**Description of the Weight Computed for ATP Panelists**

**Who Completed Both Waves 28 and 29 (WEIGHT\_W28W29)**

A custom weight, called WEIGHT\_W28W29, was computed for the 4,573 panelists who completed both Wave 28 and Wave 29 of the Pew American Trends Panel (ATP). The computation of the weight was similar to that of routine wave weights, except that the propensity adjustment was revised to account for nonresponse to Wave 28 or Wave 29 in addition to panel attrition and refusal to the invitation to join the panel. The weight was computed in three main stages:

* Base weight adjusting for differential probabilities of selection;
* Propensity adjustment;
* Calibration to demographic distributions for the target population.

## Base Weight

A base weight is computed for all ATP members. The base weight adjusts for factors affecting the probability that the individual was selected for the panel. This probability comes from the survey in which the respondent was recruited. Currently, all ATP members were recruited through three probability-based, national overlapping dual-frame landline and cell phone RDD surveys: the Typology Survey in 2014, the Governance Survey in 2015 and the Panel Refresh Survey in 2017. The target population for the RDD surveys was identical to the target population for the ATP (adults living in households in the US). All of the RDD surveys were administered in English and Spanish. In the landline sample of the RDD surveys, one adult was randomly selected from within the household. Interviewers asked to speak with either the youngest male or youngest female at home at the time of the call. In the cell sample of the RDD surveys, interviews were conducted with the person who answered the phone, provided they were age 18+ and spoke English or Spanish.

All but two groups of respondents to the RDD surveys were invited to join the panel. The first exception was some individuals who do not use the internet, as this group was initially subsampled for the panel in the Typology Survey prior to all non-internet households being invited. Additionally, internet users who are non-Hispanic white and have a higher than high school education were also subsampled in the 2017 Panel Refresh Survey. The panel invitation featured a $10 post-paid incentive for agreeing to join and a fixed post-paid incentive for each panel survey completed. Hispanics/Latinos and adults age 18 to 25 recruited in the Typology Survey were offered $10 per panel survey. Hispanics/Latinos taking the survey in Spanish recruited in the Governance Survey and all non-internet panelists who had received a tablet were offered $20 per panel survey. Respondents who were Hispanics/Latinos taking the survey in English, African Americans, age 18 to 29, with high school education or less, or not registered to vote, recruited in the Governance Survey and Panel Refresh Survey were offered $10 per panel survey. All other respondents in both surveys were offered $5 per survey. The differential incentives were designed to preemptively offset anticipated differential response rates across these groups.

For most ATP members, their base weight was computed using single frame estimation to adjust for the probability that the respondent’s phone number was selected from the sampling frame, the overlap in the landline and cell phone frames, and the within household selection in the landline sample. For most panel members, the base weight can be expressed as:

Where:

LL =1 if respondent has a landline phone

=0 if respondent has no landline phone

CP =1 if respondent has a cell phone

=0 if respondent has no cell phone

Sll= number of cases released in the landline sample

Scp=number of cases released in the cell phone sample

Ull=size of the landline RDD frame

Ucp=size of the cell phone RDD frame

AD=number of adults in the household (1, 2, 3 or more)

For a subset of the ATP members, an additional adjustment is included in the base weight to account for the fact that they belong to a group that was subsampled for invitation to the panel. In the Typology Survey, non-internet users were subsampled at a rate of 25% from January 23, 2014 through February 5, 2014, but they were not subsampled (100% invited) from February 6, 2014 through the end of the field period. Internet users who agreed to join the panel in the Typology Survey but did not have an email address were taken at 100% from January 23, 2014 through February 5, 2014, but they were subsampled at a rate of 25% from February 6, 2014 through the end of the field period. The base weight of the affected cases was multiplied by the inverse of the subsampling rate (1 / .25 = 4). In the Panel Refresh Survey, internet users who are non-Hispanic white and have a higher than high school education were subsampled at 50%. The base weight of such cases was also multiplied by the inverse of the subsampling rate (1 / .5 = 2).

## Propensity Adjustment

The next weighting stage was a propensity adjustment designed to correct for differences between the 4,573 panelists who completed both Wave 28 and Wave 29 and the panelists who did not complete both waves because they declined to join the panel, joined the panel but dropped out, or are still active in the panel but did not complete both waves.

