Paper 144

Business Intelligence Applications using JMP® Software

By Charles E. Shipp and Kirk P. Lafler

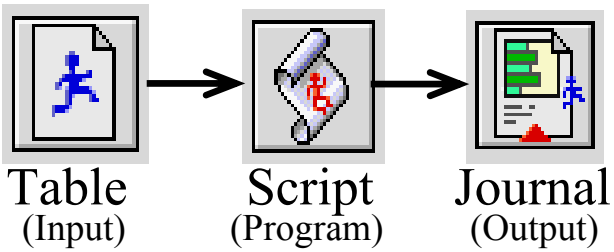
Abstract

Once you have discovered the nature of your data and its relationships using JMP, it is important to communicate with statistical graphics and tables to (1) your co-workers and management; (2) business partners; (3) review agencies; and/or (4) customers.

By looking at the complete range of JMP capabilities we show an overview of JMP and also how JMP assists in business decisions. Reports can go into MS Word and PowerPoint final reports. Business Intelligence is used in all five major information steps. Seeing your data allows critical decisions to be made.

Introduction: Learning JMP

The SAS Institute computer tool for interactive data and information discovery is JMP, pronounced 'jump'. Now available on Windows it has many valuable output possibilities, from interactive and intermediate results to journal files you can put in your final reports.



This paper looks at the results of some JMP runs. It can be understood that you get a glimpse, not a full impression, like you will get in the paper presentation, because there is color and also because of formatting. Your own experience is also paramount.

This being said, it is shown that JMP output can be included in Microsoft powerpoint and word presentations. Journal windows are created and stored for reports. They can also be stored into the table files and sent to reviewers, such as FDA.

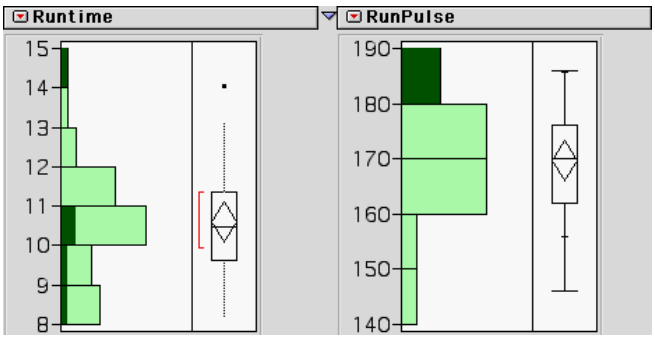


Fig. W1: Interactive Bar Charts

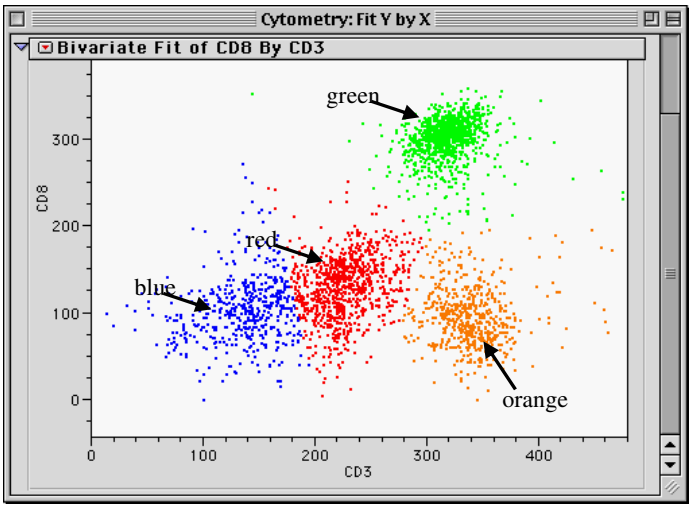


Fig. W2: Cluster Analysis

The cluster analysis is interactive and the user can select the number of clusters to try. This is just one of many ways to see data. In the graph below the data points are shown with density ellipse plots overlayed to show the relative extent and comparative correlation of the several classes involved in the study. Many options are available.

