

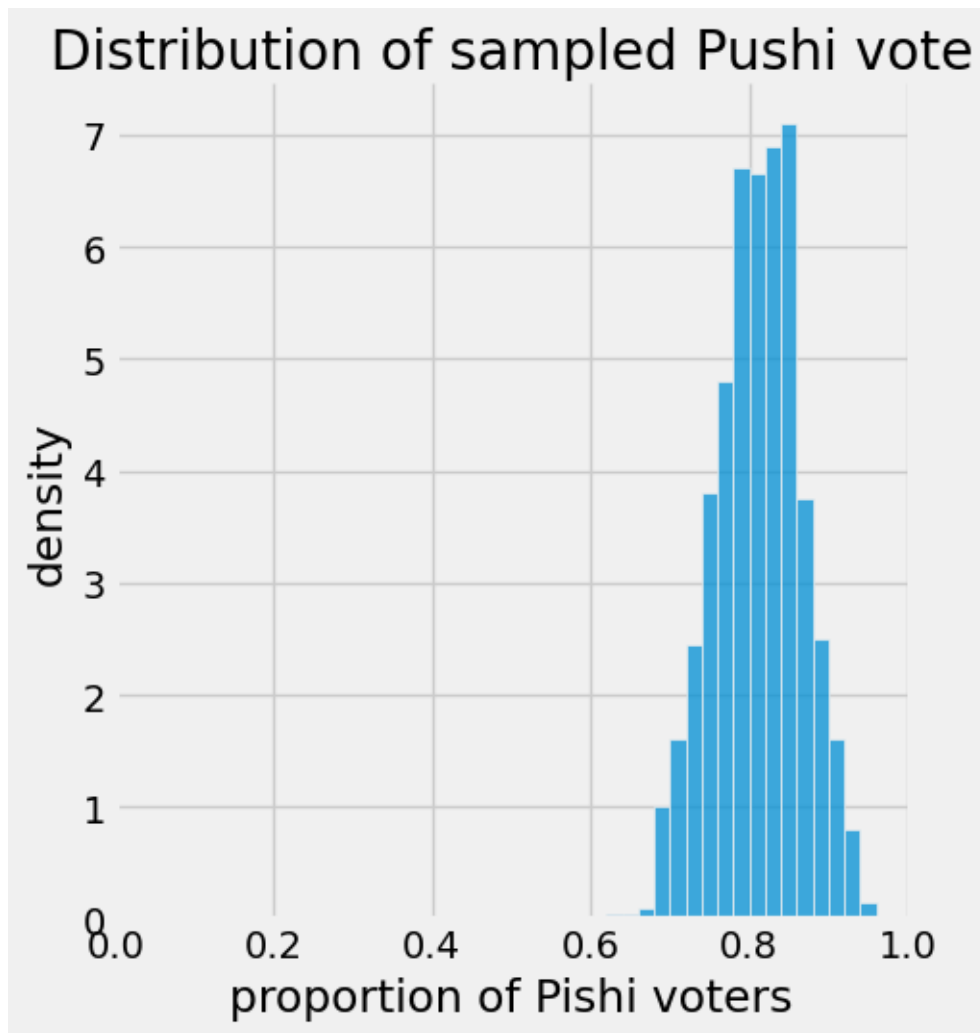
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### 0.0.1 Question 2b

Create a plot using any `seaborn` and/or `matplotlib.pyplot` functions of your choice to visualize `samples`, which is the simulated distribution of Pishi votes using a sample of size 50. Include descriptive titles and labels. An example is included below. The total area under the plot must be normalized to 1. Your plot may not match exactly ours due to randomness of the data generating process in `np.random.multinomial`.

**Hint:** use `plt.xlim(left, right)` ([documentation](#)) to specify the left and right limits of the x-axis.

```
In [71]: sns.displot(samples, stat='density', binwidth=0.02)
         plt.xlim(0, 1)
         plt.title('Distribution of sampled Pushi vote')
         plt.xlabel('proportion of Pishi voters')
         plt.ylabel('density')
         plt.show()
```



