

# Lecture 16: Artifacts

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# Nature of Problem

- **Artifact** - finding resulting from factors other than the one intended
  - ↳ Usually quite extraneous to the intent of the experimenter
  - ↳ Factors that can jeopardize the validity of the conclusions
- **Interested in subject-experimenter artifacts**
  - ↳ Must have dependable knowledge about the E-S equation
  - ↳ Astronomers need to know the effects of their telescopes
  - ↳ In behavioral experiments, experimenter is the instrument of observation and manipulation

# Nature of Problem

## → Subject side of the equation

- ↳ Human complexity
- ↳ No two research subjects behave identically
- ↳ The same careful experiment will have different results in different places/times
- ↳ Subjects know they are research participants
- ↳ Research subject role well understood

# Nature of Problem

## → Experimenter side of the equation

↳ Systematic errors usually unintentional

↳ 2 classes

➤ **Interactional**

✓ Biases that effect the response of the subject

➤ **Non-interactional**

✓ In the mind, eye or hand of the experimenter

## → Control

↳ Comparison condition to isolate some effect

↳ Procedure to serve as a check on validity

# History of Problem

## → Clever Hans

- ↳ Horse known for remarkable *intellectual* feats
  - Tap out with help ostensibly of code table in front of him
    - ✓ answers to mathematical problems
    - ✓ Date of any day mentioned
  - Psychologist Oskar Pfungst noticed that he responded to unintended cues from his questioners
    - ✓ Eg, body position
- ↳ If animals can do this why not humans

# History of Problem

## → Hawthorne Works study - began in 1924

- ↪ How workers productivity were affected by workplace conditions such as light, temperature, rest periods
- ↪ Both treatment and control groups increased their performance
- ↪ Suggested reasons:
  - flattered to participate
  - Keenly aware and responsive to task clues
- ↪ Hawthorne effect now synonymous with placebo effect, the power of suggestion

# History of Problem

## → Rosenzweig 1933 - landmark paper

- ↪ Argued that the experimental situation is a psychological problem in its own right
- ↪ Developed methodological analysis and taxonomy of certain types of interactions
- ↪ Contended that subjects try to guess the purpose of the experiment and give the results expected
  - Called the good subject effect
- ↪ Further, the experimenter might unintentionally influence the results

# Resistance to the Problem

- Why did it take so long for systematic research to begin in earnest?
- 3 suggested reasons
  - ↳ Phenomenon of artifacts that stem from playing a subject role presupposes the active influence of conscious cognition
  - ↳ Concerns about pervasive biases were possibly viewed as impeding emergence and growing influence of behavioral research
  - ↳ Logical positivist view placed great faith on impartiality of research
- In late 50s as positivists and logical empiricists tenants began to loose their hold and cognitive science rose

# Demand Characteristics

- Orne's work on hypnotism and subject expectations
  - ↳ Coined the term *demand characteristics of the experimental situation*
- Could expectations not also apply to other research?
- Treatment group: novel characteristic - catalepsy of the dominant hand; Control group: no such mention
- Almost all the treatment group exhibited the catalepsy; none in the control group
- Typical subject:
  - ↳ Attentive to demand characteristics
  - ↳ Attempted to behave altruistically in a way that confirms the experimenters hypothesis

# Motivation

→ Altruism, evaluation apprehension and obedience as motivators

- ↳ As early as high school, associate subject role with such characteristics as being cooperative, alert and observant
- ↳ Do not always enact altruistic role - may be other motivations

# Motivation

## → Aiken and Rosnow 73

- ↪ Relationship between 3 kinds of subject motivations and evaluation comprehension
- ↪ 3 kinds: altruism, obedience, evaluation
- ↪ 11 statements representing three motivations were compared to each other as pleasant or unpleasant
- ↪ Key situation: being a subject in a psychology experiment
- ↪ RR, Figure 6-1: arrows show mean psychological distance
- ↪ What do we learn from the map
  - Being subject closely associated with good subject role
  - Obedience and evaluation also entered into subjects thinking
  - Participation is mildly pleasant work-oriented activity
- ↪ Looking good (evaluation apprehension) is more likely to be dominant than doing good

