Applied Conjoint Analysis

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Conjoint, or trade-off, analysis can be a powerful tool for the marketer, typically used when the research question concerns product or service development issues or pricing strategies.

By asking respondents to “trade-off” one product feature to obtain another, conjoint unearths the importance of product features to consumers’ purchase decisions, and calculates the particular combination of price and specific product features which maximize a product’s appeal to consumers.

A Note on the Effectiveness of Conjoint Analysis

"Traditional conjoint analysis makes some heroic assumptions, including the proposition that the value of a product is equal to the sum of the value of its parts (i.e., simple additivity), and that complex decision-making can be explained using a limited number of dimensions. Despite the leaps of faith, ***conjoint analysis tends to work well in practice, and gives managers, engineers and marketers great insight to reduce uncertainty when facing important decisions****. Conjoint analysis isn't perfect, but we don't need it to be. With all its assumptions and imperfections,* ***it still trumps other methods****."*

Source: Quirk's, July / August 2004

Conjoint Overview

Factors or Features

Levels within Factors

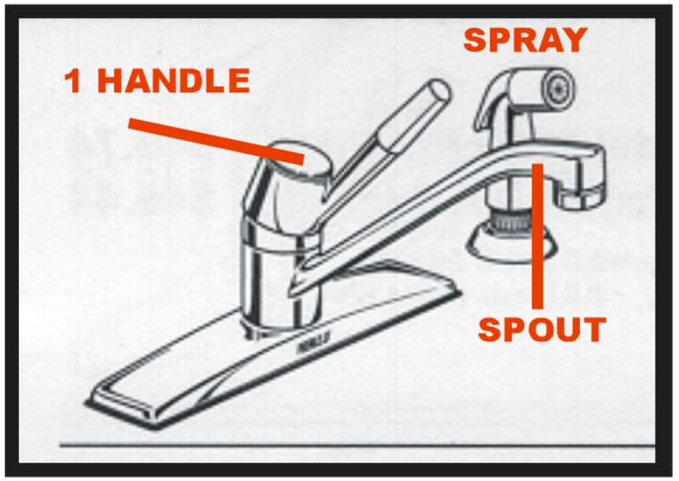
Key Outputs:
-Relative importance of factors
-Preference for levels of a given factor
-Utility structures

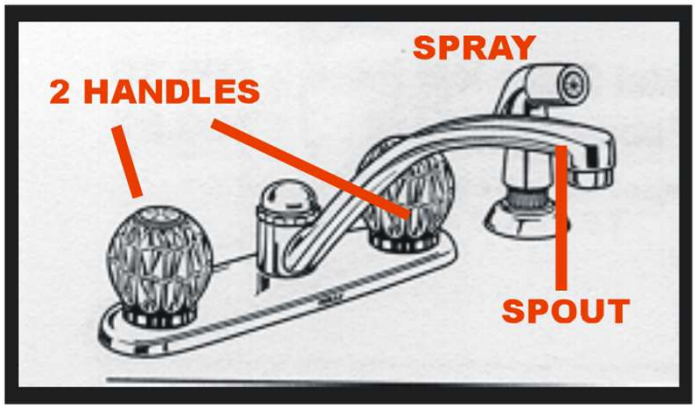
Key Analysis:
-Simulation models
    -current product mix
    -new product development
    -segmentation
-Price elasticity

Product Factors

Kitchen Faucets:

-Type of handles
-Type of spout
-Finish
-Sprayer
-Washer type
-Warranty
-Brand
-Price





Levels of Product Factors

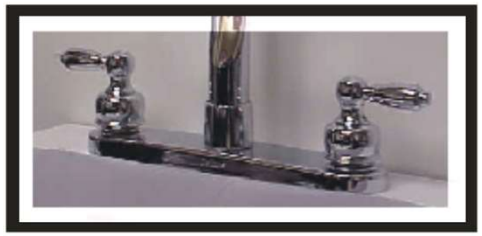
Kitchen Faucets:

-Type of handles

- **2 handled metal**
- **2 handled acrylic**
- **1 handled ball**

Etc.

2 HANDLE METAL LEVERS



1 HANDLE BALL LEVER

2 HANDLE ACRYLIC KNOBS

How do I know what factors and levels to use?

- Typically, qualitative analysis is done first (focus groups, for instance)

- Look to your client (as a vendor)

- If YOU ARE the client, look to internal decision makers, product managers, secondary data – do your homework!

Without the right factors and levels, a conjoint study is worthless!

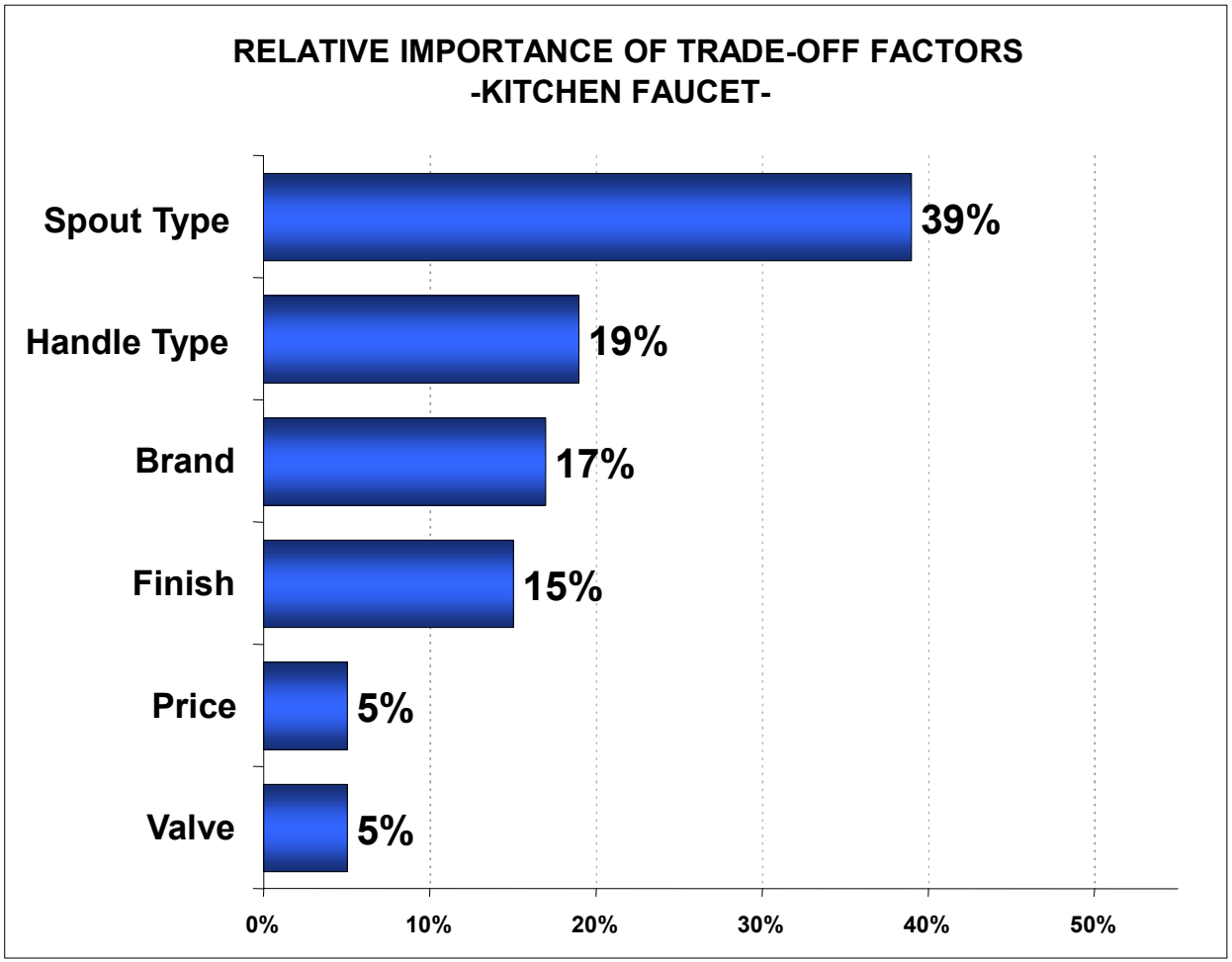
The Process

Once you've selected factors and levels, be sure to provide the appropriate stimuli to respondents prior to the conjoint task.

