

What You Feel Must Be What You See -

Adding Tactile Feedback to the Trackpoint

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The “look and feel” of UI

- *Look: every UI*
- *Feel - “computing with feeling”: very limited applications*
- *Does feel help?*
 - *Yes for physical tasks*
 - *telerobotics*
 - *VR for molecule visualization*
 - *lack evidence for mainstream tasks*
 - *GUI operation*

Why tactile feedback hasn't helped?

- *One hypothesis: visual synchronization*
 - *3D, motion theater*
 - *magnifying glass experience*
 - *virtual spring*

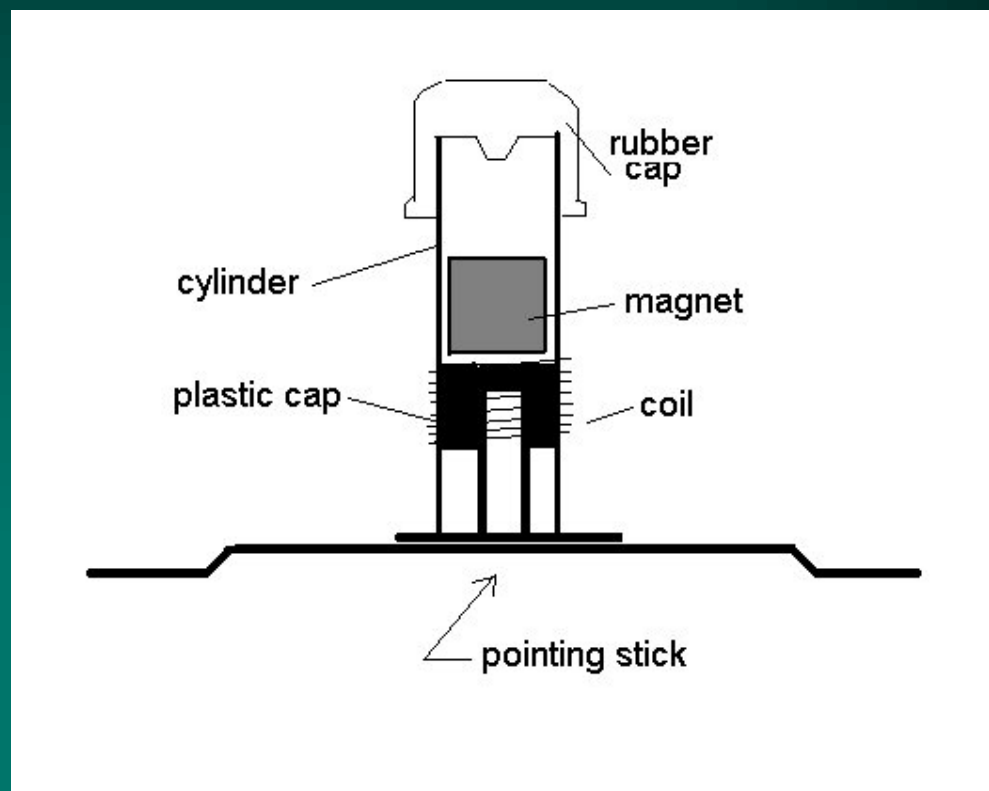
Trackpoint



- *Trackpoint - compact, isometric, in keyboard pointing device*
- *Can tactile feedback be presented through isometric devices?*

“Tractile”

