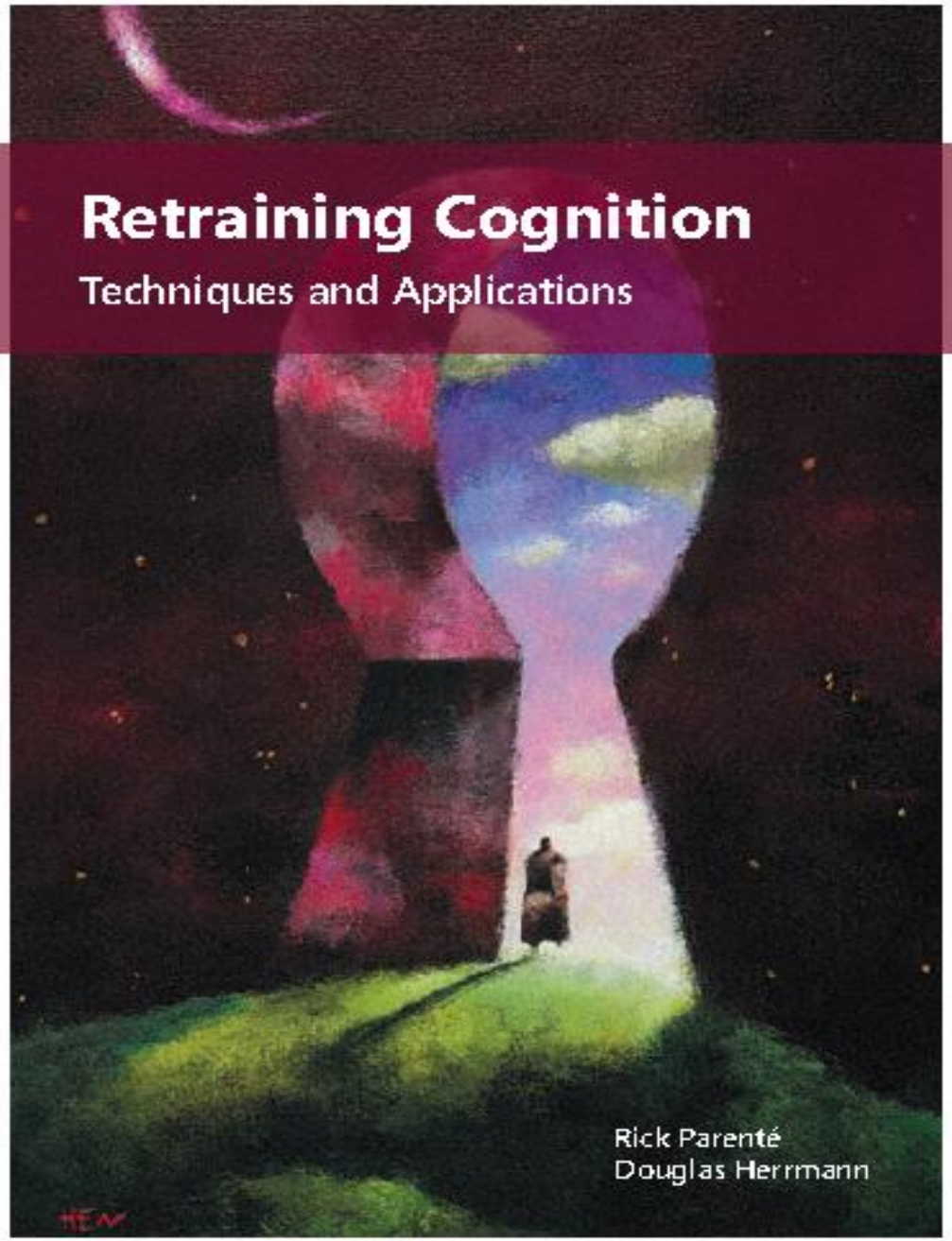
Cognitive Rehabilitation: Treatment and Efficacy

Rick Parente Ph.D.

