Jacob Barker, Kody Scordellis

Dr. Emerson-Stonnell

MATH 175

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Math Paper

For our first group paper, we were given the choice to choose a sample question from the survey that the MATH 171 and MATH 301 students had taken and analyze the statistics of the responses.  From this survey, we selected the question “How likely are you to be married in the next 10 years?” Our hypothesis for this question is that a majority of individuals surveyed will not believe they will be married within the next 10 years, because according to Wendy Wang, marriage rates among college grads at age 25 has dropped significantly over the past two decades, being 33.7% in 2000 and 18.6% in 2016 (Wang). The rate is likely still dropping, and most individuals surveyed will be 28-32 within the next 10 years, meaning that most will likely not be married within the next 10 years, and we believe the surveyed individuals’ beliefs will reflect the statistics of Wang’s data.

We chose this question because the question is not too specific with a range of answers, which makes the math and hypothesis more interesting to find out. With the data given, and assuming the students will get married within 10 years, we feel confident with our hypothesis.

The study we chose is observational. Observational studies involve those collecting data having no influence on the surveyed individuals’ ideas or the survey’s results. This survey was observational because we had no influence on the answers of the MATH 171 and MATH 301 students. Our study contains a nonresponse type of bias because some of the students did not reply or answer to the survey online.

A simple random sample was acquired through our graphing calculator, the TI-84. By selecting “Math” on the calculator, and then PROB, and then number 8 (randIntNoRep). Then, we input the equation as randInt(1, 274, 30). We chose the range 1-274 because while there were 328 students who were given the survey, there was nonresponse among 54 of them, so we excluded the nonresponses and condensed the responses to 274 before producing the simple random sample. Once put in, the 30 numbers of the sample were given out. From here, we counted down the list by the number it gave, wrote down the answer that the selected number (student) gave, and gathered the data. This gave us an average for the official class, gender, and the percentage of answers.

Comparing the demographics of all Longwood students of our sample, approximately 68% of students on campus are female, while 32% of students are male. In our sample, 70% of the students were female, while 30% were male. In terms of the demographics of the classes, 26% of Longwood undergraduates are freshmen; 23% of Longwood undergraduates are sophomores; 22% of Longwood undergraduates are juniors; 29% of Longwood undergraduates are seniors. In our sample, 36.6667% of students were freshmen, 36.6667% of students were sophomores, 20% of students were juniors, and 6.6667% of students were seniors. While the sexes were only 2% different from the actual demographics of all of campus, the classes were vastly different, being over 10% more freshmen, over 13% more sophomores, and over 22% less seniors in the sample than the real statistic of class percentages for Longwood overall. Juniors were the only close class, being only 3% off from the proportion of juniors at Longwood. While the representation of sexes was almost identical to the proportion of males and females at Longwood, the official classes are not well-represented by our sample.

Comparing the demographics of our sample and all MATH 171 and MATH 301 students who took the survey, the statistics were very different, similar to the demographics of Longwood University compared to our sample. Percentages were found referring to the data we were given for our experiment, excluding the nonresponses. In terms of sexes, 70% of respondents were female and 30% were male in our sample. In terms of all individuals who responded to our survey, 65.820% were female and 34.180% were male, surprisingly varying more compared to the correlation between our sample and the population of Longwood University. For class proportions in our sample, 36.6667% of students were freshmen, 36.6667% of students were sophomores, 20% of students were juniors, 6.6667% of students were seniors, and 0% were other. For all respondents of our survey, 25.8182% of students were freshmen, 32.7273% of students were sophomores, 26.5455% of students were juniors, 14.1818% of students were seniors, and 0.7273% of students were other. These numbers for all who took the survey also vary fairly significantly from our sample, being over 9% less than the freshmen amount in our sample, over 3% less than the sophomores, over 6% more than the juniors, over 7% more than the seniors, and 0.7273% more than the “other” responses in our sample, which there were none of. Referring to responses to our question “How likely are you to be married in the next 10 years?”, the response percentages also varied greatly. For our sample, 6.6667% responded “almost no chance,”, 0% responded “some chance, but probably not,” 20% responded “50/50 chance,” 36.6667% responded “over 50% likely,” and 40% responded “almost certain.” For all respondents to our survey, 2.5455% responded “almost no chance,” 11.2727% responded “some chance, but probably not,” 28.7273% responded “50/50 chance,” 25.4545% responded “over 50% likely,” and 32% responded “almost certain.” Of these proportions, the closest between our sample and all surveyed individuals was “almost no chance,” only having a 4.1212% difference in responses, and the largest difference was for “some chance, but probably not,” having an 11.2727% difference, with none in the sample. The simple random sample and all results from our survey varied drastically.

From our survey, we are confident that our sample can be used to estimate the responses of all Longwood MATH 171 and MATH 301 students who took the survey; this does not include all Longwood students. Since we used simple random sampling to determine 30 students for our sample, we can say that the only bias we used was nonresponse, as we did not include the students who did not take the survey in our sample. For students who *did* take the survey, although, our simple random sample had no bias in determining who was included.

We do not believe that our sample can be used to estimate the responses of all Longwood Fall 2019 MATH 171 and MATH 301 students. There were 54 nonresponses in the survey, meaning the responses of over 16% of students could not be analyzed. Because of this, we believe it provides an incomplete coverage of the opinions of Longwood Fall 2019 MATH 171 and MATH 301 students’ beliefs in whether they will be married or not in the next 10 years.

We do not believe that our sample can be used to estimate the responses of all Longwood 2016-2020 MATH 171 and MATH 301 students. While the students are taking the same classes each year, the majors, sexes, and graduation year will vary each year as demographics of Longwood change. Our sample only contained MATH 171 and MATH 301 students from the Fall 2019 academic year.

[Confidence Interval Problem Explanation]

[Conclusion Paragraph]

Appendix

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| --- | --- | --- | --- | --- |
| Number From List | Answer | Official Class | | Gender |
| 151 | almost certain | Soph. | | F |
| 171 | over 50% | Fresh. | | F |
| 38 | 50/50 | Soph. | | M |
| 99 | over 50% | Soph. | | F |
| 197 | almost certain | fresh. | | F |
| 26 | over 50% | Fresh. | | M |
| 135 | over 50% | Fresh. | | F |
| 172 | 50/50 | Junior | | F |
| 58 | 50/50 | Soph. | | F |
| 252 | almost certain | Junior | | M |
| 260 | 50/50 | Soph. | | F |
| 191 | almost certain | Soph. | | F |
| 150 | over 50% | Junior | | F |
| 7 | over 50% | Fresh. | | F |
| 81 | almost certain | Soph. | | F |
| 74 | almost certain | Soph. | | F |
| 162 | almost no chance | Fresh. | | F |
| 248 | over 50% | Junior | | F |
| 258 | over 50% | Senior | | F |
| 5 | almost certain | Soph. | | F |
| 21 | Almost certain | Fresh. | | F |
| 13 | almost certain | Fresh. | | M |
| 64 | almost certain | Fresh. | | M |
| 225 | over 50% | Fresh. | | F |
| 52 | almost certain | Soph. | | M |
| 104 | almost no chance | | Junior | M |
| 245 | over 50% | Soph. | | F |
| 213 | almost certain | Senior | | M |
| 10 | 50/50 | Junior | | M |
| 223 | over 50% | Fresh. | | F |

Bibliography

Wang, W. (2018, March 16). Early Marriage Has Fallen, Especially Among Those Without a College Degree. Retrieved from <https://ifstudies.org/blog/early-marriage-has-fallen-especially-among-those-without-a-college-degree>.