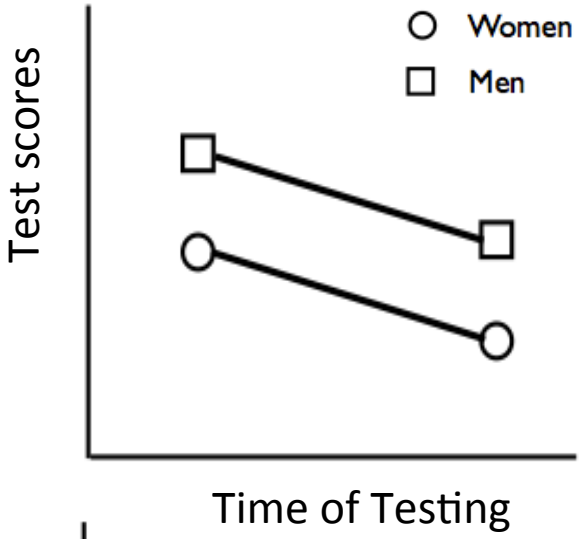
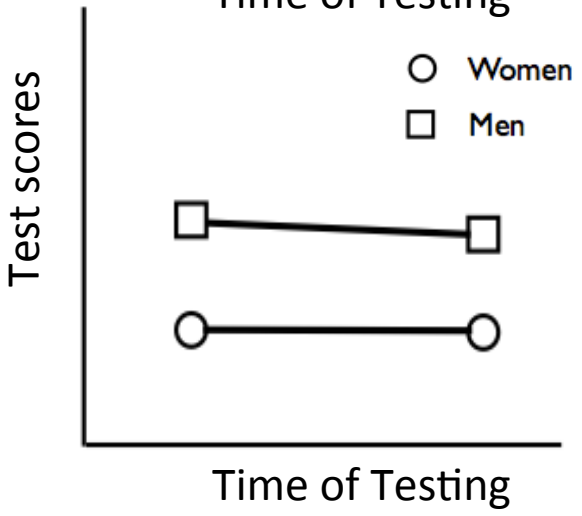
Quiz 3 Recap

- Main effects vs. interaction effects
  - Main: One IV on its own effects DV
  - Interaction: 2 (or more) IVs effect DV together
- Quiz gave a graph of effect of sex and time of testing on test scores, and asked you to identify the effects shown
- The possible effects:
  - Main Effect: Sex
  - Main Effect: Time of Testing
  - Interaction Effect: Sex AND Time of Testing

Possible Effects (2 Ivs)

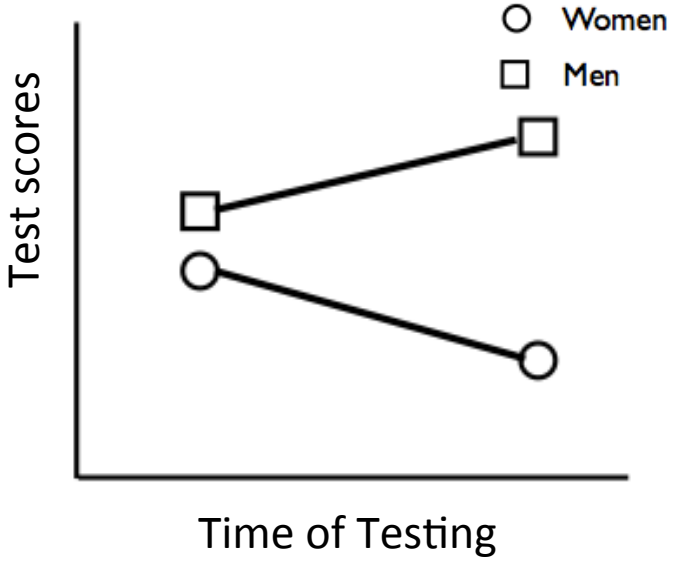


Main Effect of Sex
Main Effect of Time of Testing
NO Interaction Effect
Total Effects: 2

