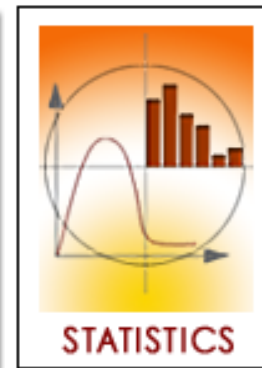
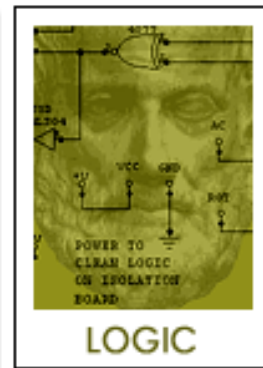
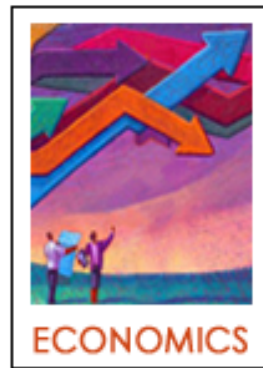
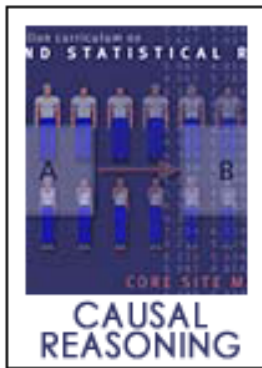


open learning initiative

Carnegie Mellon



Cognitively-informed Education Data-driven Iteration

Funding for Carnegie Mellon's OLI has been provided by the William and Flora Hewlett Foundation

Carnegie Mellon's Unique Assets to Address "Online" Learning

- Newell-Simon legacy, continued by faculty at CMU today:
 - Don't start with the technology, start with the human brain
 - Lead with cognitive science
 - Iteratively improve based on data gathering, theory refinement
 - The effort so often missing in "online courses"
- Create tools with IT, AI, and HCI.

Learning Environments that Engage the Student in Active Learning Practice with Frequent Opportunities for Feedback

2400 Cell Phones Revisited - Microsoft Internet Explorer provided by AT&T WorldNet

Address: https://ok.web.cmu.edu/course/front/snode?guid=bb1966b690020c1b009ec2886

Links: CSR1.0-local | Course 4 Dev | Course 3 - Prod | CSR1.1-local

MODULE 1.3: INDETERMINISTIC CAUSATION [Printable Module](#) | [Account Info](#) | [Contact Us](#) | [Sign Out](#)

[Previous](#) | [Up](#) | [Next](#)

2400 Cell Phones Revisited

Both the cell phone and Colored Square simulations you used in the previous sections are instances of indeterministic causation. In this section we discuss how an indeterministic response structure only **appears** to be indeterministic because some of the causes for an effect were left out.

In the original simulation on the cell phone, you probably only managed to get about half of your calls to go through. Why? Isn't hitting the "SEND" button a cause of a call getting through? The answer is yes, it is a cause, but not the **only** cause.

We only showed you part of the story in the cell phone simulation. Here we uncover another cause of getting the call to go through: whether you are in range of a cell phone tower or not. You cannot control whether you are in range of the tower -- but in this simulation you can observe it (your location appears as a small square).

SIMULATION OF CALL ATTEMPTS, LOCATION AND CONNECTIONS

ATTEMPTS: CURRENT LOCATION CONNECTIONS:

RESET

Self-Assessment LSEC_V01_A_det_indet004

Self-Assessment LSEC_V01_A_cause_ind014

[Question 1](#) | [Question 2](#) | [Question 3](#) | [Question 4](#) | [Question 5](#) | [Question 6](#) | [Question 7](#) | [Question 8](#) | [Question 9](#) | [Question 10](#) | [Question 11](#) | [Question 12](#)

