

Cluster Sampling with proportions

Example: the proportion of people interested in having an Ethiopian restaurant

Suppose we revisit the small community of $N = 150$ households, and we also obtain from the same $n = 10$ households whether or not they would dine at an Ethiopian restaurant. For each sampled household we have the number of people who live at the household, and how many of them who would go to an Ethiopian restaurant:

Household	m_i	yes/no	a_i
1	2	0,0	0
2	4	0,1,1,1	3
3	2	1,1	2
4	3	0,0,0	0
5	5	0,0,0,0,0	0
6	1	0	0
7	3	1,1,1	3
8	2	0,1	1
9	1	1	1
10	4	0,0,0,1	1
Totals	27		11

Now we have $\hat{p} = 11/27 = .407$, $\bar{m} = 27/10 = 2.7$, and $s_p^2 = 1.52$. Then we have:

$$\hat{V}(\hat{p}) = \left(\frac{140}{150}\right) \left(\frac{1}{2.7^2}\right) \frac{1.52}{10} = .0195 \text{ so that } B = .279$$

Do people appear to behave independently within households?