

Vietnam War Draft Probability Exploration

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Overview of Lesson

In this lesson, students explore actual data from the 1969 Vietnam War Draft, which was used as a way for the Selective Service to prove to the United States public that the draft was a truly random way to choose who would be chosen to serve. But how truly random was it? In this investigation, students will simulate the way that men were chosen to be drafted and compare the actual results to simulated to results to see how likely what would happen would occur by chance. Students will use simulation, probability, and expected value for this investigation.

Type of Data

- Choose one: One quantitative variable
- Choose one: Data generated or collected as a class

Learning Objectives

- HSS.IC.A.2 Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation.
- HSS.MD.A.3 Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value.
- Explain the need for choosing a sample, including the importance of representativeness and randomness in sampling
- Infer statistical significance based on probability.

Audience

- Lesson tested in an introductory statistics class at the college level.
- Also appropriate for middle and high school students learning about simulations and probability.
- *Prerequisites:* Prior to this lesson, students should have experience with calculating basic probabilities of events. Though not necessary, some background in historical events, such as the U.S. participation in the Vietnam War may be helpful.

Time Required

This lesson should be completed within one class period (75 minutes)

Technology and Other Materials

- *Technology:* Students may need laptops to access CODAP and run the simulations. Though this could also be done by the instructor on a projector for the whole class.
- Handouts either printed for students or available to them on a learning management system.

Historical Sources (these are listed on the student handout)

<https://www.studentsofhistory.com/vietnam-war-draft> ;
https://www.jstor.org/stable/799945?read-now=1&seq=6#page_scan_tab_contents;
<https://aaregistry.org/story/black-history-in-the-vietnam-war-a-brief-story/>

Statistics Teacher/STatistics Education Web: Online Journal of K-12 Statistics Lesson Plans

www.statisticsteacher.org/ or www.amstat.org/education/stew/

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Lesson Plan

Random sampling is introduced in most introductory statistics courses as the gold standard for representative samples. But how random samples are chosen may not be something that many students consider in the day and age of random number generators. This lesson explores a “random” sample that was chosen on live television in 1969 to choose the order in which young men would be drafted for the Vietnam War. Students will use basics of probability and expected value to determine how likely it would be to be chosen for the draft. They will then use a sampler in CODAP to simulate the draft many times to see if what actually happened would have likely happened by chance.

Anything outlined below in *a black box* is found in the student handout attached to this lesson.

Historical Background – Vietnam War Draft – teacher led (5 minutes)

Below is a brief background of the history of the Vietnam war and how the draft was conducted. Teachers may want to read this aloud. Teachers may also consider having a history teacher lead this small piece of the lesson.

The Vietnam War was a conflict in Vietnam, Laos, and Cambodia from 1955 to 1975. The war was officially fought between North and South Vietnam, with the North being supported by the Soviet Union, China, and other communist states, and the South being supported by the United States and other anti-community allies. The United States sent soldiers to fight in Vietnam between 1964 and 1973. While *two thirds of the soldiers volunteered to go*, one third of the soldiers were selected from the general public for military service through the Select Service System, or the draft. In the beginning of the war, eligible men were required to go to a local draft board made up of various community members to determine their draft status or not. Men could get out of service if they were in college, had a political connection, or had a family doctor that could give them a medical deferment. Because of this, men with connections were able to get out of the draft, while men who were considered poor, working-class, and/or minorities often got drafted disproportionately. For instance, while 11% of the U.S. population in 1964 was Black, 15% of draftees were Black. This inequity led many to protest the draft.

(<https://aaregistry.org/story/black-history-in-the-vietnam-war-a-brief-story/>)

In 1969, the Selective Service System decided to conduct a national lottery to decide the order of people chosen for the draft (for all draft-eligible men born between 1944-1950). This process was meant to give everyone a fair chance of being chosen and was televised on live television as an act of “good faith”. In this investigation you will determine if this system was “fair” and think about what “fair” means.

