

Assignment 7:

Network scale-up method for studying hard-to-count populations

Sociology 204 (Social Networks)
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Due: April 10, 2013

Remember to write your name and precept on your assignment and staple it!

The network scale-up method has been used to estimate the size of hard-to-count populations all over the world, especially the groups most-at-risk for HIV/AIDS. In this assignment we are going to use it to estimate the sizes of two *non-stigmatized* groups at Princeton. Further, we will compare these scale-up estimates to direct estimates. Finally, we will collect some additional data in this assignment to test the idea that the average number of friends of individuals is less than the average number of friends of friends.

1. Interview 3 of your friends using the survey form available from the class website.
2. Put your data into Table 1 so that another scientist (e.g., your preceptor) can review it.
3. Using your survey data, the information in Table 2, and the fact that there 5,149 undergraduates¹, estimate the personal network size (in this case defined to be the number of Princeton students they shared a meal with this semester) of each of your respondents using the following formula:

$$\hat{d}_i = \frac{N}{\sum_k N_k} \times \sum_k y_{ik} \quad (1)$$

where N is the number of Princeton students, N_k is the number of people in group k , and y_{ik} is the number of people that person i reports knowing in group k . Be sure to show your work clearly enough that another scientist (e.g., your preceptor) can figure out how you made the calculation.

4. Using your estimates of personal network size, the responses to questions about connections to groups of unknown size, and the fact that there 5,149 undergraduates, estimate the size of the unknown groups using the following formula:

$$\hat{N}_k = \frac{\sum_{i=1}^3 y_{ik}}{\sum_{i=1}^3 \hat{d}_i} \times N \quad (2)$$

where N is the number of Princeton students, N_k is the number of people in group k , and y_{ik} is the number of people that person i reports knowing in group k . Be sure to show your work clearly enough that another scientist (e.g., your preceptor) can figure out how you made the calculation.

5. Does completing this activity change how you think about the network scale-up method? If so, how?
6. If you were going to compare your personal network size the average persona network size of your friends, what would you expect to find? Why?
7. Now we are going to test your prediction above. Interview yourself using the same survey and add your data to Table 1.
8. Estimate your personal network size using Eq. 1.
9. Compare your estimated personal network size to the average of your respondents. What did you find? How does this compare to your prediction above? Be specific and cite data.
10. Upload all of your survey data to the class website. We will post the link on Piazza.

¹Source: <http://www.princeton.edu/pub/profile/admission/undergraduate/>

Group	Number respondent shared a meal with this semester			
	Respondent 1	Respondent 2	Respondent 3	You
Born in another country				
Football team				
Field hockey team				
Women's lacrosse team				
Men's lacrosse team				
Senior Sociology majors				
Princeton University Orchestra				
Dating someone from their high school				
Dating someone from Rutgers				

Table 1: Responses to questions of the form “How many X’s have you shared a meal with this semester?”

Group	Size	Source
Born in another country	542	http://www.princeton.edu/pub/profile/admission/undergraduate/
Football team	105	http://www.goprincetontigers.com/SportSelect.dbml?DB_OEM_ID=10600&SPID=4263&SPSID=46863
Field hockey team	24	http://www.goprincetontigers.com/SportSelect.dbml?SPID=4274&SPSID=46912&DB_OEM_ID=10600
Women's lacrosse team	27	http://www.goprincetontigers.com/SportSelect.dbml?DB_OEM_ID=10600&SPID=4263&SPSID=46863
Men's lacrosse team	37	http://www.goprincetontigers.com/SportSelect.dbml?SPID=4265&SPSID=46874&DB_OEM_ID=10600
Senior Sociology majors	54	Cindy Gibson, Administrator, Dept. of Sociology
Princeton University Orchestra	90	http://www.puorchestra.org/about_orchestra.php

Table 2: Sizes of groups.