

MSIS 510
Statistical Analysis for
Management Decision Making

UNC Phonathon Analysis

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Introduction and Background

As part of their overall alumni fund-raising and development efforts, many colleges and universities have some sort of calling or “phonathon” program to solicit the great number of alumni that they cannot contact through personal visits. Certain information about the alumni is provided to the callers to help them make their comments in the call more relevant and to help them target their “ask” - the amount they ask the alumnus to give. Phonathon managers want 1) to provide the most useful and relevant information for the callers to maximize the pledges and 2) to have some sense of the expected pledges from the calling segments given to the callers. The University of North Carolina (UNC) has a year-round calling program with paid student callers and an automated calling system to call more than 100,000 alumni annually. Last year, the phonathon hit the \$2 million pledge level, and they are always seeking to improve the program.

Problem Statement

Using data available to the phonathon callers, which are the most important factors driving pledge levels and can these be used to predict expected results from calling efforts? Factors that we initially considered were *Experience* (in months), the *Ask* amount, and the *Last* pledge and the relationship of these factors to the new *Pledge* level. Knowing the answers to these questions can help phonathon managers tailor their approach to calls and to training the callers. For example, if experience is found to be a significant positive factor, then more experienced callers could be put on larger past pledges to drive the new pledges up. If the *Ask* amount is more significant, callers would be trained better in selecting the *Ask* amount and making their

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asks. Or, if the model is good and general results in a short time period (e.g., a day or week, not an hour) do not achieve predicted levels, phonathon managers would want to explore what is happening to help them take corrective action.

Use of Regression Analysis

Regression analysis was chosen for this situation because it is able to analyze the relationships of quantitative (numeric rather than categorical) independent factors against a quantitative dependent variable. Further, if the relationships are determined to be strong, regression analysis can provide predictions of the dependent variable (in this case, the new *Pledge* level). Because there are multiple independent variables - *Ask*, *Experience*, *Last*, etc. - a multiple regression would be performed.

The Analysis Process

Data Collection - At UNC, the phonathon generally calls alumni that have given less than \$1,000, including “never-givers” who have given nothing. We wanted to collect data that was both random and generalizable to the population. The automated system randomly assigns calls to the caller from the population segment being called. The Phonathon Manager chose six callers - two new callers with one month’s experience, two with a semester’s (4-5 months) experience, one with eight months’ experience and one with two years’ (14 months) experience. Taking the data from a live calling session, with the calls assigned by the system, and this mix of callers, I believe, gave us both random and generalizable data.

Callers entered their calls and results onto a Data Collection Sheet like that attached to this report. The attached sheet shows actual data from one of the callers. Note that the callers only

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recorded actual pledges from contacts made. We collected a total of 114 observations of pledge commitments from the six callers.

Factors Used - We collected *Last*, *Ask*, *Experience*, and *Pledge* as noted before. I questioned whether the actual *Ask* amount or the percentage increase in the ask over the *Last* pledge would be more relevant so I calculated the *Ask%*. Thinking that at higher levels a caller can ask for much more and the alumnus may be more responsive, I also wondered if the interaction of the *Ask* and the *Last* pledge would have more impact. With this thought in mind I also calculated the *Ask*Last* by merely multiplying the two independent factors. So with *Pledge* as the dependent variable, I began the analysis with *Last*, *Ask*, *Experience*, *Ask%*, and *Ask*Last* as the dependent variables.

Analysis Process - A scatter plot of the pairs of variables quickly showed that *Experience* was not a useful factor. I ran a preliminary regression analysis with the other factors to identify any unusual observations; a number were found and four were discarded (e.g., a *Last* pledge of \$50 and an *Ask* of \$3,000 and other atypical situations.) With the remaining 110 observations, I ran a Stepwise analysis to see which were the most relevant factors. The analysis showed that *Last* and *Ask*Last* were the key factors with statistical relevance. Although the *Ask* amount had an 85+ % correlation with the Pledge amount, it added no significant value to the regression equation after *Last* and *Ask*Last* were considered. The regression equation resulting from the analysis was:

$$Pledge = 8.76 + 0.727 * Last + 0.00132 * Ask*Last$$

In laymen's terms, (assuming the relationships are strong, which I determined to be true) the

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Pledge amount is made up of \$8.76 as a constant, plus 72.7% of the *Last* pledge, and plus .132% times the product of the *Last* and the *Ask*. With a \$25 *Last* pledge and a \$50 *Ask*, for example, the constant has more impact in the equation. With a \$75 *Last* pledge and a \$100 *Ask*, the *Ask*Last* factor becomes more significant. (Please note that the equation is not meant to predict individual pledges!)

The regression analysis (and prior correlation) showed the *Last* and *Ask*Last* factors to be quite strong in relating to the *Pledge* amount. One of the statistical values (R^2 -adj) indicates that the model explains 90.2% of the variation in Pledges. A plot of the standardized residuals against the predictions and the dependent factors showed little or no pattern so we could conclude that the regression model is appropriate for predicting the pledge value.

Predictions Using the Regression

The regression analysis offers prediction capabilities. For certain typical Last and Ask values, the regression provided the following predicted values or “Fits” and a 95% confidence range.

Last	Ask	Ask*Last	Fit, or Predicted value	95% Confidence Interval
25	50	1,250	28.59	(24.05, 33.13)
25	100	2,500	30.24	(25.60, 34.88)
50	100	5,000	51.72	(47.48, 55.97)
100	150	15,000	101.3	(93.67, 108.91)
100	200	20,000	107.9	(101.40, 114.40)
200	400	80,000	259.9	(246.54, 273.29)

As noted above, the regression equation or “model” is not meant to predict the results of each

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individual pledge. But, if pledges are taken in groups and UNC looked at pledges, for say a week, they could expect with 95% confidence that pledges with a Last Pledge of \$25 and an Ask of \$100 ($Ask * Last = \$2,500$) would average in the range of \$25.60 to \$34.88 as seen in line two of the chart above.

Business Summary

UNC can see that *Experience* has little impact on results (as the Phonathon manager predicted in advance.) Key factors in the *Pledge* rate are the *Last* pledge amount and the interaction of Ask and Last ($Ask * Last$). This means that at the lower pledge levels, there is very little impact from the ask, and at higher pledge levels the ask and last work together relating to a higher pledge amount. It must be noted that the regression was run with *Last* pledges in the range of \$5-300 and *Asks* in the range of \$5-600. UNC should not try to predict results out of this range as results may not be valid.

One of the supervisors asked me if the \$100 ask was appropriate. Based on this analysis, it is certainly appropriate but doesn't seem to make that much difference in increasing the smaller pledges. A useful follow-up analysis would be to try different Ask amounts with the smaller pledges, perhaps \$96 in 1996 or \$83 for someone in the class of 1983. An Analysis of Variance (ANOVA) with separate and specific types of asks would be more useful in selecting a specific *Ask* amount at the lower pledge levels.

Note also that this analysis does not take into account the fulfillment rate of pledges. This is another separate analysis that UNC may wish to perform.