Conjoint Analysis

An Introduction for Designers and Product Managers

Mark Schraad

Spring 2006

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Introduction and intentions:

The purpose of this guide is to introduce designers and project managers to the benefits and outcomes derived from a conjoint analysis study. It is intended be informational. It is not intended to create experts in the design, execution and analysis of conjoint studies. It is not a how to manual. It is not intended as a recommendation of methodology.

Designers of product, services, systems and organizations must participate and engage in the process of research. Without open ended research during the investigative stages of a project the design is missing an opportunity for divergent information gathering. Further the designer must check her work through regular prototyping and testing. While marketing research is often the source of research methodologies for designer, market research rarely goes into the level of depth that the design process requires. Conjoint analysis offers the designer a tool that can gather a wealth of information regarding preferences, but does not explain why. The design must use a variety of tools to accomplish a robust understanding of the situation, the user, the purchaser and usage context. Conjoint is just one of the tools available.

A brief introduction

to the application of research to design

The greatest danger for the new venture is to "know better" than the customer what the product or service is or should be, how it should be bought, and what it should be used for. ... Businesses are not paid to reform customers. They are paid to satisfy customer."

– Peter Drucker, Innovation and Entrepreneurship, 1985

Why bother with design research?

Designers and engineers often have a vision... sometimes an epiphany. They come across an idea that is the convergence of expertise and interest and assume that everyone will want that idea – as a product or service.

Consumers, on the other hand, only need what they need... and have to select from what is manufactured - or go it on their own. Many great products have come from observing how consumer's make modifications to products that do not quite meet the their needs in their specific situations.

In the store, consumers vote with their wallets. Those products that appear to serve a need win by way of being purchased. Products that do not appear to work – or do not effectively communicate their purpose – will certainly lose in the retail arena. Products that only appear to serve the needs get talked about and most likely they eventually die. Those products that look to solve a problem, and actually serve a need will succeed in the marketplace.

So, the system kind of works, right? Good products succeed and bad ones fail?

Sure, but it cost a lot to design, produce, package, push and ship a product into the store. If we can determine attributes early, we be much more efficient. With new product failure rate in the 90% range... certainly we can find room for improvement.

What is the difference between market research and design research?

They both draw from the same overall goal, understanding the buyer/consumer/user/customer. But they have different objectives. Market research is typically concerned with what the customer wants and what they will do. The designer needs to know why. Design research often goes into greater depth and is less concerned with statistical significance. That is why more designers are embracing ethnography and 'deep dive' methodologies.

What can we find out from buyers and consumers?

A lot, but rarely as much as we would like. Consumers can only operate and talk to us based upon what they know, so familiarity is everything. Consumers are not likely to help us with insight into a brand new product category especially regarding style or fashion. For the visceral, the designer or engineer must show leadership. To that point Oakley, the California sunglass company ashews market research. They would argue that the consumer does not know what is cool or fashionable, until we design it and put it in the hands of pro athletes. In fact, Oakley often designs leading products as 'trial balloons' that appear only in use by sponsored spokespeople –– athletes that have a high visibility and are fashion leaders. The caveat is, just how far ahead of the curve can the designer afford to be. Be to far ahead of the consumer and you end up manufacturing the Apple Newton instead of the Palm or the iPod. Be too slow and your competition will beat you to market. Consumers can tell you a lot about the behavioral aspects of a product.

The second part of this answer is in how much the consumer knows and how they can tell or not tell you. Many buyers, sellers and consumers have tacit knowledge about either the industry, the product class or even your specific product. Whether they are conscious of that product is yet another question. (see Zaltman, How customers think...). And, even more important, are they able to communicate their knowledge and preferences to you... and can they do it honestly. Positive or negative response bias, ego, self image, all will likely have an impact on the data you gather. Respondents can be influenced by you, your company, your taking of their time, their current mood, need for validation, need to make an impression, are they willing to be the barer of bad news... and the list goes on.

So this seems to be getting complicated, how do we know or find out?

The easiest thing to do is to **observe**. Taking a lesson from the anthropologist – be in the environment of use and watch. Much can be learned in early stages of discovery by being in the right place, being patient, and absorbing behavior.
The next step might be to ask questions. The in depth, qualitative **interview** is another important component. But be careful not to ask questions too directly. Ask open-ended questions that allow people to expand. Find scenarios or settings that allow them to open up. Learn to listen. Show interest and talk one-on-one or in groups to create a setting that is less formal and comfortable. You want people to talk from the heart, not their egos.

To get a larger volume of information, from a larger group of potential customers, you might try a **questionnaire or survey**. There are two types commonly used. The first is the Lickert scale, where respondents answer questions on a numerical scale. The nature of the scales and the number of choices vary. Answers are summed for evaluative data and the group 'votes' as a whole. Similarly, a semantic differential survey can bring insight into impressions or ideal points. Again the data is summed and interpreted as a whole. In executing both of these survey models, of most importance is how the question is phrase and what words are chosen. The old saying of "garbage in, garbage out" hold true. Further, the researcher must understand what is being asked. Are we asking about attitudes, or beliefs, or both? Quick and relatively easy to execute, surveys can be very helpful, but are not the perfect answer.

How can we best present this information?

The richness of the data is typically in both the raw numbers and in the summaries. Much of survey data can be analyzed by evaluating means, medians, and sums. T tests and analysis of variance (ANOVA and MONOVA) are very useful tools for between subjects or within subject analysis. Did you save your notes from stats class?

Graphs and charts are also helpful for quick visual summations. Cluster analysis and multidimensional scaling (often called preference or perceptual mapping) can be shown by plotting data on dual axis (X, Y plots) graphs. With the right software three axis data can be plotted on a three-dimensional model for viewing on screen. If you plan to look at the relationship of three variables, a series of three X, Y plots may be more convenient and simpler to comprehend.

So what else?

