



# Application of Virtual Reality in Experimental Economics

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## Duncan's Dilemma

- Chronic hip pain has impacted his ability to earn a living as a construction worker
- His condition could be significantly improved through surgery
- Ontario: 6 to 8 month wait time for a free operation
- USA: costs \$30 000, but could be done in a week
  
- What will Duncan do?
- What does that decision mean?





# McMaster Decision Science Laboratory (McDSL)

Empirical research into human decision making.

Research addressing issues of funding and financing in  
health care.



# Basic Experiment



- Measurable Effort Task
- Payment per completion of task
- Introduce a functional limitation to completion of the task
- Offer an option to obtain treatment for a cost





## McDSL: Crate Experiment

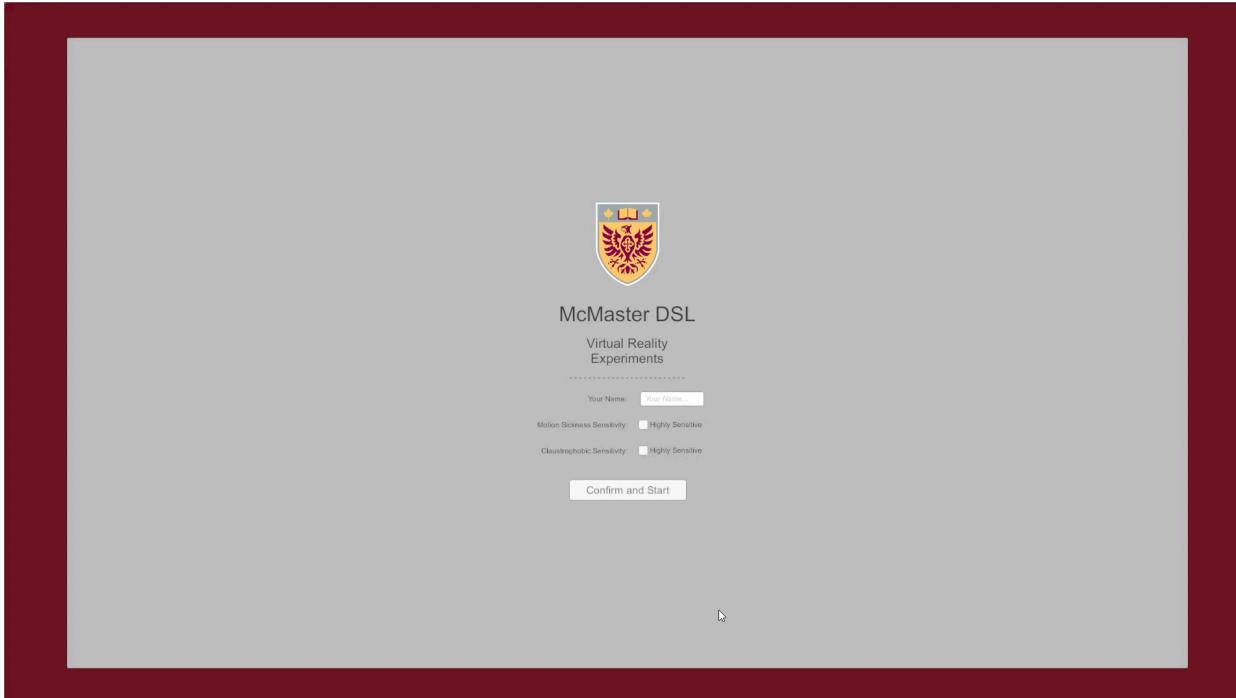
**Taking envelopes a step further:**  
Standard computer simulation  
using a controller

- Health is a complex subject
- Effort Task: Move crates across the road
- Not realistic (no internalization)
- Difficult for subjects to understand