Part 1: Develop a fair system to choose people for a draft class discussion (15-20 minutes)

Have students work in partners or groups of 3 for this part of the lesson. Some of your students may know how the people were chosen for the chosen, but some may not. Give them about 5-10 minutes to discuss the following questions.

- With your partner(s) think of how you might conduct a system so that everyone (who is eligible) has an equally likely chance of being chosen to serve in the military during the Vietnam War?

- Why do you think your system is fair? What parts of it might be problematic? Be prepared to share your ideas.

While students are discussing, walk around and monitor the class discussions. Be sure that students keep in mind the context of this occurring in 1969, things such as choosing random email addresses would not be applicable. You may want to purposefully think about how you may sequence the groups for sharing out their ideas. Depending on the knowledge they already have, you may have some students that know how the draft was chosen. Try to let those groups share out last.

After groups have had about 10 minutes to discuss, bring the class together for a whole group discussion about how they may conduct a draft. Purposefully have groups share out based on the responses you overheard. If there is time, talk about the pros and cons of each method.

The 1969 Draft Lottery, What Actually Happened – Teacher Led Class Discussion (10 minutes)

Play this video for students: <https://www.youtube.com/watch?v=OkJH6sapQMA> Stop the video at 1:05 for this part of the investigation.

The official draft lottery of 1969 was conducted at the Selective Service System headquarters in Washington D.C. on December 1, 1969. There were 366 blue plastic capsules containing birth dates (including February 29) placed in a glass container. The capsules were drawn by hand, opened one by one, and then assigned to a sequence from 1 until 366. The first date drawn was September 14, followed by April 24, which was assigned to “001” and “002” respectively. This meant the first group of people called for the draft were those born on September 14th, then April 24th, etc. The process continued until each day of the year was assigned to a lottery number.

The lower the number was, the higher the probability was that men with that birthday would be called to serve in the military. **Eventually all men with numbers 195 or lower** were called to report to their draft office to possibly serve in the military.

Was your number drawn? Go to this chart to see what your number was based on your birthdate. <https://bit.ly/1970DraftNumbers> If it was less than 195, you were to report to the draft office in 1970!

My draft number _____ Was it called? _____

Let students share as a class whether their number was eventually picked that year. **Reiterate to them that at the beginning of 1970 the Selective Service did not know how many draft numbers were to be chosen**, this was done throughout the year whenever it was determined more soldiers needed to be recruited. About 2/3 (67%) of soldiers volunteered to go, the other 1/3 (33%) were drafted from the non-military public. For 1970 it so happened that the first 195 numbers were called.

This is also a good opportunity to let students share their own history. Ask students if they had any family members or loved ones that did serve in Vietnam? If they are comfortable sharing, give them space to do so.

Part 2: Theoretical Probability – small group work (15 minutes)

For this investigation, we will first think about how likely it would be for any month to be chosen for the draft. There are 366 possible dates in the container (including February 29th). Fill out the chart below to calculate the theoretical probability of being chosen for the draft given your birth month.

Month	Days in Month	Probability of a Month being chosen for draft Hint: Calculate Days in Month ÷ 366	Expected number of days of each month chosen for 195 draft numbers called Probability x 195
January	31		
February	29		
March	31		
April	30		
May	31		
June	30		
July	31		
August	31		
September	30		
October	31		
November	30		
December	31		
Total	366	1 or 100%	

The teacher should give students the opportunity to share their answers to make sure everyone has done these calculations correctly.

Part 3: Empirical Probability (10 minutes)

Have students work in their small groups to complete the table below and the questions that follow. Depending on the student’s experience with probability and expected value, the teacher may want to help them with the first row of the table.

Let’s watch the rest of the video about what happened during the actual draft lottery:
<https://www.youtube.com/watch?v=OkJH6sapQMA>

3. Recall any number that was chosen between 1-195 was eventually called to report to the draft board for military service. The numbers below show how many days out of each month were actually chosen to report (that is had a number of 195 or less).