Well, conjoint analysis is what else. Conjoint analysis is a method of gathering information from users or customers that is quick and relatively easy. The results can be interpreted to give us tremendous insight into preference and the worth of attribute (we call this worth utility). By presenting your offerings as sets of choices, with varied attribute characteristics, we ask respondents to make a choice. Pick one or the other, option A or option B, or maybe none. For most of us this is a fairly easy process. Present a series of these choices that represent an array of attributes and their characteristics – and you have a conjoint analysis study.

How does it work?

If you are familiar with traditionally analysis of variance (ANOVA) you probably understand the basic concepts, main effect and interactions. The statistical analysis in conjoint will result in a list of all combinations of the product attributes and characteristics possible with the relative worth (utility) of each, and the overall preference of those you surveyed. This information is helpful in deciding which attributes to include in which products, what characteristics of those attributes are optimal, and how much they will be valued (read: how much are customers willing to pay). Including competitors feature sets in a conjoint study can even be a reliable predictor of market share. Further, if your conjoint study tracks specific segmentation and targeted segment, you can determine with great precision which options to include on which product for the right buying group. This information might be of great value to marketers and designer, don't you think?

Caveats

The process can be complicated... but there are ways of simplifying. Suppose you are in charge of designing a product and the final feature set (attributes) has yet to be determined. The features are up in the air because you do not yet if they are all possible, you do not know how expensive they will be to include, and are not sure which are desirable or of most value to the buyers and customers. There are five features you know about... so you will likely not test for these. But there are four that are in question. Each of these features can be implemented in several ways. Can you tell how the options are starting to add up to unrealistic proportions? Four features and four levels each are 4 to the fourth, or 1024 possible combinations. Not many people have the patience to rank all of these. So, we need to pair the number of choices down to a shorter list. Using conjoint analysis we can test a small sample of these and interpret the rest with great accuracy.

Another issue is a problem with nearly every other sort of market or design research. When a respondent is participating in a survey, they are working in isolation of the actual purchase or use. Missing in this process is the investment or ownership of the purchase process. It is much easier to determine which house to by if it is in theory only. When it comes down to the actual purchase... much more thought is put into the process, because the ramifications of that choice are real. Will people make choices in a survey that are not precisely realistic? Of course they will. The larger the investment, whether measured by money, time, image or something else, the less likely the study is precisely accurate.

So again, what's next?

Predictive markets are what's next. Often called Austrian Economics, this measure or potential is roughly equivalent to a sports book betting line in Las Vegas. No, this is not a recommendation to gamble, but it is recognition of the value of being invested in the process and the applications of tacit knowledge. Sports fans, as well as those who run the sports book both have significant influence in how the stakes end up. If the casino sets the odds incorrectly, the sports fans take notice and bet accordingly. When this happens the casino is alerted that the betting is lopsided. Those betting are essentially 'voting' on the accuracy of the casinos prediction. When this happens, the casino adjusts the terms of the bet to more accurately represent the situation. In this manner the casino is harvesting the tacit knowledge of those who are betting on the game... and the adjustments have economic implications for both the casino and those betting. It is classic free market economics.

So, how can we use this to predict product success?

Time will tell. Some progressive companies are working to implement predictive markets. Economists, statisticians and academics are working on new and better way to implement these tools. With access to the web, now standard for most businesses and consumers, it seems to be the delivery method of choice. It will not be too long before this methodology matures and finds a home in most every market research toolbox.

" 'Quality' in a product or service is not what the supplier puts in. It is what the customer gets out and is willing to pay for"

– Peter Drucker

Conjoint Analysis

the basics of application

Why should designers concern themselves with conjoint analysis? After all, it can be a complex process, it takes a significant number of respondents, it takes time to set up and administer, and it requires some trained insight to interpret results. Couldn't we just do a simple survey... or better yet just design what we already know the customer wants?

Conjoint analysis offers designers the opportunity to gather a considerable amount of valuable information and insight. The ability to determine what attributes and at what level customers prefer. Notice that I did not say which attributes they 'prefer to buy'. With conjoint analysis we can partially bridge the gap between what people say they would do, and what they actually do. We are attempting to determine purchase preferences in a non-purchase situation. In doing so, we can obtain some very valuable information.
We could take this a step further by monitoring multiple offers in the marketplace, in real time (such as Capitol One's ability to mail out variation of a credit card offer and determine through completed applications who buys what) or by measuring tacit knowledge with predictive market technology. Neither of these are appropriate options for future offerings – and both can require significantly more resources than conjoint analysis.

The ability to determine which attributes, for which customers, at which levels allows us to design products that can be mass produce, but come a little closer to custom offerings. The benefit of designing products the match customer's preferences should be obvious.

Conjoint can also tell us what level of utility an attribute has at a given level. Utility is a

measure of worth relative to the other attributes. If we include price of the product as one of the variables in the study we can interpolate a dollar value for the attribute and in some cases determine price elasticity. Knowing the utility of a product's features can help us to match the material and manufacturing costs to the price customers are willing to pay.

The third benefit that can be derived from conjoint is the ability determine market segmentation. Which customers will show maximum interest in the product at the given attributes levels? At the consumer level segmentation is the aggregation of customers based upon desired attributes of the product. And since conjoint analysis is all about determining attribute preferences it is a logical tool for this use. By tracking who completes the study we can do some basic calculations to determine subsets of the market and their specific preferences. If sampling is reliable, the results can be generalized for a larger population.

A conjoint study: What the respondent sees.

The people participating in your survey (the respondents) will see a selection of product offerings called choice attributes. The collection of attributes, each represented at a specific level is called a profile. The selection of attributes is extremely important and will greatly determine the type of analysis you end up with. Profiles can include the full range of critical attributes and is called full profile design. A subset of attributes, those that you are particularly interested in can be shown in a partial profile study.

The more attributes you include, the more complex the survey, the more complex the calculations become, and the less reliable the analysis will be. That is not to say that you should not include every attribute that is important, but be aware of the cost. Conducting a second study in order to measure an omitted attribute would certainly be costly as well.

Typically the participant has a choice of two offerings with differing attribute levels. For instance we might ask them to first choose between these options:

Option one	**Option two**
Visa	Mastercard
$75 annual fee	No annual fee
9% interest rate	6% interest rate

The respondent picks the one that has the most appeal to them.