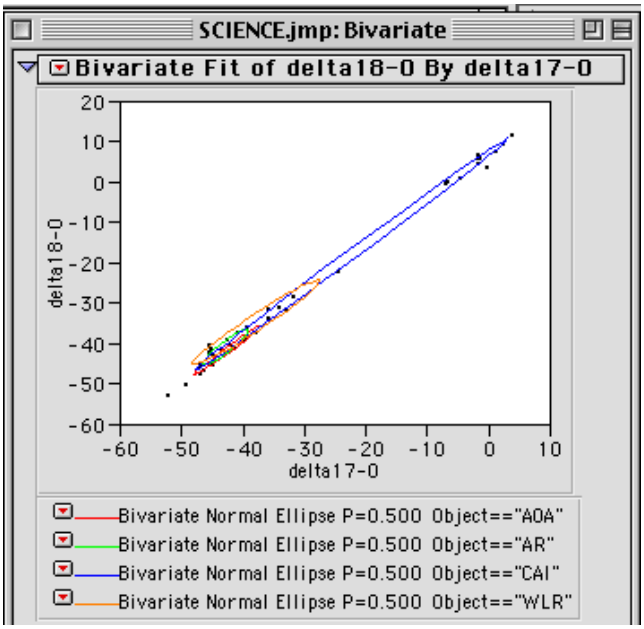
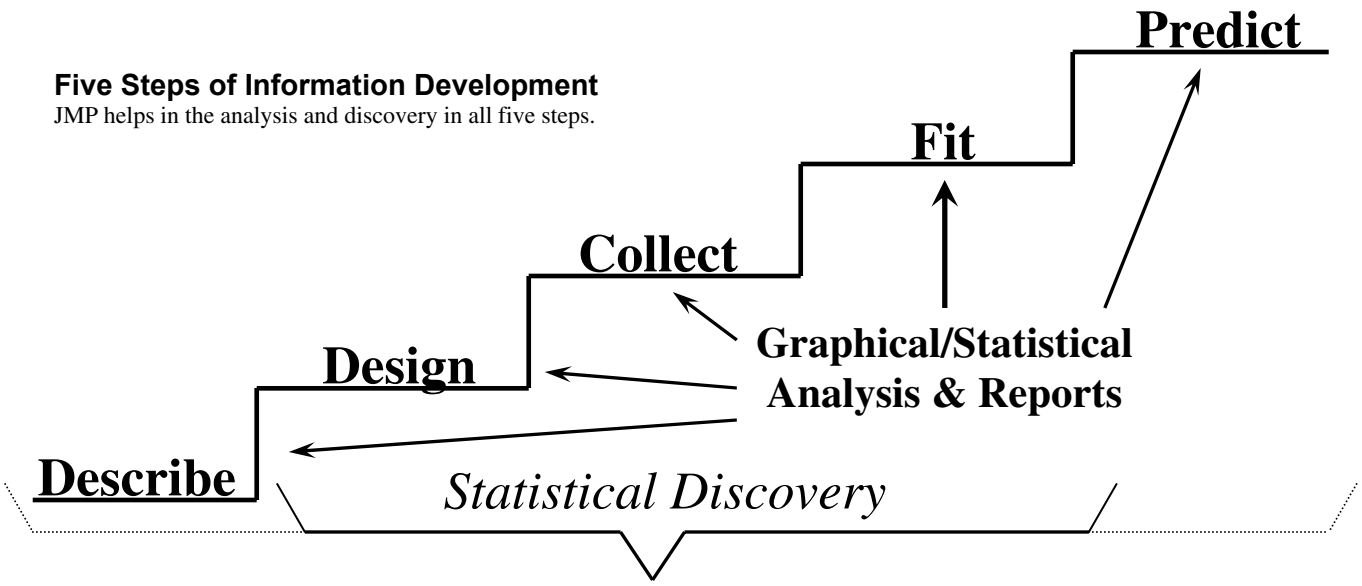


Fig. W3: Correlation Analysis

Five Steps of Information Development
JMP helps in the analysis and discovery in all five steps.