Question 3

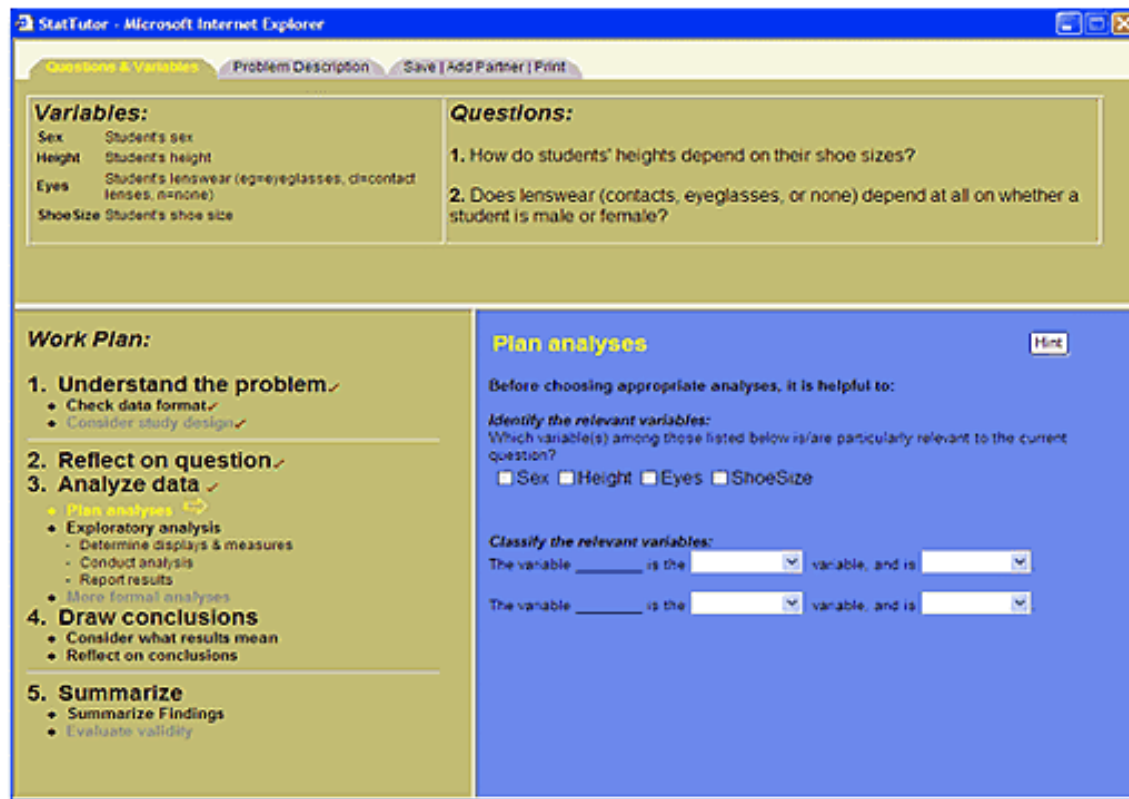
SIMULATION OF WATER, TURBINE, LIGHT CAUSAL SYSTEM

In the simulation above, which quantity can you directly intervene on, as opposed to just observe? (Choose only one answer - and be careful - this is a little tricky)

Choose **exactly one** of the following:

- A. The Light Bulb.
- B. The Red Handle on the spigot.
- C. The Turbine Wheel.
- D. None of the above

Mental Scaffolding Supports Students' Knowledge as it is Constructed Through Practice.



StatTutor - Microsoft Internet Explorer

Questions & Variables | Problem Description | Save | Add Partner | Print

Variables:

Sex	Student's sex
Height	Student's height
Eyes	Student's lenswear (eg:eyeglasses, cl:contact lenses, n:none)
ShoeSize	Student's shoe size

Questions:

1. How do students' heights depend on their shoe sizes?
2. Does lenswear (contacts, eyeglasses, or none) depend at all on whether a student is male or female?

Work Plan:

1. Understand the problem.
 - Check data format ✓
 - Consider study design ✓
2. Reflect on question ✓
3. Analyze data ✓
 - Plan analyses ⇄
 - Exploratory analysis
 - Determine displays & measures
 - Conduct analysis
 - Report results
 - More formal analyses
4. Draw conclusions
 - Consider what results mean
 - Reflect on conclusions
5. Summarize
 - Summarize Findings
 - Evaluate validity

Plan analyses Hint

Before choosing appropriate analyses, it is helpful to:

Identify the relevant variables:
Which variable(s) among those listed below is/are particularly relevant to the current question?