Profiles can be presented in pairs as shown above (Adaptive Conjoint Analysis or ADA) or in a series of options (Choice-based Conjoint or CBC). The choice can be as simple as choosing the preferred profile or can include a range of preferences such as a scale from 1 to 10. In either case an optional selection for 'none' can be included.

In a full profile conjoint study there are often to many options to test each and every one. In the survey above there are three attributes included in the profiles. If each of those attributes has three possible choices then there are 27 possible combinations. That is probably not to bad, but suppose that you are interested in the features of a complex consumer electronic device. It may have 50 or more attributes with nearly as many options for each. That would be a long a complex survey. As set of 12 attributes with 2 to 5 options each... say a total of 35 levels would reveal 186,624 possible combinations (Green, 1999). Few people have the time or patients to sit though that kind of study. Fortunately we can make use of orthogonal arrays (Addelman 1962) to reduce the number of profile we show the respondent. An array that includes only a fraction of the possible combinations can be used to accurately estimate utility for all attribute level main effects. This is called a partial factorial design conjoint analysis. Unfortunately if you are interested in interaction effects between the attribute levels a full factorial design will be necessary.

Methods of presentation

Until recently conjoint analysis studies were conducted using flash cards to present the series of choice offerings. Responses were recorded by hand and then entered into software applications for analysis. More recently CRT or computer application allow for the presentation and selection of the choice offering on a computer. This certainly simplifies the administration and recording of results. Most recently, these studies can be administrated over computer networks and the internet. Obviously this eliminates the geographic logistics as a limitation.

Steps for designing a conjoint analysis study:

Step one: Determining the attributes

Each step of designing a study is critical, but none so important as determining the attributes to be measured. Include irrelevant attributes and the complexity of the study increases exponentially. Omit important attributes and a critical opportunity is missed. So how might we choose the attributes? First, if there is existing data that measures customer preferences it should certainly be considered. Any attributes that the customer consistently shows indifference for would be likely candidates for omissions. Second, there is considerable tacit knowledge held by sales force, customer service, tech support

and often executives within the company or distribution channel. This is certainly an area for concern as conjoint analysis is a technique best used for customer preferences. The preferences of management should probably not be part of the study. Lastly, new attributes that are under consideration are appropriate. Whether they offer a differentiating advantage, cost saving, or time savings, conjoint can be an excellent predictor of consumer preferences for future offerings.

Step two: At what levels should we measure these attributes.

Too many levels and the complexity grows – to narrow or 'reasonable' a selection and we may miss an opportunity.

Step three: Determining who will participate in the study

Obviously, in any study, the more participants you get involved, the more reliable the results. Depending upon your goals, you may want to work diligently to verify your study, validate you sampling and spread you research across a wide range of segments. These are critical in assessing the statistical significance of any quantitative research.

Step four: Determine the length of the study and how it will be administered

Knowledge of your target group will help to determine the value of their time and how much you should expect. Incentives can help, but the risk of an opt-out part way through the study increases with each additional question. Keep it to a realistic length, given your audience.

Though the study can be set up, calculated and distilled by hand, the use of an available software package may save considerable time. Computer administration has the added convenience of avoiding the entry of data by hand.

Step five: Analyze the data

Determine the value systems, utility and any other results that you set out to find. You may have collected data that can be mined beyond the goals and objective you set. Outcomes that result outside of the study's objectives should be validated though additional testing.

Step six: Determine action items and take-aways

A formal debriefing session is always a smart step in the conclusion of a study. Determining what else might be of interest, what could have been done differently, how the outcomes will be realized and what the next steps should be are critical. Documentation of this process is extremely helpful when additional studies are undertaken.

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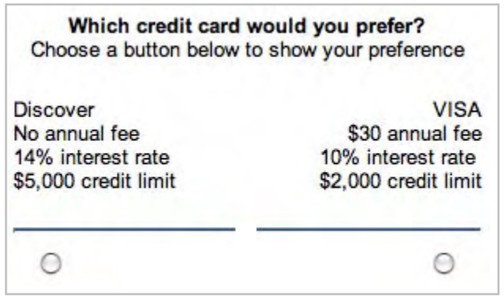
Examples and analysis

The traditional method of conjoint analysis presentation is by showing the respondent a series of paired feature sets called cards. They were called cards because they were literally seperate pieces of paper. The respondent would choose the card with preferred attributes and they would be sorted accordingly. With the advent of the world wide web, html forms, java script and dynamic database driven web pages the computer has allowed for data gathering remotely.

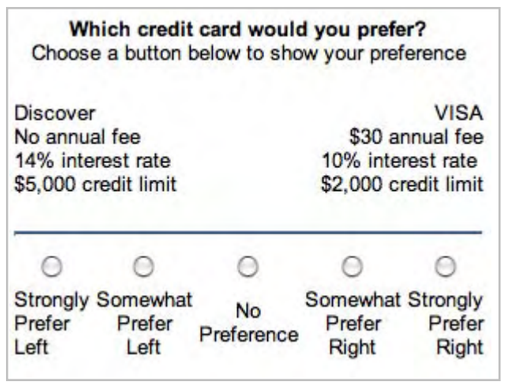
Additionally, new methods of presentation were developed in an effort to afford the respondent a more user friendly, and easier to navigate, process.

The Sawtooth approach(s)

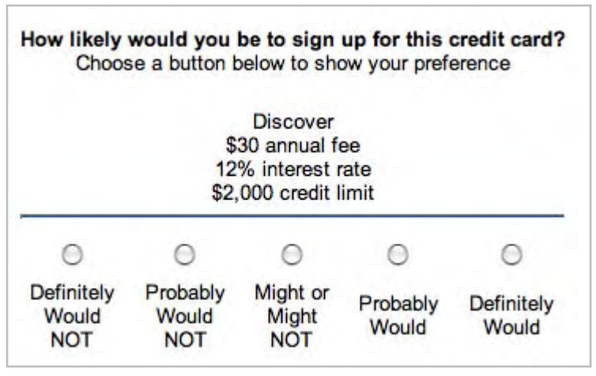
Sawtooth software was one of the first companies to implement an online process for gathering conjoint data. The simplest of those is simply by resenting a series of paired feature sets and asking the respondent to choose their preference.



