Statistics Basics Week 3 SGA

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Let X be the random variable that denotes the number of people who became happier after avoiding using social network for a week.

Let H_0 be probability of becoming happier is $= \frac{1}{2}$

Let H_1 be probability of becoming happier is $> \frac{1}{2}$

Since there is no clear information of the distribution of X, we are going to assume that

$$X \sim Binomial(n, p)$$

where $n = 20$ and $p = \frac{1}{2}$

Then we can find the p-value:

$$p(X \geq X_{obs}|H_0) = p(X = 20|H_0)+p(X = 19|H_0)+p(X = 18|H_0)+p(X = 17|H_0)+p(X = 16|H_0)$$

$$\begin{aligned} p(X \geq X_{obs}|H_0) = & \\ & \binom{20}{20}(\frac{1}{2})^{20}(\frac{1}{2})^{0}+ \\ & \binom{20}{19}(\frac{1}{2})^{19}(\frac{1}{2})^{1}+ \\ & \binom{20}{18}(\frac{1}{2})^{18}(\frac{1}{2})^{2}+ \\ & \binom{20}{17}(\frac{1}{2})^{17}(\frac{1}{2})^{3}+ \\ & \binom{20}{16}(\frac{1}{2})^{16}(\frac{1}{2})^{4} \\ =& 0.0059 \end{aligned} \tag{1}$$

This means p-value ¡ 0.05 and we can conclude that people are happier without social

networks.