Step 1: Describe

The first step in using data and information in your enterprise is to decide what you want. This is not always easy and can involve a vision and mission statement. Next try to agree on what are causes and effects and what can be measured. In this initial step, JMP can help explore data already captured.

Step 2: Design

DoE (Design of Experiments) is a large and important area of statistics in manufacturing. Standard procedures are available in addition to custom design of experiments. This is of major importance for some.

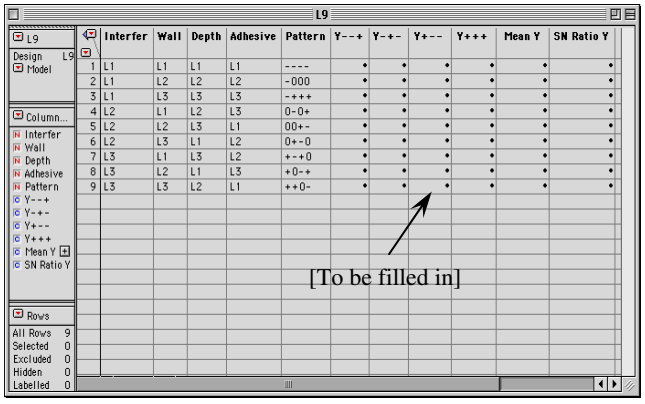


Fig. 2a: Taguchi Design

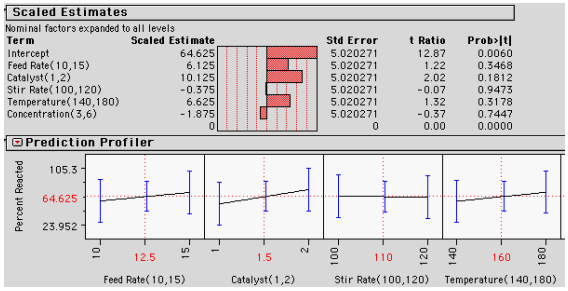


Fig. 2b: Predictor Profiler

Step 3: Collect

There are two areas of JMP assistance in collecting data: first, it will help in real-time data collection, where you connect your instrumentation to your computer. Secondly, all the standard methods of QC (quality control) are available in JMP.

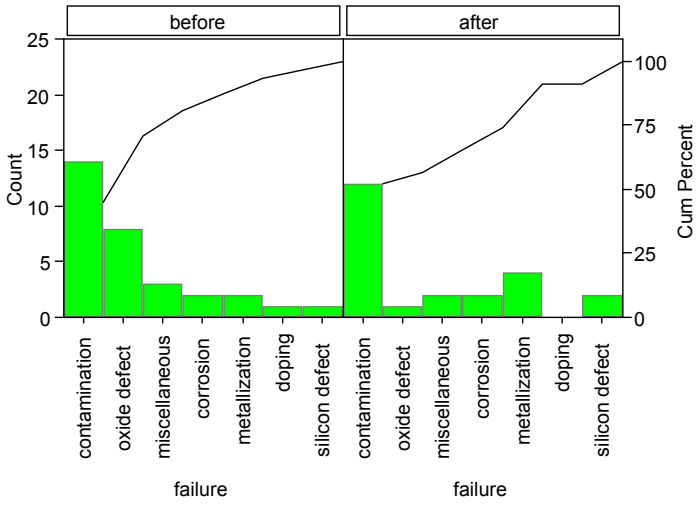
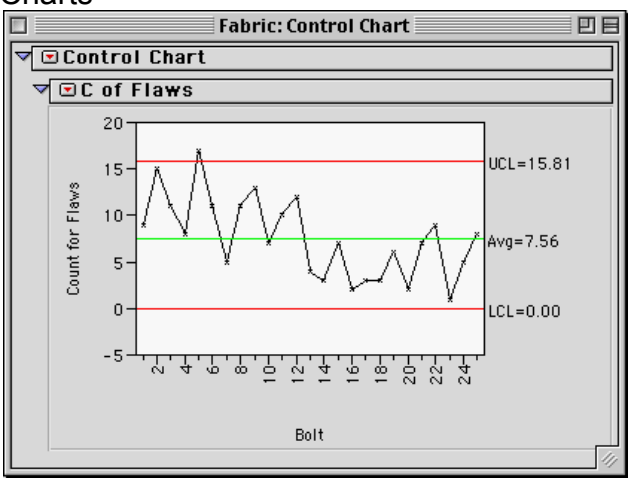
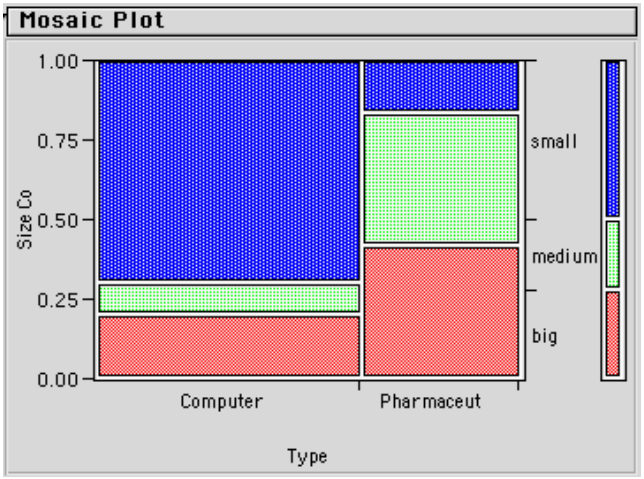