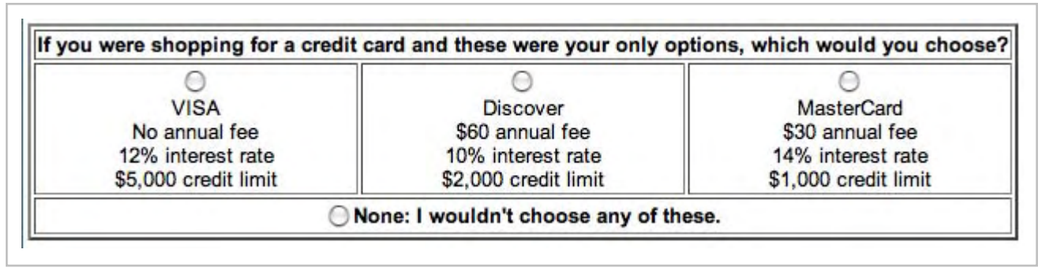
Variation upon this theme consists of allowing for variables rather than simply choosing one set of attributes or another. Sawtooth calls this approach paired scale.



Another variation is that of showing single attribute sets and asking the respondent to evaluate the profile based upon a simple scale.



Yet another approach developed by Sawtooth is that of showing several profiles, and even to go so far as to include a 'none' selection. This 'choice-based' approach allows for a more rapid collection of data.



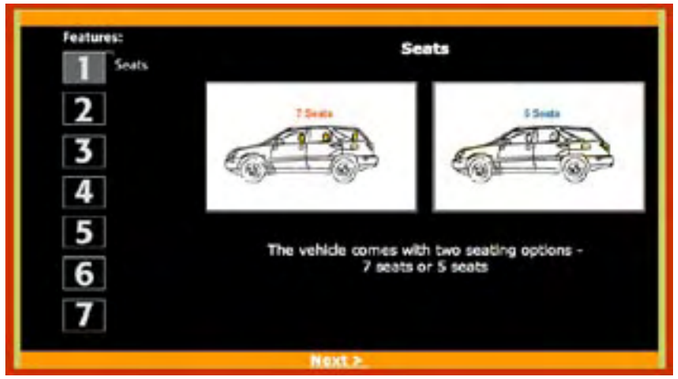
As the respondent makes a choice, the computer is able to resort the remaining sets by eliminating some of the option. In the process of sorting these options based upon the previous selection, the software is making some assumptions about the subjects preference based on a very small amount of data. This has cause may in the research community to questions the method's validity. There would seem to be a continuum with ease of use on one end and verifiable accuracy on the other.

In most cases a pair or set of profiles are represented at the end of the study. This allows for a sort of 'double checking' of the chosen preferences. This verification is particularly important when generating an orthagonal array of profiles as opposed to the full set of combinations.

Sawtooth not only facilitates your experience with the availability of on line demos, but regularly posts papers and presentation regarding conjoint analysis. Most are specific the their software applications but many are general in nature. Additionally, Sawtooth employees and developers regularly attend and present at academic and trade conferences, in addition to offering training. See www.sawtoothsoftware.com for more information

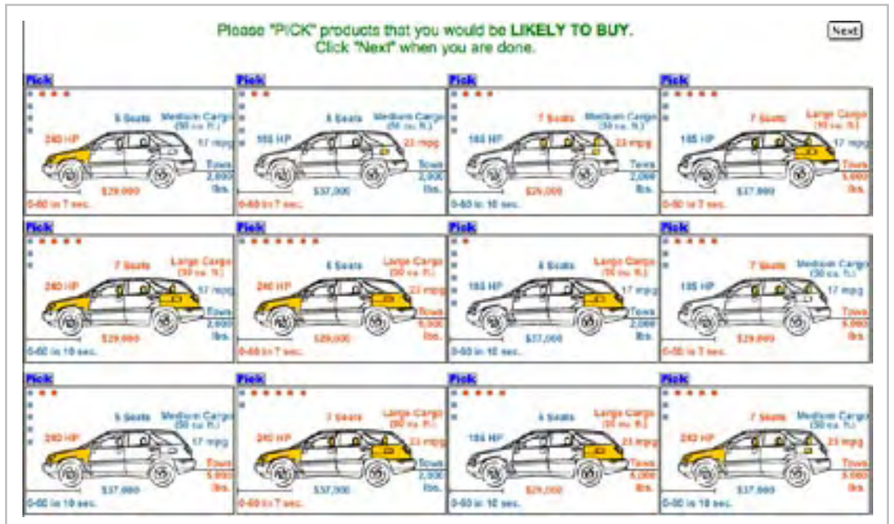
The MIT method of presentation and selection.

Often, when presenting a set of attributes as a profile it is tempting to list them by name. For the respondent this can be less than informative. In the case of the credit card examples shown earlier, if the respondent questioned how the interest rate was calculated, or was unfamiliar with some other attribute, they would have little recourse for clarification. This would obviously render results less than optimal. The MIT conjoint analysis online demonstration takes the respondent through a series of screen that explain the options and their implications prior to beginning the actual survey.

