Wizards and Potions

A new approach casts power on discrete choice conjoint experiments.

By Ken Deal

Once upon a time, not so long ago, Sawtooth Software was the only self-contained software application for fully executing all parts of a discrete choice conjoint study. Although SAS (a statistical analysis system) has been a highly effective approach, that platform has been used more by those who are very technically competent, those who want hands-on determination of all steps of design and analysis, or those who need special experimental designs. Recently, several of the Web survey services have offered conjoint features.

Now there is a new entrant in the market, operating under the clever and provocative name of StatWizards. George Boomer is the founder and owner, and developed the approach and the software. StatWizards was not meant to be a copycat of Sawtooth Software or SAS; its orientation to discrete choice conjoint is both conventional and innovative at the same time. Many who have used Sawtooth Software and SAS will take a serious look at StatWizards.

Perhaps the best way to describe StatWizards is as a rendering of the steps that one would take to design, analyze, and simulate a discrete choice conjoint study if using SAS. The stages are (1) design the experiment in Design Wizard and produce the cards or screens for fielding the study, (2) set up the field data for analysis using Data Wizard and analyze in some other statistical application, and (3) bring the analysis output into Simulator Wizard and simulate, with added output. StatWizards somewhat follows the Sawtooth Software sequence of: designing the study in SSI Web (from Sawtooth Software); analyzing the data in Sawtooth Software Sampling Modeling and Research Technology (SMRT) module, latent class analysis module, and Choice-Based Conjoint/ Hierarchical Bayes module, or externally in Statistical Innovations' Latent GOLD Choice (LGC); and then simulating scenarios in SMRT. The main difference is that the actual data analysis is not done within the StatWizards suite, whereas that function is included in SAS and Sawtooth Software.

Learning about the software. StatWizards provides multimedia presentations, for all of its phases, that greatly exceeded my expectations. To explain discrete choice conjoint, which Boomer calls discrete choice models (DCM), there are three well-prepared PowerPoint decks: one for managers, one for senior managers, and one for market analysts. Each of these presents the benefits of DCM and StatWizards to that particular audience. The StatWizards' basic Web site is also excellent,

and provides explanations of Boomer's approach to developing the software, the software itself, and several case studies. And it offers demonstration versions and tutorials.

In addition to the tutorials, the animated help is a tremendous benefit for the beginner; it steps through each of the phases in sequence, shows the Excel sheets, and overlays those with comments and directions to help with using the Wizard. These are written in MacroMedia Captivate and downloaded with the StatWizards application, and reside in the Tutorial folders for each Wizard. They have a small play, pause, rewind, and move-ahead bar at the bottom, to slow down the animation for the first-time user and speed it up for repeat and more advanced users—a very thoughtful addition. However, I did find that some commands could violate MacroMedia Flash requirements and cause warnings or errors (but these are minor and easy to work around). For example: The exit button sometimes doesn't work, and can cause an error.

Have you ever moved through an application, read an instruction, continued forward, and then realized that you forgot an important detail of the directions? StatWizards provides the valuable feature of saving each instruction in Word after each step, so you can just call up the Word file instead of backtracking or restarting the application. I find that the StatWizards approach to demonstration and help files is one of the best; the developer seems to have anticipated user questions and has provided means to get good answers quickly.

The StatWizards development of a discrete choice conjoint study. It is necessary to understand that although the Design, Data, and Simulator Wizards are nicely integrated to act as a whole, each can be used separately. Someone who wants to depend on a higher-level application to design the discrete choice experiment might rely on only Design Wizard. Someone who has fielded a study, and wants to use one of the three analytical packages with which StatWizards is integrated, might use Data Wizard to format the data for analysis. And if someone has analyzed discrete choice conjoint data in LGC, NLOGIT, or GAUSS, the data can be adapted quite easily to be used in Simulator Wizard. So StatWizards offers a great deal of flexibility, as do SAS and Sawtooth Software.

The design of the discrete choice experiment. Step No. 1 in StatWizards typically will involve using Design Wizard to establish the experimental design. And it begins with just the basic specification—of the attributes as columns and the levels

as rows in an Excel worksheet—without any concern about StatWizards. When complete, the user selects Generate Experimental Design from the Tools menu and the experiment is generated. Each user action produces instructions or information—or both—from the Wizard.

The Design Wizard is provided for those who are willing to accept the recipe that the software supplies. Although options exist for the designer to be involved in the detailed process, many users with fairly straightforward problems will simply observe the process—and leave most of the decisions to Design Wizard. The developer assures users that each design will be excellent. Although that is comforting, some users will want more influence.

