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Proficiency in JMP[®] Visualization

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Abstract

The premier tool for robust statistical graphics is JMP. It combines easy navigation, advanced algorithms, and graphical output you can trust. After a brief introduction of JMP navigation and resources within the JMP software, we take a tour of classical and modern advanced graphical capability of JMP. In the SAS Global Forum talk we introduce case studies that show the power of JMP using graphics and analysis. To conclude, we cover directions in training and JMP user exchange.

Introduction

Advanced technology is moving at an incredible pace. Version 10 of JMP came out in March and continues to be the gold standard for statistical graphical analysis. You can download JMP to try for 30 days, attend the SGF papers and Demo Floor booth for JMP — We present user insights. A lot of learning is via the www.JMP.com website, including podcasts and live webinars. Your authors have also enjoyed the JMP license to learn JMP basics and techniques, self-paced study for a year for a fee.

We emphasize in our paper and SGF presentation our user insights, suggestions, and areas for professional growth and learning rather than a review of features you can find online and with your JMP representatives. Consider also your local and regional JMP user groups — be a learner, presenter, and leader.

Unique JMP system philosophy

JMP has over 20 years of development and improvement, now in Version 10, adding three separate suites.

The first JMP suite of statistical/graphical platforms came from John Sall, creator. After choosing Lattice C for the new SAS Institute base code language, buying Lattice C, rewriting the entire SAS suite of procs and internal code in C, JMP (John's Macintosh Program) was started. Where do you read Dr. John Sall's diary?

In using JMP, it is good to know and remember how data is stored in JMP tables, (rows and columns), with variables being characterized/classified upon entry as continuous, ordinal, or nominal. The JMP philosophy is to then guide the user in JMP platform selection and usage. For example correlation analysis or regression analysis will use continuous vs continuous variables, whereas contingency tables are used with nominal vs nominal variables.

JMP recognizes variable types and helps choose platforms

JMP is easy to use and navigate. The JMP package prompts you when improper usage is selected.

Examples of continuous variables are time, distance measurements, money values, volume, pH,

Examples of ordinal variables are school grades, years, age in years — those things that are ordered.

Examples of nominal variables include labels, titles, and basically anything stored as alphanumeric.

As you explore your data (and later analyze with statistical platforms) JMP remembers the variable types.

The five steps embraced by JMP

Consider that there are five steps in fully utilizing project data: (1) Describe, by assignment or by initiative, the goals, objectives, and methodologies available. (2) Design an approach strategy and consider DOE, design of experiment, if that could apply. (3) Collect the necessary data. The set of data could come from your design of experiment analysis, or it may even come from outside sources not under your control. Hopefully, you have some control on collecting the best-quality data to meet your goal. (4) Step Four is where SAS and JMP programmers and analysts spend most of their time. Perhaps additional time should be spent in the other steps also. This is where you (a) explore your data and (b) apply robust and rigorous statistical analysis. You also create your output reports in this step. (5) Prediction is often a requirement, and the addition of JMP Pro becomes a heavyweight here with data mining.

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The [Version 5 JMP Tutorial](#) noted that of these five steps, the first and last steps are left for the knowledge people. You need to think about these areas. As is always the case, computer tools such as SAS and JMP enhance your discovery and analysis, but you need knowledge and wisdom to use properly. For example, just because you see some variables in your data seemingly correlate, this does not mean there is 'causality' between them. More recently JMP added capability to step one and step five. Pay attention to the new JMP Clinical and JMP Genomics.

- The scientist/mathematician knows what he or she wants to do but can't do it; (formulas);
- The computer person knows how to do it, but doesn't know what to do; (algorithms);
- Numerical Analysis is the bridge between [math/statistics](#) and [computer science](#).
(Formulas first; Algorithms second; plus Wisdom third, to yield valuable statistical graphics.)

1. Describe

How do you begin? Do you support your enterprise Vision Statement and Mission Statement? Are you and your mentor proactive and seek opportunity? Do you wait for your boss to send you a memo? (Do you work like Dilbert?) Macintosh JMP users can collect the beginnings of projects into folders, and for PC users, JMP provides a PROJECTS feature to contain the memo(s), the prior reports, JMP scripts and table data, and results for reports. ODS is now a common feature with both SAS and JMP procedures.