# Our Contribution: SteamVR with Unity



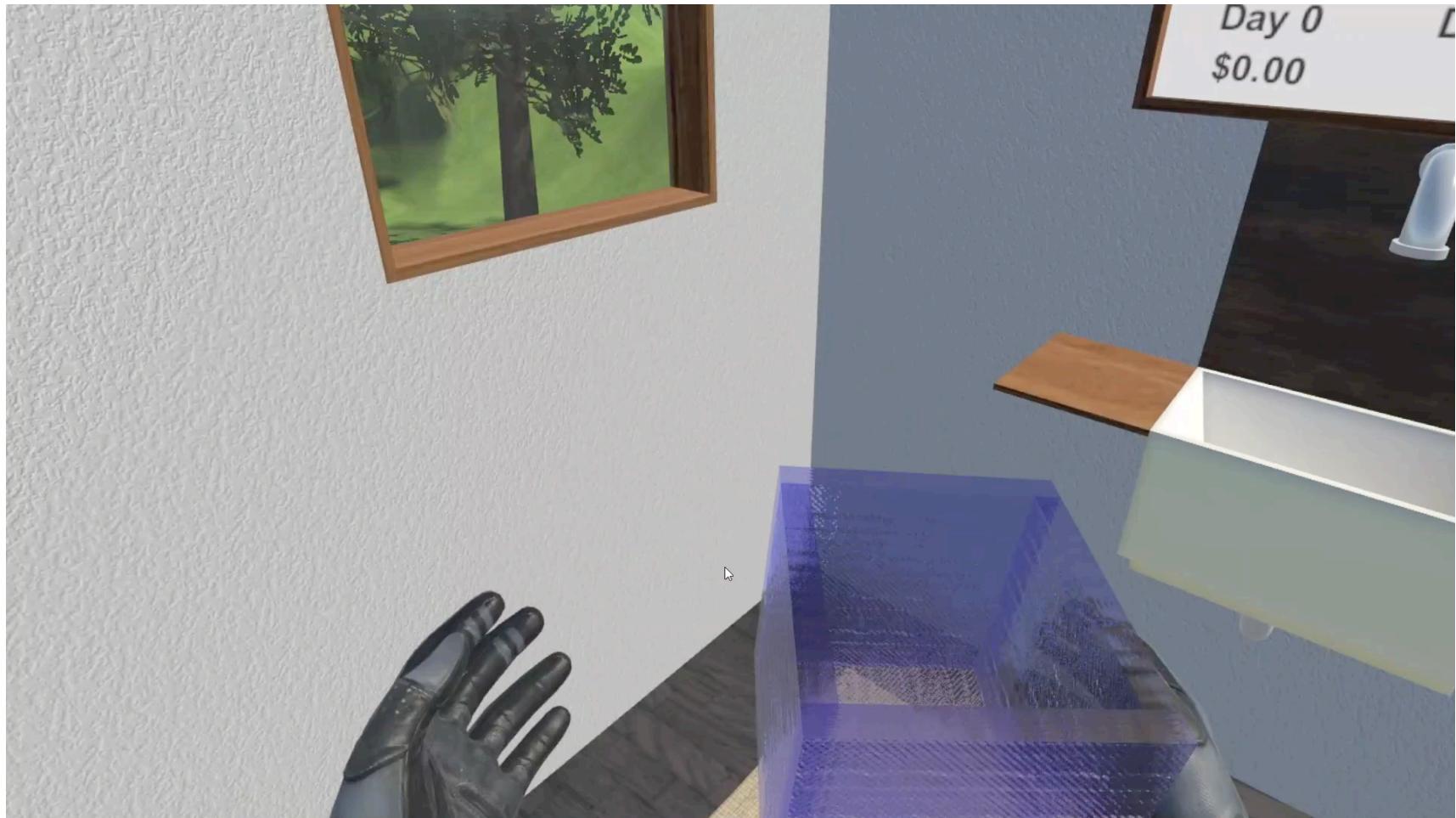


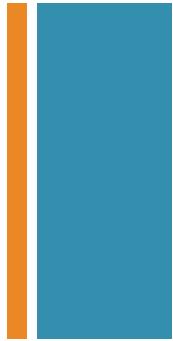
# The Effort Task





# Shaking Impairment





# Treatment

Receive Treatment

Wait for Free Treatment

45.0 s.



Pay for Treatment

\$ 120.00



Option 1: pay a fee to remove the impairment instantly by grabbing the red pill bottle.



