

Sta 101 - Discussion Section

Feb 2, 2016

2.7 Swing voters. A 2012 Pew Research survey asked 2,373 randomly sampled registered voters their political affiliation (Republican, Democrat, or Independent) and whether or not they identify as swing voters. 35% of respondents identified as Independent, 23% identified as swing voters, and 11% identified as both.⁵⁸

- (a) Are being Independent and being a swing voter disjoint, i.e. mutually exclusive?
- (b) Draw a Venn diagram summarizing the variables and their associated probabilities.
- (c) What percent of voters are Independent but not swing voters?
- (d) What percent of voters are Independent or swing voters?
- (e) What percent of voters are neither Independent nor swing voters?

2.7 Swing voters. A 2012 Pew Research survey asked 2,373 randomly sampled registered voters their political affiliation (Republican, Democrat, or Independent) and whether or not they identify as swing voters. 35% of respondents identified as Independent, 23% identified as swing voters, and 11% identified as both.⁵⁸

- (f) Is the event that someone is a swing voter independent of the event that someone is a political Independent?

2.17 Global warming. A 2010 Pew Research poll asked 1,306 Americans “From what you’ve read and heard, is there solid evidence that the average temperature on earth has been getting warmer over the past few decades, or not?”. The table below shows the distribution of responses by party and ideology, where the counts have been replaced with relative frequencies.⁶³

		<i>Response</i>			Total
		Earth is warming	Not warming	Don't Know Refuse	
<i>Party and Ideology</i>	Conservative Republican	0.11	0.20	0.02	0.33
	Mod/Lib Republican	0.06	0.06	0.01	0.13
	Mod/Cons Democrat	0.25	0.07	0.02	0.34
	Liberal Democrat	0.18	0.01	0.01	0.20
	Total	0.60	0.34	0.06	1.00

- (a) Are believing that the earth is warming and being a liberal Democrat mutually exclusive?
- (b) What is the probability that a randomly chosen respondent believes the earth is warming or is a liberal Democrat? **(See the next page for parts (c)-(f).)**

		<i>Response</i>			
		Earth is	Not	Don't Know	
		warming	warming	Refuse	Total
<i>Party and Ideology</i>	Conservative Republican	0.11	0.20	0.02	0.33
	Mod/Lib Republican	0.06	0.06	0.01	0.13
	Mod/Cons Democrat	0.25	0.07	0.02	0.34
	Liberal Democrat	0.18	0.01	0.01	0.20
Total		0.60	0.34	0.06	1.00

- (c) What is the probability that a randomly chosen respondent believes the earth is warming given that he is a liberal Democrat?
- (d) What is the probability that a randomly chosen respondent believes the earth is warming given that he is a conservative Republican?
- (e) Does it appear that whether or not a respondent believes the earth is warming is independent of their party and ideology? Explain your reasoning.

		<i>Response</i>			
		Earth is	Not	Don't Know	
		warming	warming	Refuse	Total
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(f) What is the probability that a randomly chosen respondent is a moderate/liberal Republican given that he does not believe that the earth is warming?

2.25 It's never lupus. Lupus is a medical phenomenon where antibodies that are supposed to attack foreign cells to prevent infections instead see plasma proteins as foreign bodies, leading to a high risk of blood clotting. It is believed that 2% of the population suffer from this disease. The test is 98% accurate if a person actually has the disease. The test is 74% accurate if a person does not have the disease. There is a line from the Fox television show *House* that is often used after a patient tests positive for lupus: “It's never lupus.” Do you think there is truth to this statement? Use appropriate probabilities to support your answer.