



NORTHWESTERN  
UNIVERSITY

SCHOOL OF  
CONTINUING  
STUDIES

**Handout: Problem Set #7**  
***PREDICT 401: Introduction to Statistical Analysis***

1. You are looking for research funding for the upcoming year. You have two options:

Strategy 1: Submit three proposals for funding. Each has a 0.4 likelihood of being accepted. Each proposal would take  $\frac{1}{3}$  of your time. Assume that the likelihood of getting any proposal funded is independent of whether any other is funded.

Strategy 2: Submit one proposal for funding. It has a 0.6 likelihood of being funded. It would take 100% of your time.

- a. List all the possible outcomes from Strategy 1. What is the probability of each outcome?
- b. How many grant proposals would you expect to get funded under Strategy 1? What percentage of your time would you expect to get funded?
- c. Which strategy would you choose? Discuss your answer. Provide evidence and an argument.

2. Imagine that Chicago has had problems lately retaining science teachers. You want to run a study looking at why these teachers leave. You look at eight new Chicago science teachers. The average annual departure rate for new science teachers over the first 10 years of teaching is 0.3 (assume this means that any science teacher has a probability of leaving of 0.3 in any given year). Assume that whether any of the eight teachers leave is independent of whether any other teacher leaves.

- a. What is the expected value of the number of teachers in your sample who will leave this year?
- b. What is the probability that exactly two teachers will leave in a year?
- c. What is the probability that two or fewer teachers will leave in a year?
- d. What is the probability that four or more teachers will leave in a year?
- e. What is the probability that at least one of the teachers will leave in a year?
- f. What is the probability that at least one of your current teachers will remain after seven years?