- *Trackpoint with tactile feedback*



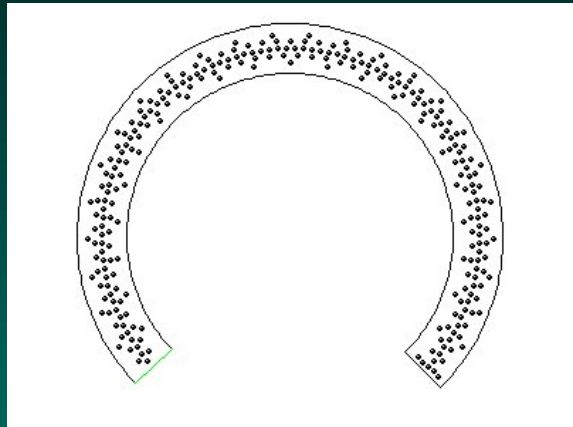
Experimental Task

■ *Steering*

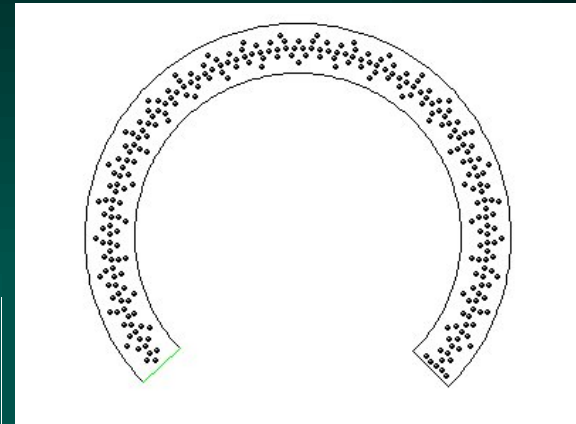


Experimental conditions

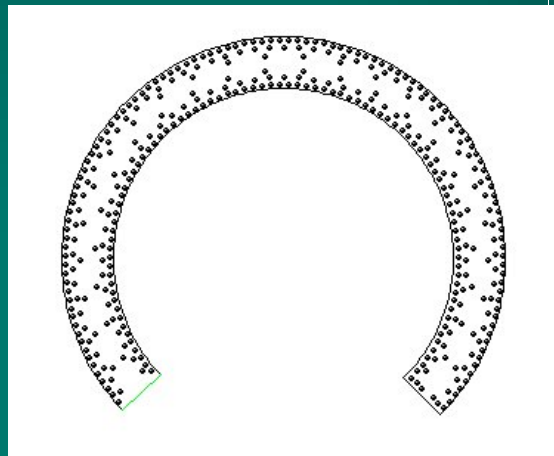
Visual only



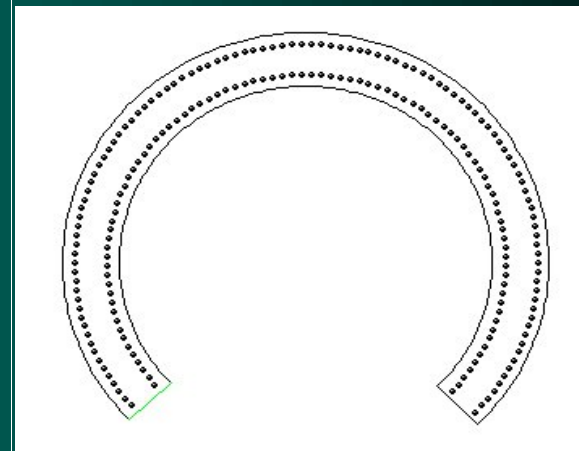
Visual + Tactile



Unconcerted



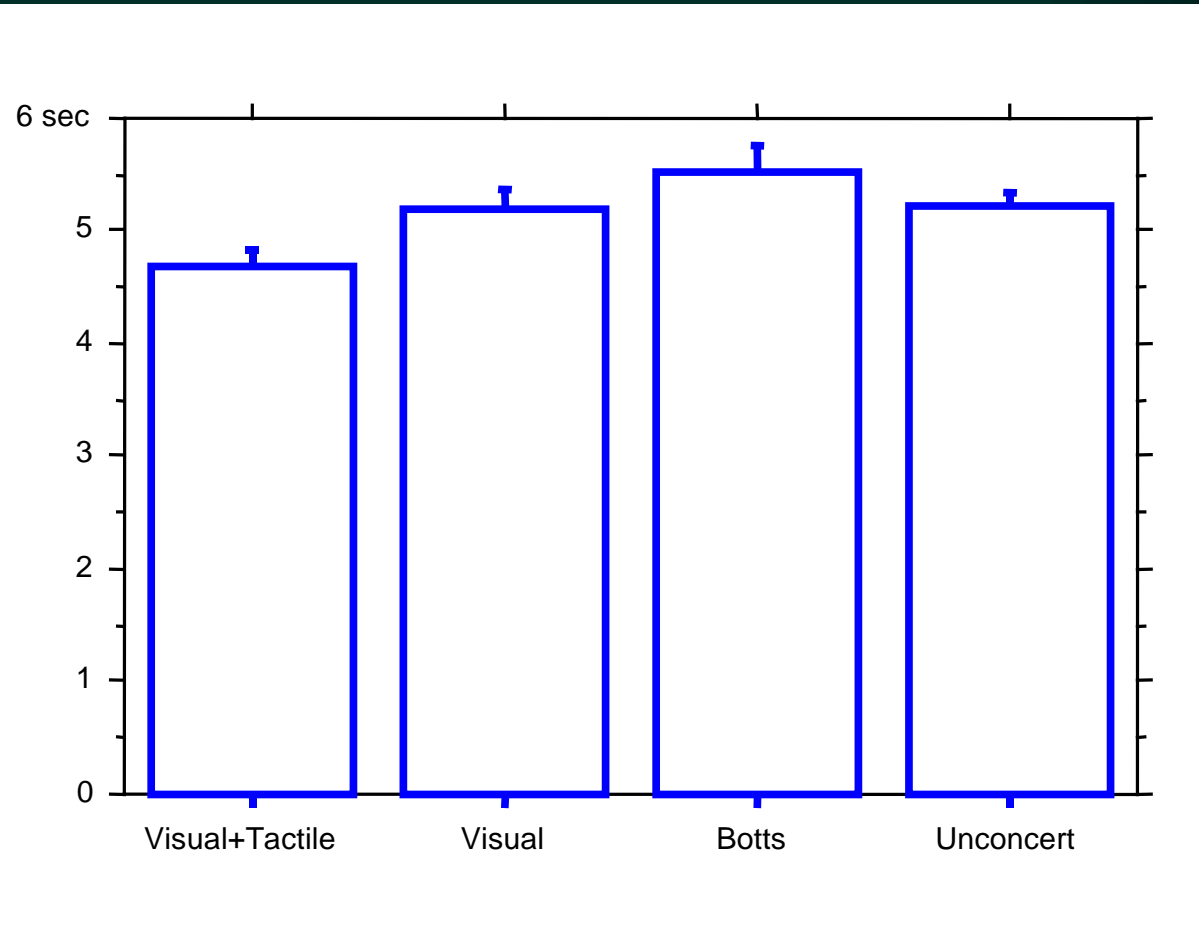