Fig. 3a/b: Pareto & Shewhart Control Charts



Step 4a: Fit to Visualize

Some JMP output helps you see the information contained in your data. "If you can't see it, maybe it isn't there." On the other hand, having the right graphic can show visually what might be there.



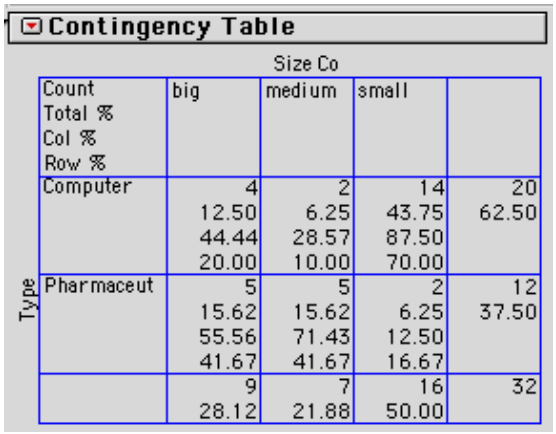


Fig. 4a1: Mosaic Plot with Contingency Table

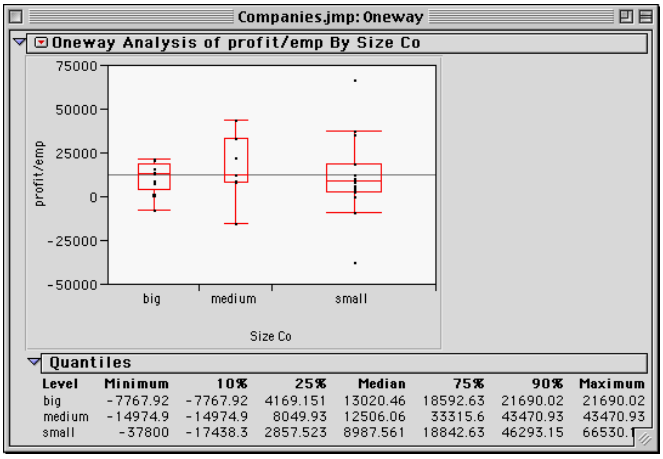


Fig. 4a2: One-Way Analysis of Variance

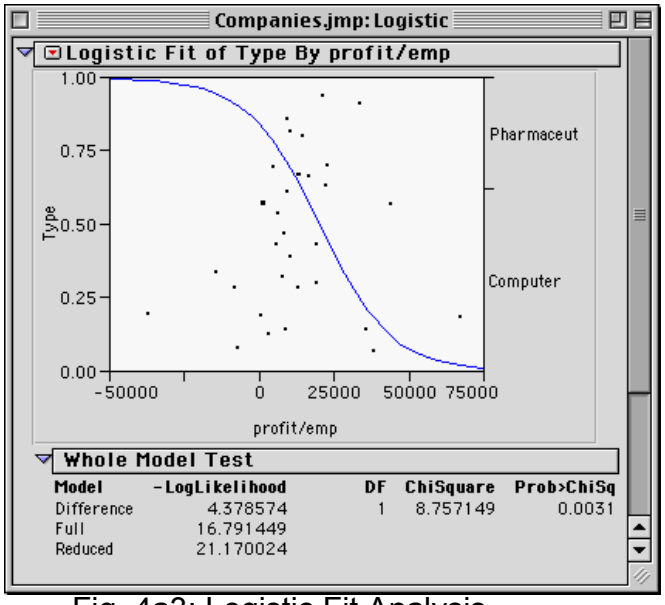


Fig. 4a3: Logistic Fit Analysis

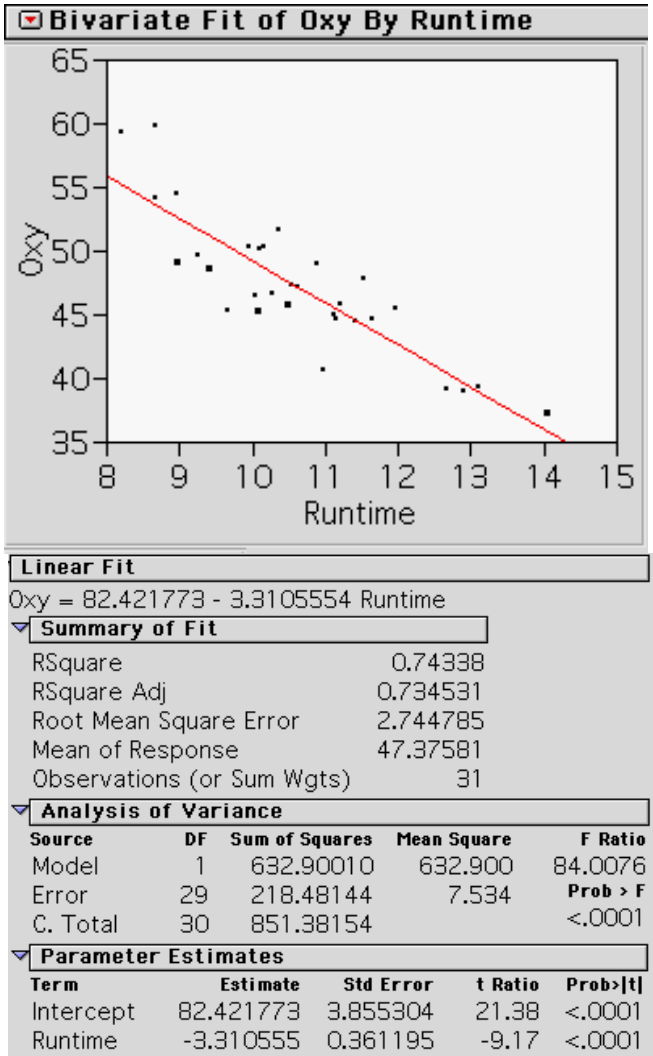
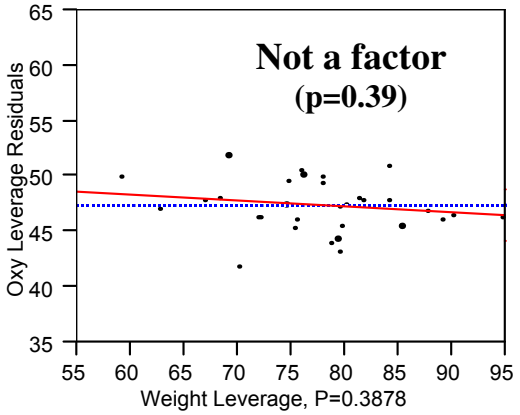
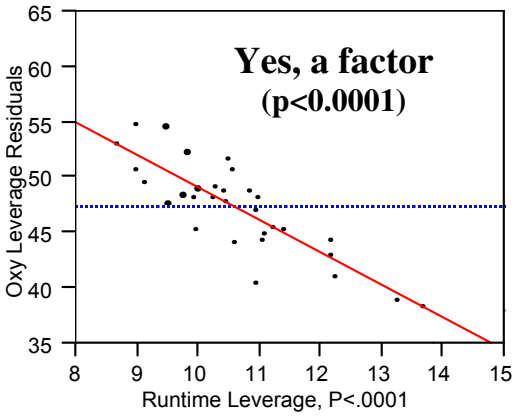