For example, if finish is a factor, show REAL versions, not just images or descriptions.

Key Outputs

FACTOR IMPORTANCE



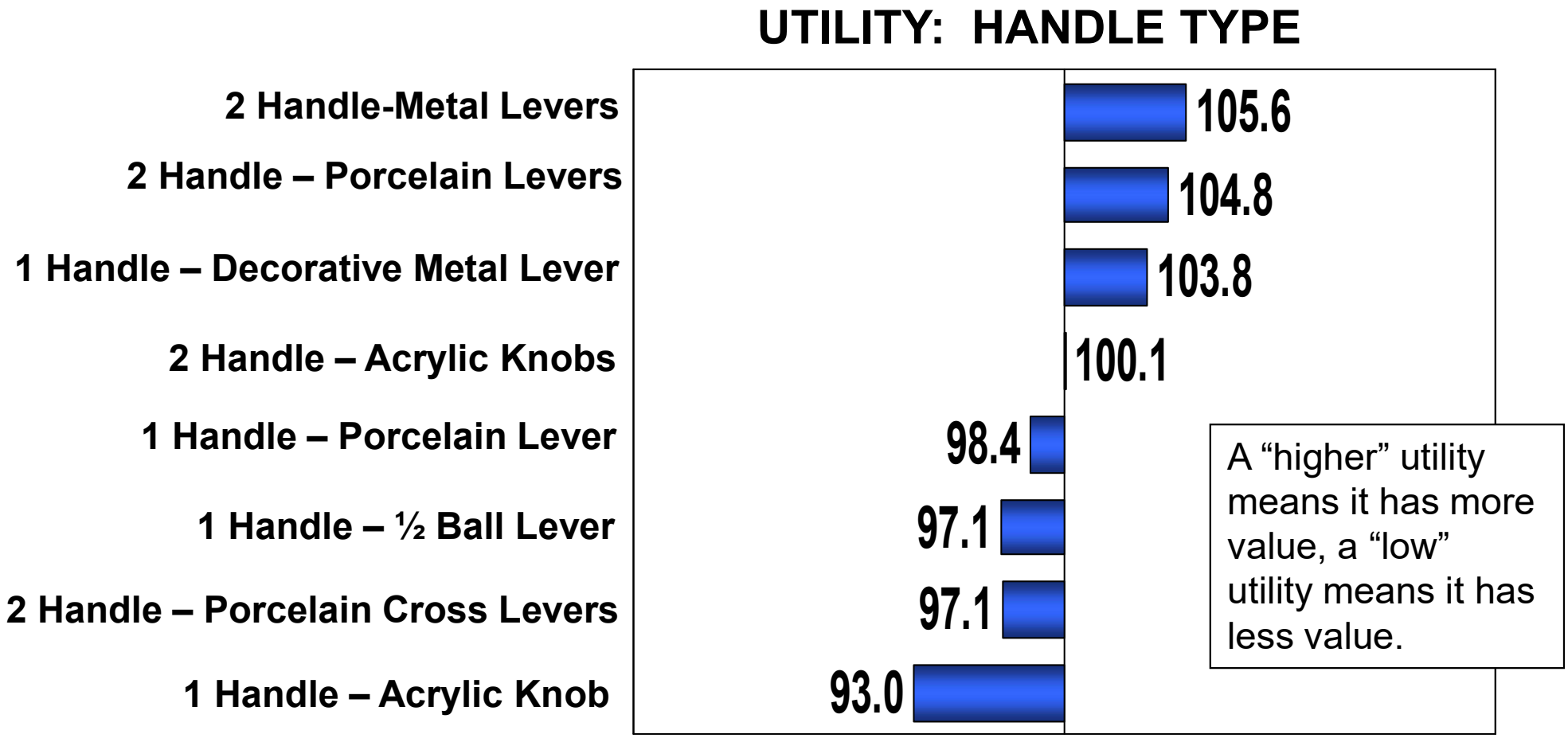
The importance of each "product factor" to the consumer's product selection. For example, how much impact does finish type have compared to price or brand?

The following is an example from the kitchen faucet discussed earlier.

As can be seen, the type of spout has much more impact than either handle type or brand.

UTILITY STRUCTURE

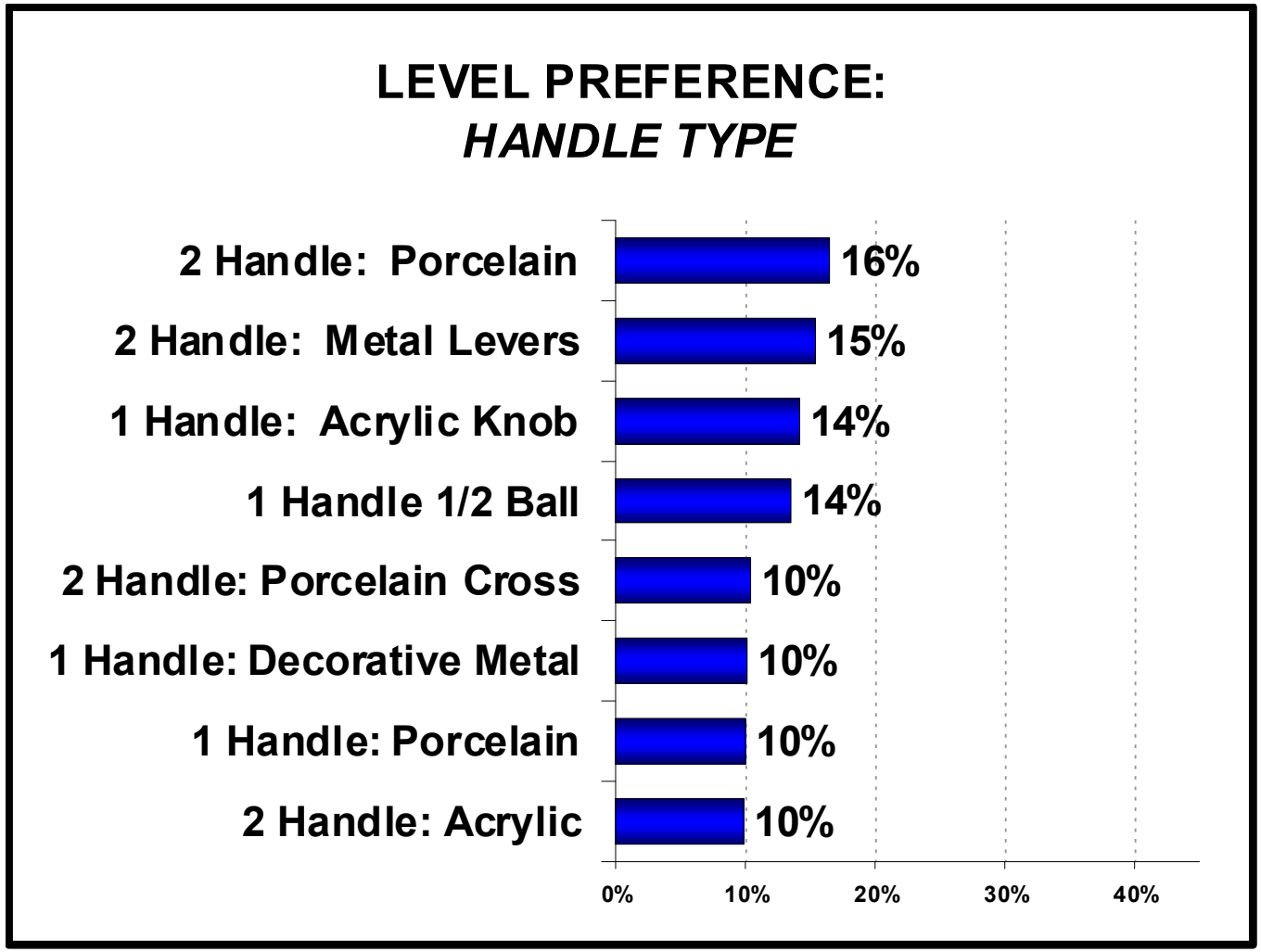
"Utility" is a numerical expression of the value consumers place on an factor level.



