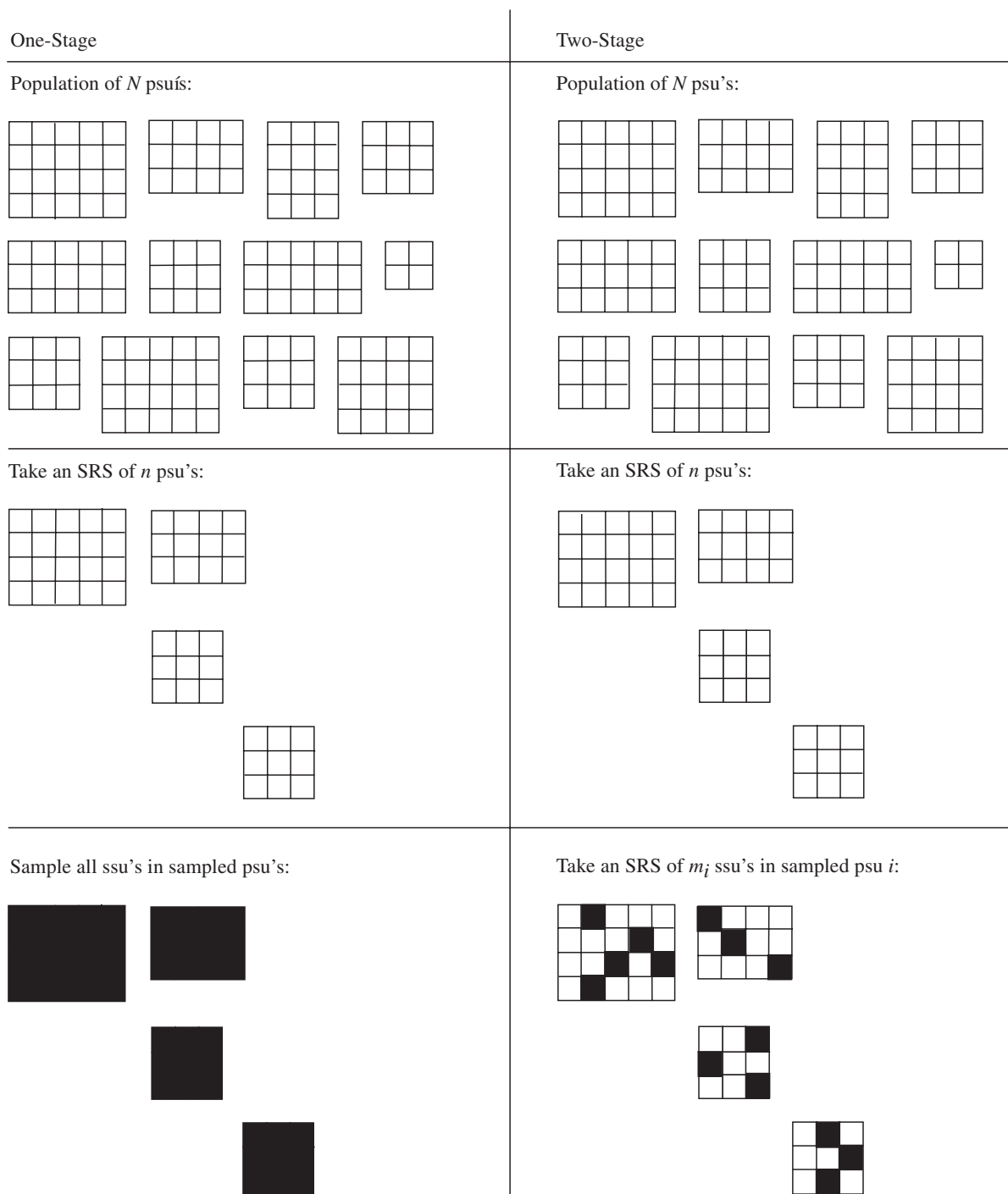


FIGURE 5.2
The difference between one-stage and two-stage cluster sampling.



and an unbiased estimator of the population total is

$$\hat{t}_{\text{unb}} = \frac{N}{n} \sum_{i \in S} \hat{t}_i = \frac{N}{n} \sum_{i \in S} M_i \bar{y}_i = \sum_{i \in S} \sum_{j \in S_i} \frac{N}{n} \frac{M_i}{m_i} y_{ij}. \quad (5.18)$$