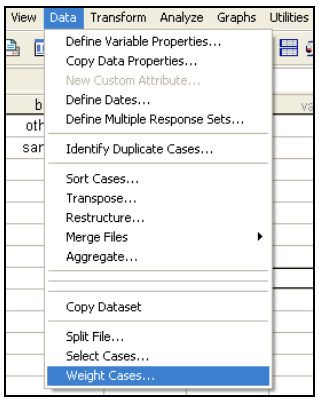
# *One Proportion Z-Tests in SPSS*

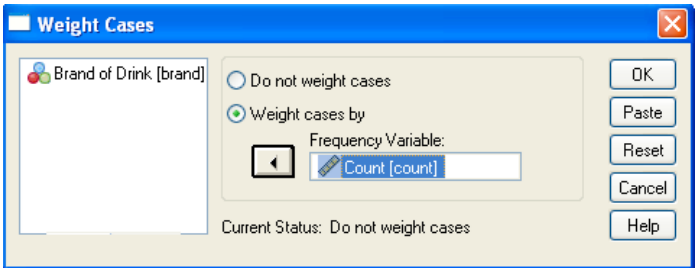
**STAT 314**

A certain soft drink bottler claims that less than 20% of its customers drink another brand of soft drink on a regular basis. A random sample of 100 customers yielded 18 who did in fact drink another brand of soft drink on a regular basis. Do these sample results support the bottler's claim? (Use a level of significance of 0.05.)

1. Enter the category values (Brand of Drink: 1=other brand, 2=same brand) into one variable and the observed counts (other brand=18, same brand=82) into another variable *(see left figure, below)*. Then weight the category values variable by the observed counts variable *(see two right figures, below)*.

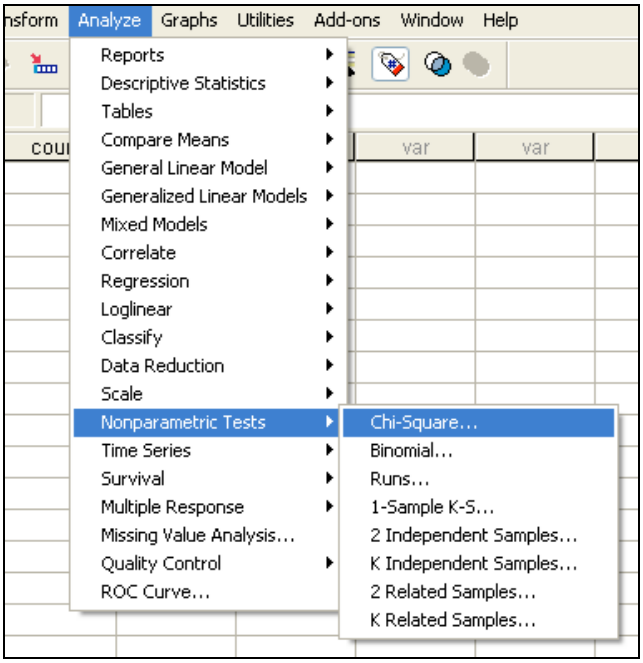
| | brand | count |
|---|---|---|
| 1 | other brand | 18 |
| 2 | same brand | 82 |

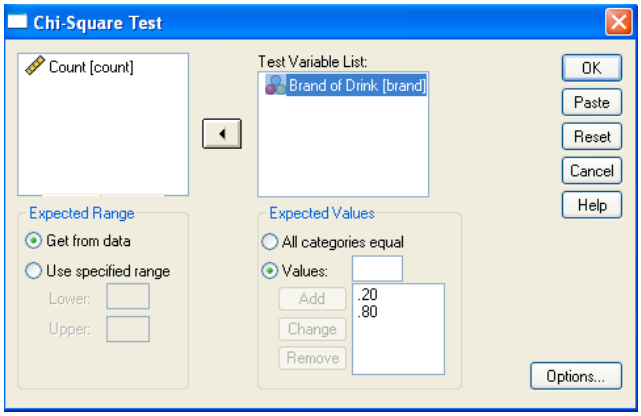



2. Select Analyze → Nonparametric Tests → Chi-Square… *(see left figure, below)*.

3. Select "Brand of Drink" as the test variable and enter the values for the null hypothesis proportions in numerical order by category value [*i.e.*, P(other brand) = 0.20, then P(same brand) = 0.80] *(see right figure, below)*.



4. Your output should look like this.

**NPar Tests**

**Chi-Square Test**

**Frequencies**

**Brand of Drink**

| | Observed N | Expected N | Residual |
|---|---|---|---|
| other brand | 18 | 20.0 | -2.0 |
| same brand | 82 | 80.0 | 2.0 |
| Total | 100 | | |

**Test Statistics**

| | Brand of Drink |
|---|---|
| Chi-Square[a] | .2500 |
| df | 1 |
| Asymp. Sig. | .6171 |

a. 0 cells (.0%) have expected frequencies less than 5. The minimum expected cell frequency is 20.0.

5. You should use the output information in the following manner to answer the question.

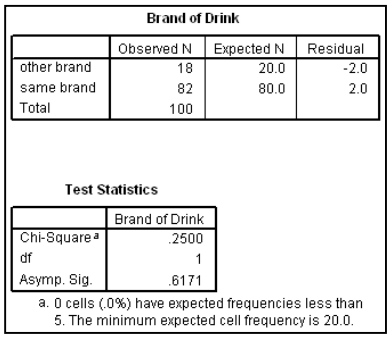
**Step 0:** **Check Assumptions**

$n\pi_0 = 100(0.20) = 20 \geq 10$ and $n(1-\pi_0) = 100(0.80) = 80 \geq 10$

**Step 1:** **Hypotheses**

$H_0 : \pi = 20\%$ $\quad\Rightarrow\quad$ $H_0 : \pi = 0.20$

$H_a : \pi < 20\%$ $\quad\Rightarrow\quad$ $H_a : \pi < 0.20$




**Step 2:** **Significance Level**

$\alpha = 0.05$

**Step 3:** **Rejection Region**

Reject the null hypothesis if *p*-value ≤ 0.05.

**Step 4:** **Test Statistic**

$Z = \sqrt{Chi\text{-}Square} = \sqrt{0.2500} = -0.5000$

(*Z* has the same sign as the Residual for "other brand")

$p\text{-value} = \frac{1}{2}(Asymp.Sig.) = \frac{1}{2}(0.6171) = 0.30855$ *(one-tailed test p-value)*

**Step 5:** **Conclusion**

Since *p*-value = 0.30855 > 0.05 = $\alpha$, we fail to reject the null hypothesis.

**Step 6:** **State conclusion in words**

At the $\alpha$ = 0.05 level of significance, there is not enough evidence to conclude that less than 20% of the customers drink another brand. Thus the results do not support the bottler's claim.