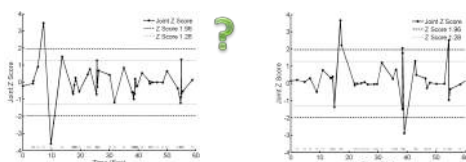
	According to Women	According to Men
Number of behaviors that are problematic if shown by a man	17	8
Number of behaviors that are problematic if shown by a woman	14	9

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Is impaired social cognition the
mechanism underlying...

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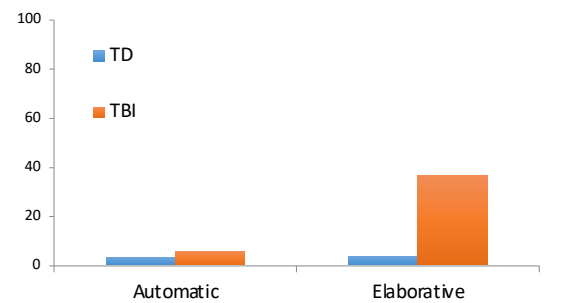
impairments in turn-taking?



Murphy, Turkstra, Montgomery & Huang (2014)

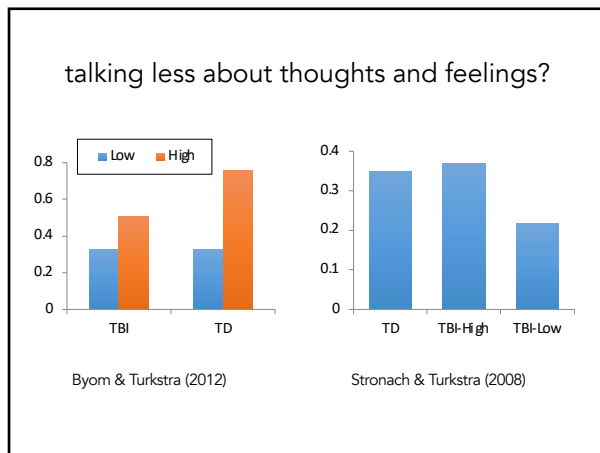
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impairments in conversational inference?



Johnson & Turkstra (2012)

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Why does social cognition matter
in TBI rehabilitation
and beyond?

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1. Social cognition skills have been linked to outcomes in critical life domains.

Disability and Rehabilitation
An international, multidisciplinary journal

<http://informahealthcare.com/dra>
ISSN 0963-8288 print/ISSN 1464-5165 online
Disabil Rehabil, Early Online: 1-10
© 2015 Informa UK Ltd. DOI: 10.3109/09638288.2015.1044621

informa
healthcare

RESEARCH PAPER

Job stability in skilled work and communication ability after moderate-severe traumatic brain injury*

Peter Meulenbroek^{1,2} and Lyn S. Turkstra³

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2. Social cognition skills might be related to rehabilitation outcomes.

Neuropsychological Rehabilitation, 2013
<http://dx.doi.org/10.1080/09602011.2013.826138>

Who benefits from treatment for executive dysfunction after brain injury? Negative effects of emotion recognition deficits

Jacoba M. Spikman^{1,2}, Danielle H.E. Boelen^{3,4}, Gerdina H.M. Pijnenborg⁵, Marieke E. Timmerman⁶, Joukje van der Naalt², and Luciano Fasotti^{4,7}

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3. Social cognition skills might be related to behaviours (and behaviour problems).

Neuropsychologia
Volume 103, August 2017, Pages 131-139

Social cognition impairments after aneurysmal subarachnoid haemorrhage: Associations with deficits in interpersonal behaviour, apathy, and impaired self-awareness

Anne M. Buurk^{a,b,c,d}, Jacoba M. Spikman^{a,b}, Wensieke S. Veenstra^a, Peter Jan van Laar^c, Jan D.M. Metzemaekers^a, J. Marc C. van Dijk^a, Linda C. Meiners^a, Rob J.M. Groen^a

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Practical Strategy #5

- Consider that the patient might not be a good "mind-reader"
- If not, consider educating family and team members to "say what they think"

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Overview of Common Cognitive Impairments in Individuals with Stroke/ABI

- Patients with stroke and other etiologies of ABI often have impairments in **declarative learning and memory**, particularly if hippocampal memory systems are impaired (e.g., via loss of oxygen to the brain)
- Patients with stroke/ABI often have impairments in **working memory**, regardless of site of lesion
- Patients with stroke/ABI often have impairments in aspects of **executive functions**, particularly (but not only) when prefrontal cortex and its connections are damaged
- Patients with stroke/ABI often have impairments in **social cognition**, not only if the lesion is in the right-hemisphere or frontal lobes

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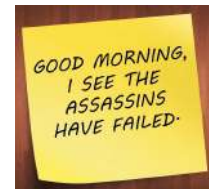
So what are we going to do about it?

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3 Principles of Intervention

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1. A distinction I wish we could drop:



<https://www.mcminnlaw.com/assets/brain-injury-photo.jpg>

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2. Start with the end

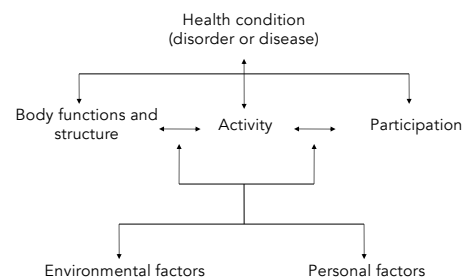
Beginning With the End Outcome-Driven Assessment and Intervention With Life Participation in Mind

Aura Kagan, PhD; Nina Simmons-Mackie, PhD

Top Learning Disorders
Vol. 27, No. 4, pp. 309-317
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2. Start with the end



WHO International Classification of Functioning, Disability, and Health (2000)

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3. Treat the person, not the problem

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What's the current evidence
related to cognitive
rehabilitation?

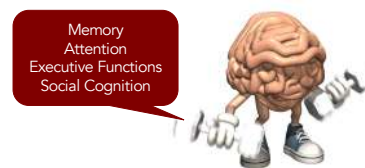
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Sources



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Recommended Practices in Cognitive Rehabilitation



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Recommended Practices in Cognitive Rehabilitation



Fantastic, if the patient has
sufficient awareness to identify
when the strategy is needed

Still requires habit learning

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Recommended Practices in Cognitive Rehabilitation



Amazing, with the caveat
that learning is probabilistic
and context specific

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Recommended Practices in Cognitive Rehabilitation

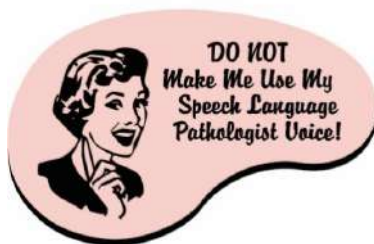
- Best results are achieved with patient-centered goal setting
- Match the instructional strategy to the patient's neuropsychological profile, goal of training, nature of to-be-trained knowledge or skills, and context in which skills and knowledge will be used
 - E.g., for patients with moderate-to-severe cognitive impairments, train on actual targets so no "generalization" is required
 - E.g., Relatively high dose, with spaced practice for low cognitive-demand targets, massed practice for high cognitive-demand targets

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You can do it. We can help.™

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