LEVEL PREFERENCE

The value of each “level” of a factor to consumers (e.g., the different finishes tested).

The sample graphic shows the percent preferring each level of the ‘handle’ factor for the kitchen faucet example.

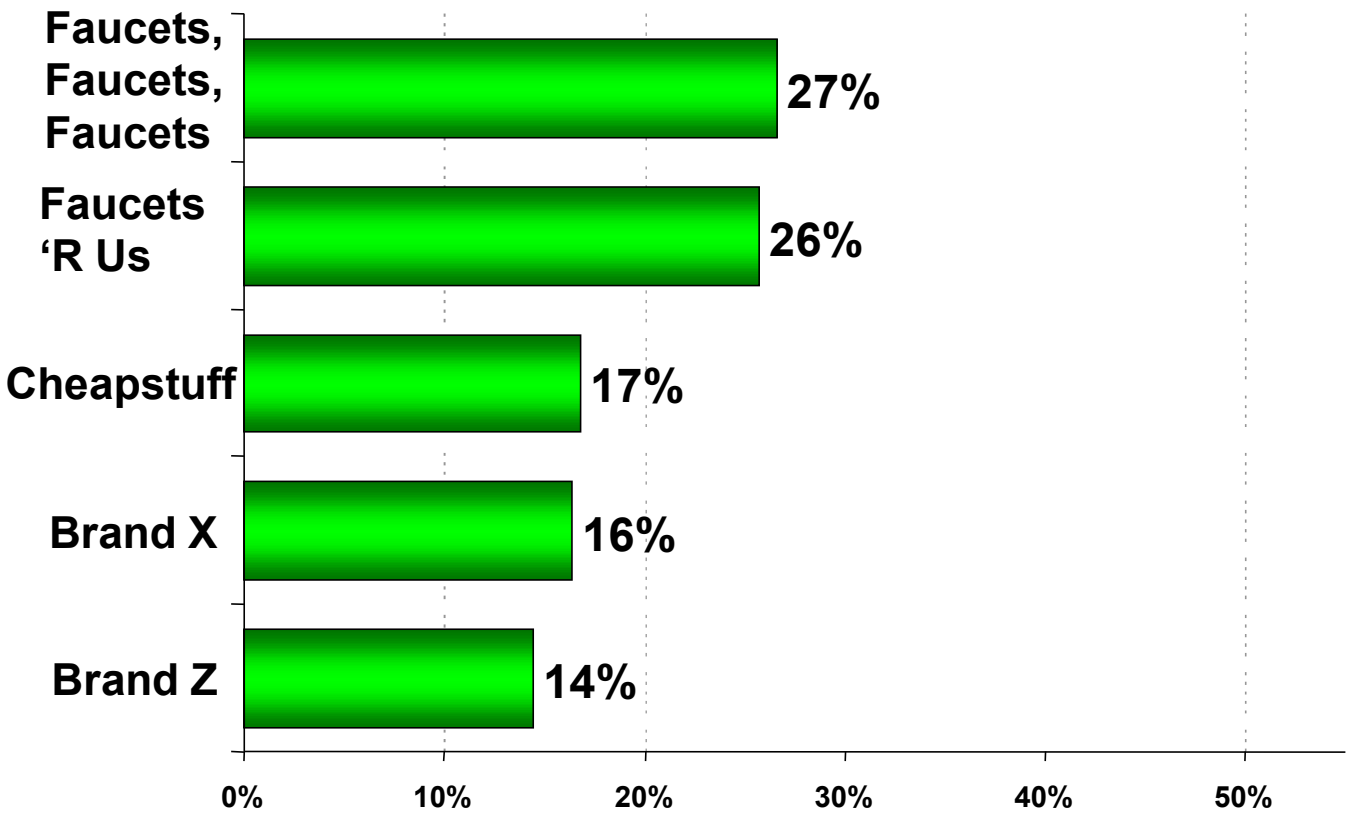


UTILITY STRUCTURE

Composition Rule: Additive

Factor1, Level1+Factor2,Level3+Factor3,Level2=Overall Utility

SIMULATION



Faucets, Faucets, Faucets
1 H – Flat
D Tube Spout
Spray 400/8500
No Filter
Chrome
$58.09 (highest)
Ceramic Disc

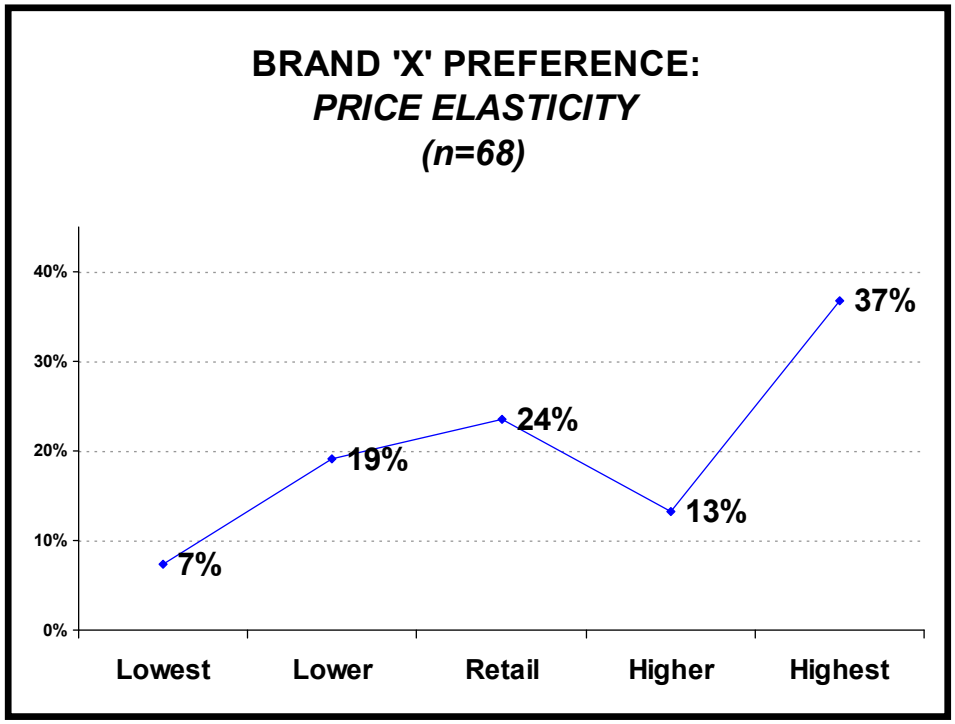
Faucets 'R Us
1H – Ball
D Tube Spout
No Spray
No Filter
Chrome
$63.06 (highest)
Stainless Steel Ball

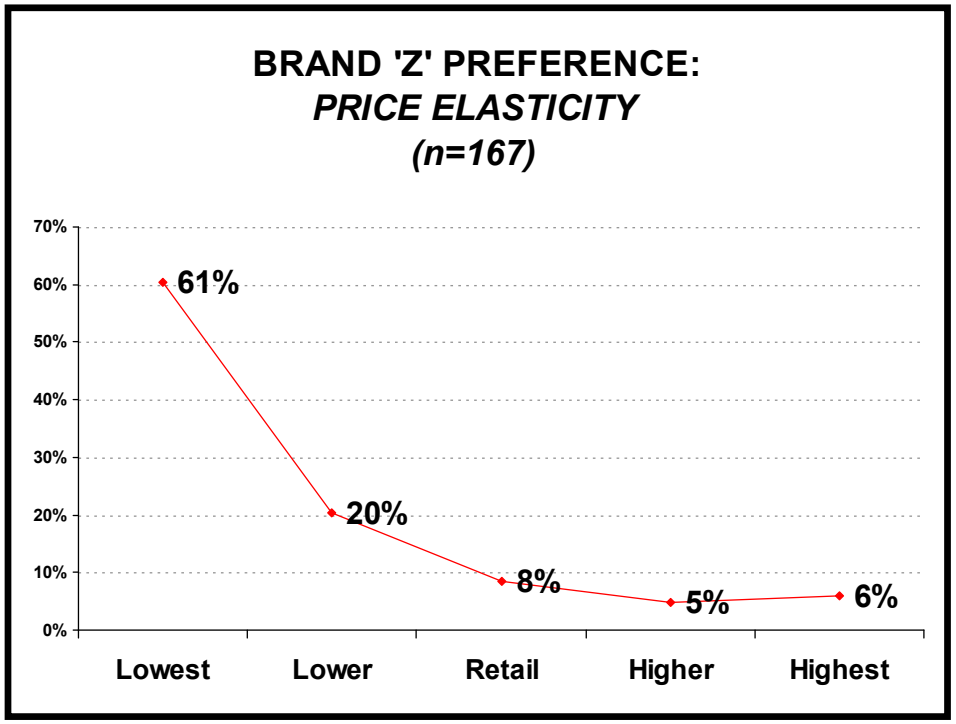
Cheapstuff
1H – Flat
Curved Spout
Spray 400/8500
No Filter
Chrome
$59.63 (highest)
Stainless Steel Ball