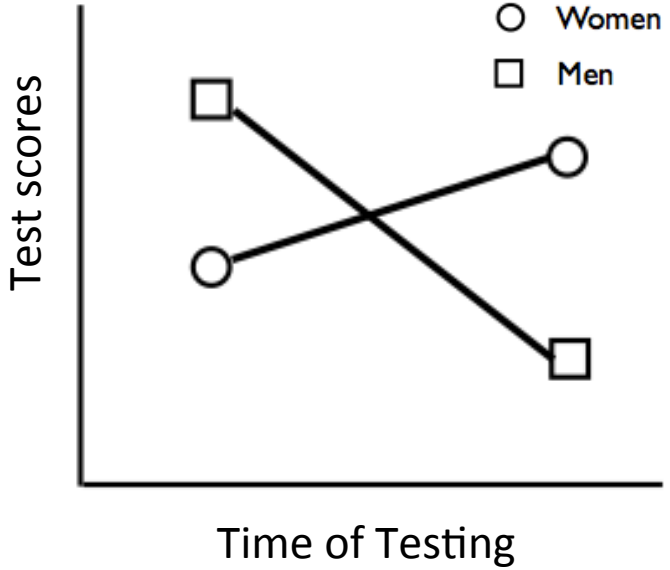


Main Effect of Sex
NO Main Effect of Time of Testing
NO Interaction Effect
Total Effects: 1

Possible Effects Cont'd



Main Effect of Sex
NO Main Effect of Time of Testing
Interaction Effect
Total Effects: 2



NO Main Effect of Sex
NO Main Effect of Time of Testing
Interaction Effect
Total Effects: 1

Correlational Studies

- Find relationship between 2 variables
  - **Pearson's r** for quantitative data
    - -1 for strong negative correlation
    - 1 for strong positive correlation
    - 0 for no correlation
  - **Spearman's rho** for qualitative data
- Predict data with best fit line using **linear regression**
  - Given x, predict y

Correlation Strength

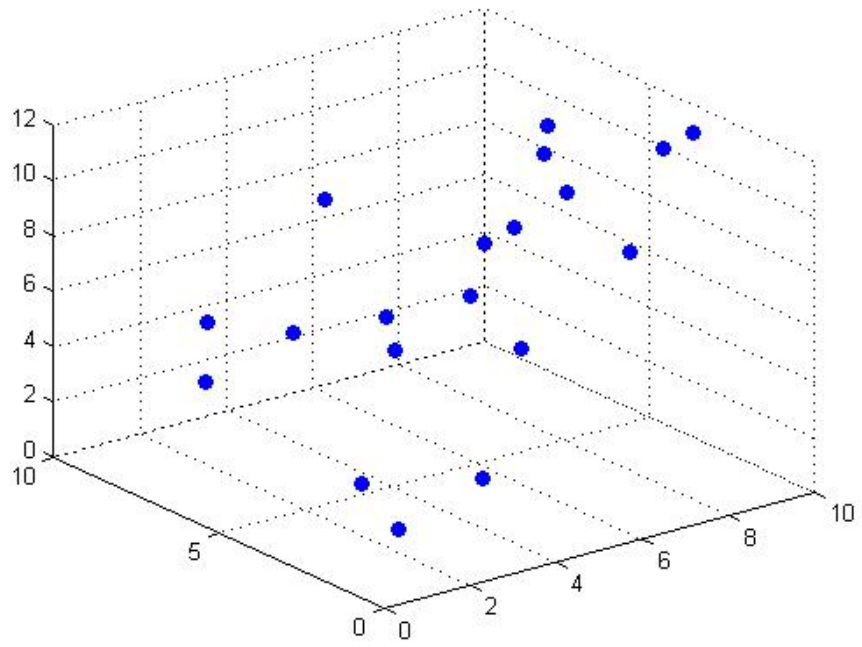
- Strong Positive: r is close to 1
- Weak Positive: r is close to 0.5
- No Correlation: r is close to 0
- Weak Negative: r is close to -0.5
- Strong Negative: r is close to -1

