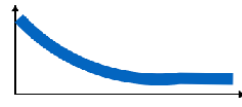


Interaction tasks

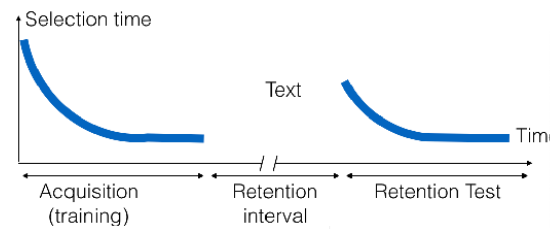
gilles.bailly@sorbonne-universite.fr

What did we learn?

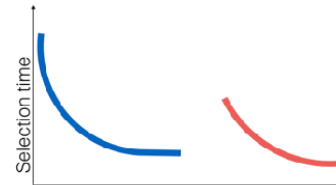
Learning



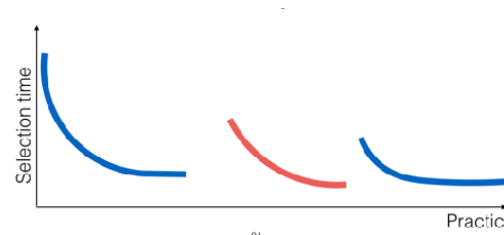
Retention



Proactive transfer



Retroactive transfer



Type

- definition
- experimental design
- measures
- examples

What did we learn?

Theory and computational models

- group level: power law of practice
 $T = a + b * P^{-c}$ or $T = a + b * e^{-c * P}$
- individual level: three stages of learning
(cognitive, associative, autonomous)

ACT-R

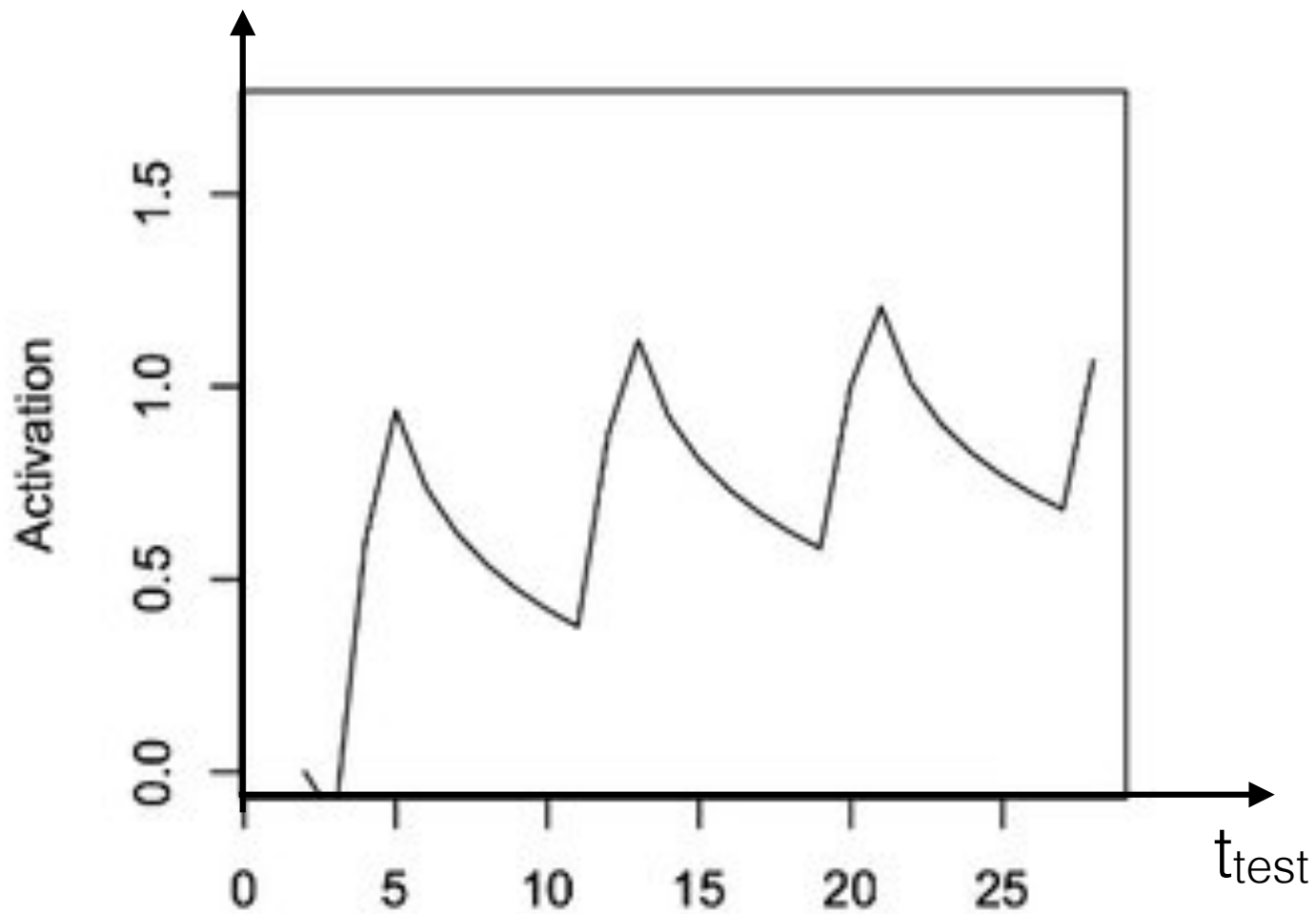
- Activation $A_i = B_i + \epsilon_p$
- base-level activation
- probability of retrieval
- latency of retrieval