Brand X
1H – Flat
D Tube Spout
Spray 400/8500
No Filter
Chrome
$61.92 (highest)
Plastic Cartridge

Brand Z
1H – Flat
Curve Spout
Spray 400/8500
No Filter
Chrome
$58.09 (highest)
Ceramic Disc

PRICE ELASTICITY





CONJOINT METHODS

Three main categories

-Traditional
-ACA (Adaptive Conjoint)
-CBC (Choice Based Conjoint)

Traditional Conjoint

Uses an “orthogonal array” for product combinations.

The trade-off task is typically a card sort – for example, 16 cards depicting the array were given to respondents and sorted from most desirable to least desirable. Ratings can be used as well.

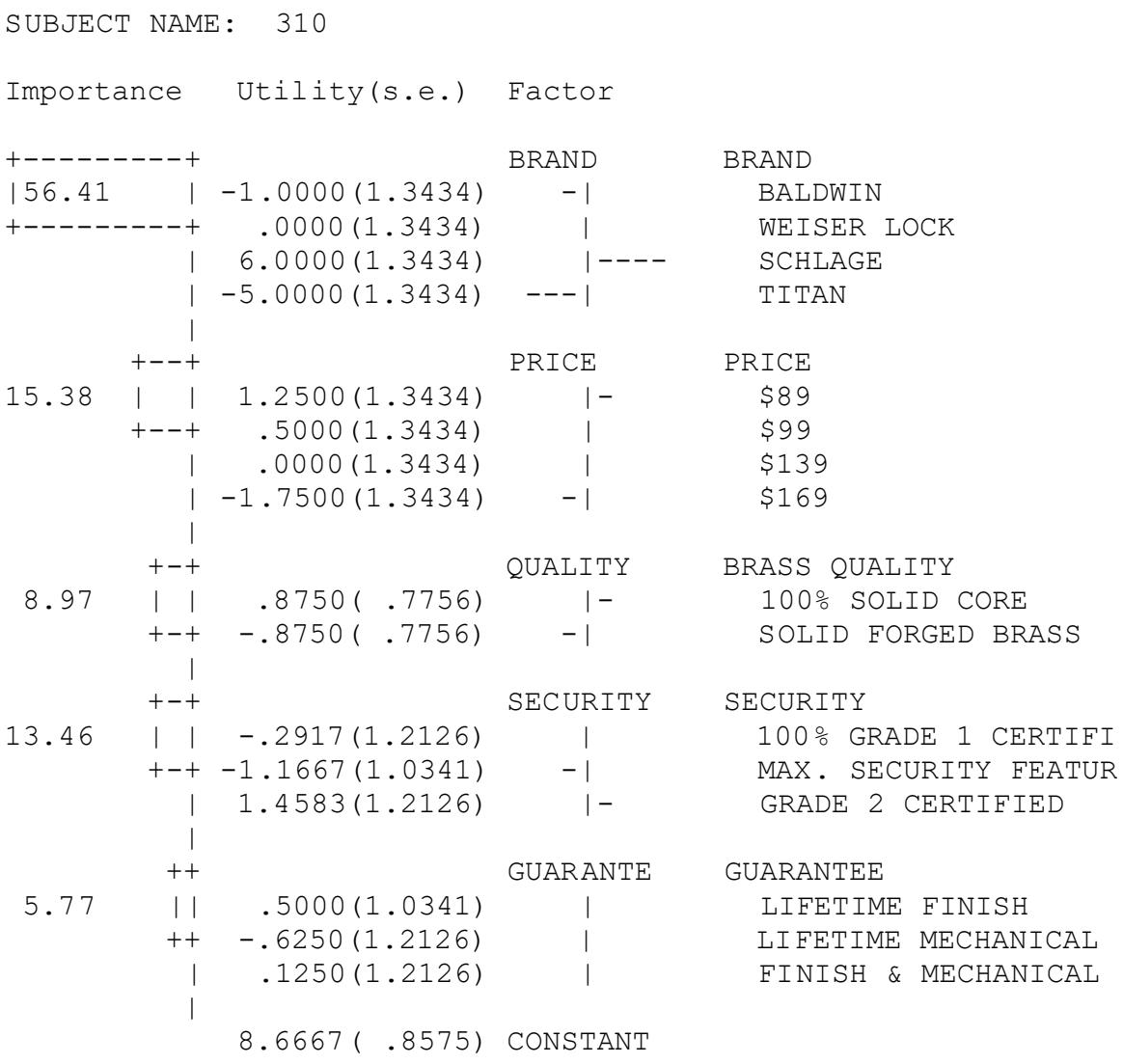
The analysis takes the rank order (or ratings) of the stimuli and uses it to calculate individual utilities that can then be extrapolated to all possible combinations.

-Price elasticity is suspect.
-Limited number of factors and levels.
-Main effects model.