2. Design

Custom design is just one of the several categories for JMP "Design of Experiments". The classical and modern ways to design experiments will save millions of dollars in manufacturing. Main design strategies include: screening, response surface, choice, accelerated life, nonlinear, space filling, full factor, Taguchi arrays, and mixed design.

These concepts can apply to other areas of science to determine use of your time and resources.

3. Collect

JMP allows you to attach real-time data capture in manufacturing. More often, the data is collected and imported to JMP tables. New features are provided, especially to PC users of JMP, for ease in importing Excel[®] files.

4. Fit

For graphical/statistical analysis and reporting, JMP software is the best in the universe. Most of project time is spent in exploring data, finding correlations, performing regressions, and then making reports. There are more than 80 statistical/graphical platforms in categories which you can explore as you discover your vast data sources.

5. Predict

The fifth step is not always needed in your projects: to predict future needs and results. There are now more and more possibilities of interaction between SAS and JMP. Greater capability has come into JMP, over the years of development. SAS users will want to send results over and use the new SAS Graph Builder.

JMP Pro[®] is a separate new package that extends JMP software into data mining and predictive modeling. Quite often, intelligent people ask what JMP Pro has that JMP Version 10 does not. What is added?

From the JMP Pro online brochure,

"In your business, you may need to know:

- Which customers are likely to accept credit card offers?
- How likely is a particular loan applicant to repay a specified amount?
- Which Web page would a customer most like to see next?
- What maintenance schedule will prevent costly repairs and downtime?
- Which customers are likely to upgrade?
- Which transactions will prove to be fraudulent?"

http://JMP.com/software/pdf/105117_JMPpro_factsheet.pdf

As you see, JMP Pro adds capability and power in data mining and predictive modeling.

Choosing from the four JMP packages

Most JMP users are using JMP Version 9 or more recently JMP Version 10. In addition, there the new JMP software packages: JMP Genomics, JMP Clinical, and JMP Pro (for data mining and advanced predictive modeling). Most JMP users will settle on JMP Version 10, but specialists and institutions with needs in the other area will adapt quickly to the more advanced packages.

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A few examples of JMP analysis and journaling

Journal files are your copies of the output JMP windows. You can stack your journal items and then store them under a file name. Here are examples from the many, many JMP feature possibilities. For each JMP graphic showing the visualization of analysis results, there is an auxiliary table of pertinent statistics.