$$B_i = \log\left(\sum_{k=1}^n (t_{test} - t_k)^{-d}\right)$$

$$P_i = \frac{1}{1 + e^{-\frac{A_i - \tau}{s}}}$$

$$T_i = F e^{-A_i}$$

$$B_i = \log\left(\sum_{k=1}^n (t_{test} - t_k)^{-d}\right)$$



Equations

Hick law

- Reaction Time = $a + b \log_2(N)$

Hick-Hyman law

- Reaction Time = $a + b H$
- $H = - \sum_1^N p_i \log_2 p_i$

Fitts' law

- Movement Time = $a + b \log_2(1 + A/W)$
- Index of difficulty (Id): $\log_2(1 + A/W)$

Eye-movement saccades

- saccade Time = $37 + 2.5 A$

2/3 power law

- $A(t) = k C(t)^{2/3}$
- $V(t) = k R(t)^{1/3}$

Power law of practice

- $T = a + b * P^{-c}$
- $T = a + b * e^{-c * P}$

Activation

- $A_i = B_i + \text{eps}$

Base-level equation

- $B_i = \log\left(\sum_{k=1}^n (t_{test} - t_k)^{-d}\right)$

Probability of retrieval

- $P_i = \frac{1}{1 + e^{-\frac{A_i - \tau}{s}}}$

Latency of retrieval

- $T_i = F e^{-A_i}$

Interaction Tasks

The human factors of graphic interaction:

- tasks and techniques

James D. Foley and Peggy Chan (1980)

Interaction Tasks

Interaction sequence

- series of basic interaction tasks

Interaction task

- primitive action unit
- application and hardware independent
- user-oriented

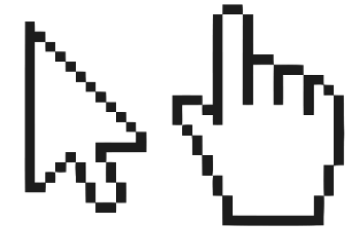
Six interaction tasks

- position, orient, path, select, text, quantify

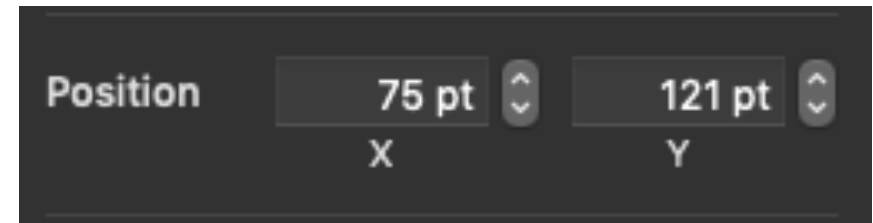
Interaction tasks

Position

- cursor, type-in, directional commands
- 1D, 2D, 3D
- known position?

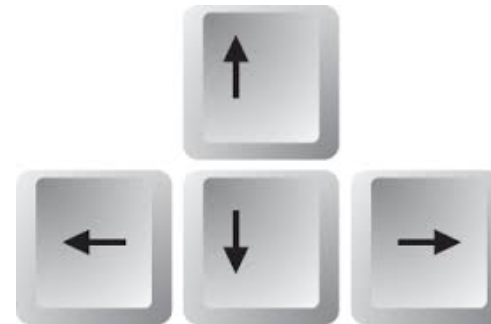


Orient



Path

Select



Text

Quantify



Interaction tasks

Position

Orient

- 2D / 3D orientation
- cursor, type-in, directional commands
- DoF: Degrees of freedom