TRADITIONAL CONJOINT EXAMPLE

-Stimuli needed
-Respondent task
-Data analysis

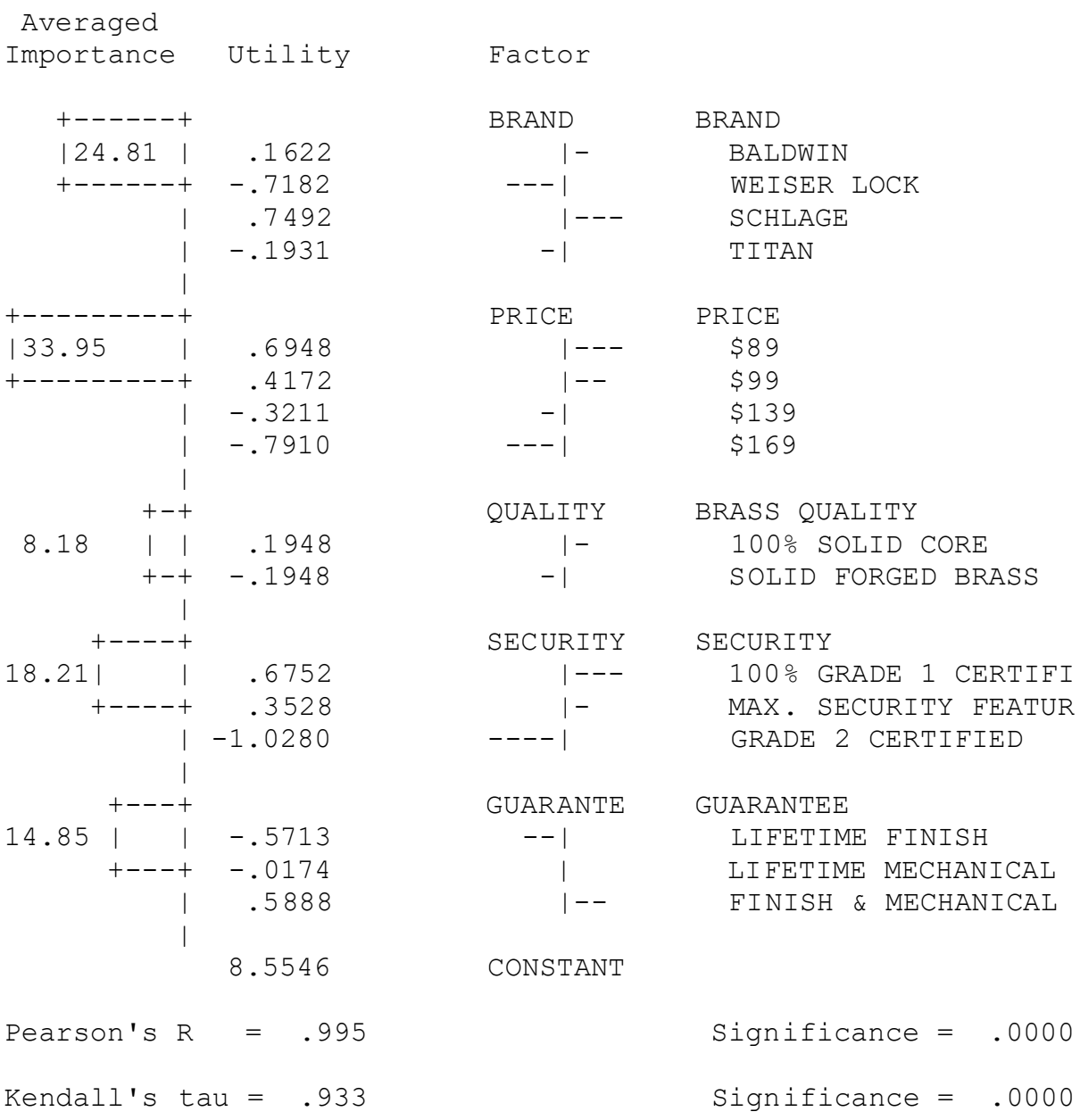
SUBJECT NAME: 310



Pearson's R = .942 Significance = .0000

Kendall's tau = .795 Significance = .0000

SUBFILE SUMMARY



Pearson's R = .995 Significance = .0000

Kendall's tau = .933 Significance = .0000

ACA

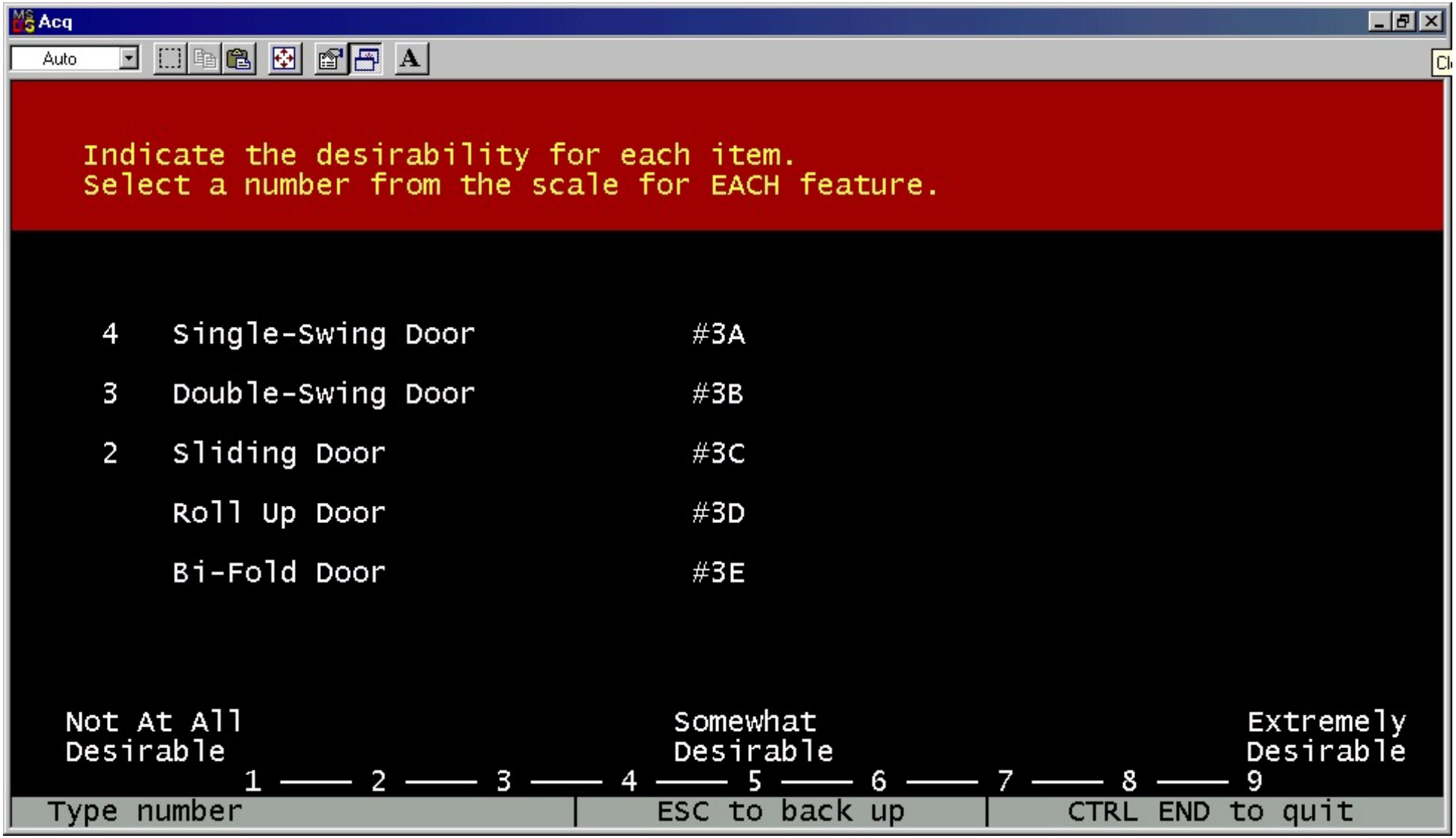
Adaptive Conjoint Analysis is a hybrid conjoint approach in that it uses both analysis of product combinations (combinations of factor levels) as well as self-reported importance information to derive utilities.

Three components of analysis:

-Factor ratings (preferability)
-Rank order of levels within factors
-Graded comparisons of partial product combinations