Fig. 4a4: XY-Fit Graph & Table

Step 4b: Fit for Statistics

In addition to seeing important features of your data you may need to prove it with statistics. Standard statistical methods can be applied for important results.





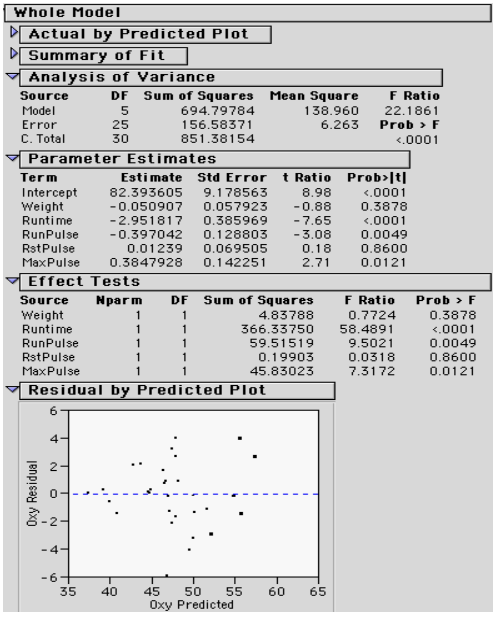


Fig. 4b1: Analysis using Leverage Plots

There are many procedures in JMP to try to see what is most effective for your data studies. These give you an indication of JMP discovery and output reports.

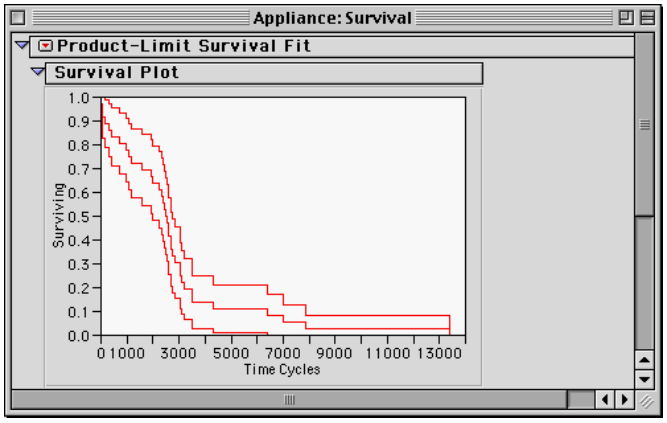


Fig. 4b2: Survivability / Reliability

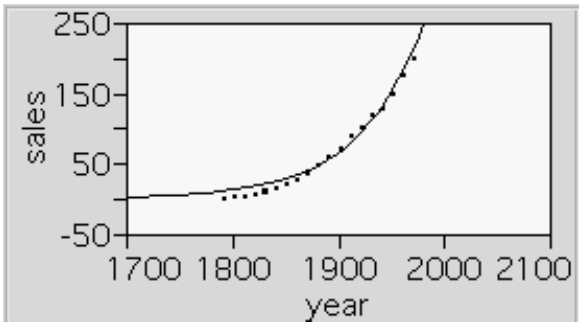


Fig. 4b3: Non-Linear XY-Fit

Step 5: Predict

Predict with methods of extrapolation in curve fitting, or with trend analysis using JMP procedures.

