

# 6.811 Principles and Practices of Assistive Technology

## Electronic Access Lab (Part 1)

### Station D: Cognitive Disability

People with cognitive impairments may have difficulties with attention, memory, problem solving, and language, among other things. There is variation in the cause, severity, and effects of cognitive disability.

Cognitive disability can be present from birth due to genetic reasons, such as with Down syndrome, Autism, and Dementia. It can also arise from an injury, such as stroke, illness, or brain tumor. Because of the complexity of the brain, the effects of such an injury vary by individual and must be evaluated for each person. Brain injuries often result in some subset of the following:

- Disrupted attention and concentration
- Language problems
- Difficulty storing and retrieving new memories
- Difficulty learning new information
- Lack of emotional response
- Emotional lability
- Depression and anxiety
- Disorientation

In this activity, we will focus on the first two items in the list. You will experience a little of what it is like to live with cognitive disabilities affecting focus, attention, and language. The two impairments we will be simulating are dyslexia and Attention Deficit Hyperactivity Disorder (ADHD).

Dyslexia is a language-based disability that makes it difficult to read. People with dyslexia sometimes perceive words and letters as being inverted, transposed, or otherwise transformed. Attention Deficit Hyperactivity Disorder (ADHD) affects a person's ability to focus, which may cause them to have difficulty paying attention to details, following instructions, or sitting still.

#### Attention

Before starting the exercise, watch this video, which contains two short interviews with children with an attention-related disability.

1) Visit <http://www.pbs.org/wgbh/misunderstoodminds/attention.html>

2) Click the "view it" link under "Attention Video" at the top

3) Click "View clip in QuickTime" in the popup that appears. (Watch on someone else's computer if you don't want to install QuickTime)

Feel free to also try out the Visual and Auditory Activity.

Now, we're going to simulate having some of the attention difficulties that someone with a cognitive disability may have.

1) Go to <http://webaim.org/simulations/distractability-sim.swf> in a browser with Flash

2) Follow the instructions and complete the exercise (Easy mode is fine), recording the number of attempts and your total time to completion (including all attempts; use a stopwatch).

## Dyslexia

There are four passages written on the next two pages. The first two passages are typeset normally, but the second two passages have been transformed in ways typical of people with dyslexia, such as with reversed and transposed letters. (See the example below that has 10 variations of the word "teapot" as written by people with dyslexia.)

Read the passages, timing how long it takes you to complete each one. After each passage, answer the comprehension questions later in this handout. Don't read the questions until after reading the passage.



teapot tɛɔpɔt  
tɛɔpɔt tɛɔpɔt  
teɔpɔt tɛɔpɔt  
tɛɔbɔt teapɔt  
tɛɔdɔt tɛɔdɔt

He lay flat on the brown, pine-needled floor of the forest, his chin on his folded arms, and high overhead the wind blew in the tops of the pine trees. The mountainside sloped gently where he lay; but below it was steep and he could see the dark of the oiled road winding through the pass. There was a stream alongside the road and far down the pass he saw a mill beside the stream and the falling water of the dam, white in the summer sunlight. "Is that the mill?" he asked. "Yes." "I do not remember it." "It was built since you were here. The old mill is farther down; much below the pass." He spread the photostated military map out on the forest floor and looked at it carefully. The old man looked over his shoulder. He was a short and solid old man in a black peasant's smock and gray iron-stiff trousers and he wore rope-soled shoes. He was breathing heavily from the climb and his hand rested on one of the two heavy packs they had been carrying. "Then you cannot see the bridge from here." "No," the old man said. "This is the easy country of the pass where the stream flows gently. Below, where the road turns out of sight in the trees, it drops suddenly and there is a steep gorge -- " "I remember."

The transition from command-line interfaces to graphical interfaces has resulted in programs that are easier to learn and use, but harder to automate and reuse. Another transition is now underway, to HTML interfaces hosted by a web browser. To help users automate HTML interfaces, we propose the browser-shell, a web browser that integrates a command interpreter into the browser's Location box. The browser-shell's command language is designed for extracting and manipulating HTML and text, and commands can also invoke local programs.

Robert John was once middleweight boxing champion of Princeton. Do you think that I am very much impressed by that as a British title? Not to me as to John. He came out there for boxing, in fact and he liked it. Not he learned it painfully and thoroughly to understand the feeling of inferiority and shyness he had left out of his mind as a Jew at Princeton. There was a certain inner comfort in knowing he could knock down anybody who was snooty to him, although, being very nice and a thoroughly nice, good he never fought except in the gym. He was Spider Kelly's arts rival. Spider Kelly thought all the London gentlemen to look like featherweights, no matter whether they weighed one pound and five or two hundred and five pounds. But it seemed to fit John. He was really very fast. He was so good that Spider promptly overmatched him and his nose permanently flattened. This increased John's distaste for boxing, but it gave him a certain satisfaction for some strange sort, and he certainly loved his nose. In his last year at Princeton he was too dumb and stout to wear spectacles. I never saw any one of his class who remembered him. They had to even remember that he was middleweight boxing champion.

In this article, we examine the effect of container shape on volume perception. Given that actual volume has been shown to affect actual consumption positively (Musnick 1998), we explore the implications of higher perceived volume on both actual and perceived consumption. The interplay among actual consumption, perceived volume (volume perception preconsumption), perceived consumption (volume perception postconsumption), and actual amount consumed, are investigated systematically. Our results suggest that one's eyes use one's stomach.

Answer the following questions about the first passage:

1. What is the setting of this scene?
2. How many characters are present?

Answer the following questions about the second passage:

1. What is the proposed interface used to do?
2. The proposed technology is a combination of which two kinds of interfaces?

Answer the following questions about the third passage:

1. Why did Robert box?
2. How did Robert break his nose?

Answer the following questions about the fourth passage:

1. What is the topic of this paper?
2. What was Wansink's previous finding?

### **Reflection**

- Given the first-hand accounts you heard in the video, how do you think actual attention disorders differ from what you experienced?
- There are a number of ATs intended to assist people with cognitive disabilities. For each type of disability that we studied, can you suggest one or more assistive technologies that might enable more independent or effective performance of the relevant task? (Note that some ATs are not limited in their application to those with disabilities; they can be useful to almost everyone.)

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