Patient Satisfaction

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Executive Summary

This report is part of a project to investigate the way patient satisfaction is related to age, severity of disease, and patient anxiety. It was found that age is the most important factor in explaining patient satisfaction. Some additional information about satisfaction can be gained by considering severity or anxiety in addition to age. Severity and anxiety provide essentially equivalent additional information so only one is required in addition to age.

1 The Data

The data consist of values for satisfaction, age, severity of disease and anxiety level collected for 37 randomly selected patients. Age is measured in years while the other three quantities are all indices. Table 1 summarises the distribution of values for each of these quantities.

Table 1: Summary of Data

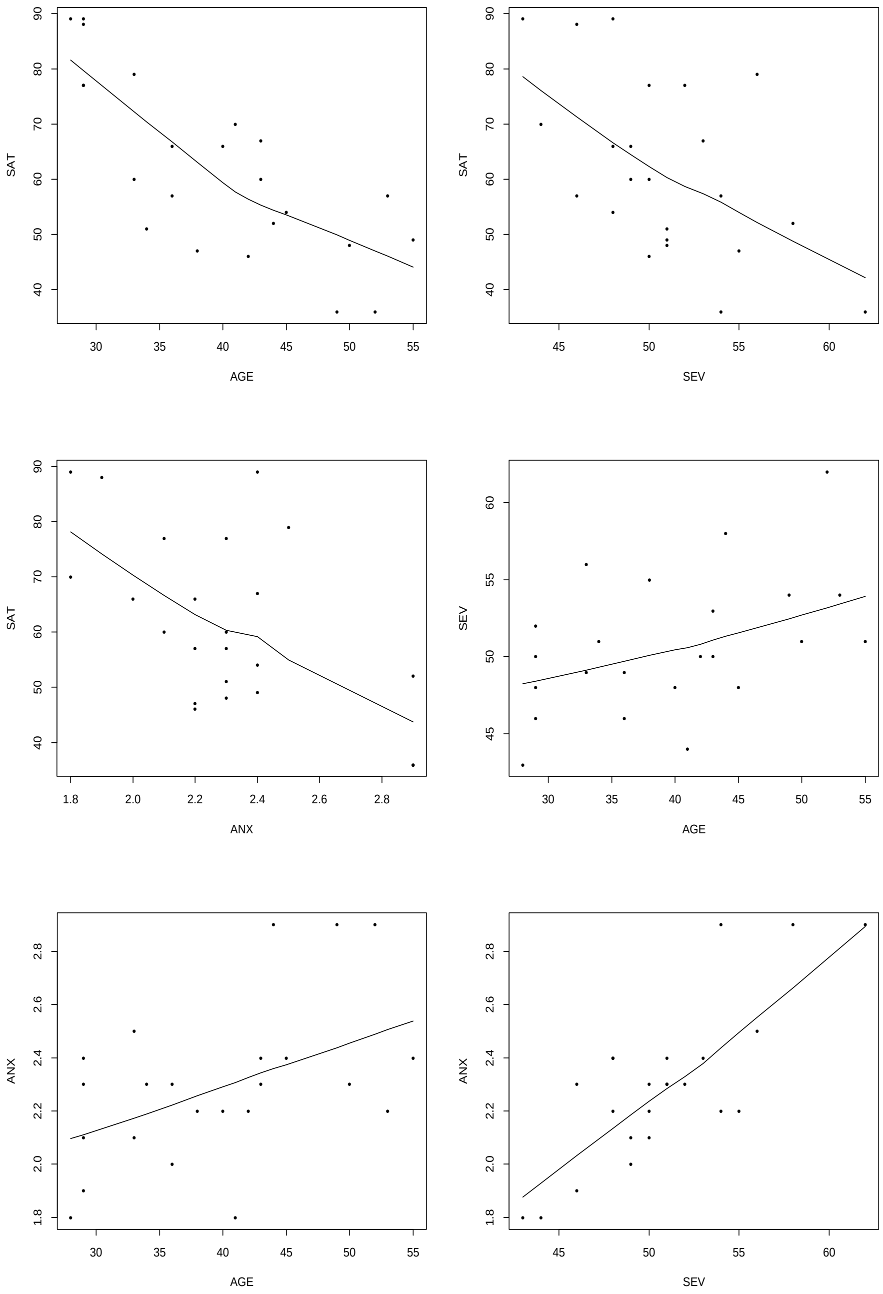
	Age	Severity	Anxiety	Satisfaction
minimum	28	43	1.8	36
lower quartile	33	48	2.15	50
median	40	50	2.3	60
upper quartile	44.5	53.5	2.4	73.9
maximum	55	60	2.9	89

2 The relationships between the measured quantities

First consider the relationships between pairs of the variables. Figure 1 contains pairwise scatterplots of the data. Each of these plots indicates the relationship between the plotted variables if the values of the other variables are ignored. These plots show that satisfaction clearly decreases as each of age, severity, and anxiety increase. They also show positive relationships between age and severity, age and anxiety, and severity and anxiety.

Since age, severity, and anxiety are clearly related to each other, there may be some overlap in the information that they provide about patient satisfaction. Statistical analysis shows that severity and anxiety supply essentially the same information.Therefore, if the value of one of these indices is known, little further information about satisfaction is gained by knowing the value of the other one as well. Age on the other hand, provides information on satisfaction that cannot be supplied by either severity or anxiety. As people get older their level of satisfaction decreases beyond what can be accounted for by the general increase in severity (and anxiety) that accompanies aging. There is weak evidence that severity (or equivalently anxiety) provides some information about satisfaction that is not accounted for by age. Thus if we group patients by age, for each group satisfaction decreases somewhat as severity (or anxiety) increases.

Figure 1: Pairwise scatterplots of the data.



Statistical Appendix

A series of regression model were used to investigate the relationships between satisfaction and the other three variables. If the full model is used the following results are obtained.

Variable	Estimate	Std. Err.	P-value
Intercept	150.2	25.2	0.0000
AGE	-1.189	0.295	0.0007
SEV	-0.411	0.803	0.6143
ANX	-8.885	11.972	0.4671

The the low P-value for AGE indicates that AGE contributes information that cannot be supplied by SEV and ANX. The high P-value for SEV indicates that SEV provides little additional information to that provided by AGE and ANX. Similarly, the high P-value for ANX indicates that ANX provides little additional information to that provided by AGE and SEV.

If we drop SEV from the model then for the new model the P-value for ANX is 0.1097. This indicates that there is weak evidence that for a model that just contains AGE and ANX, ANX is providing additional information to that provided by AGE alone. Now if we fit the model that contains AGE and SEV, we get weak evidence that SEV is needed in the model. Also, the R^2value for this model is very similar to that for the model that contains AGE and ANX (0.642 compared to 0.645). This indicates that ANX and SEV are supplying essentially the same additional information so one but not both may be required in the model.

Note that there is some indication that a squared term for AGE should be added to the above models. If this is done, we come to the same conclusions.