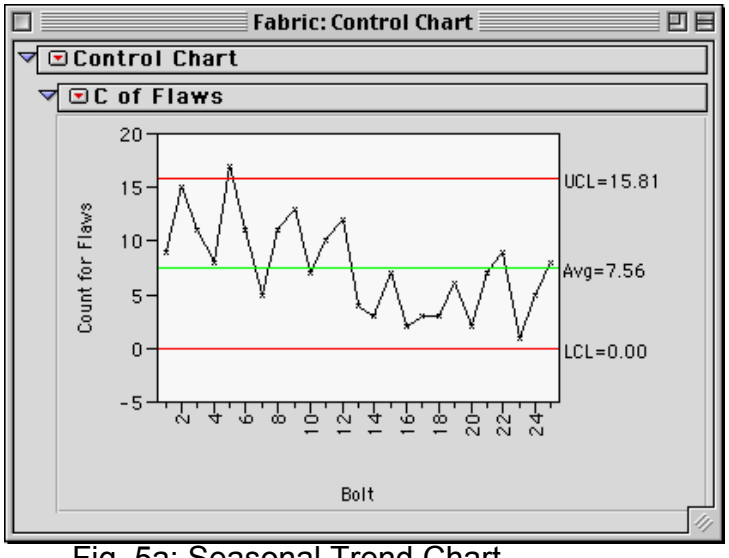


Fig. 5a: Seasonal Trend Chart

Summary

JMP is a tool for data/information discovery. Our paper teaches and illustrates discovering JMP by looking at samples throughout the spectrum of JMP interacting and reporting. It can be noted that the combination of procedural panels and their respective buttons and options results in a very, very large number of possible output results that can be saved to your reports. As a result, this paper gives you only a representative sample. More is in the presentation.

Conclusions

JMP covers the five steps of information found on p.17 of the Design of Experiment manual. You can see the description of these steps also in online help by searching on DoE. Collectively, most time is spent in step 4 to visualize and fit collected data, but for those that do not work in the preliminary steps, they should consider the possibilities. Wherever you should be in your analysis, JMP can provide what you need, or augments your current SAS capabilities.

Future Work

There continues to be much to do in the competitive area of data research. The use of statistical graphics is a good area to be explored. The company and research team that can make their selling points graphically will go farther than those that rely on tables of obscure numbers alone. A picture augments the value of words and tables, and can be the big difference in discovery, communication, and acceptance.

References

Sall, John, et. al., JMP Start Statistics, 2nd Ed., Duxbury, Pacific Grove, CA, 2001.
JMP Discovery Software, Version 5, set of manuals.

Acknowledgments

We would like to thank our section chairs Lori Griffin and Richard Livornese and the SUGI 28 leaders for their support and a great Conference.

Note1: A manuscript is being prepared in this area called, JMP Templates You Can Use. If you are interest in reviewing the material, then contact CharlieShipp.

Trademark Citations

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Charles E. Shipp is a programmer and consultant with over 20 years experience working with the SAS System. He has authored numerous articles and co-authored the popular Books by Users (BBU) book, Quick Results with SAS/GRAPH Software. His expertise includes application design and development, training, and programming using base-SAS, JMP, SQL, ODS, SAS/FSP, SAS/AF, SCL, FRAME, and SAS/GRAPH software. He has also been involved with web design, content creation, and development. Current work is in JMP instruction/web.

Kirk P. Lafler is a SAS® Consultant and SAS Certified Professional® with over 25 years of SAS software experience. He has written two books and over one hundred articles for professional journals and SAS User Group proceedings. His popular SAS Tips column appears regularly in the SANDS and SESUG Newsletters. His expertise includes application design and development, training, and programming using base-SAS, SQL, ODS, SAS/FSP, SAS/AF, SCL, FRAME, and SAS/EIS software.

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Note2: A website is being prepared to share information among JMP users that will have JMP Templates in 21 different business sectors, which you can copy/use: < www.JMPtemplates.info >