Towson University

Powerpoint available on Yahoo
www.yahoo.com
User: Denver17
Password: Powerpoints



Third Edition Available from:

ProEd Publishers: 800-897-3202

June, 2010

A Brief History

- Three traditions –Retraining - Compensation – Holistic Rehabilitation

- Egyptians – Medical problems are either treated, contended with, or not treated. Aphasia was not treated. Many still believe that it is not possible to treat cognitive deficits after TBI or stroke.

Retraining – “Re-education”

- Sheppard Ivory Franz (1924) – Studied long-term changes in aphasia and hemiplegia recovery after long-term “nervous and mental re-education”.
- Wars – Walter Poppelreuter (1917), Kurt Goldstein (1942), Oliver Zangwill (1947), Alexander Luria, (1948)/63), Yahuda Ben-Yishay, and Leonard Diller (1983).

Influence of Kurt Goldstein

- Long-term treatment and follow-up
- Variability in behavior is the rule not the exception.
- Psychometric monitoring
- Importance of fatigue
- Need to train compensation strategies
- The importance of therapeutic transfer

Influence of Alexander Luria

- Study of the organizational structure to the brain. CRT involved reorganizing the brain.
- Use of drugs to stimulate recovery.
- Focus on areas of the brain that remained intact.

Influence of Yehuda Ben-Yishay

- Holistic rehabilitation – Work with the entire human rather than specific deficits.
- Patients given behavioral and cognitive templates to direct behavior.
- The problem of awareness

Lessons Learned

- Recovery is a slow arduous process requiring motivation, repetition and sustained practice (Franz, Goldstein). Recovery is seldom 100%.
- The most practical rehabilitation efforts involve teaching patients to compensate (Golstein, Luria).
- The best practice is one that treats the person holistically and for whom the effects carry over to the real world (Goldstein, Ben-Yishay).
- Recovery does not occur without awareness (Prigatano).

Systems of CRT

- Stimulation therapy
  - Process training
- Attention/Concentration Training
  - Strategy Training
- Nutrient and Drug Treatment
- Prosthetic-Orthotic Device
- Domain-Specific Training
  - Invisible Aids

Efficacy:

Does any of this actually work?

Efficacy vs Effectiveness?

Efficacy is the potential for beneficial change.

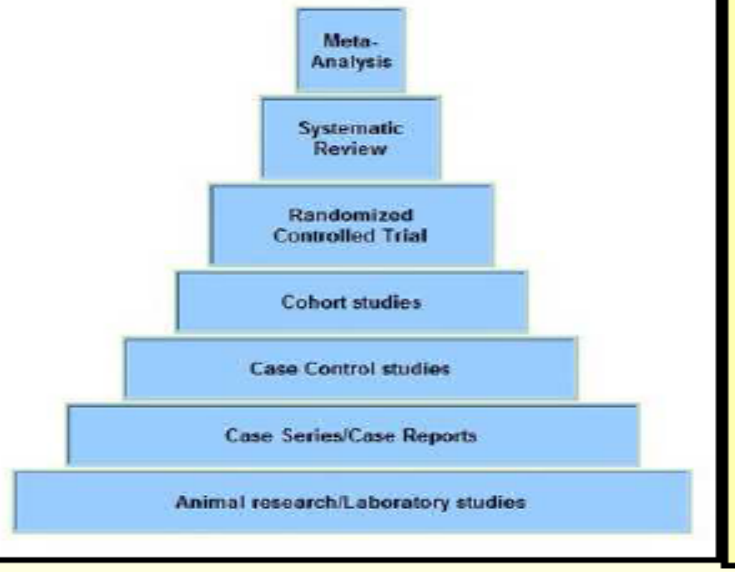
How well the treatment works in a laboratory.

Effectiveness is the practical utility of the treatment

How well a treatment works in the practice of medicine.

Hierarchy of Research Evidence
After Rohling et al., 2011

What is the hierarchy of research studies suggesting the order of scientific reliability?



