Ipsos Poll Conducted for Reuters

Lance Armstrong Poll1.22.13

These are findings from an Ipsos poll conducted for Thomson Reuters from January 18-22, 2013 . For the survey, a sample of 1,240 Americans ages 18+ were interviewed online. The precision of the Reuters/Ipsos online polls is measured using a credibility interval. In this case, the poll has a credibility interval of plus or minus 3.2 percentage points. For more information about credibility intervals, please see the appendix.

The data were weighted to the U.S. current population data by gender, age, education, and ethnicity. Statistical margins of error are not applicable to online polls. All sample surveys and polls may be subject to other sources of error, including, but not limited to coverage error and measurement error. Figures marked by an asterisk (*) indicate a percentage value of greater than zero but less than one half of one per cent. Where figures do not sum to 100, this is due to the effects of rounding.

LANCE ARMSTRONG

Q1. How familiar are you with the following athletes, taking into account all the ways you may have heard about them?

	Very familiar	Somewhat familiar	Not very familiar	Have heard of them, but that's it	Have not heard about them	*Aware (net)*
Tiger Woods	58%	28%	7%	5%	2%	*98%*
Lance Armstrong	53%	30%	8%	5%	4%	*96%*
Kobe Bryant	44%	27%	13%	10%	5%	*95%*
Michael Phelps	47%	29%	9%	8%	6%	*94%*
Serena Williams	43%	29%	13%	8%	7%	*93%*
Tom Brady	40%	23%	13%	11%	13%	*87%*
Tim Tebow	39%	25%	13%	9%	13%	*87%*
Michael Vick	40%	24%	14%	9%	14%	*86%*
Roger Clemens	33%	23%	18%	12%	15%	*85%*
Roger Federer	20%	21%	19%	12%	28%	*72%*
Usain Bolt	18%	15%	20%	9%	38%	*62%*
Ben Johnson	11%	13%	24%	11%	41%	*59%*

Q2. Would you say you are generally favorable or unfavorable towards these athletes? (*Asked of those aware of each athlete*)

	Very favorable	Somewhat favorable	Lean towards favorable	Lean towards unfavorable	Somewhat unfavorable	Very unfavorable	*Total favorable (net)*	*Total unfavorable (net)*
Michael Phelps	31%	26%	30%	8%	3%	2%	*87%*	*13%*
Serena Williams	32%	25%	30%	8%	3%	3%	*86%*	*14%*
Tom Brady	26%	23%	33%	12%	3%	3%	*82%*	*18%*
Roger Federer	19%	22%	40%	14%	3%	3%	*81%*	*19%*
Usain Bolt	23%	21%	36%	15%	3%	3%	*79%*	*21%*
Tim Tebow	28%	21%	30%	13%	4%	3%	*79%*	*21%*
Ben Johnson	10%	18%	43%	21%	4%	5%	*70%*	*30%*
Roger Clemens	13%	16%	38%	18%	6%	9%	*67%*	*33%*
Kobe Bryant	17%	17%	30%	19%	8%	9%	*64%*	*36%*
Tiger Woods	16%	15%	23%	21%	10%	15%	*55%*	*45%*
Michael Vick	14%	11%	23%	20%	9%	23%	*48%*	*52%*
Lance Armstrong	11%	9%	16%	21%	10%	32%	*37%*	*63%*

Q3. Would you say that each of the following athletes is a good or bad role model for children? (*Asked of those aware of each athlete*)

	Good role model	Bad role model	Don't know
Serena Williams	67%	10%	23%
Tim Tebow	65%	9%	26%
Michael Phelps	63%	14%	23%
Tom Brady	59%	7%	34%
Roger Federer	43%	8%	50%
Usain Bolt	41%	11%	48%
Kobe Bryant	30%	37%	33%
Ben Johnson	27%	17%	56%
Roger Clemens	25%	33%	42%
Tiger Woods	20%	62%	18%
Michael Vick	15%	60%	25%
Lance Armstrong	13%	71%	16%

Q4. How much, if anything have you heard about the Lance Armstrong's admission that he used performance-enhancing drugs?