To the extent that the 4,573 respondents to Waves 28 and 29 may be different from individuals who did not complete both waves (either because they declined to join, because they dropped out, or because they did not complete both waves), there is a risk that estimates from the sample of 4,573 could be subject to nonresponse bias. A logistic regression model was estimated in which being an active panel member was regressed on recruitment survey sampling frame, incentive amount ($10/20 vs $5 per survey), internet user, race, child in the household, age, education, religious service attendance, survey recruitment (Typology vs Governance/Panel Refresh), registered to vote, party identification (Republican vs Democrats/Independent/Others), and statistically significant 2-way interactions (p < .05). The model was estimated using the respondents in the recruitment surveys who were invited to join the panel. Hispanic ethnicity was excluded from the model because it was collinear with the incentive variable. Number of adults in the household, child in the household and incentive were not predictive and ultimately excluded from the model. The set of predictors considered for the model are variables that are routinely measured in surveys conducted for the Pew Research Center for the People & the Press. The significant predictors used in the final model are presented in Table 1.

The estimated propensities were used to divide cases into approximately equal size groups using the quintiles of the estimated propensity score. Quintiles have been found to be effective in capturing most of the variation. For each quintile, the propensity score adjustment was computed as the inverse of the proportion of cases completing both waves. This approach helps to protect against model misspecification, relative to using the inverse of the propensity score.

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| **Table 1. Parameter Estimates from the Attrition Propensity Model^** | | | | |
| **Variable (reference group)** | **Estimate** | **s.e.** | **p-value** |  |
| Intercept | -3.708 | 0.592 | <.001 | \*\*\* |
| Frame (landline) | -0.444 | 0.133 | 0.001 | \*\* |
| Gender (male) | 0.416 | 0.109 | <.001 | \*\*\* |
| Internet User (non-user) | 0.239 | 0.590 | 0.685 |  |
| Race (other race) |  |  | <.001 | \*\*\* |
| White | 0.419 | 0.084 | <.001 | \*\*\* |
| African American | 0.199 | 0.098 | 0.043 | \* |
| Asian | 0.071 | 0.131 | 0.588 |  |
| Multi-racial | 0.371 | 0.121 | 0.002 | \*\* |
| Child in HH (no children) | -0.169 | 0.083 | 0.041 | \* |
| Age | -0.017 | 0.007 | 0.022 | \* |
| Education | 0.217 | 0.074 | 0.004 | \*\* |
| Religious Attendance | 0.333 | 0.077 | <.001 | \*\*\* |
| Recruitment Survey |  |  | 0.007 | \*\* |
| Governance | 0.306 | 0.166 | 0.065 | \* |
| Panel Refresh | 0.604 | 0.198 | 0.002 | \*\* |
| Registered to Vote | -0.682 | 0.124 | <.001 | \*\*\* |
| Party Identification |  |  | <.001 | \*\*\* |
| Democrat | 1.472 | 0.302 | <.001 | \*\*\* |
| Independent/Others | 0.719 | 0.308 | 0.02 | \* |
| Frame x Age | 0.011 | 0.002 | <.001 | \*\*\* |
| Internet User x Age | 0.025 | 0.007 | <.001 | \*\*\* |
| Internet User x Education | 0.137 | 0.063 | 0.029 | \* |
| Internet User x Religious Attendance | -0.195 | 0.059 | 0.001 | \*\* |
| Internet User x Party Identification |  |  | 0.052 |  |
| Internet User x Democrats | -0.646 | 0.275 | 0.019 | \* |
| Internet User x Independent/Others | -0.360 | 0.285 | 0.207 |  |
| Gender x Education | -0.060 | 0.020 | 0.002 | \*\* |
| Child in HH x Party Identification |  |  | 0.012 | \* |
| Child in HH x Democrats | 0.026 | 0.106 | 0.806 |  |
| Child in HH x Independent/Others | 0.243 | 0.099 | 0.014 | \* |
| Age x Education | -0.002 | 0.001 | 0.001 | \*\* |
| Age x Religious Attendance | -0.002 | 0.001 | 0.001 | \*\* |
| Religious Attendance x Registered to Vote | 0.092 | 0.033 | 0.006 | \*\* |
| Religious Attendance x Party Identification | |  | <.001 | \*\*\* |
| Religious Attendance x Democrats | -0.154 | 0.031 | <.001 | \*\*\* |
| Religious Attendance x Independent/Others | -0.089 | 0.030 | 0.003 | \*\* |
| Recruitment Survey x Age |  |  | 0.011 | \* |
| Governance x Age | -0.002 | 0.002 | 0.319 |  |
| Panel Refresh x Age | -0.009 | 0.003 | 0.003 | \*\* |
| Recruitment Survey x Education |  |  | 0.011 | \* |
| Governance x Education | -0.045 | 0.022 | 0.046 | \* |
| Panel Refresh x Education | -0.078 | 0.028 | 0.006 | \*\* |
| \*\*\* *p*<.001, \*\* *p*<.01, \* *p*<.05 |  |  |  |  |
| ^Variables are coded such that the model predicts response to both Wave 28 and Wave 29. Positive coefficients are associated with a higher probability of response. Negative coefficients are associated with lower probability of response. | | | | |

