Part 1: Review of the paper ‘Storks Deliver Babies’

1.

Matthews (2000) explains how p-values can be misunderstood. In the context of the paper the p-value of the correlation analysis is 0.008. One way this can be misunderstood is that ‘there is 99.2% chance that the statistic (in this case correlation coefficient) is in the range of the confidence interval’. This leads to an incorrect belief that there is a 0.8% chance that this result was a fluke. The correct interpretation is that if the analysis was repeated over and over with the same sampling process the statistic would fall within the 99.2% interval of the range of values.

2.

When asking the question 'how good is my regression model?' two of the metrics that can be used to help answer this question are the correlation coefficient and the p-value of the model. The difference between these metrics is that the correlation coefficient relates to strength of the relationship while the p-value relates to its statistical significance. The correlation coefficient can range from -1 to 1, if the value is 0 it means that there is no relationship and the closer it gets to 1 or -1 the stronger the relationship. The stronger the relationship the better the regression model will fit the data. The p-value relates to statistical significance and can range from 0 to 1. The higher the p-value, the less significant the findings, meaning that if the analysis was repeated with the same sampling process a different outcome would be more likely and the regression model is therefore unreliable. The lower the p-value the higher the significance, meaning that if the analysis was repeated with the same sampling process the same outcome would be more likely and the regression model is more reliable and generalisable.

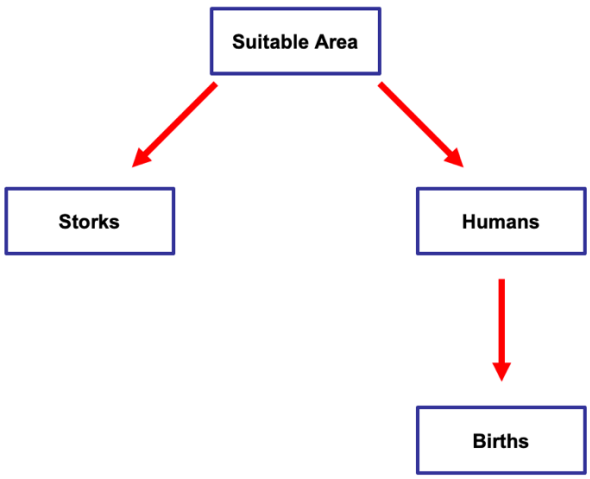
3.

Just because two things are correlated does not necessarily mean that one causes the other. In the discussed paper (Matthews, 2000) a clear example of this can be seen. Matthews (2000) explains how there is a relationship between shoe size and

reading skill in children. However, just because these are related does not necessarily mean that one causes the other. In this case it is unlikely that shoe size causes someone's reading skill to improve, likewise it is unlikely that an increase in reading skill would cause someone's feet to grow, however, Matthews (2000) explains that there is still a correlation between the two variables meaning that they both tend to change with each other consistently. One way that this can happen is through another variable called a confounding variable.

4.

A confounding variable in the context of this paper (Matthews, 2000) would be a variable which affects both the number of storks in an area and the birth rate in an area in a way that would make the number of storks and the birth rate correlate. Such a confounding variable in this case could be 'suitable area'. The suitable area for storks may also be suitable for human habitation, this could cause a higher population of storks and a higher population of humans, in turn giving a higher birth rate in that area. This can be demonstrated in a causal diagram below.



References

Robert Matthews. "Storks Deliver Babies (p = 0.008)". Teaching Statistics. Volume 22, Number 2, Summer 2000, p36-8.