# Task Oriented Cues

## → Detection:

- ↪ Use quasi-control subjects as a possible way to get the subjects to figure out what is going on just by thinking about it
- ↪ Serve as co-investigators rather than subjects of the study

# Task Oriented Cues

→ Orne suggests 3 techniques

↳ Experimental subjects function as their own controls

- Post-experimental interview
- Pilot study on their perceptions/beliefs

↳ Pre-inquiry:

- Quasi-control subjects to imagine they are the real subjects
- Not subjects, but given full treatment information
- Quasi-subjects predict how they might behave
- Similarity between data from quasi and real implies results could be affected by subject guesses

↳ Blind controls: unaware of their status

- Compare blind controls to quasi controls
- Blind groups sometimes used as a sacrifice group

# Task Oriented Cues

- **Alternative: observe dependent variable in different contexts**
  - ↳ Eg, both inside and outside the lab setting
  - ↳ Eg, observed by someone other than the experimenters
- **Orne considered these to be supplementary techniques**
  - ↳ Do not automatically enable us to avoid problems
  - ↳ Not always aware of effects
  - ↳ Challenge: their subtlety and teasing them out

# Theoretical View

→ Interesting model proposed, a preliminary statement, not a theory

- ↪ Assumption: subjects are sensitive to coercive demands of whatever propriety norms may be operating in the experiment
- ↪ Focuses on a few intervening variables instead of categorizing artifact producing variables
- ↪ Assumption: artifact producing variables generalize to a few mediatory factors:
  - > compliance, non-compliance, counter-compliance
  - > receptivity, motivation, capability

# Theoretical View

- ↪ **Either receptive or not**
  - **If not receptive, then non-compliant**
- ↪ **Either motivated, not motivated or uncooperative**
  - **If not motivated, then non-compliant**
  - **If not cooperative and capable, then counter compliant**
  - **If not cooperative and incapable, then non-compliant**
- ↪ **Either capable or incapable**
  - **If incapable then non-compliant**
  - **Otherwise compliant to demand characteristics**
    - ✓ The only path to worry about

# Prediction and Control

## → Two objectives in the model

- ↳ Visualize systematically how demand characteristics operate
- ↳ Blueprint for strategies for reducing or eliminating subject artifacts

## → Allows us to generate theoretical predictions about how artifact producing events might operate in a given situation

- ↳ Eg. Clarity of demand and subjects behavior as a result
- ↳ Consider only receptivity and motivation; hardly ever incapable
- ↳ Motivation and receptivity cancel out when demand very high or very low

# Strategies

## → Receptivity manipulations to minimize demand clarity

↳ Measure dependent variable in a setting not obviously connected to the treatment or employ unobtrusive measurements

- Ideally, no demand characteristics received
- Approximated in field studies with unobtrusive measures
- Unaware -> receptivity is nil

↳ Measure the dependent variable removed in time from the treatment

- Ideal usually not met, reception of demand unavoidable
- Some demand transmitted by means of relationship between treatment and test
- Break the relationship: separate in time and space

↳ Employ Solomon design or else avoid pre-testing, especially in attitude change experiments, and instead employ after-only design

- Pretest sensitization is a problem
- Measure effect or rule out pre-test

# Strategies

- ↪ Standardize and restrict the experimenters communication with subjects
  - Experimenters are the main channel of demand characteristics
  - The more standardized and restricted the better
  - Eg, computerized instructions
- ↪ Use blind procedures in testing and experimental manipulations
  - The less known the less transmitted

# Strategies

→ Receptivity manipulation to generate alternative demands

↳ Elicit false hypotheses about the purpose of the research, ie be deceptive

➤ Contrived demands

→ Motivation manipulations to encourage honest responding

↳ Give feedback of compliant behavior in a set of pre-experimental tasks to bring the subject to a state of non-acquiescence

➤ More difficult and less confident in manipulation outcome

➤ Aim for cooperation and favorable evaluation for true experiment

# Strategies

- ↳ Make experimental setting and procedures low-keyed and non-threatening (eg, anonymous or confidential)
  - Non-threatening to avoid evaluation apprehension
  - Protection of privacy is important
- ↳ Encourage honest responding thru self-monitoring
  - bogus pipeline: subject is told device detects lying
  - Subject will give truthful answers
  - Not without risk