The type of each attribute can be changed in Design Wizard, as can the number of choice alternatives per store (i.e., choice task) and the number of blocks. However, those parameters are linked in the formulas for the experimental design, and limits are imposed on the range of values; violations generate error messages and suggestions. The inquisitive or educated user can change the characteristics that appear in blue font in the base design sheet, and note the resulting impact on the total number of stores and the number of stores per block. Pop-up comments on many of the cells explain the nature of the parameters, limitations on changes, and likely implications of altering the parameters. Users can see the effect of any change by reactivating the Design Wizard: Simply pull down the Tools menu and select Generate Experimental Design, or use Ctrl+Shift+E.

Because the design is generated in successive worksheets, including a detailed design table for investigation, those with more advanced experimental design backgrounds can investigate the design details and alter the design where desired.

At the end of the process, Create Layout generates the choice sets according to the design for each of the stores, in each of the blocks. When the final design-layout page for "store 1" is displayed, several options are provided—including whether circles should be presented above each choice alternative, and whether the instructions for those circles should be stated for paper-and-pencil surveys or Web surveys. The complete layout for each store, for each block, can be printed to a printer or a sequence of Excel worksheets—one for each store. (It is necessary to activate some Visual Basic code in order to print, but that action is quick and seems stable.) The choice alternatives can be rotated, and the design can be formatted to a MaxDiff variation—a nice bonus.

Preparing field data for analysis. When field data from appropriate respondents are available, Data Wizard prepares them for analysis by other applications: LGC, NLOGIT, the advanced version of LIMDEP, and GAUSS. The discrete choice analytics reportedly are not provided within StatWizards because of the excellent availability of applications, and the rapid advances being made in the methodology.

Boomer promises that future versions of StatWizards will integrate with Salford Systems' Logit and Systat. (Close to press time, Boomer mentioned that he and Sawtooth Software are discussing joint development efforts.) Because LGC uses Statistical Package for the Social Sciences (SPSS) files,

choosing to prepare data for LGC produces three SPSS files—labeled LGSet, LGAlt, and LGResponse. Data Wizard is so detailed that it allows the user to set up variable names and value labels in Excel that create nearly fully specified SPSS files. When changes are made to the data file, the user needs to activate them by pulling down the Excel Tools menu and rerunning Data Wizard. The Wizard checks those changes, and either validates the alterations or provides suggestions.

Additional information is included in several static help files, one for each step of each Data Wizard process. Those files provide more specific information on when and why particular options are chosen. For example: If preparing files for use in LGC, which buttons should be checked to ensure that all three SPSS files are produced? Unfortunately, the older SPSS rule requiring eight-character variable names has been followed here to accommodate older versions of SPSS; this imposes restrictions on newer versions.

Boomer also has provided comments in the selected cells of the worksheet, which pop up when the cursor is moved over a red triangle in those annotated cells. This is great when you

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need some basic information, but don't want to deviate from your current path.

LGC simultaneously finds latent class segments among the sample respondents, and estimates discrete choice parameters for each of those segments. The flexibility, scope, and graphical output of LGC are outstanding.

NLOGIT provides many sophisticated analytical benefits, and the ability to perform nested logit analysis is specifically highlighted in the help window titled "Step 5: Create data files for statistics programs."

Users can produce GAUSS files that allow for the use of the mixed logit analysis of David Revelt and Kenneth Train, which provides individual-level coefficients. Although Revelt and Train's code is free from Train's Web site, GAUSS must be purchased to run that code. Similar benefits can also be accessed in the random parameters logit analysis that's available in NLOGIT, which is also based on input from Train.

Boomer provides a file that explains each of the currently active statistical applications for which Data Wizard prepares data files. Valuable information is provided in each profile. For example: In the NLOGIT file, some of the other relevant analyses available in NLOGIT are mentioned while restricting the illustrative material to nested logit, which is the unique contribution of NLOGIT among the related statistics programs.

In the file that explains preparing data for LGC, NLOGIT, and GAUSS, not only is the data preparation process illustrated, but also the basics of inputting the data files to LGC and NLOGIT—and performing the analysis in those applications—are profiled. For GAUSS, Data Wizard is programmed not only to prepare the data file, but also to call the appropriate mixed logit routine in GAUSS, perform the analysis, and

pipe the output into Excel—quite a benefit. The only very minor drawback is that some of the specifications for the attributes and covariates in the LGC tutorial do not align with the output.