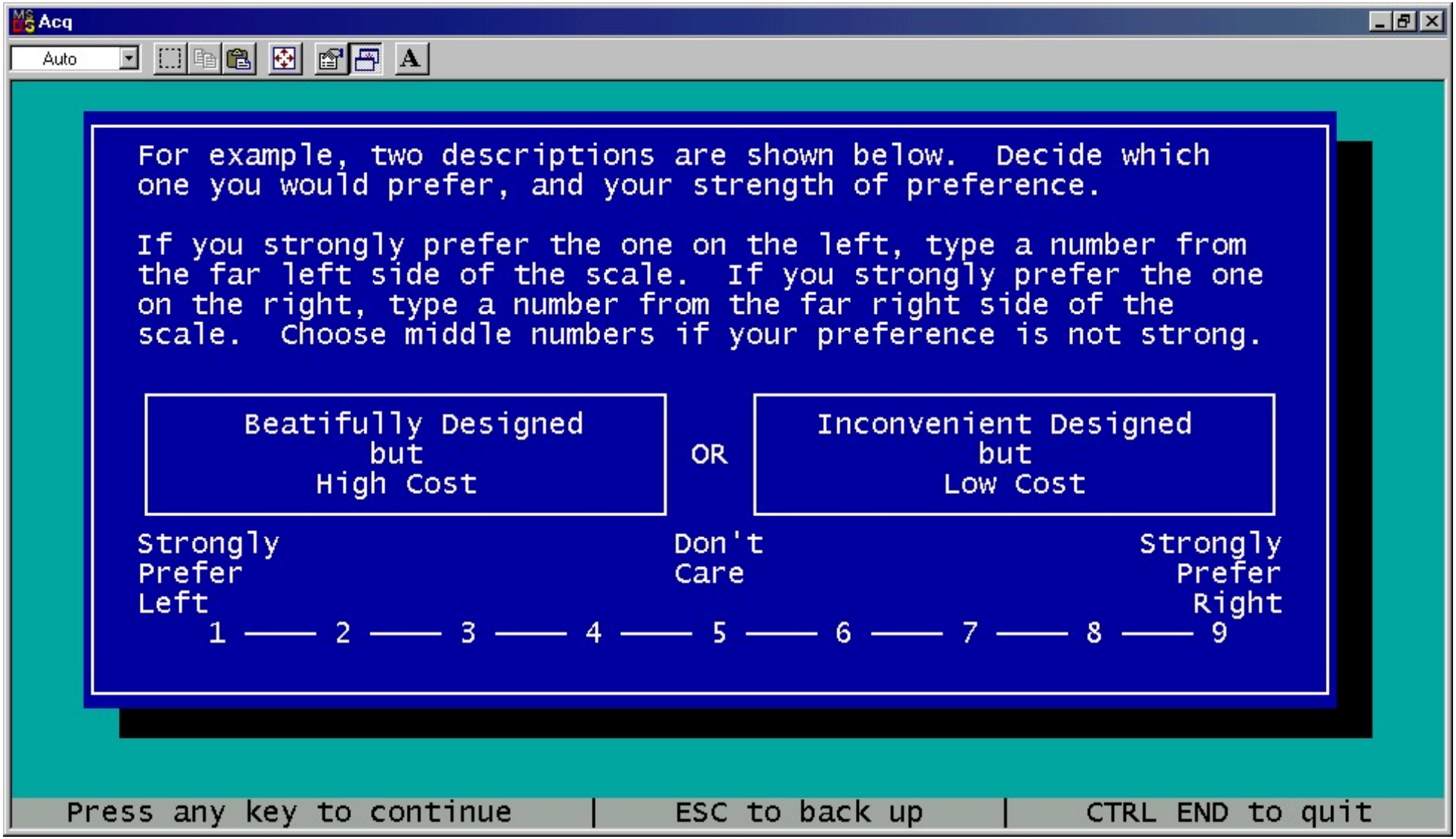
-It allows for a larger number of factors and levels can be analyzed.
-Can only be administered via computer.
-Cannot analyze interactions.
-Price elasticity still an issue.

EXAMPLE: factor ratings (preferability)

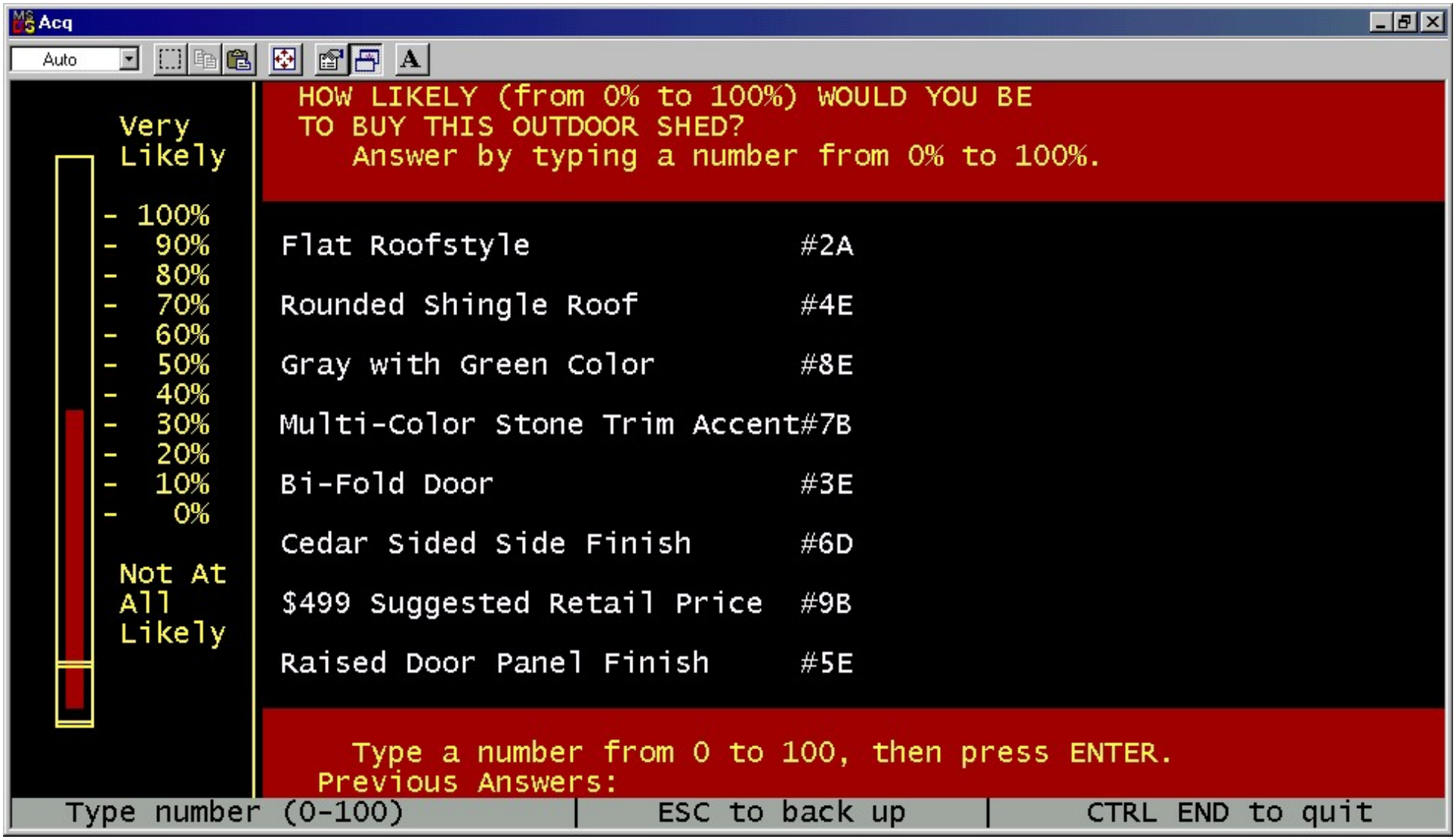


EXAMPLE: comparisons of factor levels

EXAMPLE: product comparisons



EXAMPLE: purchase likelihood



CBC

CBC, or Choice Based Conjoint, has become the preferred method, due to it's ability to truly gauge price elasticity, and it's easy to comprehend trade-off task.

Full product combinations are pitted against each other in "choice sets". Respondents choose among the products depicted, or (as an option) can choose none of the products.

A respondent typically receives anywhere from 10 to 20 choice sets, depending on the number of factors and levels in the design.

-It's modeling capabilities (interactions, special effects, etc.) are seen as an improvement from prior methods.
-Due to relative pricing, elasticity models are more accurate.
-Like ACA, allows for more factors and levels than traditional method.
-Individual utilities now available (first versions generated aggregate models)

CBC EXAMPLE

-Stimuli needed
-Respondent task
-Data analysis

In this section, we'll be asking you some additional questions about file storage products.

We'd like you to imagine that you are considering purchasing a file storage product for your use in the setting we have been discussing.

We'll show you some different combinations of the features that make up your decision to choose one file storage product over others, and we will ask which one you would prefer. The combinations we'll be showing include those features you just reviewed and identified your top choices.

Some of the file storage product choices you are going to see are not currently available on the market, but we would like you to **imagine that they were available today**.

It is important that you answer in the way you would be thinking if you were actually thinking about purchasing one of the file storage products.

Next

If these were your only options, which would you choose?
Choose by clicking one of the buttons below:

HANDLES	 Handle located on sides of unit, metal handle with soft grip	 Handle located on back of unit, with ability to expand	 Handle located on sides of unit, with shoulder strap for carrying	
LATCHES	 Two latches on either side of lid, can act as a hinge	 Single latch at center of lid, metal latch	 Two latches on lid (side by side), large soft grip	
LIDS	 Removable lid	 Prop hinge/ arm lid	 Push and release lid	
HINGE TYPE		 Connected hinge	 Interlocking plastic hinge	
STORAGE OPTIONS	 Miscellaneous storage compart-ments located under lid inside unit	 Adjustable storage compart-ments located under lid	 Removable storage compart-ments located in lid	
MOBILITY OPTIONS	 The storage unit has no wheels or rollers	 The storage unit has wheels	 The storage unit has four rollers	
LOCKING OPTIONS	 The storage unit has no locking mechanism	 The storage unit has a keyed lock	 The storage unit has an integrated lock hole	
PAPER SIZE	 Both Letter and Legal sized storage	 Legal sized storage	 Letter sized storage	
FILE PLACEMENT	 Cascading files	 Standard standing files	 Cascading files	
PRICE	$19.99	$34.99	$22.99	
	○	○	○	○

NONE: I wouldn't choose any of these.