Sex Height Eyes ShoeSize

Classify the relevant variables:
The variable _____ is the _____ variable, and is _____
The variable _____ is the _____ variable, and is _____

Tools that allow Instructors to Create Interactive Student Activities that Support Varied Practice

The screenshot displays the IrYdium Chemistry Lab software interface. The main window is titled "IrYdium Chemistry Lab - Default Lab Setup". The interface includes a menu bar (File, Edit, Tools, View, Help), a "Reagent Explorer" on the left, a central "Workbench" area, and a "Solution Info" panel on the right.

Reagent Explorer:

- 1M $\text{NaCl}_2\text{CHCOO}$
- 1M NaCN
- 1M NaF
- 1M NaHCO_3
- 1M NaHCO_3COO
- 1M NaOAc
- 1M NaOCl
- 1M NaOI
- Indicators
 - Bromocresol Green
 - Cresol Red
 - Methyl Orange
 - Methyl Red
 - Phenolphthalein
- Stock Solutions
 - 11.5M HCl
 - 14.5M H_2PO_4
 - 14.5M NH_3
 - 15.4M HNO_3
 - 15M HCO_3
 - 17.5M H_2CO_3

Workbench: Shows a virtual laboratory setup with a 10mL Pipette, a 1M CaCl_2/HCl solution, and a 1M NaHCO_3 solution.

Solution Info:

Name: 1M NaHCO_3
Volume: 100.0 mL

Aqueous Solid Gas

log₁₀ Molarity

Species	Molarity
H^+	4.624e-9
OH^-	2.168e-6
Na^+	1.000e0
HCO_3^-	9.797e-1
H_2CO_3	1.015e-3
CO_3^{2-}	1.015e-3

25.0°C

pH Meter

Transfer amount (mL): [] [Withdraw] [Pour] from 10mL Pipet to 1M NaHCO_3

[The IrYdium Project -- Virtual Laboratory](#)

The Student is a Participant as Well as an Observer in Experiments that Teach Economic Principles

Supply and Demand Experiment - Microsoft Internet Explorer

Address: https://ol3.andrew.cmu.edu/workbook/workbook/view

Supply and Demand Experiment: There are no taxes on this market.

You are a supplier (seller) in this session.
 You have 0 trade(s) remaining in this session. You have 0 outstanding offer(s).

Your next trade has a Seller Cost of \$36.00. Thus, your profit from this trade will equal the price you receive minus your Seller Cost of \$36.00 if you do not make this trade, you will earn \$0.00 (therefore, avoid trades at prices below \$36.00).

To make as much profit as possible, try and trade at the highest price you can get above your Seller Cost of \$36.00.

Your current profit in this session is \$2.00.

Transactions				
Transaction	Price	Buyer	Seller	Date/Time
1	\$38.00	jar2	cstudent	Wed Sep 10 16:14:07 EDT 2003

All of your potential trades have been used up.

Current Offers	
Offers to Buy	Offers to Sell

Update this Page View Other Sessions Return to Syllabus

Workbook: Supply and Demand - Microsoft Internet Explorer

Address: https://ol3.andrew.cmu.edu/workbook/workbook/view?activity=86f3e4680027b930096b38e2c068924&role=student&view=workbook

Supply & Demand

Introduction

In your experiment there were 34 total traders (17 demanders and 17 suppliers). The traders had different Buyer Values and Seller Costs, and Table 1 gives you the distribution across all of the agents present in the experiment (regardless of whether they traded or not). Note that none of the agents (including you) knew any of this information during the experiment.

Table 1: Distribution of Agent Types in the Experiment

Suppliers		Demanders	
Seller Cost	Number of Suppliers	Buyer Value	Number of Demanders
12	6	41	12
31	11	21	5

Table 2 contains a record of each transaction that took place during the experiment, including its price and the Buyer Value and Seller Cost for each pair of agents involved in the trade. Please complete the profit calculations for the traders involved in the first transaction—recall that profit is equal to revenue minus cost. Seller profit is easy to calculate because each seller receives the price paid for the good as revenue and must pay her Seller Cost to produce the good for the buyer. For buyer profit, remember that each buyer earns his Buyer Value when he receives the good in return for paying whatever price he negotiated with the seller. (Unlike Seller Costs, in the real world

Tools that allow Instructors to Create Interactive Student Activities that Support Varied Practice

File
Your overall task is to find the "true" causal graph among TV Violence, Aggression, and Testosterone. You may collect data by setting up experiments and then inspecting the independence relations that hold in your

Check my answer **Reveal the answer**

Correct Graph Experimental Set-up Hyp. Graph
Correct Manip. Graph Hyp. Manip. Graph
Population Sample
Population Indep. Observed Indep. Predicted Indep.
Compare Indep.