A great deal	38%
A fair amount	32%
A little bit	21%
Nothing at all	9%
At least a little bit (net)	*91%*

Q5. Please indicate how much you agree or disagree with the following statements: (*Asked of those who have heard at least a little about Lance Armstrong's admission about doping, n=1,143)*

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	*Total agree*	*Total disagree*
Lance Armstrong should be banned from competing in racing in the future	38%	18%	24%	10%	9%	*57%*	*20%*
Lance Armstrong has come forward with the whole truth about his doping	16%	27%	27%	17%	13%	*43%*	*30%*
Despite the doping scandal, Lance Armstrong is a good person	15%	21%	35%	14%	15%	*36%*	*29%*
Lance Armstrong's legacy as an athlete outweighs the doping scandal	11%	13%	22%	19%	35%	*25%*	*54%*

Q6. Why do you believe Lance Armstrong confessed to doping? (*Asked of those who have heard at least a little about Lance Armstrong's admission about doping, n=1,143)*

He knew he could no longer continue to deny it	48%
He wants to rebuild his public image	31%
To minimize his legal issues	28%
He wants to be able to continue competing in cycling and triathlons	27%
To wipe the slate clean	19%
He is genuinely remorseful	12%
To show support for anti-doping initiatives	3%
Other (specify)	4%
Not sure	11%

Q7. For each of the athletes below, do you think they will be remembered more for their athletic achievements or the scandals involving them? (*Asked of those aware of each athlete*)

	Athletic achievements	Scandals	Not sure
Lance Armstrong	16%	72%	12%
Michael Vick	15%	66%	19%
Tiger Woods	35%	54%	11%
Roger Clemens	26%	38%	37%
Kobe Bryant	45%	29%	26%
Ben Johnson	18%	24%	58%
Michael Phelps	71%	10%	19%

How to Calculate Bayesian Credibility Intervals

The calculation of credibility intervals assumes that Y has a binomial distribution conditioned on the parameter θ\, i.e., Y|θ~Bin(n,θ), where n is the size of our sample. In this setting, Y counts the number of "yes", or "1", observed in the sample, so that the sample mean ($\bar{y}$) is a natural estimate of the true population proportion θ. This model is often called the likelihood function, and it is a standard concept in both the Bayesian and the Classical framework. The Bayesian [1] statistics combines both the prior distribution and the likelihood function to create a posterior distribution. The posterior distribution represents our opinion about which are the plausible values for θ adjusted after observing the sample data. In reality, the posterior distribution is one's knowledge base updated using the latest survey information. For the prior and likelihood functions specified here, the posterior distribution is also a beta distribution (π(θ/y)~β(y+a,n-y+b)), but with updated hyper-parameters.

Our credibility interval for ϑ is based on this posterior distribution. As mentioned above, these intervals represent our belief about which are the most plausible values for ϑ given our updated knowledge base. There are different ways to calculate these intervals based on . Since we want only one measure of precision for all variables in the survey, analogous to what is done within the Classical framework, we will compute the largest possible credibility interval for any observed sample. The worst case occurs when we assume that a=1 and b=1 and . Using a simple approximation of the posterior by the normal distribution, the 95% credibility interval is given by, approximately:

$$\bar{y} \mp \frac{1}{\sqrt{n}}$$

For this poll, the Bayesian Credibility Interval was adjusted using standard weighting design effect 1+L=1.3 to account for complex weighting[2]

Examples of credibility intervals for different base sizes are below. Ipsos does not publish data for base sizes (sample sizes) below 100.

Sample size	Credibility intervals
2,000	2.5
1,500	2.9
1,000	3.5
750	4.1
500	5.0
350	6.0
200	7.9
100	11.2

[1] *Bayesian Data Analysis, Second Edition, Andrew Gelman, John B. Carlin, Hal S. Stern, Donald B. Rubin, Chapman & Hall/CRC | ISBN: 158488388X | 2003*

[2] *Kish, L. (1992). Weighting for unequal Pi . Journal of Official, Statistics, 8, 2, 183200.*