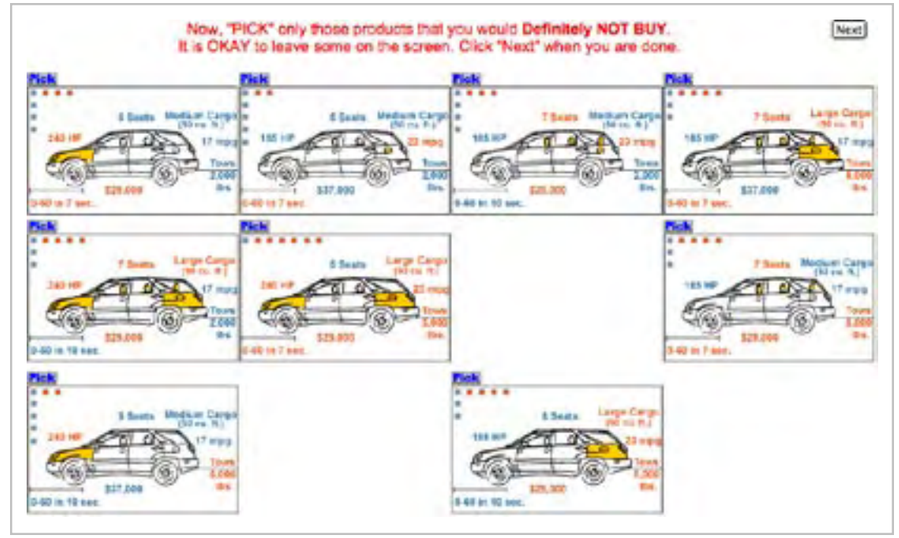


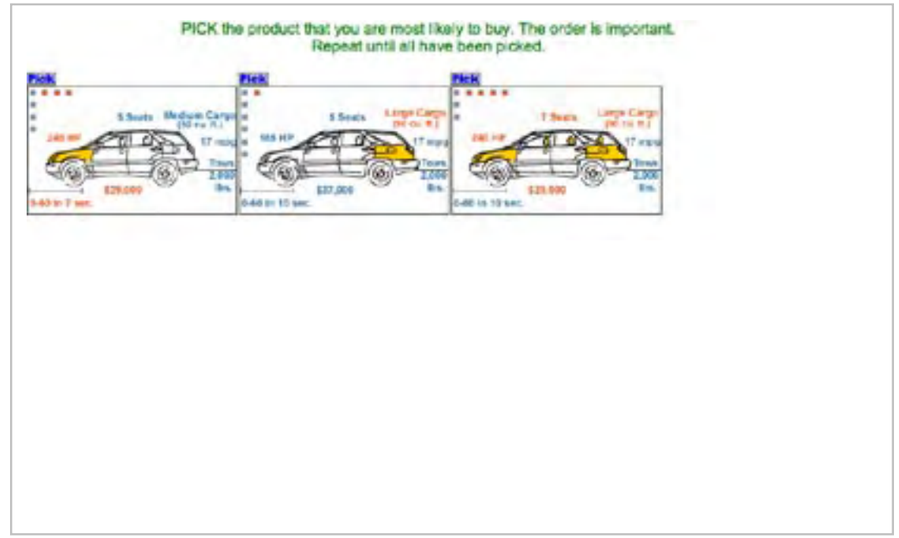
In this demo there are a series of 7 screen that explain each option and show the visual representation that will be used for each.

When the actual survey begins, the respondent is presented with a full set of 16 cards and asked to choose those they would be likely to purchase. The images are provided with the features labeled.



The user is then asked to choose the option they would definitely NOT purchase. Once the 'NOT' choices have been removed from the screen the respondent is asked to choose from the remaining cards in order of preference. This process works well in alleviating the user of having to fully evaluate all 16 profiles simultaneously.





You can try the MIT version of this demo online as well as several others at http://conjoint.mit.edu/demos/index.html.

Lunch time for the classroom design team

In this example design students were asked their lunch preferences. The following scenario was presented prior to the survey:

You are on a team of four student that worked late the prior night. You reconvened early this morning in order to get work done as the project is somewhat behind schedule. At approximately 2 PM it is apparent that the team is not yet near completion of the project. Everyone is tired and hungry. There are plenty of options available for lunch. These options fall into four classes. They a re described briefly here:

Location of lunch:
A) Get lunch at the snack bar and bring it back to the classroom.
B) Hike three buildings over to Wescoe Hall where there is slightly more selection but usually lots of other students and long lines to deal with.
C) Walk further to the east end of campus where there is a popular lunch spot.
D) Walk to the parking lot and drive downtown (approximately 2 mile) and get food from a wide variety of vendors.

Food choices available:
A) The all-you-can-eat buffet.
B) A Fresh sub sandwich
C) A chicken sandwich (Chick Fil A)
D) A Microwave hamburger

Lunch cost per person:
A) $2
B) $3
C) $4
D) $6

Dining style:
A) Eat outside in very comfortable weather
B) Choice of carry out or dine in
C) Share a booth
D) Get carry out and bring it back to the classroom

These choices are ordered in what is presumed to be first to last preference given the circumstances.

These four classes, each with four choices present 256 different combinations for lunch. This is obviously beyond the patience of nearly anyone to rank. Using SPSS's conjoint analysis module the classes were defined as factors. The choices within these factors were input as an orthagonal array was then generated. With this scenario and the card array, the form below was generated and administered to a class of design management student. The class was a mix of undergraduate and graduate students.

The unofficial lunch choice survey 14 March 2006

Consider that you are working on a group project in the Art and Design building. Everyone in the group has decided they are hungry (it is about 2 PM and you have not yet had lunch) and it is a good time to take a break and eat. You decide to go as a group to continue discussing the project. Please rate your favorite choices from the list below. Write your rankings in the left most column.

Your favorite choice would be number 1, your least favorite would be 16.