Next

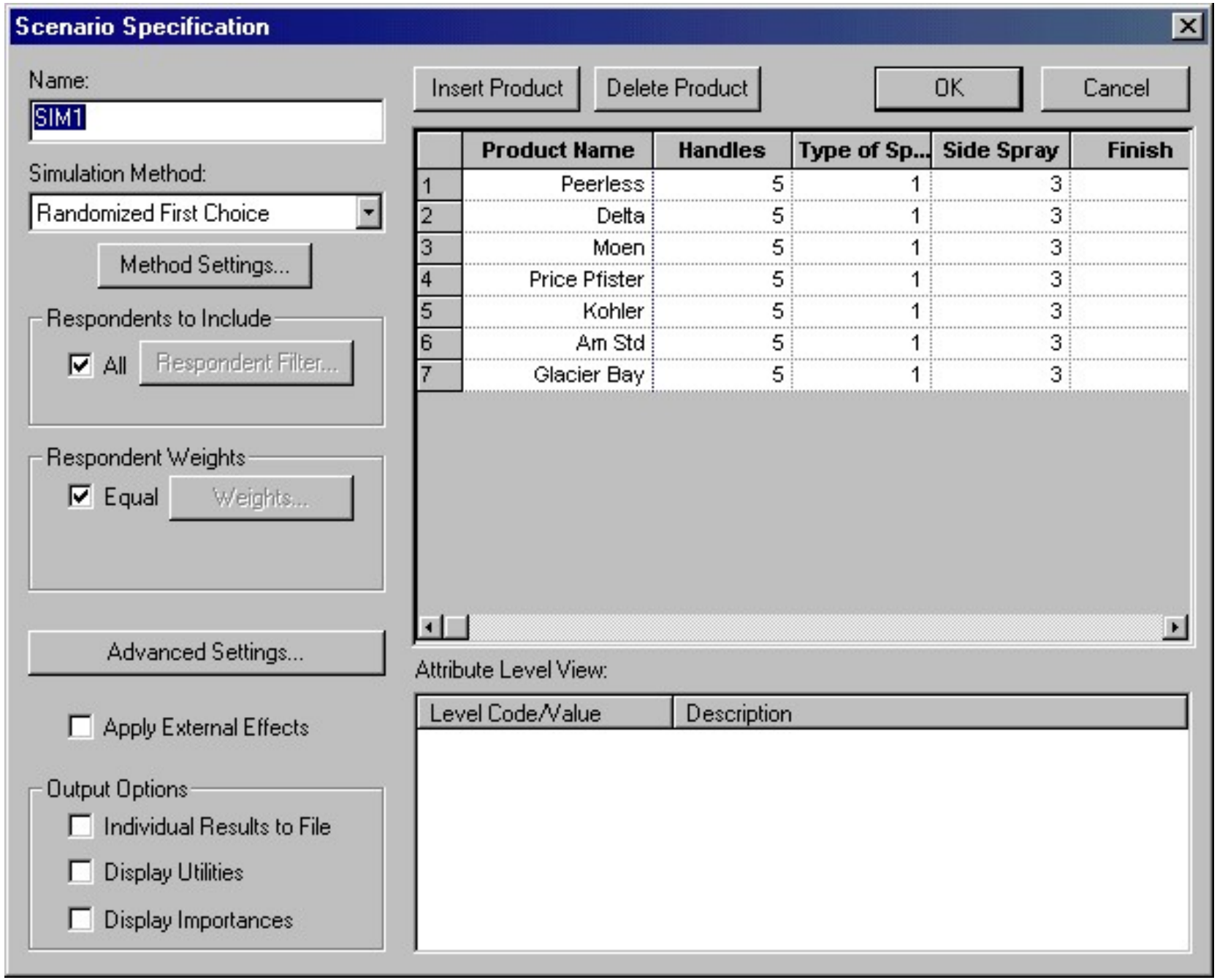
If these were your only options, which would you choose?
Choose by clicking one of the buttons below:

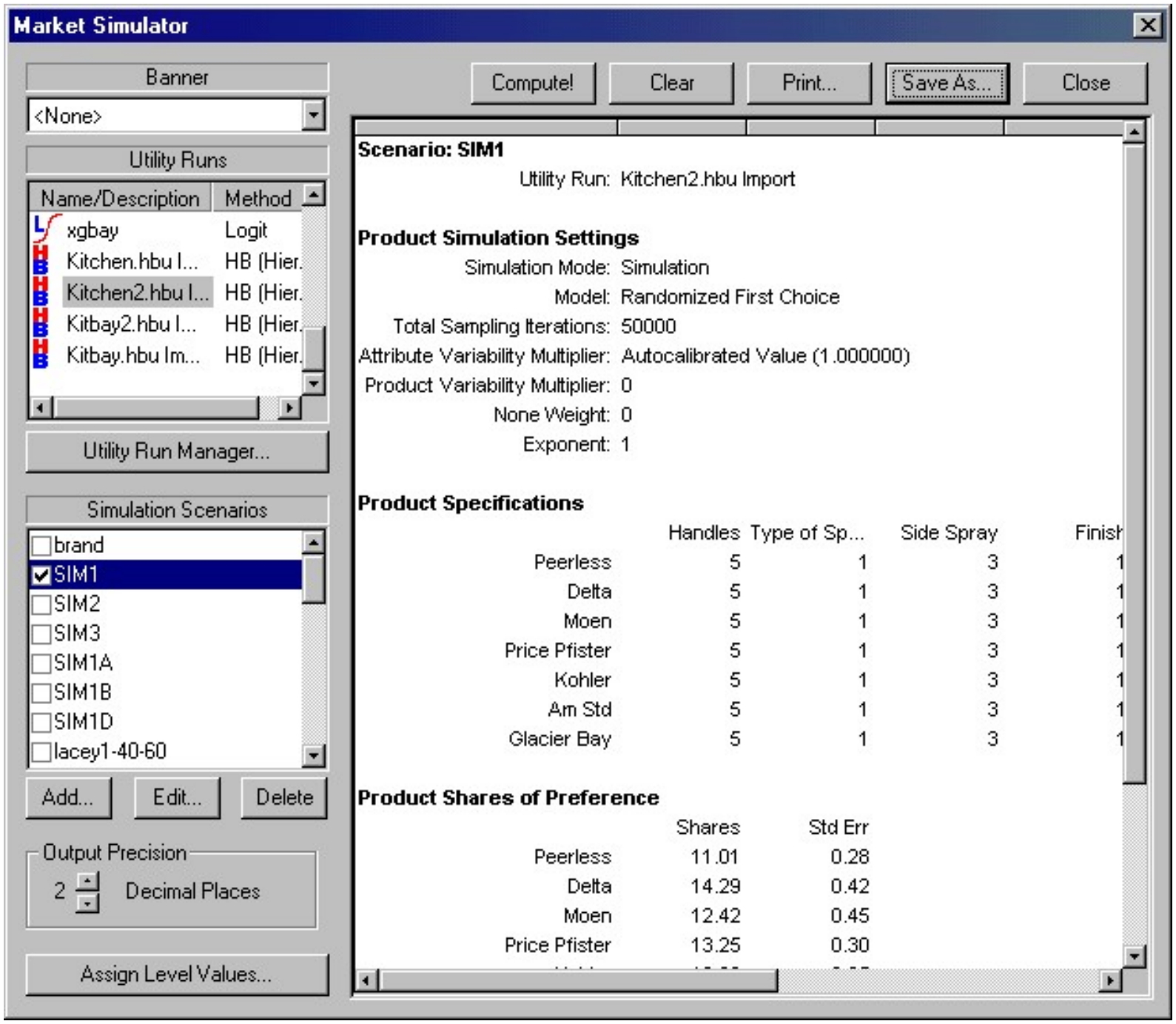
C	C	R
		
Dishwasher Safe Microwave Safe Freezer Safe	Dishwasher Safe Microwave Safe Freezer Safe	Dishwasher Safe Microwave Safe Freezer Safe
$4.99	$7.49	$7.99
○	○	○

If you were to see the food storage container that you selected while shopping, would you really buy it?