→ No method really infallible, but do need to think deeply about the problem

# Non-interactive Effects

- **Systematic errors on the experimenter side**
  - ↳ Observer effects
  - ↳ Interpreter effects
  - ↳ Intentional effects
- **Observer effects**
  - ↳ Not so easy to be sure that one has made accurate observations
  - ↳ Observer effects well known in astronomy
  - ↳ Accounted for in interpreting the data

# Non-interactive Effects

## → Interpreter effects

- ↪ Experimenters rarely debate accuracy of observations, will debate interpretation
- ↪ Difficult to state rules of accurate interpretation
- ↪ Wrongness of interpretation often due to theory monogamy
  - Though theory monogamy often advantageous
- ↪ Intentional effects
  - Implies dishonesty
  - May cook the data too much - ie, too good to be true
  - Need strong sense of ethics and honesty

# Interactional Effects

## → Biosocial effects

- ↪ Gender, age, race, of experimenter
- ↪ Subjects may respond differently to those aspects of the experimenter
- ↪ Can get different results merely by varying these factors
- ↪ Males and females may unconsciously conduct different experiments
  - Males might be more friendly towards female subjects
  - Before declaring gender differences in studies must make sure they were treated the same

# Interactional Effects

## → Psycho-social effects

- ↪ Personality, temperament, etc
- ↪ Differences in hostility, authoritarianism, status and warmth will get different responses
- ↪ Warmer examiners tend to get better responses than cooler challenging

## → Situational effects

- ↪ Context, situation
- ↪ More experience experimenters tend to get different results than less experienced
- ↪ Acquaintance may yield different results as well
- ↪ What happens during experiment can cascade throughout the rest of the experiment

# Interactional Effects

## → Modeling effects

- ↪ Often experimenter will trial experiment
- ↪ Sometimes the experimenter's performance becomes a factor in the subject's performance
- ↪ When situation is ambiguous, subjects may agree with experimenter too often
- ↪ Experimenter's behavior may have been influencing results

## → Self-fulfilling prophecy

- ↪ Researchers expectations - expectancy effect
- ↪ Eg, teacher thinks X is bright, treats differently from Y

# Experimenter Expectancy Effects

## → Consider a standard type of experiment

- ↪ Differing only in hypotheses, expectations
- ↪ Eg, study of *bright* rats, *bright* did better
- ↪ Meta-analysis of 345 studies
  - Mean effect size of expectancy bias of .33
  - Vary according to category of study
  - Do occur to a considerable degree in all

## → How are expectancy effects communicated

- ↪ Psychological climate
- ↪ Physical distance from interactants
- ↪ Frequency and duration of interactions
- ↪ Eye contact and smiling
- ↪ Verbal rewards and punishments

# Expectancy Controls

- **Increase the number of experimenters**
  - ↪ Decreases learning of influence techniques
  - ↪ Helps maintain blindness
  - ↪ Randomizes expectancies
  - ↪ Increases generality results
- **Observing the behavior of experimenters**
  - ↪ Sometimes reduces expectancy effects
  - ↪ Permits correction of unprogrammed behavior
  - ↪ Facilitates greater standardization
- **Analyze experiments for their order effects**
  - ↪ Permits inference about changes in experimenter behavior
  - ↪ Compare earlier with later
    - End of experiment changes (whew!, etc)
    - Learning effect on experimenter

# Expectancy Controls

## → Maintaining blind contact

- ↪ Minimize expectancy effects
- ↪ Lack of knowledge of treatment being given make expectancy unlikely

## → Minimizing experimenter-subject contact

- ↪ Minimizes expectancy effects
- ↪ Important: does it reduce the realism of the manipulations
  - This affects generalization

## → Employing expectancy control groups

- ↪ Permits assessment of expectancy effects
- ↪ Experimenter expectancy becomes a second variable
- ↪ Get the magnitude of expectancy effect

# Limitations on Knowledge

- All experiments subject to error
- Understand and measure it
- Does not destroy our opportunities
  - ↳ Makes us aware of errors and limits