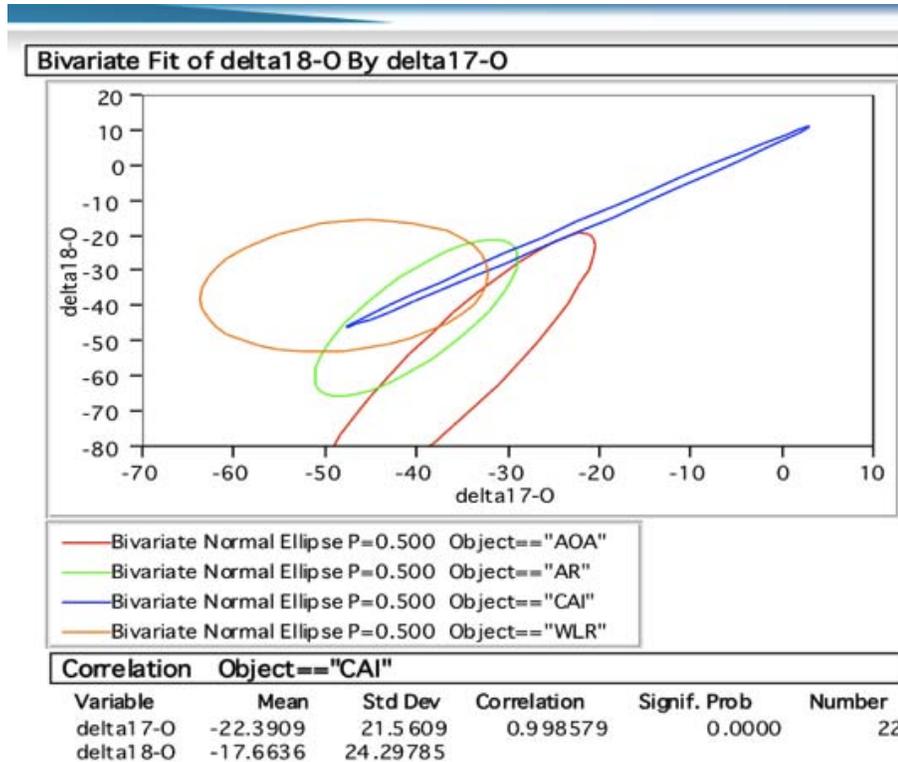


Figure 1. Correlation of data for four stars in the galaxy

Points of Success in Personal JMP Development

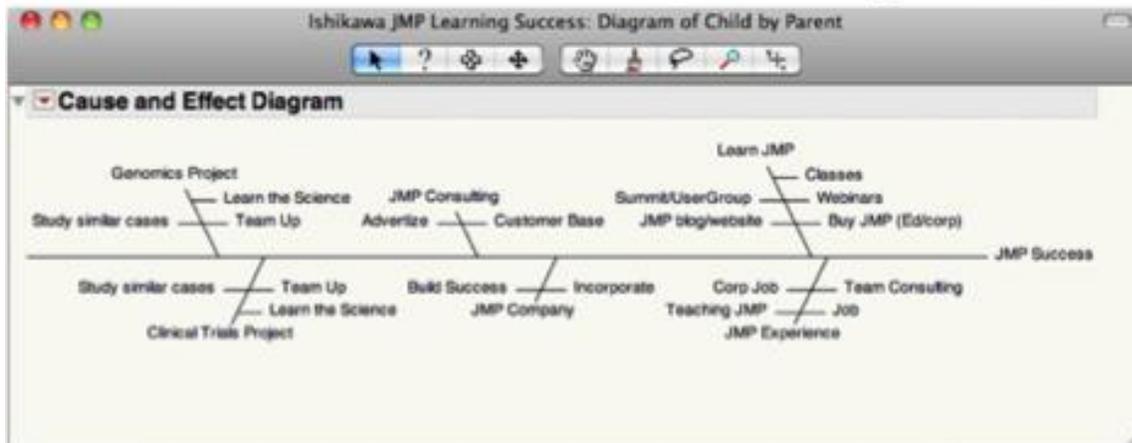


Figure 2. From the DOE section

This display of event planning and review is created with a custom JMP script: Scripting manual is provided.

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An example of the power of visualization is given in overlaying ellipses of correlation. Visualize this:

