

# Research Methods

Quantitative and Qualitative Research Methods



# Topics of Interest

- Teaching is dangerous
- Categories of Research
- Problems with these categories
- The monkey analogy
- Why Research?



# Teaching is Dangerous

- You are responsible for the 3 pillars as an academic.
- One of the pillars is teaching and can take up all your available time.
- But it is also very rewarding and can tempt you into the life of teaching focus.
- (It shames me to say) this decision would be a mistake in our current system.



**Research  
Career**

# Research Method Categories

- Research methods are generally categorized as either
  - *quantitative*
  - *qualitative*
- How do you choose?



# Qualitative Research

- Concentrates on collecting and analyzing subjective data
- Usually the perceptions of the people involved
- Intention is to illuminate perceptions and, thus, gain
  - greater insight (explain why) and
  - Knowledge (reproduce or recognize).





# Subjectivity Problem

- What are these monkeys doing?



# Quantitative

- Concentrates on what can be measured.
- Involves collecting and analyzing objective data
- Usually involves some form of math
  - Statistical
  - Calculus
  - Discrete



# Causality Problem

- Data taken from 20 year study of 2438 middle-aged Welsh men's shaving habits discovered that the unshaven are;
  - Less likely to be married
  - More likely to be blue-collar
  - Had a 45% higher death rate
  - Had a 70% higher risk of stroke
  - Were shorter
  - More likely to suffer from Angina
- Conclusion: Not shaving causes these problems?



# Quantity vs. Quality

	<b>Qualitative Research</b>	<b>Quantitative Research</b>
<b>Type of reasoning</b>	<i>Inductive (infer general from specific)</i>	<i>Deductive (infer specific from general)</i>
<b>Link with concepts</b>	<i>identifies concepts from situation</i>	<i>Has predetermined concepts and investigates relationships</i>
<b>Action</b>	<i>Usually only describes the action in a situation</i>	<i>tests relationships between concepts on performing an action</i>
<b>Outcome</b>	<i>illuminates the situation by adding examples</i>	<i>accepts or rejects proposed theory</i>
<b>Approach to validity</b>	<i>truth seen as context bound (socially constructed)</i>	<i>truth seen as objective and universal</i>

# Quantity vs Quality



- Quantitative

- We have an hypothesis that monkeys will put bananas to their ears
- We gave bananas to monkeys
- If we see banana to ear == “Monkeycide”
- We counted xx instances of Monkeycide over yy trials
- Our hypothesis is accepted if  $xx > 0$

- Qualitative

- We saw monkeys pick up bananas
- We observed the monkeys placing bananas to their ears
- From observation we have the concept: “Monkeycide”
- Monkeys Jenny, Irene and Blake exhibited Monkeycide

# Why Research?

- Research is conducted to solve problems
  - Descriptive (*find facts*)
  - Exploratory (*identify patterns*)
  - Analytical (*explain why or how*)
  - Predictive (*forecast the likelihood of particular events*)
  - Problem Solving (*improve current practice*)

# Descriptive Research

- Purpose
  - To describe the way things are or were accurately
- Two main types
  - Surveys
  - Observations

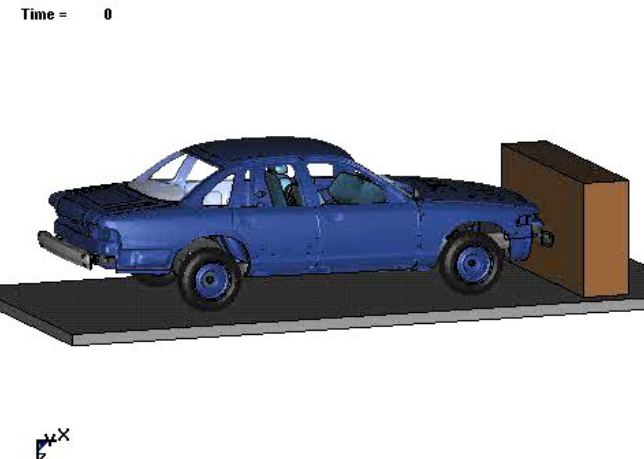
# Surveys

- Two reasonable ways of doing it
  - Questionnaire
    - Relies on carefully composed questions
  - Interview
    - Face-to-face
    - Electronically (phone, chat, email, etc.)

# Situational Observation

- Set up a situation and talk to people about what they are doing when they are dealing with the situation.
- You are not a participant
- Setting can be
  - Naturally occurring
  - Simulated
  - Something in between

# The Setting



# Exploratory Research

- Done when a problem is not clearly defined
- Exploratory research helps determine the best
  - research design,
  - data collection method and
  - selection of subjects.



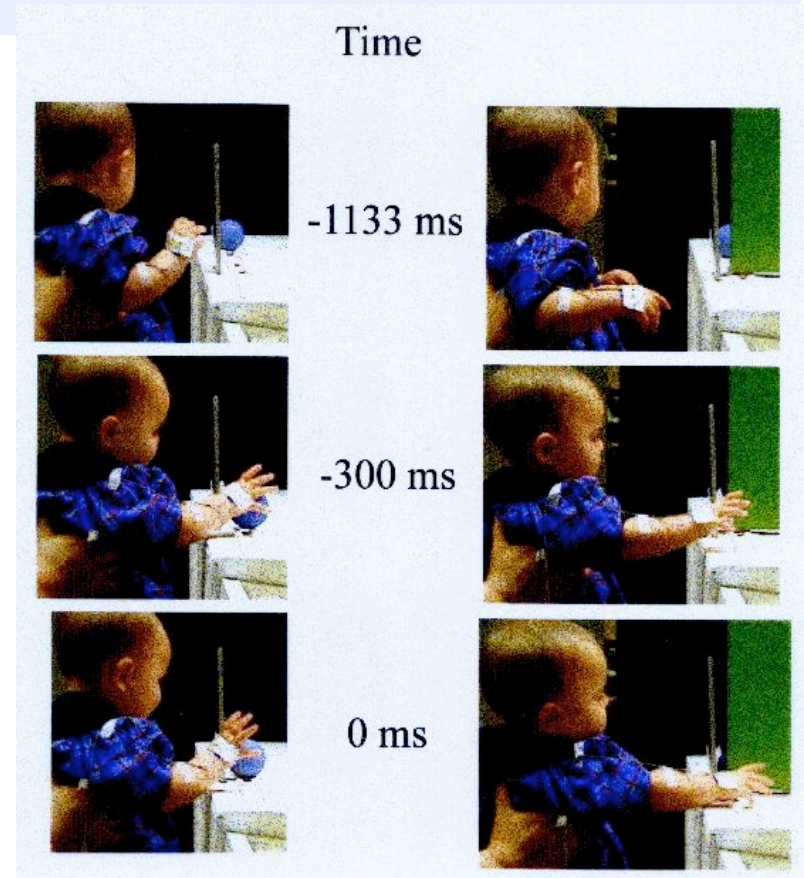
The “Oh Crap!” moment

# Analytical Research

- Seeks to explain the reasons behind a particular occurrence by discovering causal relationships.
- Once causal relationships have been discovered, the search then shifts to factors that can be changed (variables) in order to influence the chain of causality.
- You poke at it to see what makes it tic!

# Predictive Research

- Seeks to forecast the likelihood of particular phenomena occurring under the given circumstances.



# Problem Solving Research

- A form of problem solving based on increasing knowledge through observation and reflection, then following this with a deliberate intervention intended to improve practice.
- You examine current practices and change them (not necessarily for the better)
- Mostly a Social Science format