Interventions for Adults and Children with Attentional Difficulties

Presented by
Catherine A. Mateer, Ph.D., ABPP/CN
Kimberly Kerns, Ph.D.
Department of Psychology, cmateer@uvic.ca
Importance of attention to neurorehabilitation

- Attention deficits common consequence of acquired brain injury
- Attention required to learn new tasks, and to perform routine activities
- Attention is important to problem solving and communication
- Predicts return to work and other functionally important activities
Attention and purposeful action

- cognitively unimpaired individuals made more errors performing routine actions concurrently with an attention-demanding secondary task compared to performing a routine task on its own

Humphreys (2000); Cicerone (1996)
The relationship of attention to functional action sequences

Attention test scores strongly predicted number of errors stroke individuals made while learning novel purposeful actions (e.g., making a caesar)

(Green, 2002)
The integrity of the attentional system has predictive power.

Sustained attention performance at 2 months predicted functional status at 2 years in a sample of 47 right-brain damaged stroke patients.
Attention Impairments

Changes in...

- Speed of processing
- Vigilance & maintenance of attention
- Freedom from distractibility
- Shifting attention
- Working memory

(Brooks & McKinlay, 1987; Mateer & Mapou, 1996; Cicerone, 2002)
Intervention Approaches

- Education about attentional difficulties
- Reducing physical factors affecting attention
- Direct training of attention processes
- Specific skills training
- Training of metacognitive strategies
- Environmental modification/task accommodation
- Training use of external aids
Measuring the effectiveness of interventions

- Changes in performance of cognitive measures
- Functional/behavioral improvement attributable to treatment
- Evidence of generalization to untrained but relevant tasks
- Self and/or other report of changes in functioning
- Improved self-report of adjustment to difficulties
- Evidence of changes in brain functioning
Effects of an educational intervention

- Mittenberg et al, 1996
  - 29 Ss with MTBI (Mean GCS=14.86)
  - Treated group given ten page manual - Recovering from Head Injury: A guide for patients (Mittenberg, Zielinski & Fichera, 1993)
  - Compared to untreated patients, treated patients showed
    - significantly shorter symptom duration
    - fewer symptoms at 6 months
    - fewer symptomatic days
    - lower average symptom severity levels
Cog/Beh Prevention of PCS

Mittenberg et al. (1996)

% of initially symptomatic patients who continued to report specific symptoms 6 months post injury

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Control</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>86%</td>
<td>44%</td>
</tr>
<tr>
<td>Fatigue</td>
<td>82%</td>
<td>47%</td>
</tr>
<tr>
<td>Memory</td>
<td>80%</td>
<td>38%</td>
</tr>
<tr>
<td>Concentration</td>
<td>80%</td>
<td>29%</td>
</tr>
<tr>
<td>Anxiety</td>
<td>58%</td>
<td>38%</td>
</tr>
<tr>
<td>Depression</td>
<td>56%</td>
<td>27%</td>
</tr>
<tr>
<td>Dizziness</td>
<td>50%</td>
<td>36%</td>
</tr>
</tbody>
</table>
Important early messages

- Normalize symptoms and provide a realistic explanation as to their bases
- Regulate lifestyle/environment to avoid problems
- Recognize early signs of stress and take steps to reduce it
- Develop compensations - reduce overall workload, introduce a diary
Address physical conditions that may affect attention

- Sleep disorders
- Headache
- Neck and back pain
- Tinnitus
- Dizziness and balance
Restorative interventions designed to improve attention skills

- Practice tasks require increasingly more demanding attentional skills
- A variety of stimuli and tasks
- Hierarchically organized, theoretically driven
- Types of attention treated: sustained, selective, alternating, divided
- Task performance measured and feedback provided
Compensatory interventions designed to improve specific skills

- Driving requires attention to keep track of many things and to shift focus
- Experimental group – shaping to train ABI patients using an electric-powered vehicle
- Control group – same amount of time in vehicle, but no specific training

(Kewman, et al, 1986)
Park & Ingles (2001)

- Meta-analysis of intervention studies for general attention disorders
- 30 studies (359 participants)
  - 26 restoration
  - 4 specific-skills training (e.g., driving)
Improvement after Training

-0.4  -0.2  0  0.2  0.4  0.6  0.8  1  1.2  1.4  1.6

Attn Memory Other Drive Attn Beh

Effect size

d+

Restoration  Specific Skills

Attn  Memory  Other  Drive  Attn Beh
Performance after Training on Attention Measures

![Bar chart showing performance measures](chart)

- Focus
- Sustain
- Encode
- WM
- Other

Legend:
- Without Control
- With Control
Conclusions/Implications

Restorative and compensatory approaches are difficult to compare using the same metric

- Interventions designed to improve attention may have smaller effect sizes but a broader impact
- Park & Ingles meta-analysis included highly variable tasks/goals/subjects in the “restorative” studies
- Compensatory training approaches can be very effective for targeted skills, but are difficult to manage logistically and are less likely to generalize to other skills
For example:
Importance of initial state of arousal

- Sturm et.al, 1997
- Stroke patients with good basic arousal benefited from both simple and complex attention training
- Stroke patients with low level of arousal benefited from basic level attention training, but not more complex levels
- When basic attention is poor, training at complex levels alone had no affect or actually decreased attention
Memory Changes Following Attention Training  
(Mateer, 1989)
Multiple goals of rehabilitation: Cognitive skills & Adjustment

Usually cognitive and adjustment oriented interventions are treated separately, but

Is there a differential impact?