Correlations with >2 Variables

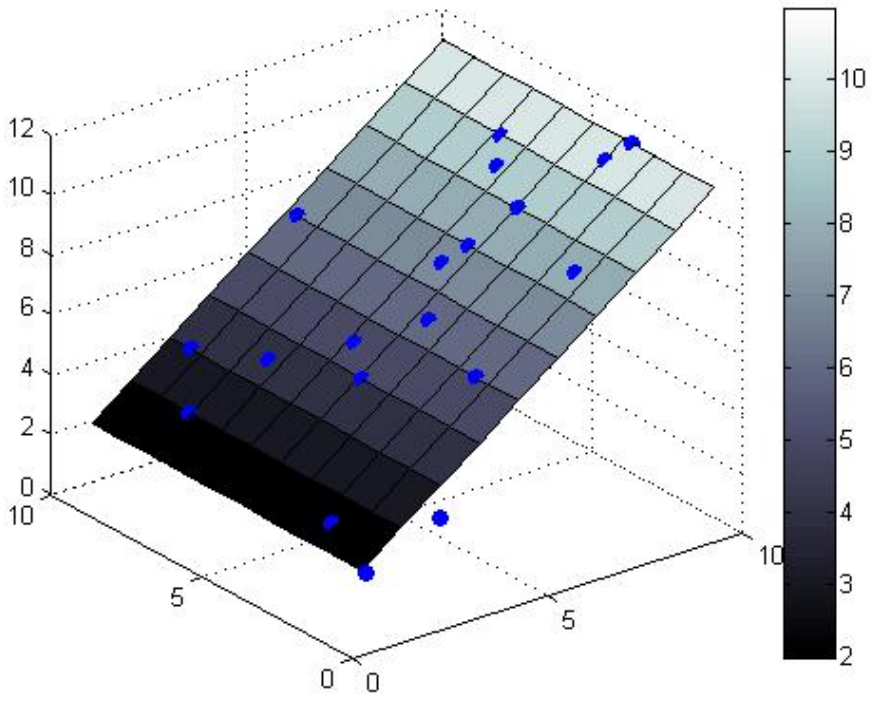
- Multiple correlation
  - Multiple correlation coefficient (values between 0 and 1)
- Multiple regression
  - Prediction of y from multiple x (x_1, x_2, … x_n)
  - Best fit plane/hyperplane
  - Relative importance of certain factors is hard to visualize in space higher than 2D

Multivariable Correlation

We have a scatterplot of data points that look like this:

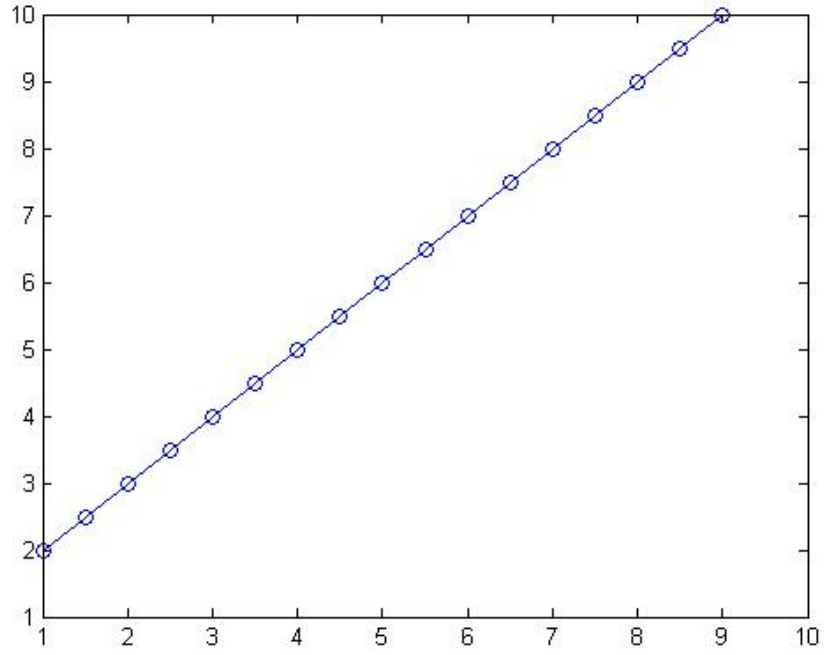


The best fit plane is this:



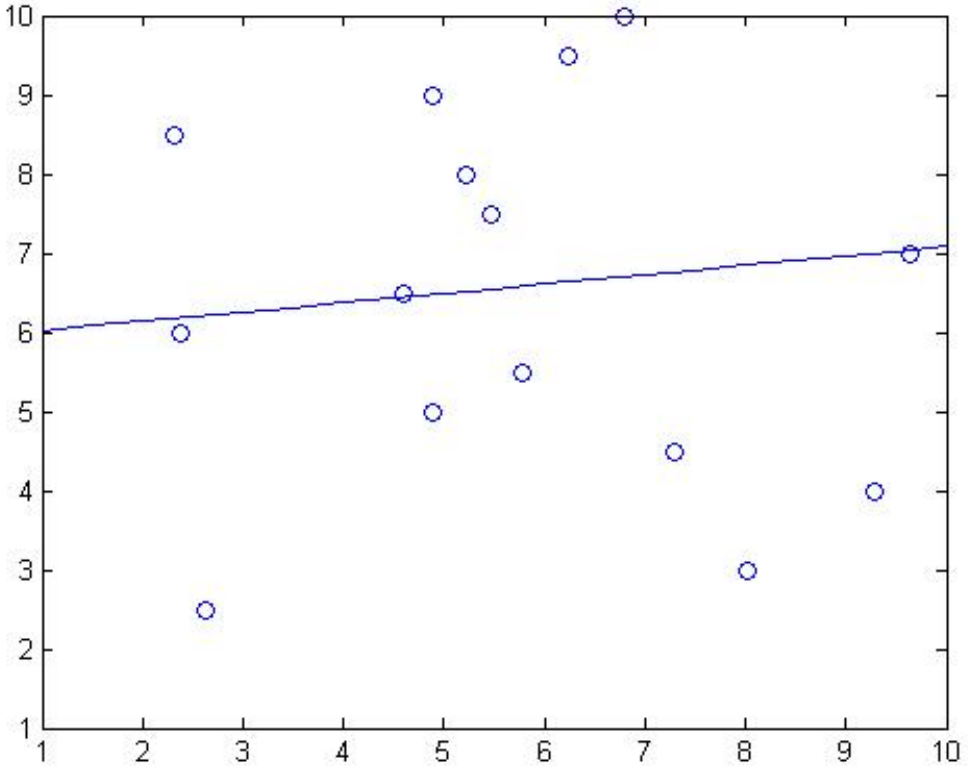
But how do we tell how strongly x_1 and x_2 predict y? Let's look at the 2D correlations.

The data points projected onto the x_1-y axis looks like this:



It looks like x_1 perfectly predicts y! How does x_2 perform?

x2 does not predict y at all!



Sometimes it can be helpful to look at 2D correlations individually (much more visualizable than ND)

Exercise 5

- A researcher is interested in the relationship between stress and severity of cold symptoms. Volunteers are exposed to a cold virus and also indicate the amount of stress they have been feeling over the last week on a 10-point scale. Four days later, the participants indicate on a 10-point scale the severity of cold symptoms they are experiencing.
  - If the researcher finds a correlation of .85, how would she describe the relationship?
  - Indicate a correlation coefficient *r* that would be interpreted as a weak negative relationship.
  - What statistical technique would be used to predict cold symptom severity?

Natural Settings

- Types:
  - **Observational Research Designs**
  - **Field Experiments**
- Useful starting points
- Might be the only way to study a certain phenomenon
  - e.g., kestrel
- High ecological validity!