Simulations and other advanced analyses. Simulators are the most important deliverables to clients for most choice-based conjoint studies, and the Simulator Wizard might provide the most innovative benefits among the three Wizards. The statistical output from LGC, NLOGIT, or Train's GAUSS application is taken into Simulator Wizard with fairly little work. And the simulator is ready to function after setting just a few parameters, such as total market size, market potential, and which attribute to use for price response curves.

If you're using data generated from a study that was (1) fielded using the Design Wizard design and (2) analyzed by LGC, for example, then the setup process for Simulation Wizard is quick and painless. At each of the setup stages, users can alter some of the input, formatting, or other parameters. One of the stages links demographic variables used as covariates in the discrete choice analysis to U.S. Bureau of the Census data, for weighting. Certainly some technical procedures must be learned to properly set up the Simulator Wizard on any data set, but those are quite easy and become routine after working through a few simulations.

Simulator Wizard is set up to receive segmentation data. For example, if the analysis is conducted in LGC, then those latent segments automatically become part of the simulator. The user can perform the analysis over all the segments, some of the segments, or no segments—or over all a priori segments, some a priori segments, or no a priori segments—based on demographic or behavioral dimensions.

The examples in the simulation tutorial assume that the design was conducted in Design Wizard and that the data were set up for use in LGC, for example, within Data Wizard. However, I used the output from an LGC analysis of data—from a study designed and fielded using Sawtooth Software in the simulator—and it worked fine. Although LGC accepts and works well with Sawtooth Software choice data, the attribute labeling flexibility, attribute-level labeling flexibility, and covariate labeling flexibility has not yet been added. Consequently, the output from the simulator won't look quite as good as from StatWizards' input—but that can be fixed by taking some time to label attributes, attribute levels, and covariates in the Excel worksheet.

A tremendous amount of flexibility has been built into the simulator. For example, a great time-saving feature is the ability to remove a product from the simulation simply by deleting its name from the column heading. The calculations are automatically adjusted as soon as the name is deleted.

The Simulator Wizard provides a basic and functional approach to simulation resulting from discrete choice research. The result is a highly flexible Excel tool, which can accelerate learning about the impact of likely product/service configuration changes. Not only can all parameters be changed in seconds, but also a convenient tracker shows changes from the previous configuration. The term market share is appropriate in some applications of conjoint. However, routinely using that term can inflate the importance of simulation results where actual marketing executions among brands vary, and where customers are heterogeneous in quantities purchased and other behavior. Simulator Wizard provides some features that help take the analysis closer to market share, including an adjustment factor that seems meant to act as a final subjective bridge to the reality of the market.

Many potential users have probably thought about integrating the Bass diffusion model into their conjoint analyses, and some have gone that extra step. Simulator Wizard provides the integrated functionality of having the Bass diffusion model as an output option. As an additional bonus, it generates price response curves that relate price to potential revenue and to potential market share.

Summary. StatWizards will become an extremely useful part of the methodological toolboxes of many consultants. It allows one to design a discrete choice conjoint study and prepare the data for analysis with three powerful applications, and includes the important feature of building and running simulations. This has been a noteworthy achievement for Boomer and StatWizards.

The purchase choice will be obvious for many but not for others, as is true of any application. One thing to consider is cost. To execute a discrete choice study, StatWizards must be licensed. And one or more of LGC, NLOGIT, and GAUSS must be purchased. The cost of StatWizards is $2,400 for the suite of three wizards, including a half day of consultation. Separately, Design Wizard is available for $950, Data Wizard is available for $800, and Simulator Wizard is available for $650.

Design Wizard can be used as a stand-alone experimental design application. However, Data Wizard and Simulator Wizard require LGC, NLOGIT, or GAUSS to operate. Consequently, the StatWizards suite price must be augmented with funds for at least one of the statistical applications. LGC sells for $1,195 for the first year and $995 thereafter, and NLOGIT sells for $1,195—for a total outlay of $3,595 for StatWizards combined with either LGC or NLOGIT.

Boomer has set up a modern and powerful approach to designing, preparing to field, preparing to analyze, and running simulations of discrete choice conjoint experiments. StatWizards is not a direct replacement for existing conjoint software, but an extremely creative, clever, and well-developed professional approach to this highly important area of strategic marketing research and modeling. Those who have not yet moved into developing and executing choice-based conjoint studies should seriously consider the StatWizards option. As mentioned, a demonstration version is available, and the Stat-Wizards Web site (www.statwizards.com) provides a great deal of information and support for considering the application. •

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