Using Experiments to Put Hypotheses to the Scientific Test

- A Creativity Study
- A Police Interview Study
- An Eye-Gaze Study
- Some Cell Phone Studies

Hypotheses

- Competition for rewards will increase creativity.
- Cognitive interview procedure will increase recollections of eyewitnesses.

The Gazing Study

- Equal numbers of males and females randomly assigned to 2 groups, then males in each group randomly paired with females in that group.
- Group 1 – Eye gaze condition
- Group 2 – Hand gaze condition
- Group 1 reported feeling more emotionally attracted to their partners
- Example of use of deception in research
- Informed consent beforehand
- Debriefing afterwards

Avoiding Bias in Research

- Avoiding participant bias-  
  - Because they want to be helpful, sometimes we must deceive the participant about the nature of the study until the data is collected
  - The expectations of the participant can cause “placebo effects”
- Avoiding experimenter bias —
  - Even a well-meaning researcher may accidentally influence participant responses.
  - Double Blind procedure can help avoid bias.

A Blind Taste Test of Srirachas on Potstickers & Fried Rice

Individuals are not actually blindfolded but they are “blind” in the sense of not knowing which treatment each person received until AFTER the study is conducted.
Research on Multi-tasking

• Humans are NOT good at it
• Not truly able to pay attention to 2 complex tasks at once – must switch attention back and forth, missing info
• We’ve all heard about the dangers of texting while driving, but it need not be a MANUAL task to disrupt attention and behavior.

• Fascinating and important research by Dr. David Strayer
• Studied the effect of hands-free cell phone use on driving behaviors
• Used high quality driving simulator with Ford Crown Vic dashboard and controls
• Hypothesis 1: talking on cell phone will impair driving more than talking to passenger during 24 mile “drive” to specific location
• This experiment used 3 groups (Talk on cell, Talk to passenger, No cell/no passenger)

• https://www.youtube.com/watch?v=XToWVx5_s9A

How Significant is the Interference?

➢ Cell-phone vs. drunk-driver

➢ Hypothesis 2 – talking on cell will impair driving as much or more than driving intoxicated

Reaction Time When Braking

Lane Keeping Errors

Successful Navigation
Rear-end Collisions

![Graph showing rear-end collisions](image1)

Traffic-related Brain Activity

**Elicited by Brake Lights**

![Graph showing brain activity](image2)

When you are multitasking, not only are you slower to respond, you also have less brain power to devote to any task.

**Scientific Method Cycle**

![Diagram of the scientific method cycle](image3)

Autism Spectrum Disorder

**up to 1 in every 68 kids, 4 X as many males**

Identifiable by age of 2-3
Varying degrees of severity
Varying symptoms

![Image of a child with autism](image4)

**DEFINITION:**

- **Theory**
  - Explanation using an integrated set of principles that organizes previous observations/research results and predicts behaviors or events
  - Theories stimulate more research
- That research might provide:
  - additional support for the theory
  - or might suggest the theory needs some revision
  - Or might result in the rejection of the theory

![Definition of theory](image5)

**Psychology in Everyday Life: Third Edition / David G. Myers & C. Nathan DeWall**

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Describing Autism Spectrum Disorder (based on observations)
• Impaired social communication & social interactions & social relationships
• Restricted, repetitive pattern of behavior, activities & interests
• Insistence on sameness, routines
• Abnormal response to changes in environment
• Symptoms appear early & cause serious impairment (it's a developmental disorder)

Famous Neurologist Oliver Sacks Discusses Autism
• http://www.youtube.com/watch?v=cZndKnARq88

Goal: Prediction
• Predicting who is at risk:
  • 3-4x as many males with autism
  • Couples with 1 autistic child are 50-100x more at risk of having another with autism
• Predicting when symptoms may worsen:
  • when there is sensory overload
  • when usual ways of doing things are disturbed

Goal: Explanation of What Causes Autism
Early theory: Cold, rejecting parenting caused autism - NOT supported as more studies were conducted.
A more recent theory: Autism is caused by vaccinations – turned out this was an elaborate fraud based on falsified data.
More recent theory: Autism is biologically based (due to abnormal prenatal brain development which probably has a genetic basis in most)
Multiple genes involved; if an identical twin is autistic usually the other twin is also.

The Most Difficult Goal: Explanation
• Explanations in science are rarely final or complete.
• They are usually in the form of a theory that seems to fit the existing data.
• As new evidence becomes available, the theory (explanation) may be supported or may have to be revised or even discarded.