Observational Designs

- Naturalistic Observation
  - Researcher does not interfere with the environment
- Participant Observation
  - Researcher is part of the group of participants

Naturalistic Observation

- Researchers unobtrusively observe the phenomenon in its natural setting
  - Don't change anything in environment
  - Being aware of the researchers can change behavior
- When focused on specific behaviors and settings, this is called **systematic naturalistic observation**
- When observations made overtly:
  - **Desensitization:** researcher gradually moves closer until no behavior change
  - **Habituation:** researcher appears in setting many times until their presence no longer affects behavior

Participant Observation

- Researcher actively participates in the situation
  - Undisguised vs. disguised
- Researcher must be aware of personal biases
  - Try to hone in on specific behavior to avoid outside biases

Undisguised Participant Observation

- Researcher informs participants of his/her identity and observes the group, interacting from time to time
- Fun example: Ed Hutchins (Cog Sci professor) frequently does undisguised participant observation to study things like:
  - Naval ship navigation
  - Social interactions between commercial airline pilots
  - Abstract reasoning in Trobriand Islanders

Disguised Participant Observation

- People being observed are unaware of the researcher's true identity
- Usually done to avoid people changing their behavior because they are aware of the experiment
  - this is especially true in cases where people are sharing sensitive information
- Ethical problem: cannot get informed consent beforehand

Concept Question 10.1

- A researcher is interested in the treatment of the elderly people in our society. Discuss how each type of observational study might work:
  - Naturalistic Observation
  - Undisguised Participant Observation
  - Disguised Participant Observation

Problems with Observation

- Usually can't establish causal relationships
- Two types of confounds:
  - Observer influence
  - Biased observations

Observer Influence

- Hawthorne Effect
  - Participants change their behavior because they're in an experiment
- Reactivity
  - Participants' behavior is different because they are aware they're being observed
  - Minimized via desensitization and habituation
- How to avoid?
  - Have some level of deception in the study
  - Use disguised participant observation

Observer Bias

- Expectancy effects
  - Preferences affect observations (confirmation bias)
  - Have to very specifically operationalize every single behavior
    - E.g., what is aggressive behavior? If you have a bias, may consider more things as aggressive behavior
  - Use naïve observers

Biased vs. Unbiased Coding

Biased Observer

Time	Aggressive Behavior
0:00	0
0:15	0
0:30 (rocks taken away)	1
0:45	3
1:00	6
1:15	9
1:30	10

Unbiased Observer

Time	Aggressive Behavior
0:00	0
0:15	0
0:30 (rocks taken away)	1
0:45	2
1:00	4
1:15	5
1:30	5

Observer Bias Cont'd

- Using recording devices can help
  - Have multiple naïve people code videos/ recordings independently for extra safety!
  - E.g., Prof. Deák's work here at UCSD (mom & baby shared attention)

Example Coding

- Coders watch video and judge whether a baby is looking at its toy or at its mother (or neither) at different time points

	Looking at toy	Looking at mom
0:05	1	0
0:10	0	1
0:15	0	0
0:20	0	1

Drawbacks to Recordings

- A lot of information is lost
- Audio recording of speech will lose visual context
- Audiovisual recording will lose what's happening in the periphery

Field Experiments

- Controlled study that takes place in a natural setting
- Researcher manipulates IV and measures effect on a DV
- Tons of ecological validity!
- Internal validity
  - Same confounds possible as in lab experiments *and* issues w/ having less control, extraneous variables, etc.

How to Choose a Design?

- Ecological Validity
  - observation > field exp. > lab
- Control
  - lab > field exp. > observation
- Other considerations
  - Time
  - Resources/money
  - Logistics
  - Ethical issues

Data Collection

- What phenomenon will be observed, and how?
  - Keep in mind the characteristics of good measurement (reliability, validity, sensitivity, objectivity)
- Reliability
  - Interobserver reliability
    - Based on percentage agreement/disagreement

Interobserver Reliability

- Two observers collect data for a specific behavior. They make 350 observations, and disagree on 28.
  - Interobserver reliability = 92%
  - In general, over 90% is good, but should be adjusted for individual experiments (e.g., the standard should be higher if the behavior being coded is relatively unambiguous)