(Sohlberg et al, 2001)
Cognitive Changes Associated with Two Types of Intervention

![Bar Chart]

- **Attention**
- **Organization**
- **Prospective Memory**
- **Speed**
- **Impulse Control**
- **Compensations**

**Legend**
- **Attention Training**
- **Psychosocial Group**
Psychosocial Changes Associated with Two Types of Intervention
Melding interventions

Implementing a cognitive behavioral treatment approach
Memory self-efficacy

- An individual’s beliefs about:
  - Their own memory capacity
  - How much memory had changed
  - The degree to which memory performance is under personal control
Why are self-efficacy beliefs important?

- Influence level of motivation an individual is willing to put forth on a task
- Higher processing effort produces better performance
Using CBT to address adjustment to cognitive impairment

- Educate regarding the interplay between attention and self-efficacy beliefs
- Practice underlying cognitive skills
- Promote self-regulation of emotional response to frustration and failure
- Foster re-establishment of a sense of mastery over the environment and oneself
Principles of intervention

- Focus on everyday function
- Adopt mutual goal setting
- Engage family and significant others
- Knowledge, skills, practice, implement
APT – Attention Questionnaire

- Rate the level of difficulty one is experiencing in different domains of attention on a 5-point scale from Not a problem to A problem all the time
- Ratings are done on 14 items, e.g.,
  - I seem to lack mental energy
  - I can only concentrate for short periods
  - I am easily distracted
  - I have difficulty paying attention to more than one thing at a time

(Ponsford, 1998)
Attention Rating and Monitoring Scale (ARMS) allows rating frequency of attention symptoms using five point scale

(Cicerone, 2002)
Develop individualized attentional problem list

- Describe a specific example of an attentional failure
  - I got overloaded in a meeting. I lost my ability to follow what was going on. I panicked.

- Describe what you do when it occurs
  - I had to escape. I just got up and left the room. I didn’t know what to tell my boss so I didn’t say anything.
Practice APT and Functional Attention Tasks

- Focused attention
- Simple sustained attention
- Complex sustained attention
- Selective attention
- Alternating attention
- Divided attention
General education in self-regulation of attentional difficulties

- Take advantage of peak times
- Use orienting procedures
- Pace yourself
- Alternate easy and difficult tasks
- Take breaks – don’t push yourself
- Slowly increase amount of time on tasks
- Reserve enough time to complete a task
Manage the Environment

- Task management strategies
  - Reduce distractions
  - Select facilitating environments
- Environmental modifications
  - Posted reminders
  - Message centers
  - Use of external aids
## Attention Lapse Log

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Describe Lapse in attention</th>
<th>What did (or could) you do to manage lapse?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monday 8:00am</strong></td>
<td><strong>Burnt pancakes</strong></td>
<td><strong>Don’t leave kitchen</strong></td>
</tr>
<tr>
<td><strong>Tuesday 1:00pm</strong></td>
<td><strong>Forgot what tool I went to get</strong></td>
<td><strong>Write it down, say it to myself</strong></td>
</tr>
<tr>
<td><strong>Tuesday 5:00pm</strong></td>
<td><strong>Didn’t stop at store, record mileage</strong></td>
<td><strong>Put post-it on dash</strong></td>
</tr>
</tbody>
</table>
## Attention Success Log

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Describe attention success</th>
<th>Why were you successful?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday 9:00am</td>
<td>Cleaned and reassembled chainsaw</td>
<td>Stuck with 1 task, no distractions</td>
</tr>
<tr>
<td>Tuesday 3:00pm</td>
<td>Remembered to make phone calls; didn’t quite when I wanted to</td>
<td>Made a list, set aside enough time, quiet</td>
</tr>
</tbody>
</table>
Generalization Exercises

- **Sustained attention**
  - e.g., set aside study time each night

- **Selective attention**
  - e.g., pay bills with tape of children playing in the background; record irritation rating

- **Alternating attention**
  - e.g., alternate between filing, typing forms and answering phones at work
Treatment Outcomes on APT Test

(Raskin & Buckeit, 2000)
Evidence for changes in emotional state

- Post-training changes following APT training on the MMPI
  - Reduction on Scale 2 (depression)
  - Reduction on Scales 7 and 8 (anxiety and disorganized thinking)
Metacognitive Strategy Training

- Emphasize behavioral methods to train specific attention skills
- Help individuals achieve internalization of strategies for controlling and monitoring attention
MCSTraining Specific to Attention

- Self instructional statements to use when attention drifts (Webster & Scott, 1983)
- Reducing attentional slips while reading (Robertson, 1991)
- Time Pressure Management (Fasotti et al., 2000)
- Cognitive Rehabilitation Program (Butler & Copeland, 2002)
Memory interventions: External memory aids

- Reminding devices
  - Stand alone
    - watches
    - voice recorders
    - key finders, car locators
  - Interfaced with computer
    - Timex data link watch, Palm Pilot, Visor
  - Interfaced with paging systems, telephone, cable, internet
    - Palm Pilot, Visor, Blueberry
  - Notebooks, sticky notes, calendars