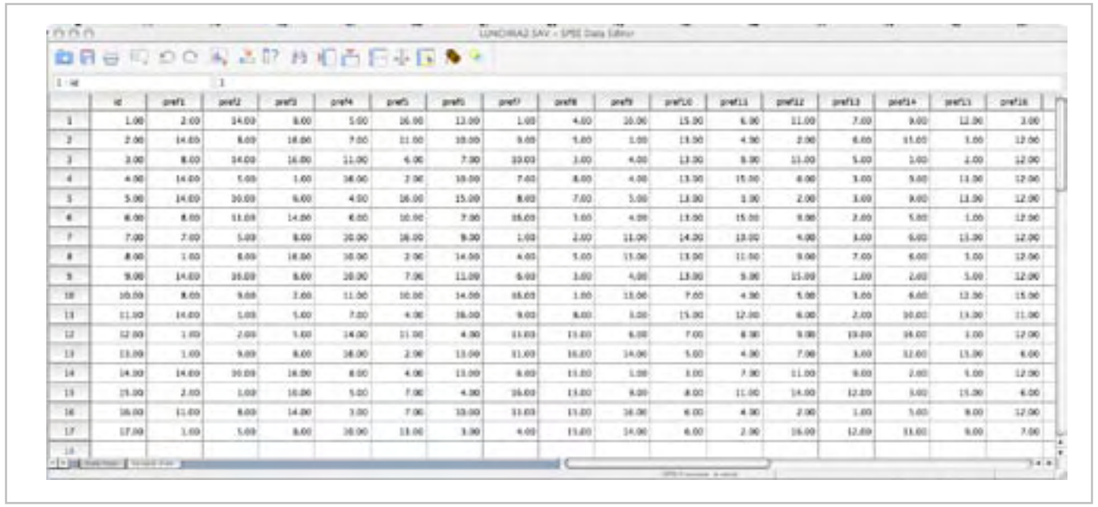
Rank	Location convenience	Food Choice	Cost in dollars	Dining environment
	downtown	fresh sub	2	sit in a booth
	downtown	chick fil a	3	outside in nice weather
	wescoe hall	microwave burger	4	outside in nice weather
	east end of campus	all you can eat buffet	3	carry out
	downtown	all you can eat buffet	4	carry out or dine in
	art and design	microwave burger	3	sit in a booth
	wescoe hall	all you can eat buffet	6	sit in a booth
	art and design	fresh sub	4	carry out
	east end of campus	fresh sub	6	outside in nice weather
	wescoe hall	chick fil a	2	carry out
	art and design	chick fil a	6	carry out or dine in
	downtown	microwave burger	6	carry out
	east end of campus	chick fil a	4	sit in a booth
	art and design	all you can eat buffet	2	outside in nice weather
	east end of campus	microwave burger	2	carry out or dine in
	wescoe hall	fresh sub	3	carry out or dine in

Thanks very much for your help in this project. It is a preliminary study for the development of my thesis work. If you have any questions or concerns about the project or this survey please feel free to contact me via the information provided below.

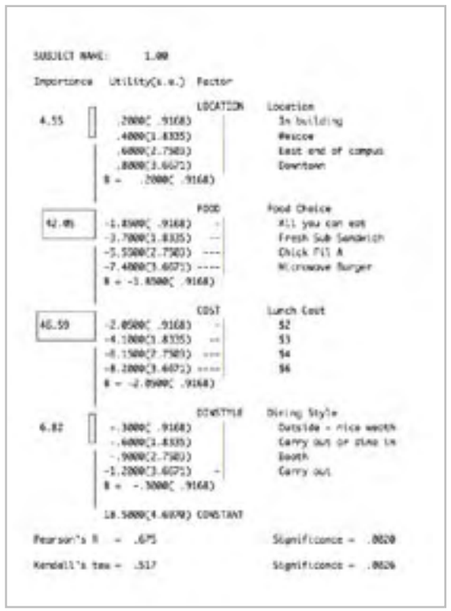
Mark Schraad
785 832 1081
mschraad@ku.edu

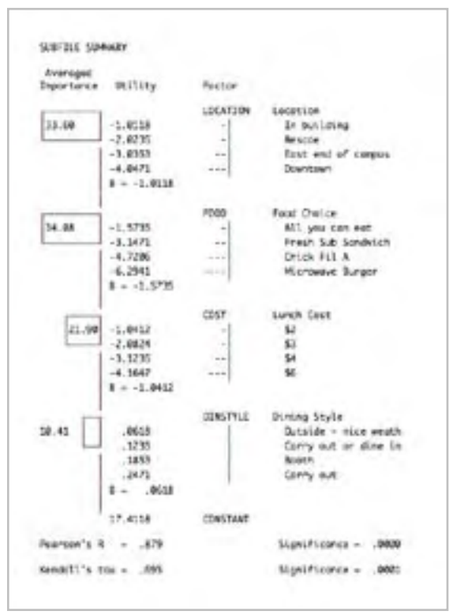
Students were given the scenario and presented with a paper form and asked to rank the 16 options in order of preference.

Inputting the data from the respondents resulted in the following table.

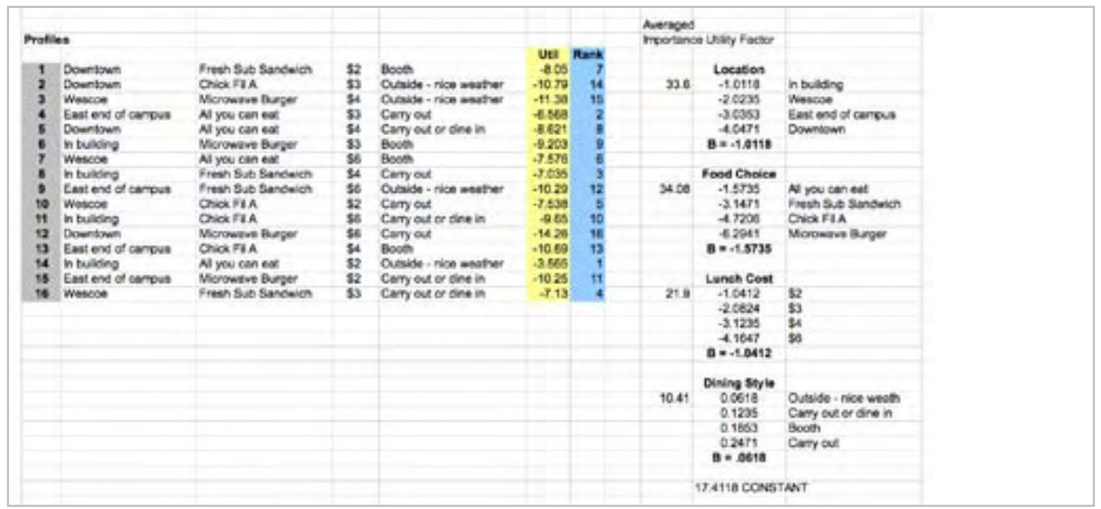


Once the data was run SPSS produced a table for each respondent as well as a summary table. Examples of these are represented here.





