

// LIES AND MORE LIES

“Coming of Age in Samoa” was Margaret Mead’s first major contribution to academia and it was widely accepted as truth when it was published in 1925. Even today, Mead’s work is often used to perpetuate a myth about non-industrialized societies: idyllic pockets of non-westernized utopias. Mead knew utopia was in Samoa, but needed to document what she already knew so the world would recognize her incredible insight. Sort of like Mendel’s genetic experiments where he knew the underlying process and then set out to collect data to support what he already knew. Some believe Mendel lied, or maybe just ignored what did not fit. Mead probably did not fudge the data, but rather collected fudged data from unreliable sources. The juicier the data, the less skeptical your general audience will become. Mead asked young nubile Samoan women about their sexual proclivities, racy material for sure. Our prurient nature is so strong that Mead’s academic work made for good reading, even among non-academics, and her conclusions were just too entertaining to ignore. Samoa was a ‘free love’ paradise where young nubile women were free for the asking and all without the normal societal troubles: jealousy, pregnancy, disease, etc. The problem is that the young nubile women may have been lying. Just think, an important researcher from halfway around the world comes to visit you, expecting juicy stories. The girls were more than ready to reply. Who hasn’t embellished a story or two? Especially when someone’s interested!

Here is a juicy question: are you a virgin? Yes, or no only! What is likely to happen is that some young people are going to lie because they are embarrassed or afraid. Most people will answer a simple survey to the best of their ability, but may be afraid of revealing questions. So maybe they’ll lie on one or two of the questions. Perfectly normal behavior and this drives survey analyst crazy. Can their response be trusted? Let’s twist a paradoxical bend into the problem.

Give survey participant a six-sided fair die with the following six sides:

{LIE, LIE, LIE, LIE, LIE, TRUTH}.

This die should only be visible to the survey participant. Tell the survey participant to toss the die and look at the face up. If it says LIE the participant should lie, if it says TRUTH the participant should tell the truth. Have the participant toss the die several times to get a sense of how the survey method works. Ask only trivial yes/no question to make sure participant understands how to respond. Do several of these little questions so the participant can get comfortable with your stupid little questions and

this stupid little method. Behave professional at all times (no smiles please) and record their responses.

Possible list of questions:

1. Did you drink coffee today? Toss die. Yes or no only.
2. Are you a registered Republican? Toss die. Yes or no only.
3. Do you believe in God? Toss die. Yes or no only.
4. Are you older than 19? Toss die. Yes or no only.
5. Do you own a gun? Toss die. Yes or no only.
6. Have you ever cheated on schoolwork? Toss die. Yes or no only.
7. Have you ever gone to the movies alone? Toss die. Yes or no only.
8. Have you ever used heroin? Toss die. Yes or no only.
9. Are you a virgin? Toss die. Yes or no only.

Thank you, the survey is complete.

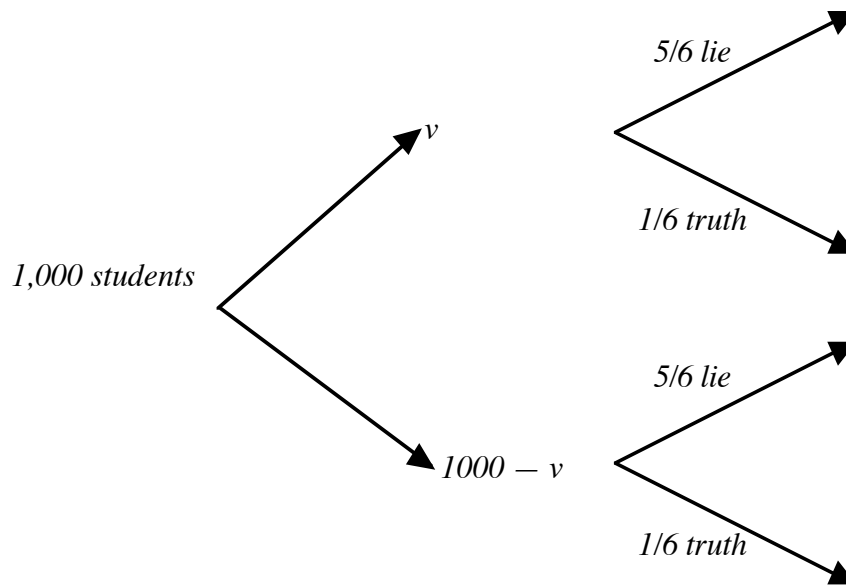
We're only interested in the "Are you a virgin" question. If we questioned 1,000 incoming freshman students at a large university, we might get 219 virgins and 781 non-virgins (these numbers are completely made-up). However, these numbers cannot be correct because not everyone is telling the truth. We will assume that the first eight question that you asked were solely there to familiarize the participant with the method and by the ninth question they are playing into our game. What we would like to know is how many virgins (v) there are in reality among the 1,000 surveyed. Use the tree-diagram if you are not clear on the equations below.

$$1000 - v = \text{non - virgins}$$

$$v = \text{virgins}$$

$$219 \text{ virgin responses} = v \cdot \frac{1}{6} + (1000 - v) \cdot \frac{5}{6} \quad v = 921.5$$

$$781 \text{ non - virgin responses} = v \cdot \frac{5}{6} + (1000 - v) \cdot \frac{1}{6} \quad v = 921.5$$



So let's conclude that if all went as expected we have about 92% virgins in the 1,000 sampled. This is certainly not a new survey technique and its usefulness should not be neglected. I generally don't trust people's answers to sensitive questions, but I do trust people to lie, especially if they are told to do so.

Here's a computer simulation of our system.

```

#include <iostream> // needed for cout
#include <cstdlib> // needed for rand() and RAND_MAX
using namespace std;

double uniform(void); // function U(*) prototype

double uniform(void)
{
    return(static_cast<double>(rand()) / RAND_MAX);
} // uniform function

int main ()
{
    int virgin = 0;
    int non_virgin = 0;
    int i;

    for (i = 1 ; i <= 1000 ; i++)
    {
        if (uniform() < 5.0/6.0) // lie
        {
            if (uniform() <= 921.5/1000.0) // Virgin
                non_virgin++;
            else
                virgin++;
        }
        else // truth
        {

```

```
        if (uniform() <= 921.5/1000.0) // virgin
            virgin++;
        else
            non_virgin++;
    }
} // for

cout << virgin << " virgins.\n";
cout << non_virgin << " non virgins.\n";

} // main function
```

Here's the output:

```
209 virgins.
791 non virgins.
```

Again, our simulation is pretty close to what we expected.