

Understanding Employee Attrition

Brian Anderson ~ 1 March 2019

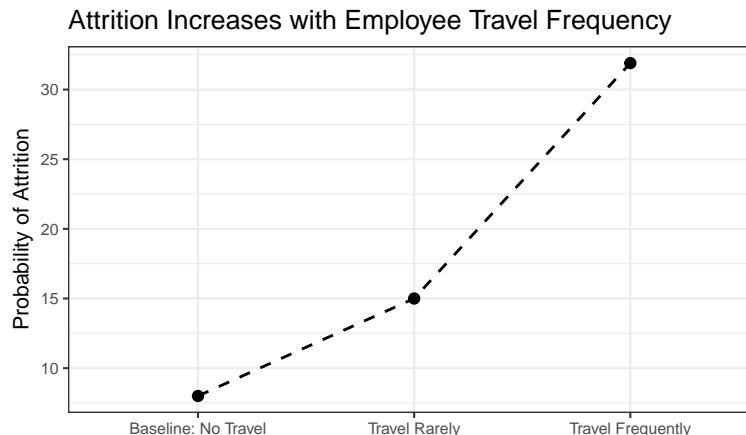
Summary

I identified three meaningful factors influencing the probability of an employee voluntarily leaving (attrition) the company:

- The frequency of work-related travel
- The commuting distance from home to the office
- The number of training events attended in the past year

The second and first factors increase the probability of attrition. As travel frequency and commuting distance increases, so does the probability of attrition. However, attending more training events *decreases* the probability of attrition. I used 1,470 employee records from our human resources management system in my analysis. These analyses are only meant to illustrate patterns in the data, and not to infer a causal connection between any of the factors and attrition. I recommend interpreting these relationships as a place to start more rigorous research into the causes of attrition.

Travel Frequency



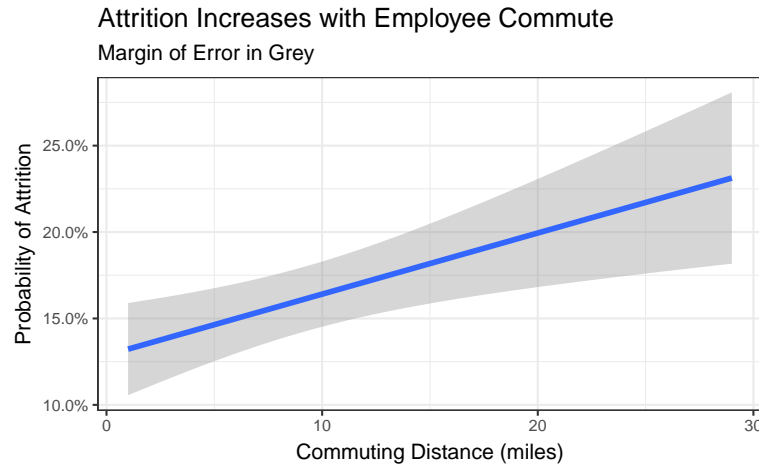
There are three categories of travel frequency, as displayed in the figure above. There is a modest change in the probability of attrition when going from the baseline category of no travel, and a much larger change going from the travel rarely category to the travel frequently category.

The following table highlights the expected change in the probability of attrition as we move from the baseline up through the travel frequently category. The *lower* and *upper* bounds represent the margin of error (confidence interval) around the change in probability. You can interpret the margin of error as the probability of the change in attrition could fall anywhere inside this range, given this data.

To relate the table to the figure, add the “Change in Attrition” column cumulatively to see the expected change in attrition; the expected probability of attrition for the *Travel Rarely* category is 7% plus the baseline value of 8%, so a cumulative 15% increase in the probability of attrition.

	Change in Attrition	Lower Bound	Upper Bound
Baseline: No Travel	8.0	2.2	13.8
Travel Rarely	7.0	0.7	13.2
Travel Frequently	16.9	9.7	24.2

Commuting Distance

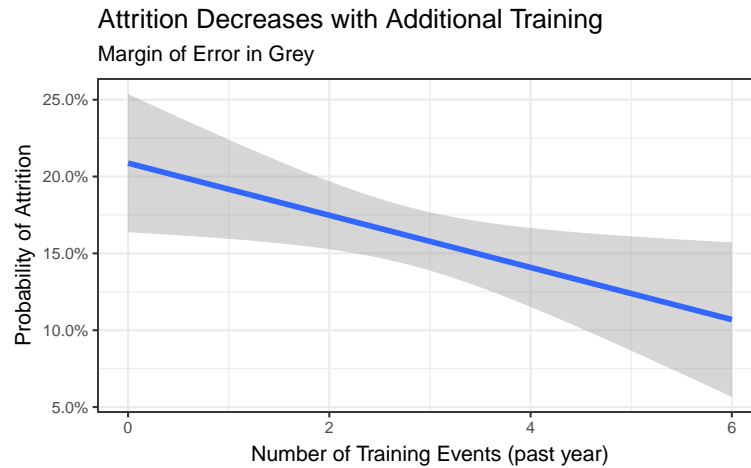


In the figure above, we see a modest increase in the probability of attrition for each mile increase in employee commute. The grey bar represents the margin of error (confidence interval), and as before, the predicted probability could plausibly fall anywhere within this range. This is important because, for example, at short commutes, the predicted probability could be as high as ~16% in this data, while at very long commutes, the predicted probability could be as low as ~18%. With a possible ~2% difference, while commuting is a meaningful predictor of attrition, its effect may be modest.

That said, as described in the below table, we would expect about a .5% change in the probability of attrition for each one mile increase in commuting distance. Also of note is our baseline level of attrition—with a commute of zero, we would expect about a 13% probability of attrition.

	Change in Attrition	Lower Bound	Upper Bound
Baseline: No Commute	12.9	10.0	15.7
Each One Additional Mile	0.4	0.1	0.6

Training Frequency



Our last figure shows a fairly robust decrease in the probability of attrition for each additional training session attended in the past year. That said, the larger margin of error around our prediction suggests greater uncertainty about this relationship, and so we should interpret this model with caution.

In the table below, we see a 1.7% decrease in the probability of attrition for each additional training session, although that probability could plausibly range from as much of a 3.2% decrease to a far more modest .2% decrease in this data. A reasonable conclusion is that this data suggests that additional training lowers attrition, although why it does so, and having greater confidence in estimate, warrants additional study.

	Change in Attrition	Lower Bound	Upper Bound
Baseline: No Training	20.9	16.4	25.4
Each One Additional Training	-1.7	-3.2	-0.2