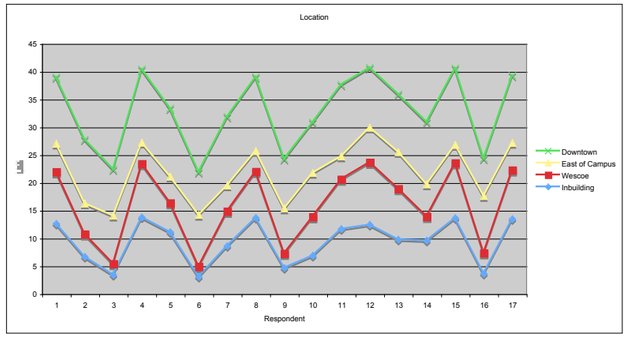
From this data, utility (inverted) and ranking were then calculated using simple spread sheet design.

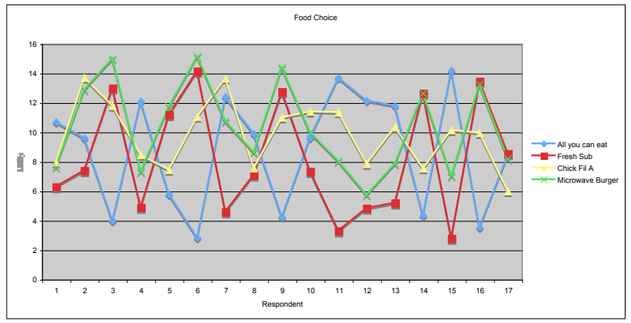


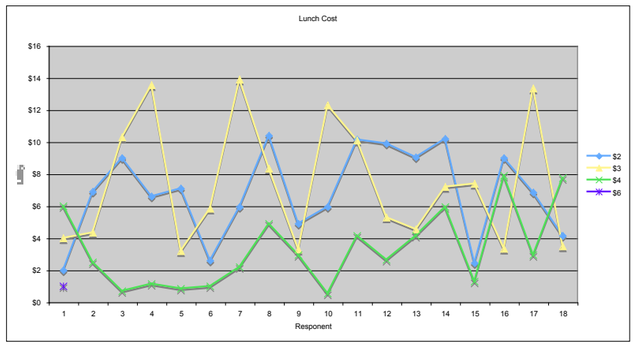
Profiles					Util	Rank	Averaged Importance	Utility Factor	
1	Downtown	Fresh Sub Sandwich	$2	Booth	-8.05	7		**Location**	
2	Downtown	Chick Fil A	$3	Outside - nice weather	-10.79	14	33.6	-1.0118	In building
3	Wescoe	Microwave Burger	$4	Outside - nice weather	-11.38	15		-2.0235	Wescoe
4	East end of campus	All you can eat	$3	Carry out	-6.568	2		-3.0353	East end of campus
5	Downtown	All you can eat	$4	Carry out or dine in	-8.621	8		-4.0471	Downtown
6	In building	Microwave Burger	$3	Booth	-9.203	9		**B = -1.0118**	
7	Wescoe	All you can eat	$6	Booth	-7.576	6			
8	In building	Fresh Sub Sandwich	$4	Carry out	-7.035	3		**Food Choice**	
9	East end of campus	Fresh Sub Sandwich	$6	Outside - nice weather	-10.29	12	34.08	-1.5735	All you can eat
10	Wescoe	Chick Fil A	$2	Carry out	-7.538	5		-3.1471	Fresh Sub Sandwich
11	In building	Chick Fil A	$6	Carry out or dine in	-9.65	10		-4.7206	Chick Fil A
12	Downtown	Microwave Burger	$6	Carry out	-14.28	16		-6.2941	Microwave Burger
13	East end of campus	Chick Fil A	$4	Booth	-10.69	13		**B = -1.5735**	
14	In building	All you can eat	$2	Outside - nice weather	-3.565	1			
15	East end of campus	Microwave Burger	$2	Carry out or dine in	-10.25	11		**Lunch Cost**	
16	Wescoe	Fresh Sub Sandwich	$3	Carry out or dine in	-7.13	4	21.9	-1.0412	$2
								-2.0824	$3
								-3.1235	$4
								-4.1647	$6
								B = -1.0412	
								Dining Style	
							10.41	0.0618	Outside - nice weath
								0.1235	Carry out or dine in
								0.1853	Booth
								0.2471	Carry out
								B = .0618	
								17.4118 CONSTANT	

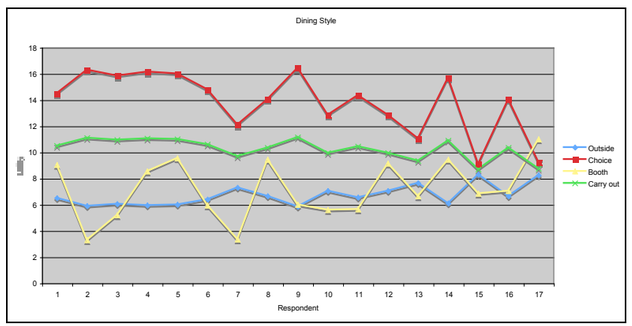
Again, using a spreadsheet design and the importance values from SPSS we can begin to see groupings of respondents - those that deem location or food choice as most important, for instance.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	avg
Location	4.55	41.35	75	6.78	26.47	81.63	8.11	3	66.18	30	10.2	20.41	17.31	35.82	37.5	90.54	17.44	33.61
Food choice	42.05	54.81	19.23	44.92	18.38	8.16	74.32	36	19.64	42.86	82.24	32.65	61.54	11.94	42.31	1.35	6.98	34.08
Cost	46.59	0.96	2.33	40.88	41.91	3.06	14.86	51	12.5	8.57	16.33	28.57	1.92	38.06	11.54	4.05	48.84	21.87
Dining Style	6.82	2.88	2.88	7.63	13.24	7.14	2.7	10	2.68	18.57	11.22	18.37	19.23	14.18	8.65	4.05	26.75	10.41









While the utility numbers generated in SPSS give us a good idea of the worth of those features, the ranking and utility of the profiles provide us with considerable insight. We can see that the primary considerations of the group as a whole were closely divided between Location and Food choice, we can also see that Cost was an important factor as well.