Month	Expected number of days chosen (from above table)	Actual number of days in month chosen for 1969 draft
January		14
February		13
March		10
April		12
May		14
June		14
July		18
August		19
September		19
October		14
November		22
December		26

- Which month(s) were chosen most often? Which month(s) were chosen least often?
- Does there seem to be a significant difference between what we would expect to happen and what happened? That is, compare the actual and expected values.
- Does it seem like these numbers were truly randomly chosen for the 1969 draft? Why?

The teacher should pause here to lead a short class discussion about these questions. During the discussion be sure to address the over or under of how the actual numbers compared to the expected number of days. Ask them if these numbers seem truly random. A good point of discussion may be to ask them *Is it possible that these numbers occurred by chance?* Students will probably acknowledge that it is certainly possible. Then ask the more pointed question *Is it likely that these numbers occurred by chance?* There is a difference between possible and likely, which will be something to address later when students begin discussing more formal inferential statistics.

Part 4: Simulating the 1969 Draft – small group work or teacher led (15 minutes)

For this part of the exploration, students will use a sampler in CODAP (a free online, statistics software tool) to simulate several random draft drawings to see how likely it would have happened for the extreme months (December – 26 and March – 10) to be chosen if this was truly left to chance. Students and teachers do not need prior knowledge of CODAP to use this simulation, it is explained in the handout. If students have access to classroom laptops, this may be better for them to work in their small groups to run their simulations. If classroom laptops are

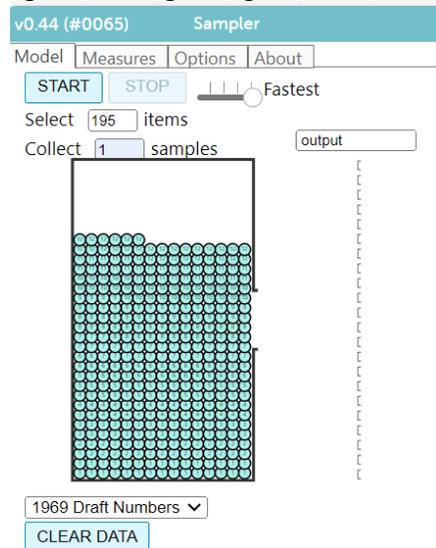
not available, it would also work well for the teacher to run the simulation on a project at the front of the classroom. This may also be a better option if time is an issue.

After students have experienced the simulation, allow them to work in groups to answer the questions in the handout.

Note: The CODAP file is attached to this lesson. It can be opened in CODAP to make changes and to make a new shareable link as needed.

Though it may seem that the way the numbers were chosen was not random, all things being fair, the way it happened may have happened by chance. Now we will use an online sampler to simulate the 195 dates that were chosen and see how likely the outcome that happened would happen by chance.

4. Go to the following CODAP site: <https://tinyurl.com/1969Vietnamdraft> (note this should be opened using Google Chrome or Firefox, does not work well with Safari or on phones/tablets)



In this simulation, notice there is an “urn” simulating the 366 days that were in the original glass container used for the 1969 draft.

The sampler is set to choose 195 days (without replacement). There is a graph that will show the number of days out of 195 chosen from each month.

There are two graphs shown on the screen. One graph shows the number of days chosen for December and one for March. For each graph there is a line that shows the actual number of days chosen for each month from the draft.

For the actual 1969 draft, about **26 of the 195 days chosen were from December and about 10 were from March.**

a. Take one sample. For your one sample record the following.

Number of days from March chosen: _____

Number of days from December chosen: _____

Were these numbers close to the actual numbers of 26 and 10 days respectively (note the green lines marking these values)? How do they compare?

b. Take more samples. Change the Collect 1 samples input to collect 50 samples.

How many samples had the number of days for December be 26 or higher? _____

- What percentage of samples were greater than or equal to 26? _____

How many samples had the number of days for March be 10 or lower? _____

- What percentage of samples were less than or equal to 10? _____

c. Now that you have simulated the 1969 draft 51 times, do you think it likely that the actual outcome of the draft was truly random? Would the actual outcome have happened if all days had an equally likely chance of occurring? Why?

