Model:

I chose the concept of time-to-event in relation to relapse and recovery. I also looked into survival models as a way to model survival probabilities. Social Support and Life Satisfaction are important in all realms and walks of life. I have personally found in recovery that social support is an important factor to sobriety. I also added life satisfaction. The data I used was something I fabricated. The made-up data is purposely skewed to either side and was created using a random number generator. Life satisfaction was made with numbers 3-7, and social support was 1-5. If social support had 1-3 and event was observed. Life satisfaction had no manipulation as I cared to see how this would affect social support.

I chose the cox model for survival analysis as it was often quoted in the literature for time-to-event (this is also typically seen in the medical world for drug survival rates and time to event).

Here are my references.

R-script:

First, I called upon the libraries I need.

I read in my data.

I forgot to create a time column, so I made it in r.

I check to make sure it looks fine.

I fit the model for each variable.

I predict the survival probabilities using the means

I need to plot the data for each variable.

I combine the data to create the graph.

Here is where I do the graph. The color and group depend on the variable.

I changed the colors because I am extra and the red and blue were gross.

Render and save animation. Here it is:

Results:

**Support**

The Coefficient for support is -1.0501. This shows us a negative relationship between support and the hazard (the risk of an event occurring). This means higher levels of support are associated with lower hazard rates. (reduction of risk of the event)

The Hazard Ratio is .3499. A HR < 1 means that an increase in support reduces the hazard of experiencing the event. This means as support increases in one-unit, hazard decreases by about 65%.

SE is .1794. The SE is how precise the coefficient is estimated. I don’t full understand SE, but since the COEF is large relative to the SE, it means the estimate is fairly precise.

Z= COEF/SE

A large value means the COEF is significantly different from zero. This is showing that support has a meaningful effect on the hazard.

The p-value is <0.001

CI: it doesn’t include 1, showing it is statistically significant. Higher values indicated better predictive performance.

Concordance = .857

This measures the predictive accuracy of the model. This means the model predicts the ordering of survival times correctly about 85.7% of the time. (Model fit)

The likelihood ratio, Wald, and Score tests all provide strong evidence that support is a **highly significant** predictor of the event.

**Satisfaction**

COEF -0.0953

High satisfaction has a slight decrease in hazard.

HR

One unit of satisfaction, hazard decreases by 9.1%

Neither of these are statistically significant p = 0.417

SE = .1173

This indicates less precision

Z = -0.812

This suggests the coefficient is not significantly different from 0

Concordance index (c-index)

.535 indicates the model performs only slightly better than random guessing.