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MATH 263H

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Assignment #1

#1.1.30:

1. At least twenty times to get a minimum of ten successes and ten failures for the test to be considered valid. Or a test of 12 flips and a minimum of 6 successes to model outcomes of the person who may just be guessing.
2. It is very unlikely that someone could have guessed correctly 11 out of 12 times as the results from the applet have shown that even though 100 trials of 12-coin flips were done, out of the 100 trials, none ever got the result of 11 out of 12 heads.
3. I think it is plausible to say that Milne is doing a lot better than simply guessing whether or not someone has Parkinson’s disease. This can be derived from the proportion of success results that we got from the applet. Our p-value was 1/100 = 0.01.
4. This gives us stronger evidence as that would mean that she got 100% correct and that we know from the applet that it is near impossible to guess correctly 12 out of 12 times or to get heads 12 out of 12 times. A p-value of 0.05 would give us strong evidence to reject the null and claim that Milne is only guessing.
5. Instead of the proportion of success being cut off at 0.9167, it would be at 1 since the proportion of success will be 12 out of 12 instead of 11 out of 12.

#1.2.24

The p-value is 0.2571, this came from 2314/9000 = 0.2571. Since our p-value is too large, we do not have strong evidence that the long run proportions are not greater than 0.50 or 50%.

#1.3.10

1. P-value is 6/100 = 0.06.
2. No because the p-value is greater than 0.05.
3. The standardized statistic is 1.724, this was obtained by doing (0.70-0.50)/0.116 = 1.724. This shows that the sample proportion is 1.724 standard deviations above the mean of the null distribution.
4. No because the standardized statistic is less than 2.

#1.3.24

1. Parameter of interest is the number of times a child of 10 months picks the ‘helper’ or ‘hinderer’. This we will assign the symbol of π (long run proportion)
2. - The null hypothesis (π0) is π0 = 0.5.

* The alternate hypothesis (πa) is πa > 0.5.

1. 14/16 = 0.875. This will be assigned the symbol *p-hat*.
2. Z-score = (0.875 – 0.499) / 0.125 = 3.008
3. The z-score indicates that the observed statistic is equal to roughly 3.008 standard deviations above the null hypothesis (π0) of 0.50.
4. Based on the standardized statistic, it is plausible to state that we have evidence supporting our alternate hypothesis that a child of 10 months will choose the helper toy over the hinderer toy as the π value, the long run proportion is greater than 0.50.

#1.4.10

1. The p-value is 5/100 = 0.05.
2. The p-value is now (5 + 6) / 100 = 0.11.

#1.4.34

1. The research hypothesis is that a taller candidate is more likely to win over a shorter candidate. π = P (taller) > S (smaller)
2. -The null hypothesis, π0 = 0.5. The null hypothesis can be described as, there is an equal chance for both candidates to win and their height is not a factor in the final decision.

-The alternate hypothesis, πa > 0.5. The alternate hypothesis is that the taller candidate is more likely to win more than 0.5 times.

1. The p-value is 48/1000 = 0.0048
2. Taking the p-value at face value, we can conclude that there is not any evidence that supports the conclusion that a taller candidate is chosen over a shorter one.
3. Yes, there could be other factors that may affect a candidate being chosen over the other. This could range from facial features to their tone of voice to even how they stand while talking. We should also determine the standardized statistic and how many standard deviations the p-value is above/below the mean, as the standardized statistic will give us information regarding whether or not it is evidence against or for the null hypothesis, giving us another avenue to discuss whether or not we should reject the null.