Botts



Experiment Design

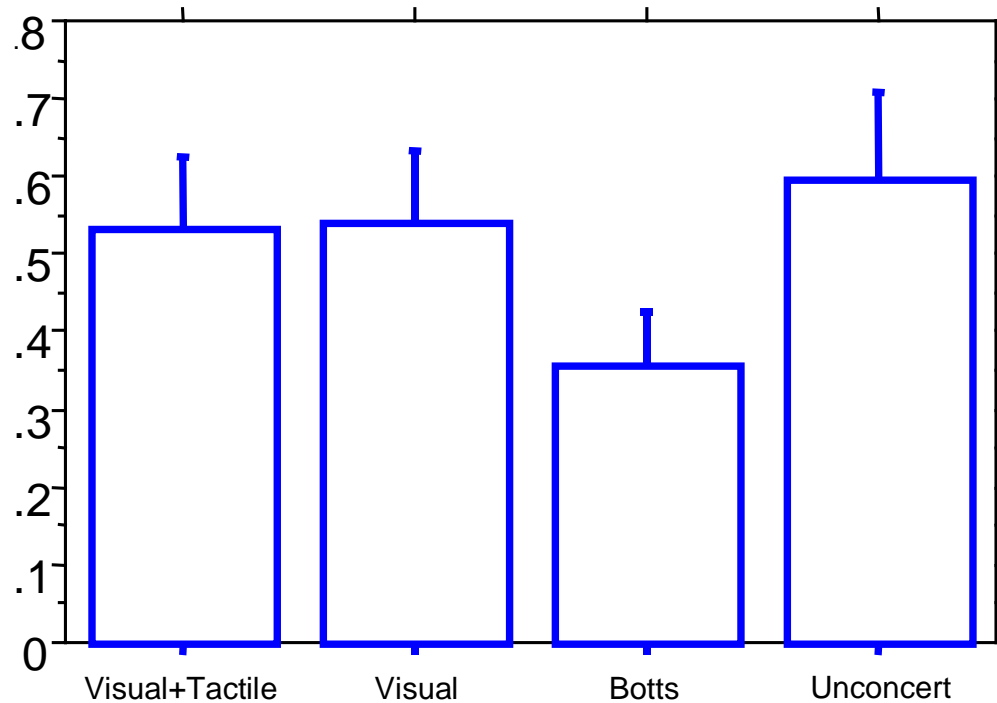
- *4 conditions*
- *16 participants*
- *30 trials per condition*
- *Balanced within subject design*

Completion time



$F(3, 45) = 5.22, p < 0.005$

Error rate



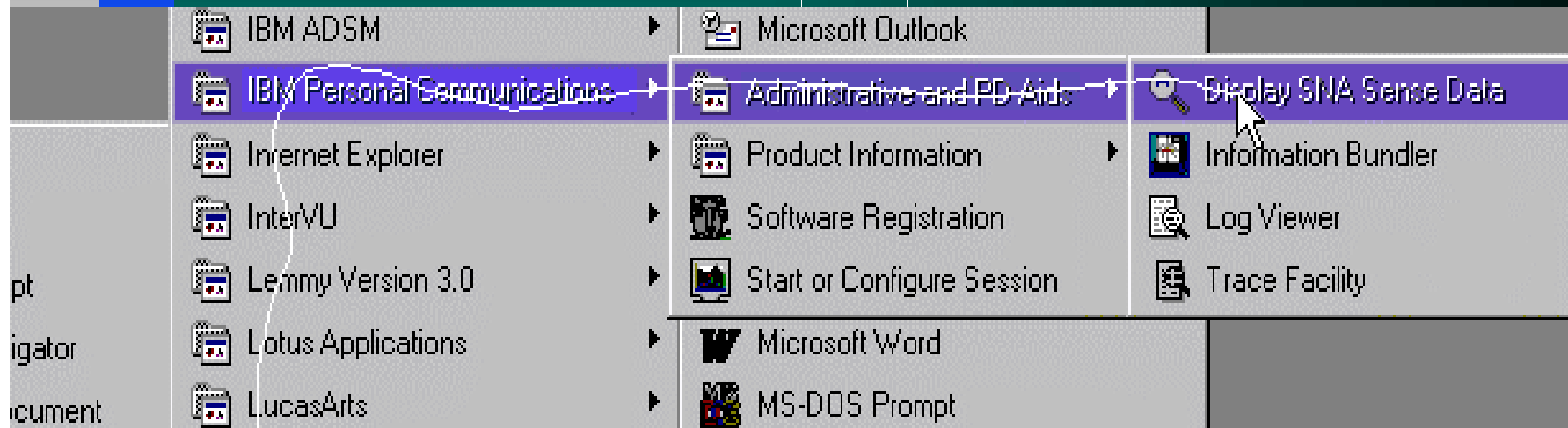
$F(3, 45) = 2.87, p < 0.05$

Conclusions

- *Tactile feedback can help - only if in concert with visual*
 - *Increase speed*
 - *reduce error (botts)*
- *Isometric tactile device can be effective*

Implications and Applications

- *Adding tactile devices to GUI does not necessarily help*
- *Steering can be improved with tactile*



“Look and Feel”

- *“What you feel must be what you see”*