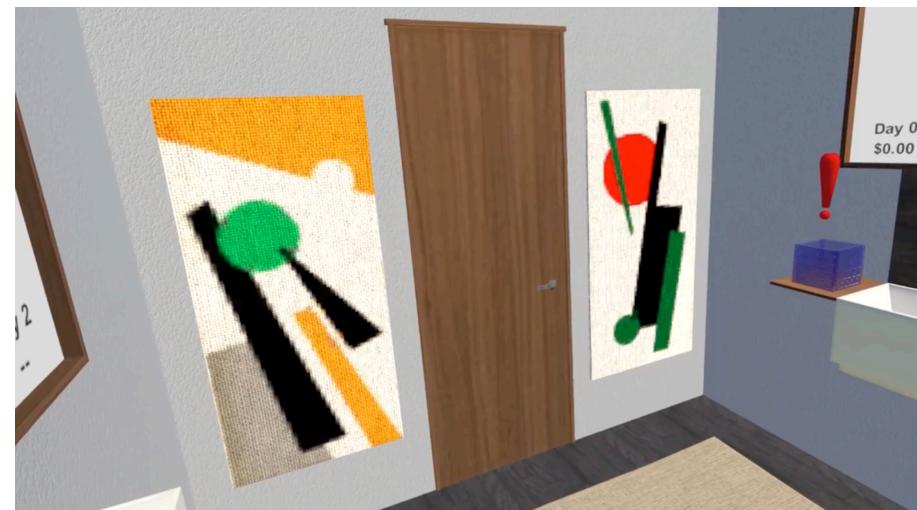
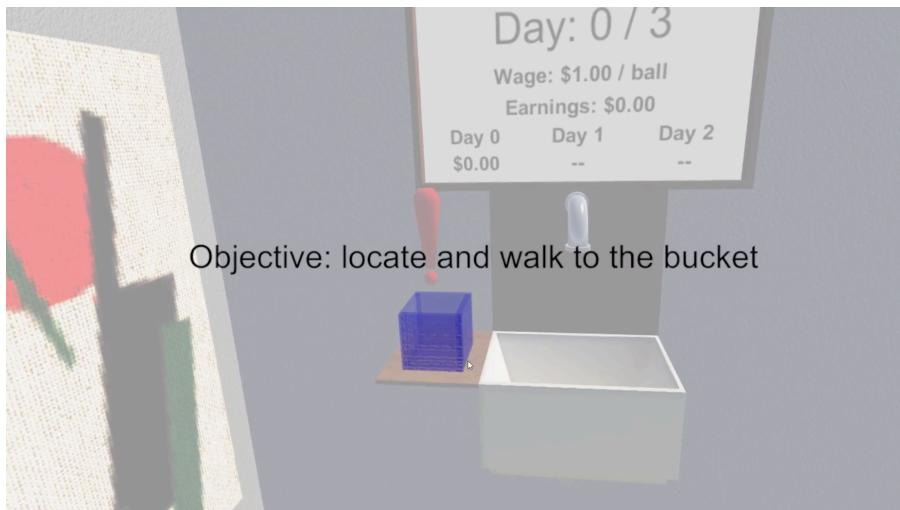
# Configuration

- Many elements can be changed
- Temporal structure of the experiment
- Impairments & when they occur
- Treatment options

```
Simulation
  Name:Sample_Config
  Output:.txt
  Description:Sample file.
  Instructions:enabled
  Sound:enabled
Tutorial
  Score:150
  ImpairedScore:125
  Impairment
    Type:Physical/Shake
    Strength:50%
Day
  Duration:1:30
Day
  Duration:1:30
  Impairment
    Type:Physical/Shake
    Strength:50%
Day
  Duration:1:30|
  Impairment
    Type:Physical/Shake
    Strength:50%
Treatment
  Wait
    C:0.5
    a:default
    b:default
    c:default
Cost
  C:80
  a:default
  b:default
  c:default
```

# + Design Considerations

- Tutorial Period: 'Day Zero'
- Claustrophobia & Motion Sickness



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# Insights

- Many important metrics persisted into a CSV file for lab analysis



# Back to Duncan(s)...

- This is an issue that stems globally across the healthcare industry
- Critical insights could lead to more efficient healthcare systems in the future





# Can This Go Further?



- Applications can extend beyond the healthcare sector



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Thank you!