

PSY 201: Statistics in Psychology

Lecture 01

Statistics are everywhere

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MAKING JUDGMENTS

we have to make judgments all the time

- Do nicotine patches help people stop smoking?
- Is Pepsi better than Coke?
- How is alcohol consumption related to depression?
- Is this a good buy for a stereo?
- ...

A PROBLEM

people are not very good at answering these kinds of questions. we make *systematic* errors (take PSY 200, PSY 285 or PSY 318)

people in the “know” can take advantage of these tendencies

- politicians
- retailers
- drug companies
- “activists”

Let's look at an example

DECISION MAKING

Imagine you are getting a loan to purchase a car. You get three offers from different institutions. For each one you have to put some money down up front, and you don't have a lot of available cash. The loans also differ in interest rate. A higher rate means you will end up paying more for the loan. You estimate that each 0.1% increase in the interest rate is going to cost you about \$200 over the life of the loan.

Bank	Money down	Interest rate
1 st Federal	\$2000	5.3%
United Savings	\$2000	5.6%
National Federated	\$2600	5.0%

DECISION MAKING

Imagine you are getting a loan to purchase a boat. You get three offers from different institutions. For each one you have to put some money down up front, and you don't have a lot of available cash. The loans also differ in interest rate. A higher rate means you will end up paying more for the loan. You estimate that each 0.1% increase in the interest rate is going to cost you about \$200 over the life of the loan.

Bank	Money down	Interest rate
1 st Federal	\$4000	8.3%
United Savings	\$4900	8.0%
National Federated	\$4600	8.0%

AVOIDING COLDS

- Many people recommend the herb *echinacea* to reduce the severity of colds and/or to increase your immunity to getting a cold
- What should happen if echinacea *does* work?
- What should happen if echinacea *does not* work?
- Why is it popular?

SIGNIFICANCE

- people are easily influenced by the *context* in which they make decisions
- this is a problem, because context is easily (and subtly) manipulated
- it is important to *learn* how to make decisions properly
- STATISTICS
- it is not always easy...but it is worth it

COURSE GOALS

- 1 Descriptive statistics
 - ▶ How to describe data.
 - ▶ Using graphs.
 - ▶ How to summarize data.
- 2 Inferential statistics
 - ▶ Hypothesis testing.
 - ▶ Comparing descriptive statistics.
 - ▶ Designing good experiments.

WHY IS IT HARD?

- several reasons

- ▶ Little differences in presentation can make a big difference in understanding.
- ▶ It is hard to get good measurements.
- ▶ It involves mathematics.
- ▶ It goes against our intuitions (anecdotal evidence).
- ▶ If you don't ask the right type of question it is worthless.
- ▶ Sometimes the answer is "I don't know."

COURSE OUTLINE

- statistical terms
 - ▶ describing data
 - ▶ percentiles
 - ▶ normal distribution
 - ▶ correlation
 - ▶ **EXAM 1 (10%)**
- Significance tests
 - ▶ probability
 - ▶ signal detection theory
 - ▶ hypothesis testing
 - ▶ power
 - ▶ estimation
 - ▶ **EXAM 2 (10%)**
- various types of hypothesis testing
 - ▶ Proportions, correlations
 - ▶ Two sample means
 - ▶ Two sample proportions, correlations
 - ▶ **EXAM 3 (10%)**
- ANOVA
 - ▶ Multiple testing
 - ▶ Contrasts
 - ▶ Power
 - ▶ Dependent
- **FINAL (15%)** (cumulative)
 - ▶ Beware scheduling of the final exam!

TEXTBOOK

- On-line, free (to you). Set up instructions in the paper copy of the syllabus.
- Readings are assigned and monitored (10% of your class grade)
- Finishing a reading means that you answer the questions at the bottom of the page, or that you go through the entire demonstration/simulation
- Due dates and times are listed in the syllabus. The specific sections to read are listed on the Reading Assignments page on the textbook web site

HOMEWORK

- homework counts for 20% of your class grade
- finishing means that you get the correct answer (unlimited guesses)
- Due dates and times are listed in the syllabus. The specific questions are listed on the Homework Assignments page of the textbook web site

- On-line experiments where you generate your own data and then do a statistical analysis (15% of your class grade)
- You need to complete all the questions to get credit for a lab assignment
- Due dates are listed on the syllabus

ATTENDANCE

- Mandatory, we will check every class period (5% of your class grade)
- You are allowed 6 misses before you are penalized

PRACTICE EXAMS

- I have posted practice exams on the course web site. You need to complete the exam and submit it to the TA by the date/time indicated in the syllabus (5% of your class grade)
- Use the feedback from the TA to prepare for the real exam

COMPUTER SOFTWARE

- The textbook provides nice tools for calculating many things.
- Oftentimes the homework requires that you use those tools
- It is useful to have some skills with a spreadsheet to perform simple computations and to format data

GRADING

- straight scale

- ▶ 98% – 100% A+
- ▶ 93% – 97% A
- ▶ 90% – 92% A-
- ▶ 88% – 89% B+
- ▶ 83% – 87% B
- ▶ 80% – 82% B-
- ▶ 78% – 79% C+
- ▶ 73% – 77% C
- ▶ 70% – 72% C-
- ▶ 68% – 69% D+
- ▶ 63% – 67% D
- ▶ 60% – 62% D-
- ▶ 0% – 59% F

OFFICE HOURS

- Psychological Sciences Building
Room 3186
494-6934
- Monday, Wednesday, Friday
2:00 - 3:00 pm
or by appointment.
- email: gfrancis@purdue.edu

LECTURE NOTES

- reduced format of 6 slides to a page
- available on the class web page

<http://www.psych.purdue.edu/~gfrancis/Classes/PSY201/indexF23.html>

TEACHING ASSISTANT

- Victoria Jakicic
- OFFICE: PSYCH 3188
- OFFICE HOURS: Tuesday and Thursday, 1:00–2:30 pm
- Email: vjakicic@purdue.edu

NEXT TIME

- variables:
 - ▶ independent
 - ▶ dependent
- measurement scales
 - ▶ nominal
 - ▶ ordinal
 - ▶ interval
 - ▶ ratio
- descriptive statistics

What is our national security threat?