Path

Select

Text

Quantify

Interaction tasks

Position

Orient

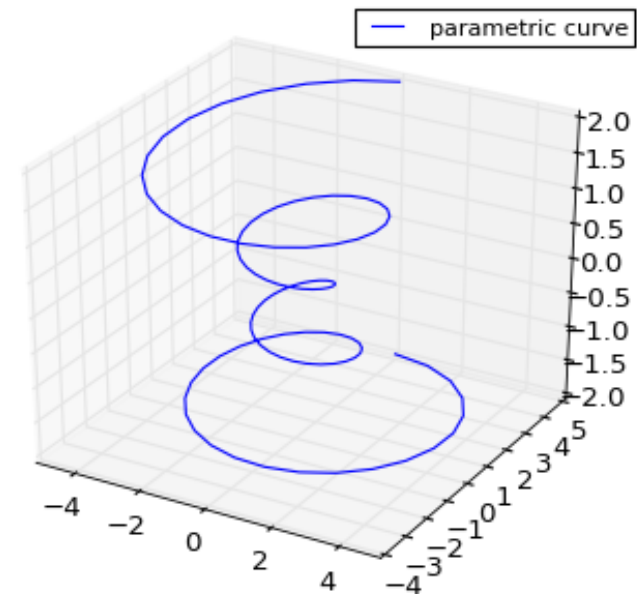
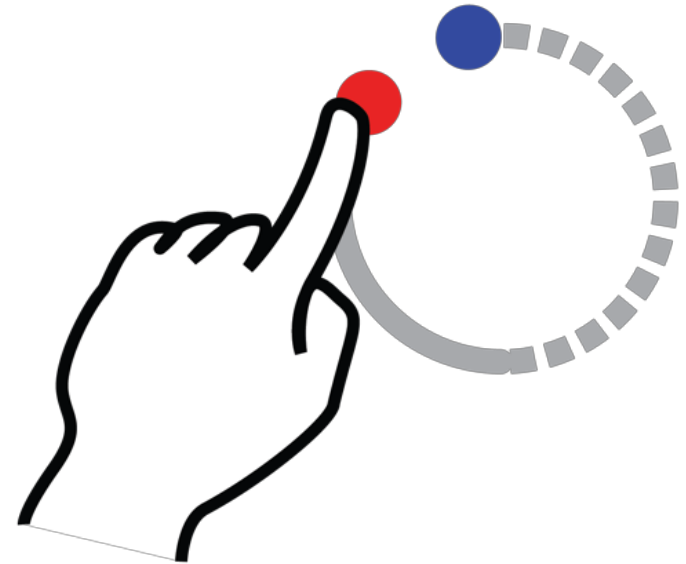
Path

- position+orient+time
- gesture
- 2D/3D path

Select

Text

Quantify



Interaction tasks

Position

Orient

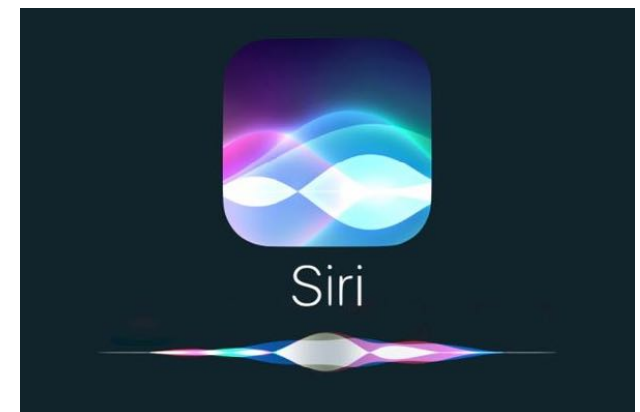
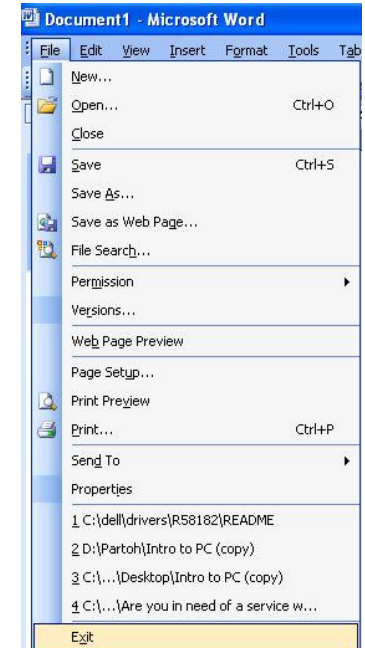
Path

Select

- selection from a set of alternatives
- alternatives: commands or elements on the screen
- menu, command line, voice input

Text

Quantify



Interaction tasks

Position

Orient

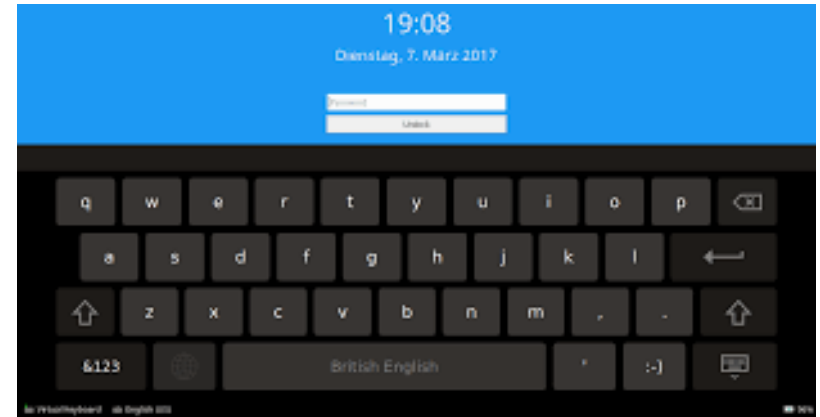
Path

Select

Text

- enter text string
- text string part of the information stored
- virtual vs. physical keyboard

Quantify



Interaction tasks

Position

Orient

Path

Select

Text

Quantify

- specify a value
- type-in, slider

