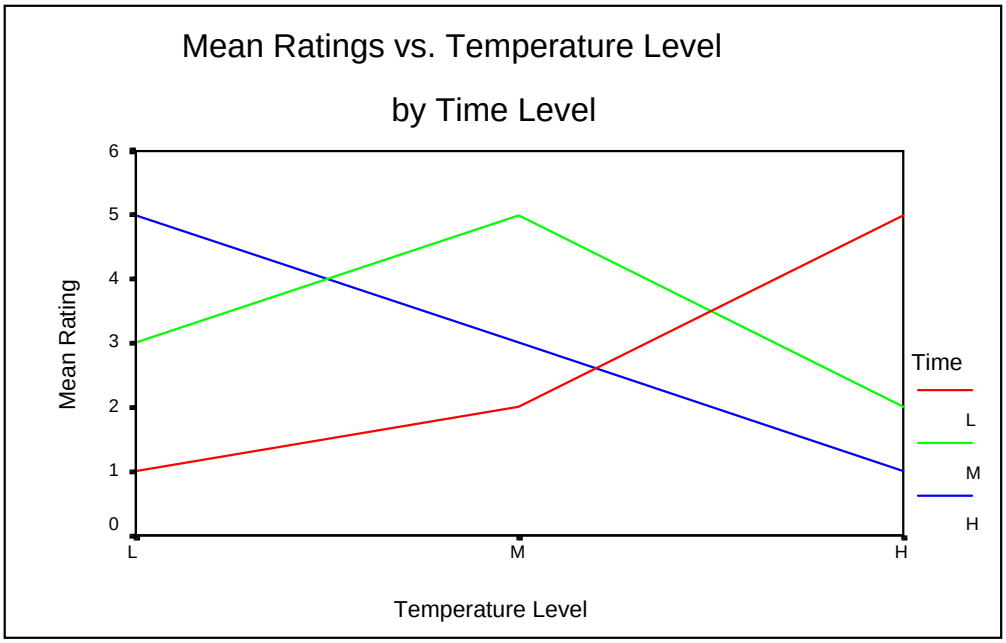
CAKE-BAKING EXPERIMENT

6. Displaying the Data

Graphical displays of the data can be very helpful for understanding the information contained in the data. We will visualize the effects of baking time and temperature on the taste of a cake by obtaining the plot of mean ratings versus temperature level by time level or the scatterplot of ratings versus temperature level with time level as the grouping variable.

6.1 Mean Ratings versus Temperature Level by Time Level
6.2 Scatterplot of Ratings versus Temperature Level with Time Level as the Grouping Variable

6.1 SPSS produces the following line chart of mean ratings versus temperature by time level:

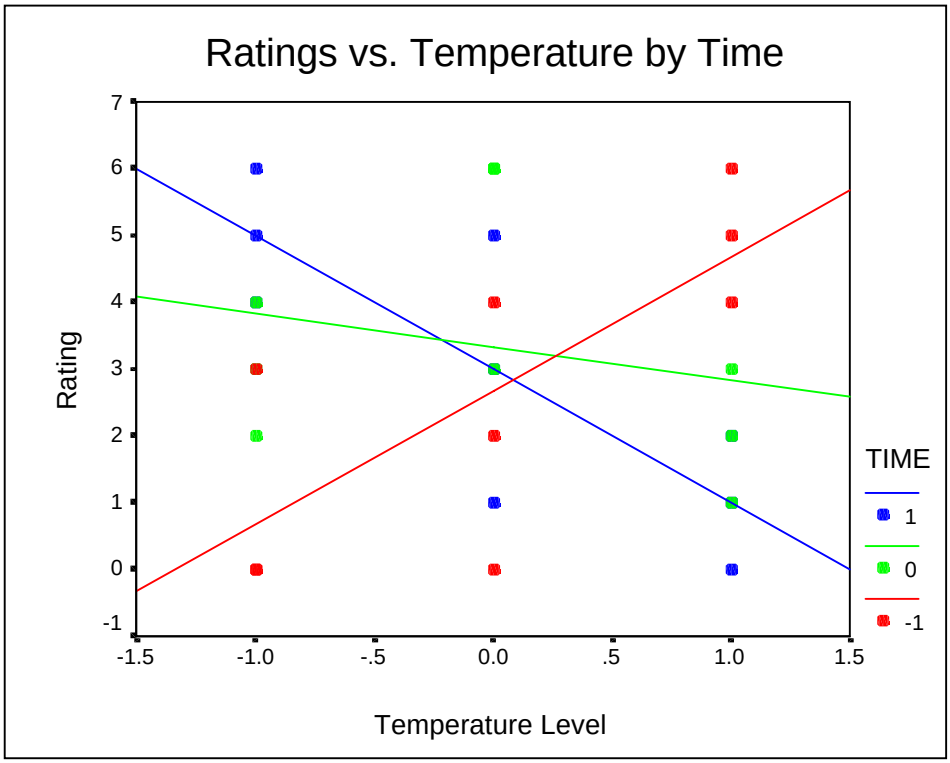


The three levels of temperature denoted in the data file by the numerical labels -1, 0, and +1 have been replaced by the labels L (low), M (medium), and H (high), respectively. The levels of time are plotted similarly, with L denoting the low (-1) level of time, M denoting the medium (0) level of time, and H denoting the high (+1) level of time. The numbers -1, 0, and +1 have no other meaning.

Because the lines in the plot cross each other, there is interaction between time and temperature. The plot shows that the highest mean rating is achieved with the following combinations of time and temperature: (H, L), (M, M), and (L, H). Thus it is possible to compensate for a lower time by using a higher temperature and vice versa. The lowest average rating is achieved with the following

combinations of time and temperature: (L, L) and (H, H). IN other words, a combination of low time and temperature or high time and temperature produces an unsatisfactory cake.

6.2 SPSS produces the following scatterplot:



As you can see, the time and temperature effects seem to be not significant. It is impossible to claim that increasing or decreasing the level of either factor produces better quality cakes. However, the regression lines for the subgroups indicate strong interaction between time and temperature. It is possible to compensate for a lower time by using a higher temperature and vice versa.