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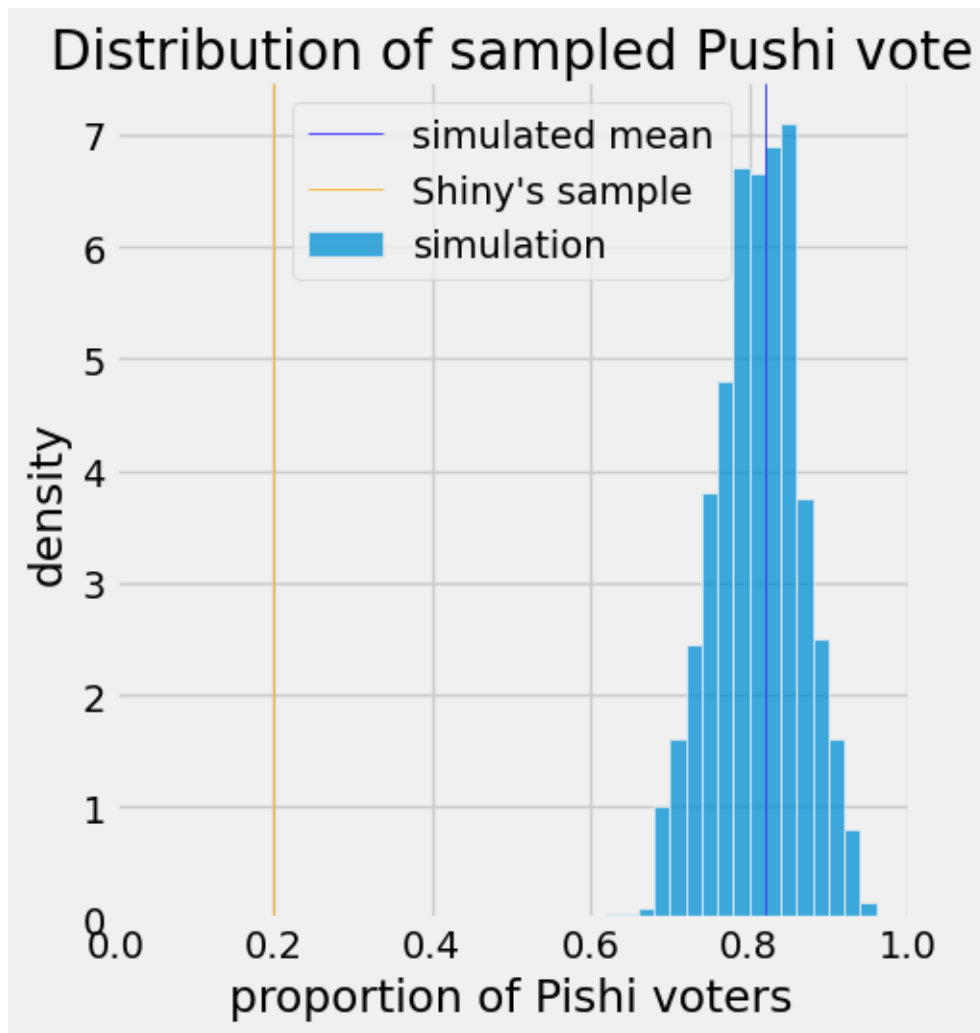
### 0.0.2 Question 2c

According to Shiny's 50-person sample, 20% of her discussion section reported that they would vote for Pishi in the end-of-semester contest.

In the cell below, create a plot using any `seaborn` and/or `matplotlib.pyplot` functions of your choice to visualize Shiny's sample statistic superimposed on the simulated sample distribution you plotted in the previous part. In other words, include - a vertical line that passes through 20%, - a vertical line that passes through the mean of the simulated sample distribution, and - the simulated sample distribution itself.

You should choose contrasting colors and include a descriptive title, labels, and a legend if needed. An example is included below.

```
In [77]: sns.displot(samples, stat='density', binwidth=0.02, label='simulation')
plt.xlim(0, 1)
plt.title('Distribution of sampled Pushi vote')
plt.xlabel('proportion of Pishi voters')
plt.ylabel('density')
plt.axvline(x=np.mean(samples), color='blue', label='simulated mean', lw=0.5)
plt.axvline(x=0.2, color='orange', label="Shiny's sample", lw=0.5)
plt.legend()
plt.show()
```



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### 0.0.3 Question 2d

Based on your analysis above, could Shiny's result have arisen due to chance alone? If not, what could be a potential source of bias?

No, even in the most severe outliers, Shiny's result could have not arisen due to chance alone. Since Shiny was using a convenience sample (her discussion session), this could lead to a potential bias in people voting for Mimi (by far the majority in her sample) just because the owner is Shiny (the discussion GSI). Because of the chance that this could happen, this could be the source of bias, and would most likely make Shiny's sample not a good sample to take from.