## Calibration to Target Population Controls

In the final stage of weighting, the propensity-adjusted weights were calibrated to population benchmarks using raking, or iterative proportional fitting. This adjustment is designed to reduce the risk of nonresponse bias stemming from nonresponse at the various stages of the panel design. The raking adjustment was done within the four combinations of the two forms of Wave 28 and Wave 29. The raking dimensions and the source for the population parameter estimates are reported in Table 2. All raking targets are based on the non-institutionalized U.S. adult (age 18+) population.

Most of the dimensions are commonly observed in weighting protocols for general population household surveys in the US. One exception is the raking for internet usage. This is included in the algorithm so that the panel survey estimates reflect the target population with respect to the proportion of people who use the internet and the proportion who do not. Currently, all of ATP interviews are completed via self-administered Web survey. There is, therefore, a concern that internet users could be over-represented in the survey estimates if this dimension is not controlled for in the raking. Currently, the estimated population parameter for the percent of U.S. adults who use the internet is 90.2%, based on the 2017 ATP Panel Refresh Survey conducted for the Pew Research Center. It would have been preferable to use a large, federal in-person survey (such as ACS or CPS) to obtain this parameter estimate, but unfortunately the federal government does not routinely measure internet access from any location.[[1]](#footnote-1),[[2]](#footnote-2) Another dimension that is not typically used in weighting protocols for general population household surveys in the US is volunteering. It is included in the calibration to adjust for some potential bias due to the over-representation of more civically engaged adults of the panel identified in some recent analysis.

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| **Table 2. Raking Dimensions and Source for Population Parameter Estimates** | |
| **Raking Dimension^** | **Source** |
| Gender(2) x Age(6) | 2015 American Community Survey |
| Gender(2) x Education (3) | 2015 American Community Survey |
| Age(3) x Education(3) | 2015 American Community Survey |
| Race/Ethnicity(4) | 2015 American Community Survey |
| Census Region(4) | 2015 American Community Survey |
| Population Density(5) | 2010 Decennial Census |
| Telephone Service(3) | January-July 2016 National Health Interview Survey, projected to 2017 |
| Internet Usage(2) | 2017 ATP Panel Refresh Survey |
| Party Affiliation(3) | Average from the three most recent monthly surveys conducted for the Pew Research Center for the People & the Press |
| Volunteerism(2) | September 2015 Current Population Survey Volunteer Supplement |
| ^ The numbers of categories (prior to any collapsing from small cell size) are shown in parentheses. | |

***Trimming***

The distribution of the raked weights was then evaluated and checked for extreme values. The weights were trimmed at the 1.5th and 98.5th percentiles.

***Design Effect and Margin of Error***

Weighting and survey design features that depart from simple random sampling tend to result in an increase in the variance of survey estimates. This increase, known as the design effect or *deff*, should be incorporated into the margin of error, standard errors, and tests of statistical significance. The overall design effect for a survey is commonly approximated as the 1 plus the squared coefficient of variation of the weights and for this set of weights it was equal to 2.77. For estimates based on this sample of n=4,573 panelists, the margin of error (half-width of the 95% confidence interval) incorporating the design effect for estimates of p=50% is ± 2.41 percentage points. Estimates based on subgroups will have larger margins of error. It is important to remember that random sampling error is only one possible source of error in a survey estimate. Other sources, such as question wording and reporting inaccuracy, may contribute additional error.

1. The July 2011 Current Population Survey estimated that 73% of US residents age 15 and older access the internet from some location. Given the increasing trends in internet access, particularly on mobile devices, this 2011 CPS estimate was deemed too out-of-date to be helpful in the ATP weighting. [↑](#footnote-ref-1)
2. Starting in 2013 the American Community Survey is measuring internet access, but it only measures access inside the sample household. Members of the ATP are permitted to complete the surveys from any location. So the more relevant parameter for the ATP is the proportion of adults who can access the internet from any location, not just at home. [↑](#footnote-ref-2)