Part 5: Bringing it all together – teacher led (10 minutes)

The following is part of the handout but may work well as a follow up discussion. Students will often ask questions that the teacher may not know the answer to, especially in a historical context. If there is time, let them look up the questions they ask. One question that is often asked is “once the Selective Service figured out that the dates were not properly mixed, did they redo the draft”? The Selective Service acknowledged the error, but the draft numbers for 1970 still stood and were not redone.

How could such a simple procedure go so wrong? In theory, pulling capsules from a well-mixed tumbler should provide random results and more-or-less uniform results across the months.

The key word in the previous sentence is “well-mixed.” In fact, the tumbler was anything but well-mixed. When the tumbler was filled, January capsules were placed in first, followed by February, and so on. Evidently, the mixing process did a poor job of shuffling the capsules around, leaving the capsules in the tumbler striated like a layer cake.

But why did they do it like this? Why not just use a computer to create random assignments?

Remember in 1969 computers were relatively new, people didn’t trust that technology yet, so the government thought airing the drawings where everyone could see the outcome would make them feel that the process was more equitable.

Almost immediately after the drawing, many statisticians cried foul and posted articles and arguments showing just how unfair this was. This led to the next drafts being chosen in different ways.

Extension: Look up how the 1970 and 1971 drafts were conducted. Do you think these drafts resulted in a more fair assignment? Why?

Attached Materials

List any additional materials that are attached.

- Student handout is attached
- Student handout with solutions is attached
- If you prefer Desmos, here is a link to a similar Desmos activity I created:
https://teacher.desmos.com/activitybuilder/custom/672a76a0fb8bb924eab1d377?utm_campaign=share&utm_content=activity
- CODAP file is attached which can be saved and edited or a new link generated as needed. CODAP files can be opened directly in the website
<https://codap.concord.org/app>
- Follow up homework assignment about Black and White relationships in Vietnam during the Civil Rights era.

Reflections and Additional Recommendations

I have taught this lesson in both an introductory statistics lesson as well as in a statistical modeling course and have even introduced it to middle school students. I find that high school and college students find this exploration particularly interesting because many of these students would have been the age of the young people who were drafted during the Vietnam War, it hits home for them. It also shows for them how important random sampling would have been when such high stakes are on the line.

The sampler gives a powerful introduction to informal inference, without thinking about formal p-values. Though having students consider the percentage of times extremes occur does introduce the idea of a probability value. The sampler shows how rare what happened with the extreme months (March and December) would have happened if everything were left up to chance. But it is also important for students to realize that this could have happened by chance, there is a lot of variability here (though I have rarely had 26 days in December ever chosen in the sampler!). Another follow up may be for students to look back at all the months to determine if any of the number of days chosen from the months seem to be “fair”.

This lesson is embedded in an introductory statistics course I teach on my campus that addresses societal inequities in the United States, specifically as they deal with racial inequities. As a follow up to this, I assign a homework assignment (attached) where students read a *New York Times* article about race relations among U.S. troops in Vietnam during the Civil Rights era. This article introduces a lot of statistics about the topic, giving a nice extension and follow up to this in class assignment.

As a result of teaching this class, I have developed many activities that have to do with historical statistics in the United States. Teaching about social justice in the present day can often be difficult, because statistics can be hard to find, and often issues are changing so fast, it is hard to know what students want to discuss. But I have found that bringing in historical issues gives students a chance to reflect on things that may be happening around them today. This can help empower students to see how the statistics they learn can be used to recognize inequities and even use that knowledge to become changemakers.

References

CBS Sunday Morning. (2019, December 1). Almanac: The 1969 Draft Lottery. YouTube.
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Murray, Paul, T. (1971) Local draft board composition and institutional racism. *Social Problems*,
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