When looking at the importance tables we can see how we might target a specific group of individual by featuring or emphasizing location over other features. Yet another group finds the Food choice of utmost importance. Further analysis of the specific choices within those profiles and factors would allow us to produce some segmentations. Had we collected demographic, psychographic and sociographic information, we would be better able to determine marketing messages and how best we might deliver those in addition to the ideal feature set to offer those groups.

Common terms

in research and conjoint analysis

Definition of terms:

Offering

This is a term that avoids the pitfalls of calling something a 'product' or 'service'. All products are essentially services, but it's just easier to discuss them of we lump them all together. To that end, we will call all products and services as offerings.

Attributes

All aspects of the offering in question fall into the big bucket of 'attributes.' Attributes can be features, benefits, brands, price or outcomes related to the product. At this juncture we may or may not care which of these categories the attribute falls into.

Utility

What is the offering worth to prospective buyers or users of the offering? Utility can be used to compare relative worth of an attribute, or can be converted to currency for assessing some level of price elasticity.

Adaptive conjoint analysis (ACA)

ACA allows for the testing of relatively large numbers of attributes (up to about 30) and a larger range of options for each of those attributes. When using ACA the selection of attributes and range varies for each person being tested. Partial testing for each participant results in a realistic test. Testing for each and every option would be prohibitive. So, given a volume of options, and realistic test duration, ACA is a great option. The trade off is in how utility is calculated. A more simplified calculation model is used which makes the selection of attribute ranges even more critical to assure reliable results.

The ACA calculation model shows the individual participant utility levels. This allows the researcher to segment those individuals into clusters based on desired attributes.

Choice-based conjoint analysis (CBC)

CBC shows the participant a full description of the product (all attributes) and tests the full rage for each attribute. CBC allows for showing more than just two choices and often includes an option for the participant to select 'none of these' as a choice. 5- 7 attributes are optimal for CBC.

The simplicity of the CBC presentation results in a test that can be effectively administrated with paper surveys. In the case of ACA, the selection of attributes and levels is complex enough that it must be administered with computer software.

Full factorial conjoint

FPC is a study in which each attribute level appears with every other attribute level.

Full profile conjoint (FPC)

A range of profiles in which each attribute is evenly matched to each other attribute. Controlling the included pairings allows for the estimation of other attribute levels not included in the survey.

Self explicated conjoint analysis

This approach allows respondents to eliminate attributes and levels if they are not acceptable.

Hierarchical Bayes Estimation

Bayes estimation is an iterative process that interpolates betas (partial worth) of attributes based upon the neighboring data. It is hierarchical because it has two levels. The higher level assumes a normal distribution of the data, the lower level assumes a specific model of achieving outcomes (multinomial logit or linear regression). Enough iterations are calculated to minimize probable error.

Two attribute trade off analysis

The most basic (and early) flavor of questioning in which the respondent is presented with only two profiles to choose from.

Fractional factorial design

The ASQC (1983) Glossary & Tables for Statistical Quality Control defines fractional factorial design in the following way: "A factorial experiment in which only an adequately chosen fraction of the treatment combinations required for the complete factorial experiment is selected to be run." The strategy is one of trading off the interpolation of some of the utilities in exchange for shortening the survey to realistic length so that enough attributes and levels can be included.

Orthagonal Array

A method commonly used in conjoint studies to reduce the number of choices for the respondent, but still calculate utility for all attributes. Reliable analysis is restricted to the studies main effects.

Compensatory Models

The presumption used in a survey whereby, in evaluating the alternatives, a customer will select the alternative with the highest overall evaluation (sum of the measure of each attribute) across a set of attributes. Positive evaluations can compensate or balance negative evaluations.

Non-compensatory models

This approach presumed that the lack of some attributes, or a negative evaluation could not be compensated for by other attributes. These attributes are perceived as 'make or break'.

Attitude

Evaluations and beliefs combine to form customer attitudes.

Belief

The opinion of the participant or customer, that a product possesses an attribute in question.

Evaluation

The measure of goodness or badness of an attribute in question.

Ideal point model

By establishing an inverse relationship between preference and the weighted distribution an ideal point for the level of an attribute can be established. This is most effective for qualitative measures such as taste preferences, rather than qualitatively measured preference such as power or range.

Cluster analysis

A body of statistical techniques concerned with developing natural groupings of objects based on the relationships of the p variables describing the objects.

Multidimensional scaling

An approach to measurement in which people's perceptions of the similarity of objects and their preferences among the objects are measured, and these relationships are plotted in a multidimensional space.

Perceptual mapping

Perceptual mapping is a graphics technique used by marketers that attempts to visually display the perceptions of customers or potential customers. Typically the position of a product, product line, brand, or company is displayed relative to their competition. Perceptual maps can have any number of dimensions but the most commonly use two dimensions. Any more is a challenge to draw and confusing to interpret.

Preference mapping

Similar to perceptual mapping but displays ideal points rather than perceptions.

Halo-effect

A problem that arises in data collection when there is carry-over from one judgment to another. In the case of surveys of products the halo effect is a situation where the evaluation (typically a positive evaluation) of one attribute effects the perception of another.

The four major types of data collection used for Conjoint Analysis

Full profile

Each participant views a full set of attributes and levels through the evaluation sequence. Each card is rated on a scale of 0 – 100 in likeliness to purchase.

Compositional

Each participant rates both the desirability of the attribute levels (evaluation) and the importance of the attribute on a scale of 0 – 100.

Hybrid

Each participant performs a self-explicated evaluation and then evaluates a subset of the full profile sets. A composite of the data from both tasks is used to calculate utility.

Adaptive

Similar to the hybrid except that the profiles are evaluated two at a time.

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