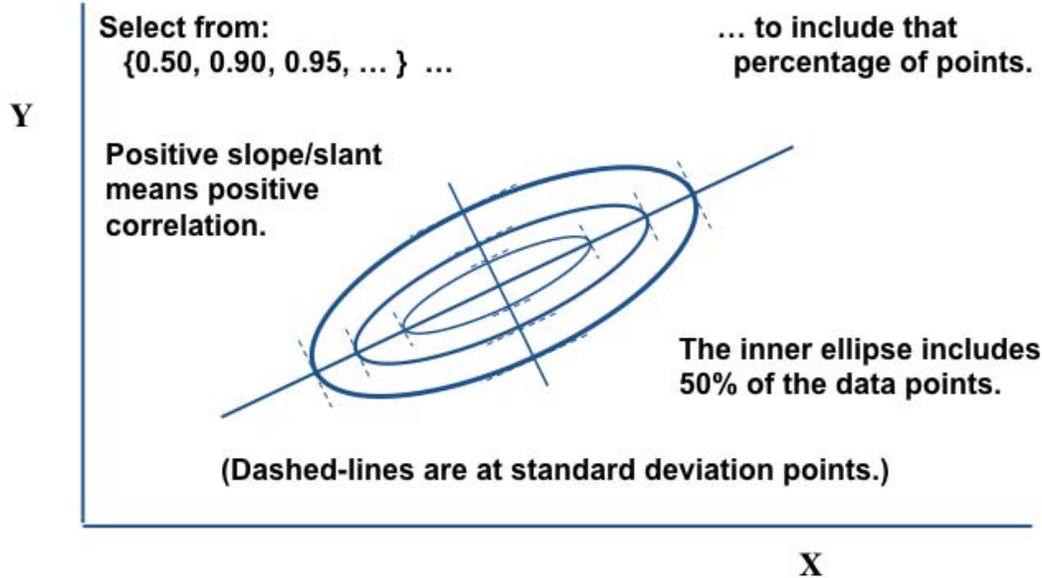


Figure 3. Derivation and illustration of Correlation Ellipse Analysis

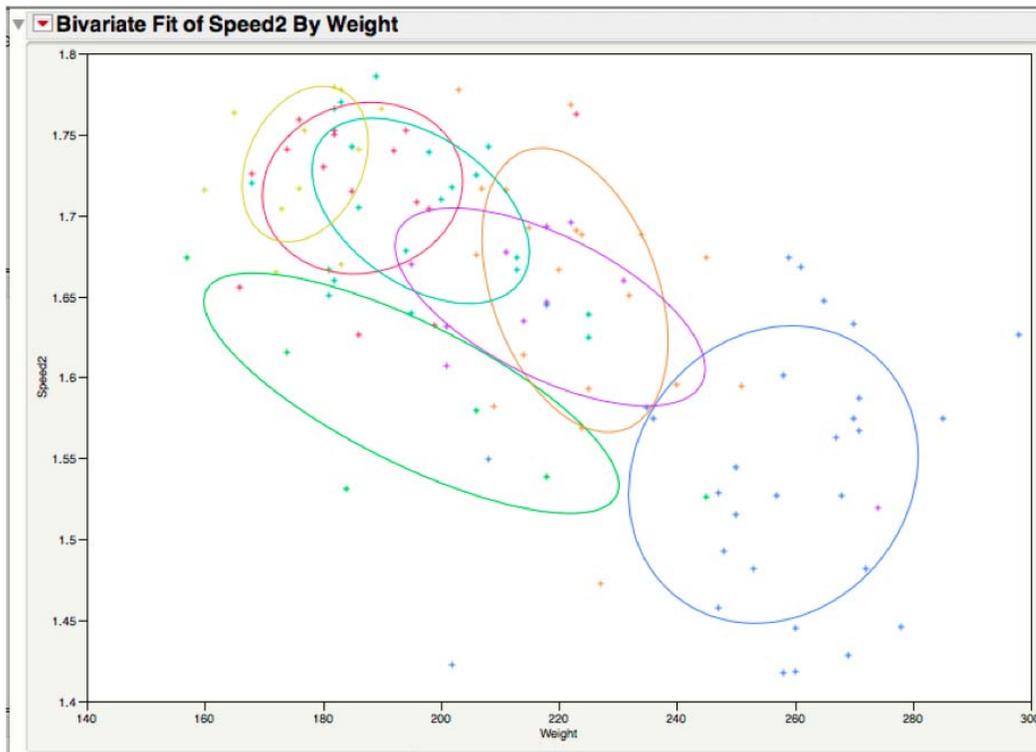


Figure 4. BYU football players, by position

www.sasCommunity.org/sugi/SUGI88/Sugi-13-218%20Buckner%20Allen.pdf

In Figure 4, the superimposed ellipses show positive (and negative) correlation of weight vs. speed, grouping BYU football players by position. The running backs are lighter and faster than the linesmen, and the four positions slating to the left show negative correlation. For football fans, the largest ellipse points are linesmen, the smallest wide ends.

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This illustrates just one of the statistical-graphical capabilities of JMP—there are many more. You can begin to create JMP programs with point-and-click which creates a JMP script behind the scene, write the JMP script using the scripting capability, or copy and modify one of the more than 250 sample sets under HELP.

Directions in training

Wide selections of JMP classes are scheduled in major cities. In addition, ongoing training comes from webinars and podcasts. sasCommunity.org and JMP.com provide additional interaction between major annual conferences. The main conference for JMP users is the annual JMP Discovery and Summit.

JMP itself is a great training wizard! You have several ways to learn as JMP runs: there is the '?' tool which you can put over any aspect of processing or 'journal' output; there are the sample code sets (very instructive); the seven manuals, plus the 'menu card' and the 'quick reference' (under HELP also); and tutorials.

For college, high school, JrHS, and other learning environments, JMP is superb at many levels. Consider areas such as computer science, math/statistics/probability, social science, and chemistry/physics, (basically any science collecting data, such as AGW). JMP can be illustrative and instructional. JMP makes learning easy by emphasizing what you are trying to teach, unencumbered by hardware or software.

User exchange and collaboration

Look for JMP training, papers, and interaction online, at SGF and Regional SAS conferences. Look for new and ongoing interaction of SAS programming and JMP visualization/reporting by SAS and JMP development teams.

Summary

Our paper goes into SGF 2012 proceeding just before JMP Version 10 is released. Be sure to see the newest features at the JMP booth and in presentations. We have given you a "user's view" for insights. Explore and discover.

