**THE AGE OF A COIN**

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**Part I**

Fifty coins and fifty pennies were collected from a jar located in my home. The coins had been deposited over the years, however, no deposits have been made in the past two years, so this could have influenced the currentness of the collected coins. There is a possibility that coins with a higher minted date than 2015 were not present in the jar. For this reason, bias could have possibly been introduced through the coin collection method. The population of this project is the total coins in circulation in the United States. The individuals in this project are pennies and quarters. The fifty pennies and fifty quarters collected from this population are the sample of this project. The variables include the type of coin, the age of the coin, and the presence of an eagle on the quarters. The type of coin and eagle presence are categorical variables and the age of the coin is a quantitative variable. The distribution of coin ages and frequency are shown in Figure 1.



Figure 1. A histogram portraying a graphical representation of the distribution of the ages of pennies and quarters and their frequency of occurrence.

The mean, standard deviation, and five-number summary of the ages of the coins in the sample is shown in Table 1. As shown in the table, the mean age and standard deviation of the coins is relatively similar. The five-number summaries are somewhat similar. The minimum, median, and third quartile are either the same or off by one number for each coin type. The first quartile and maximum have no similarity. As shown in Figure 1, the shape of the pennies distribution is skewed right and the shape of the quarters distribution is symmetric. These distributions do not have any outliers. The pennies most likely have a skewed right distribution because they had been collected more recently. The quarters had been collected over the span of five years so that is why the distribution is much more symmetric. The main difference in the distribution of the quarters and pennies is that there is a spike in the frequency of quarters around age twenty. There is also a much larger frequency of pennies zero to five years old than quarters. The mean ages of pennies and quarters present in Table 1 seem relatively similar to that of Figure 1.

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| Coin Type | Mean | Standard Deviation | Five-Number Summary |
| Pennies | 20.94 years | 14.20177 | (4, 9, 19, 31, 58) |
| Quarters | 23.18 years | 12.58553 | (3, 15, 19, 32, 52) |

Table 1. Mean, standard deviation, and five-number summary of the ages of pennies and quarters in the sample.

The distribution of all pennies in circulation should not be compared to the distribution of this sample. The actual distribution of all pennies in circulation is not similar to this sample because less and less pennies have been produced each year. This would show the opposite distribution to what was found in this sample. The distribution of all quarters in circulation would follow the same trend. This distribution would be skewed left, unlike the symmetric distribution found in this sample. As shown in Table 2, the 95% confidence interval for the sample of pennies is from 17.04 years to 24.84 years and from 19.68 years to 26.68 years for the sample of quarters.

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| Coin Type | 95% Confidence Interval | Margin of Error |
| Pennies | 20.94 ± 3.9 years | 3.936 years |
| Quarters | 23.18 ± 3.5 years | 3.488 years |

Table 2. A 95% confidence interval for each coin type along with the margin of error.