The hierarchy of studies reflecting the order of scientific reliability and is generally viewed as follows from the top as the most reliable & then down each level to the bottom. Met-analysis is considered the highest level of evidence.

e style

Efficacy of CRT

Several Systematic Studies of CRT Efficacy

- **"A Deep Literature" 655 articles through 1997 and an additional 315 published from 1998 to 2002 plus 50-150 recent articles through 2017**

- Binder, L. M., Rohling, M. L., & Larrabee, G. J. (1997). A review of mild head trauma. Part I: Meta-analytic review of neuropsychological studies. *Journal of Clinical and Experimental Neuropsychology*, 19, 421-431
- Cicerone, K.D., Dahlberg, C., Kalmar, K., Langenbahn, D.M., Malec, J.F., Bergquist, T.F., Felicetti, T., Giacino, J.T., Harley, J.P., Harrington, D.E., Herzog, J., Kneipp, S., Laatsch, L., & Morse, P.A., (2000). Evidence-based cognitive rehabilitation: recommendations for clinical practice. *Archives of Physical Medicine and Rehabilitation*. 81(12), 1596-1615.
- Cicerone, K.D. (2002) Remediation of `working attention' in mild traumatic brain injury. *Brain Injury*, 16(3), 185-195.
- Cicerone K.D., Dahlberg, C., Malec, J.F., Langenbahn, D.M., Felicetti, T., Kneipp, S., Ellmo, W., Kalmar, K., Giacino, J.T., Harley, J.P., Laatschm L., Morse, P.A., Catanese, J. (2005). Evidence-based cognitive rehabilitation: updated review of the literature from 1998 through 2002. *Archives of Physical Medicine and Rehabilitation*. 86(8), 1681-1692.
- Frencham, K. A., R., Fox, A. M., & Marybery, M. T. (2005). Neuropsycyhological studies of mild traumatic brain injury
- Park, N. W. & Ingles, J. W. (2001). Effectiveness of attention rehabilitation after an acquired brain injury: A meta-analysis. *Neuropsychology*, 15, 199-210.
- Robey, R. R. (1998). A meta-analysis of clinical outcomes in the treatment of aphasia. *Journal of Speech, Language, and Hearing Researcher*, 41, 172-187
- Rohling, M.L., Faust, M. E., Beverly, B. & Demakis, G. (2009). Effectiveness of cognitive rehabilitation following acquired brain injury: a meta-Analytic re-examination of Cicerone et al.'s (2000, 2005) systematic review. *Neuropsychology*, Vol 23(1), Jan, 2009 pp. 20-39.
- Rohling. M. L, Binder, L.M., Demakis, G. J., Larrabee, G. J. Ploetz, D. M. & Langhinrichsen-Rohlin. J. (2011). A Meta-analysis of neuropsychological outcomes after mild traumatic brain injury: re-analysis and reconsiderations of Binder et al. (1997), Frencham et al. (2005 and Pertab et al. (2009). The Clinical Neuropsychoolgist, 25(4) 608-623.

The Questions of Efficacy

- Does cognitive rehabilitation improve cognitive functioning after neurological injury?
- Are some treatment modalities more efficacious than others?
- Are some types of cognition more amenable to recovery with CRT?
- What variables moderate the recovery process and the efficacy of CRT?
- Does efficacy translate into effectiveness?

Synthesis of Meta-Analytic Studies and Systematic Reviews:

Questions and Answers

Q? – Does CRT improve cognitive functioning after neurological injury?

A - CRT does produce a small but significant treatment effect that cannot be attributed to the passage of time.

A - Mild TBI has a negligible effect on neuropsychological functioning in the long-term?

Synthesis of Meta-Analytic Studies and Systematic Reviews:

Questions and Answers

Q? - What variables moderate the recovery process and the efficacy of CRT?

A – Depends on how you define recovery.

A - Significant moderators of recovery are: type of injury, amount of damage, and age.

Synthesis of Meta-Analytic Studies and Systematic Reviews: Questions and Answers

Q? – Are some treatment modalities more efficacious than are others?

A - Of the various domains originally discussed by Cicerone (2000-2005), meta-analytic studies provide evidence for 3 of them: visual/spatial training, attention training, and language training.

There is less consistent evidence for the efficacy of memory and comprehensive training

Synthesis of Meta-Analytic Studies and Systematic Reviews:

Questions and Answers

Q? – Does efficacy translate into effectiveness?