Conclusion

JMP is a power tool in data exploration, analysis, and report creation. There is interaction with SAS, Excel, and R, as needed and appropriate, but prior requirements can now be handled better in JMP. In addition, there are the new packages of JMP Pro, JMP Clinical, and JMP Genomics. Learning and interaction continues from books, papers, webinars, conventions, JMP website/blog, and within the JMP packages. Take it to the limit.

References

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 Willbann Terpening, [Statistical Analysis for Business Using JMP: A Student's Guide](#), SAS Press, 2011.
 Roger Hoerl and Ronald Snee, [Statistical Thinking: Improving Business Performance with JMP, Second Edition](#), SAS Press, 2012.

NOTE: This is about a third of the very valuable JMP reference texts by major JMP authors.

Webliography

- sasCommunity.com — For SAS and JMP users, [by users](#) (The power to interact with peers)
SAS.com — Business Analytics and Business Intelligence Software (The power to know!)
[SAS.com; /publications/; /support/; blogs.SAS.com;](#)
JMP.com — JMP Software – Data Analysis – Statistics – Six Sigma – DOE (design of experiment)
[blogs.SAS.com/JMP](#) — The online community for discussion and learning
[JMP.com; /about/; /genomics/; /pro/; /clinical/;](#)
[Google.com; \(choose a web browser to find solutions and resources\)](#)

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You can learn about SAS-L on sasCommunity (join the meeting of both at SAS Global Forums)

JMP.com/about/events/summit2012/callforpapers_2012.shtml [Consider also PharmaSUG]

JMP.com/about/events/usergroups/

JMP.com/about/newsletters/JMPercable/itunes.shtml

JMP.com/about/resources.shtml

JMP.com/about/jmp_research.shtml — Best white papers (partial list) on JMP usage, by year

JMP.com/software/genomics/research.shtml — A partial listing of reviews, research articles, and thesis publications that cite JMP Genomics

JMP.com/software/sim_studio/ — Discrete-event simulation to model complex systems

JMP.com/software/brochures.shtml — Seven excellent and detailed pdf files to view/download

JMP.com/software/jmp9/pdf/jmp_family_of_products.pdf — What started as a single family ...

JMP.com/software/Genomics/pdf/103112_jmpg51_prodbrief.pdf — Statistical graphics in genomics

[LinkedIn](#) — Professional networking for jobs, consulting opportunity, and also group discussion

LinkedIn.com/groups/JMP-data-visualization-analytics/; [/JMP Professional Network/](#)
blogs.sas.com/content/jmp/2012/03/08/control-chart-builder-in-jmp-10-video-preview/

NOTE: The main website is JMP.com with information repositories branching off from there.

NOTE: Your Google-searches will bring you to new information, such as Regional information.

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About the Authors

Charles Edwin Shipp is a programmer, consultant and author, and has been using the SAS and JMP software since 1980. He is credited in the original JMP manual for his roles in the early days. He has written more than one hundred papers and has been an invited speaker at more than one hundred International, regional, local, and special-interest groups. He is the recipient of 11 “Best” contributed paper and poster awards. Charlie is the co-author of three books including the ever-popular Books by Users (BBU) book, Quick Results with SAS/GRAPH Software. Currently, Charlie is involved as an eBook author, App developer for Apple iPad, sasCommunity.org Advisory Board member, consultant for 4Life, AdvoCare, Genesis Pure, Melaleuca, Trivani Foundation International, and consultant in JMP and JMP Genomics.

Kirk Paul Lafler is consultant and founder of Software Intelligence Corporation and has been using SAS since 1979. He is a SAS Certified Professional, provider of IT consulting services, trainer to SAS users around the world, and sasCommunity.org Advisory Board member. As the author of four books including PROC SQL: Beyond the Basics Using SAS, Kirk has written nearly five hundred peer-reviewed papers, been an Invited speaker and trainer at more than three hundred SAS International, regional, local, and special-interest user group conferences and meetings, and is the recipient of 19 “Best” contributed paper, hands-on workshop (HOW), and poster awards. His popular SAS Tips column, “Kirk’s Korner of Quick and Simple Tips”, appears regularly in several SAS User Group newsletters and websites, and his fun-filled SASword Puzzles is featured in SAScommunity.org.

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