Matt Maslow

Professor Chapman

MATH-326

4/25/24

**Mini-Project 4**

1. By using more statistical thinking we will have fewer false alarms (like type I and II errors), have less overlooked and unnoticed observation or discoveries, and allows for potential construction of different statistical methods. With statistical thinking it is less about making decisions for the hypothesis based on p-value and its location in relation to the significance level. For example, when doing a hypothesis test and the p-value is considered middle range significance (a = 0.05). Bring us to the question whether, p=0.05, is significant or not, makes it hard to conclude. This is where statistical thinking could come in handy, as it could find an alternate way using the same given info to come to a more logical conclusion.

1. When the author says this, he refers to the problem that starts with the use of the word “significant” as many used this to conclude a research question, however, the definition of significance in general and in relation to statistics have become confusing, and the term should be avoided when concluding. Using this term in conclusions can lead to potential errors and misled/false decisions. In all, the author is trying to get at that making a conclusion with just the p-value without consulting other aspects of the situation/research it will not always give the most accurate or logical answer.
2. I would say that I agree with the author statement, because by basing conclusion off a significance threshold, it can result in errors (like type I and II). These potential errors can be avoided if we did not base our answer off a threshold and get a logical result. Furthermore, creates an idea of a split between significant and insignificant, and in some cases p-values could be difficult to interpret if there are close to the threshold line or equal to. Also, makes more sense to not use these thresholds in scientific publishing’s, because it would not make sense to publish a p-value that infers a type I or II errors, which can lead to false inferences, even though the logical answer can be inferred easily in the research question and problem. Therefore, there are better ways to conclude a research question than with a p-value threshold as publishing with thresholds could end with illogical observations, resulting with skewed results/conclusion.

1. Yes, I do agree that “one size fits all” expectation is not appropriate to conclude with. This is because by only looking at just p-value, which is found using information on the problem, although, has possibility of leading to false inferences. I feel that in addition to the threshold test there needs to be a test for assessing the logicalness or whether an answer make sense before viewing the threshold. Furthermore, an example of where this would be bad is when we have a logical answer, but the p-value infers that we are above the threshold, so we scrap it and forget about it as it would be a type II error. Instead of doing that, this is where a logic test could be helpful and prevent these mishaps from happening.

1. I believe the idea behind statistical thoughtfulness is from being able to be open to different ways to assess problem or test. Also, one should not be restricted to just the threshold test, as with other ways we could have a more accurate analysis that gives us logical answer based on the problem. I would say some ways to demonstrate statistical thoughtfulness is by not only concluding with stat. significance but look at the clinical significance as well, so we are also assessing practicality and logic of the problem.
2. Researchers and scientist believe that the use of the term “significance” (p-value’s) and “confidence” (confidence interval’s) leads people to conclude with overconfident claims. I do agree that there’s a problem and changing the name can have its ups and downs. The ups being, it helps with fixing the overconfident answers a bit, and allows for possibility of different interpretations. The downs being that by only changing the name only hopes people will interpret it differently, however, they are not actually changing any parts of the procedure. The hope is that it will encourage a more logical and reasonable way to utilize statistical thoughtfulness.
3. Quote: I found this is section 3.2.3 on page 5 of the pdf, and I think it said page six when scrolling through on canvas…… “Statistical decision theory is not based on p-value threshold and readily distinguishes between statistical and clinical significance.”

This quote stood out to me because having the clinical significance is important to me because I strongly believe that having a part of this process be dedicated to assessing clinical significance. This is because it is important part of a conclusion to have an explanation to why the answer is the answer, more specifically a test for whether it is logical answer or not. Furthermore, we will not be focusing only on the statistical significance, but have more of the reason why an answer make sense or does not make sense as it will help bring us to a more accurate and precise decision.