A - Depends on how you measure effectiveness.

e.g., Quality of life, Return to work, Independent living

Meta-Analysis of 24 Recent Attention Studies (Rebecca Bernard)

Overview of Results

Meta-analysis of 24 studies of attention since 2005.

Significant corrected effect size for pre-post change in treatment group.

Small but significant ES for control group pre-post change.

Meta-Analysis of 24 Recent Attention Studies (Rebecca Bernard)

ESs largest for studies of selective attention.

ES largest in stroke populations and smallest but least variable in TBI populations.

A Meta-Analytic Assessment of 23 Recent Memory Studies (Madison Elliott)

- 23 studies of memory retraining published since 1990.
- Significant overall effect size across the studies that included a comparison of treatment to control conditions.
- Significant ES in the control conditions where the participants did not receive any treatment, i.e., the ES was simply due to the passage of time.

A Meta-Analytic Assessment of 23 Recent Memory Studies (Madison Elliott)

- Comparison of treatment groups indicated that the largest ESs occurred in studies of stroke patients,
- Lowest occurred in studies of patients with traumatic brain injury (TBI).
- Results indicate that memory rehabilitation is an effective therapeutic intervention.
- However, significant improvement also occurs spontaneously over time.

A Meta-Analytic Assessment of 12 Studies of Language Therapy (Zack Mitlos)

- 12 studies of "communications training" published since 1990.
- Significant overall effect size across the studies that included a comparison of treatment to control conditions.

A Meta-Analytic Assessment of 12 Studies of Language Therapy (Zack Mitlos)

- **ES largest in stroke populations and smallest but least variable in TBI populations.**
- **Significant ES in the control conditions where the participants did not receive any treatment, i.e., the ES was simply due to the passage of time.**

Systematic Review of Pediatric CRT Studies Parente, Vaidya & Tawari)

- Studies of pediatric CRT generally report more improvement relative to studies of children where recovery occurs simply due to the passage of time.

- Several predictors of return of function have been identified and replicated, e.g., age at injury, family related variables, injury severity, and number of lesions the child sustains.

Systematic Review of Pediatric CRT Studies Lessons Learned

- **Therapies involving attention training, using prosthetic devices, or that involve some tangible reward generally produce efficacious treatments after pediatric TBI.**

- **Severity of injury and age at the time of injury are perhaps the best predictors of persistent executive difficulties.**

- **A strong family support structure facilitates recovery.**

Implications of Research for Therapists

- **Best to start patients in treatment as soon as possible.**
- **Age inversely related to recovery**
- **Older patients do benefit from CRT – especially if they are stroke patients.**

Implications of Research for Therapists

- **Targeted specific interventions are more effective than comprehensive non-targeted interventions.**
- **Interventions that target language and attention likely to produce greatest improvement.**
- **Stroke patients will likely recover faster and more completely relative to TBI patients.**

Problems With Interpretation

- **A “deep literature” but shallow data base of usable articles.**
- **Over-reliance on pre-post test designs for estimating effect size.**
- **Ecological validity of the measures used in the studies.**
- **Few studies of symptom validity, motivation, and incentive effects.**
- **Few replications**

Personal Perspective

- What works and what doesn’t

What Does not Work

- Doing nothing
- Short-term treatment
- Most stimulation therapies
- Most Freudian oriented psychotherapies

What Works: The things I've learned so far

- Gradual step-by-step therapy
- Eclectic treatment
- Prosthetic devices
- Academic remediation
- Functional skills training

What Works - continued

- Individualized mnemonics
- Changing life-long habits
- Creating incentives and personal relevance of treatment

What Works - *continued*

- Rehearsal training
- Group therapy
- Social skills integration training
- Nonverbal perception

The Right Questions To Ask

- Does the treatment have demonstrated efficacy?
- Is there any evidence of effectiveness i.e., carryover to the real world
- Can you provide an incentive ?
- Does the person see relevance to the treatment?
- Is it possible to measure improvement?
- Is there a clear therapeutic goal?
- Can the client or family continue the treatment without you?