- ○ Yes
- ○ No

Next


Scenario Specification
Name:
SIM1
Simulation Method:
Randomized First Choice
Method Settings...
Respondents to Include
All
Respondent Filter...
Respondent Weights
Equal
Weights...
Advanced Settings...
Apply External Effects
Output Options
Individual Results to File
Display Utilities
Display Importances
Insert Product
Delete Product
OK
Cancel
Product Name
Handles
Type of Sp...
Side Spray
Finish
1 Peerless 5 1 3
2 Delta 5 1 3
3 Moen 5 1 3
4 Price Pfister 5 1 3
5 Kohler 5 1 3
6 Am Std 5 1 3
7 Glacier Bay 5 1 3
Attribute Level View:
Level Code/Value
Description


Market Simulator
Banner
<None>
Utility Runs
Name/Description
Method
xgbay
Logit
Kitchen.hbu I...
HB (Hier.
Kitchen2.hbu I...
HB (Hier.
Kitbay2.hbu I...
HB (Hier.
Kitbay.hbu Im...
HB (Hier.
Utility Run Manager...
Simulation Scenarios
brand
SIM1
SIM2
SIM3
SIM1A
SIM1B
SIM1D
lacey1-40-60
Add...
Edit...
Delete
Output Precision
2
Decimal Places
Assign Level Values...
Compute!
Clear
Print...
Save As...
Close
Scenario: SIM1
Utility Run: Kitchen2.hbu Import
Product Simulation Settings
Simulation Mode: Simulation
Model: Randomized First Choice
Total Sampling Iterations: 50000
Attribute Variability Multiplier: Autocalibrated Value (1.000000)
Product Variability Multiplier: 0
None Weight: 0
Exponent: 1
Product Specifications
Handles Type of Sp... Side Spray Finish
Peerless 5 1 3 1
Delta 5 1 3 1
Moen 5 1 3 1
Price Pfister 5 1 3 1
Kohler 5 1 3 1
Am Std 5 1 3 1
Glacier Bay 5 1 3 1
Product Shares of Preference
Shares Std Err
Peerless 11.01 0.28
Delta 14.29 0.42
Moen 12.42 0.45
Price Pfister 13.25 0.30

Max/Diff Analysis

Max/Diff Analysis

MaxDiff is an approach for obtaining preference/importance scores for multiple items (brand preferences, brand images, product features, advertising claims, etc.). Although MaxDiff shares much in common with conjoint analysis, it is easier to use and applicable to a wider variety of research situations. MaxDiff is also known as “best-worst scaling.” *

MaxDiff (or Best/Worst) is primarily used to gain a hierarchy of a set of items – such as importance ratings, value propositions, menu choices, etc.

Like ‘conjoint’ or ‘discrete choice’ methods, the result is a ‘derived’ measure of strength or impact.

> *Why use MaxDiff instead of standard rating scales? Research has shown that MaxDiff scores demonstrate greater discrimination among items and between respondents on the items. The MaxDiff question is simple to understand, so respondents from children to adults with a variety of educational and cultural backgrounds can provide reliable data. Since respondents make choices rather than expressing strength of preference using some numeric scale, there is no opportunity for scale use bias. This is an extremely valuable property for cross-cultural research studies. **
>
> **Source: Sawtooth Software*

MaxDiff/Web Tutorial Example

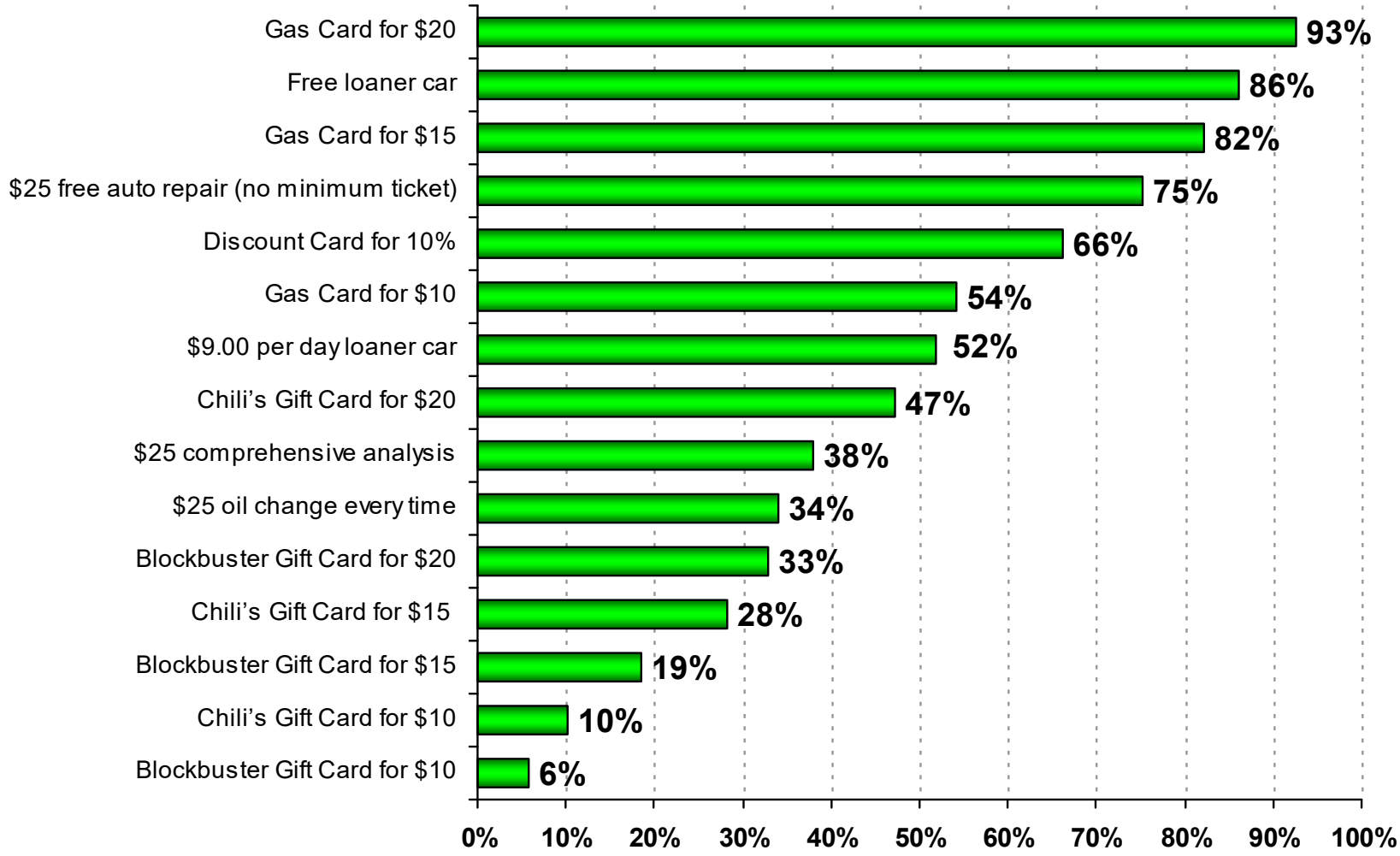
Imagine you were making the decision to reenlist in the Navy today.

Which of the following four factors would make you most and least likely to want to reenlist?

Makes me Most want to reenlist		Makes me Least want to reenlist
○	Receive phone-based personal counseling services	○
○	Location guarantee for next assignment	○
○	Current reenlistment bonus ($2,500)	○
○	Choice between living in 2-person barracks or 4-person barracks when in port	○

Source: Sawtooth Software

DISCOUNT OFFERS:
Derived Preference



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