Experimental Set-up

Experimental Workbench

TV Violence Testosterone Aggressiveness

Variable Bin

Experiment Set-up 1

Hyp. Graph

TV Violence

Testosterone → Aggressiveness

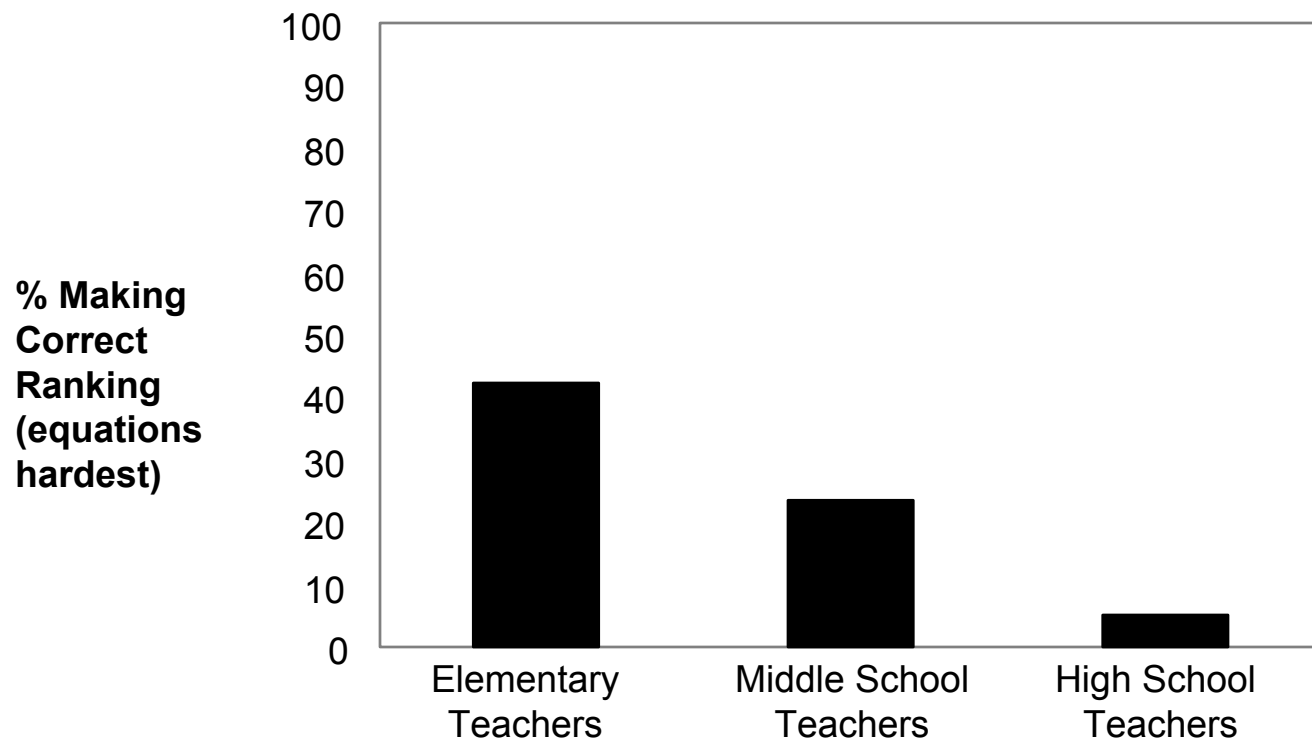
Hyp. Model 1

Compare Indep.

By Hypothetical Graph By Experimental Set-up

Experiment Set-up 1			Population	Sample	Hyp. Model 1
Var 1	Var 2	Cond. Set			
TV Viole...	Testost...		⊥	⊥	⊥
TV Viole...	Testost...	Aggressiv...	⊥	⊥	⊥
TV Viole...	Aggress...		⊥	⊥	⊥
TV Viole...	Aggress...	Testostero...	⊥	⊥	⊥
Testost...	Aggress...		⊥	⊥	⊥
Testost...	Aggress...	TV Violence	⊥	⊥	⊥

Data-driven Iteration Mitigates The Expert's Blind Spot:



All OLI courses are being instrumented to collect data about student use to inform the next iteration of course design.