Fry Lengths at McDonald's

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Abstract

The lengths of McDonald's french fries are crucial to the fast food restaurant chain's economic viability. A previous study found that french fry lengths exhibit a bimodal distribution. This paper reports the results of a duplicate study, but our results do not agree with the original. We find a normal distribution of fry lengths.

1 Introduction

The lengths of french fries were first analyzed by Biss [1] for the 1994 Research Science Institute. He found that the lengths of fries followed a bimodal distribution and speculated that broken fries contributed to the smaller mode. Here we repeat the experiment and analyze the modern results. What is the average length of a french fry? How are these lengths distributed?

2 Materials and Methods

A large container of french fries was purchased at McDonald's and the lengths of the fries were measured in millimeters (mm). Each fry was taken from the container, placed against the ruler so that the fry was straight, and the fry's length was recorded.

3 Results

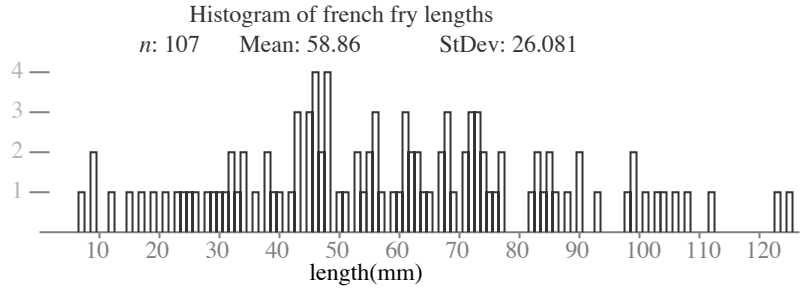

Figure 1: Histogram of the fry lengths

The french fry container held 107 french fries. The average length was 58.9 mm with a standard deviation of 26.1 mm. The data is shown graphically in Figure 1.

To see if this distribution approximates a normal distribution, we perform a Ryan-Joiner normality test as described in Devore [2]. The test statistic is $r \approx .9959$, so at the 5%

n	Length	Standard Deviation
107	58.859	26.081

Table 1: Summary of the Lengths of French Fries

significance level we do not reject the hypothesis that the distribution is normal. The quantile plot is shown in Figure 2.

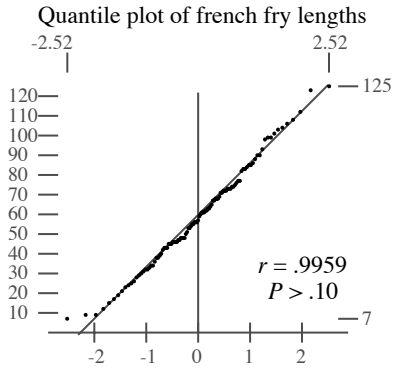

Figure 2: Quantile plot of the fry lengths

4 Conclusion

We studied the lengths of french fries in large container of french fries purchased at McDonald's. We found that the distribution of lengths of fries is statistically indistinguishable from a normal distribution. This is in contrast to Biss' work, which found a bimodal distribution. Future studies should measure fries from other McDonald's as well as other restaurants.

5 Acknowledgments

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References

[1] Biss, Daniel, personal communication, June 1994.

[2] Devore, Jay. *Probability and Statistics for Engineers* Brooks/Cole Publishing Company, 5th edition(1999)