Motor Disabilities

Angela Vujic
CS 8803
Discussion Outline

• Definition
• General Statistics
• Types of Motor Disabilities
• Examples of disabilities, technologies
• ITA: Bonus Video
Definition

• Physical impairments that can impede movement, coordination, or sensation
CDC National Health Survey

• Difficulties in physical functioning
• Example of measures included:
  – Very difficult or cannot walk a quarter of a mile
  – Very difficulty or cannot grasp or handle small objects
  – Very difficult or cannot push or pull large objects
• For Adults aged 18 and over:
  – At least one basic actions difficulty or complex activity limitation: 74.8 million or 32.4%
  – Unable (or very difficult) to walk a quarter mile: 17.1 million or 7.1%
  – Any physical functioning difficulty: 36.2 million or 15.5%
<table>
<thead>
<tr>
<th>Selected characteristic</th>
<th>Any physical difficulty$^1$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>15.2 (0.26)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>12.6 (0.34)</td>
</tr>
<tr>
<td>Female</td>
<td>17.6 (0.36)</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
</tr>
<tr>
<td>18–44</td>
<td>5.4 (0.26)</td>
</tr>
<tr>
<td>45–64</td>
<td>19.4 (0.50)</td>
</tr>
<tr>
<td>65–74</td>
<td>29.8 (0.90)</td>
</tr>
<tr>
<td>75 and over</td>
<td>48.0 (1.16)</td>
</tr>
</tbody>
</table>

$^1$“Any physical difficulty” consists of a "very difficult" or "can't do at all" response to at least one of the nine physical activities shown in the remaining columns.
CDC National Health Survey

• Based on the format of the survey results, CDC is trying to say: strong positive correlation between age and motor disabilities
Types: Breakdown

Traumatic Injuries
1. Spinal cord injury
2. Loss or damage of limb(s)

Congenital Conditions
1. Cerebral palsy
2. Muscular dystrophy
3. Spina bifida

Diseases – Onset correlated with age
1. Arthritis
2. Parkinson's disease
3. Essential tremor
4. Multiple sclerosis

Diseases – Still a mystery
1. ALS (Lou Gehrig's Disease)

Source: WebAIM (http://webaim.org/articles/motor/)
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Spinal Cord Injury

• Can result in paraplegia (paralysis of legs) or quadriplegia (paralysis of all 4 limbs)
• Average age at injury: **31.7 years**
• The leading causes of spinal cord injury are as follows:
  – motor vehicle accidents: 44%
  – acts of violence: 24%
  – falls: 22%
  – sports: 8%
  – other: 2%
• Percent male patients: **75%***

*Do you think the gender statistics affect design & development of AT? Why or why not?*
Cerebral Palsy

- Symptoms generally appear in early childhood
- Common characteristics include muscle tightness or spasm, involuntary movement, and impaired speech
- Video, example technology: the Eye Harp*, a musical instrument controlled by eye tracking technology

*Thoughts? Have you developed or are currently developing similar technology?

https://www.youtube.com/watch?v=KKfNGGS5yCM
DBS for Parkinson’s Disease

- Deep Brain Stimulation (DBS) implant delivers electrical stimulation to targeted areas to block abnormal nerve signals associated with PD*
- Cannot cure or stop progression of PD

*When do you consider it ethical to surgically implant assistive technology – particularly in the deep brain?
ALS

- Progressive neurodegenerative disease that affects nerve cells in the brain and the spinal cord
- Video, example technology: Low tech communication and interdependence*

*From surveys see that despite the numerous hi-tech options available (most developed from in-lab research), most individuals rely on low-tech forms of communication because they are affordable and reliable. **Is it your responsibility as a researcher to ensure your accessibility technology research is accessible?**

https://www.youtube.com/watch?v=z7lo0XuxywY
Any other questions or comments?
Bonus

• [https://www.youtube.com/watch?v=f31m5-5-xUY](https://www.youtube.com/watch?v=f31m5-5-xUY)

• *Why are dogs perfect?*