Advanced Topics in CBC
Part 2

Agenda

- ▸ Partial Profile
- ▸ Shelf-Sets
- ▸ Free Format CBC

PARTIAL PROFILE

Partial Profile Designs

▸ Rather than showing all attributes at the same time, we show a random subset of the attributes in each task

▸ Attributes are rotated so that each task contains different subset of attributes

▸ Over the course of an interview, all attributes typically seen at least once, usually many times

Too many attributes is difficult…

For your practice, which of the MRI systems below would you be most likely to purchase? If information about a particular product feature is not shown, assume that all of the machines are equal in that regard.

Choose by clicking one of the buttons below:

Brand	Philips	Hitachi	Picker
Patient Position	Multi-position	Upright	Recumbent
Field Strength	1.0 Tesla	1.5 Tesla	0.6 Tesla
Clinical Space Requirement	300 sq. feet	500 sq. feet	400 sq. feet
Patient Weight Limit	400 pounds (180 Kg)	600 pounds (270 kg)	500 pounds (225 kg)
Brain Array	No	Yes	No
Neurovascular array	Yes	No	Yes
Cardiac Array	Yes	No	No
Spine Array	Yes	No	Yes
Lower Leg Array	No	Yes	Yes
Gap Between Patient and Magnetic Array	21 inches	17 inches	19 inches
System Cost (excluding installation and service)	$1.5 million	$2 million	$3 million
	○	○	○

So let's only show a partial list

For your practice, which of the MRI systems below would you be most likely to purchase? If information about a particular product feature is not shown, assume that all of the machines are equal in that regard.

Choose by clicking one of the buttons below:

	GE	Fonar	Philips
Brand			
Patient Position	Upright	Multi-position	Recumbent
Field Strength	1.5 Tesla	3.0 Tesla	1.0 Tesla
Neurovascular array	No	Yes	No
Cardiac Array	Yes	Yes	No
Spine Array	No	Yes	No
System Cost (excluding installation and service)	$3 million	$2 million	$2.5 million

Benefits of Partial Profile CBC

▶ Seemingly no limit to the number of attributes

   ▪ More complete model???

▶ Reduces the respondent burden

▶ Forces respondents to consider all attributes

   ▪ Can't simplify and focus only on 2-3 attributes

Potential Pitfalls

▸ Usually requires larger sample size and/or tasks per respondent

▸ Data are often quite "noisy" at the individual level for very large designs

▸ "Flattening" of attribute importances

▸ Probable understatement of importance of price

▸ Can respondents maintain an "all else being equal" mindset when viewing a subset of attributes?

All Else Equal?

For your practice, which of the MRI systems below would you be most likely to purchase? If information about a particular product feature is not shown, assume that all of the machines are equal in that regard.

Choose by clicking one of the buttons below:

Brand	Picker	Siemens	Hitachi
Patient Position	Multi-position	Upright	Recumbent
Clinical Space Requirement	300 sq. feet	500 sq. feet	400 sq. feet
Brain Array			
Cardiac Array			
Lower Leg Arra			
System Cost (installation an			

For your practice, which of the MRI systems below would you be most likely to purchase? If information about a particular product feature is not shown, assume that all of the machines are equal in that regard.

Choose by clicking one of the buttons below:

Brand	GE	Fonar	Philips
Patient Position	Upright	Multi-position	Recumbent
Field Strength	1.5 Tesla	3.0 Tesla	1.0 Tesla
Neurovascular array	No	Yes	No
Cardiac Array	Yes	Yes	No
Spine Array	No	Yes	No
System Cost (excluding installation and service)	$3 million	$2 million	$2.5 million

Lighthouse Studio Settings

"Fixed" Attributes

▶ In PP designs, some attributes (such as "price") can be constrained to always be present in the task

- May make tasks more realistic

- Preliminary research suggests this doesn't bias the parameters for the "forced inclusion"

- We'll need more research to confirm this

Design Considerations

▸ Sample size – rotating attributes reduces effective sample size

- With 10 attributes showing 5 at a time, we are collecting only 50% as much information as we would using full profile

- BUT…respondents answer with less error when there are fewer attributes to consider, so measurement error increase is offset by respondent error decrease.

▸ Which attributes should be rotated

- Help respondents keep "all else equal" mindset?

- Realistic to market?

- Non-rotated attributes will have proportionally more information than rotated attributes

Analysis

▶ Partial profile designs are analyzed the same way you'd analyze standard CBC

- Omitted attributes are coded as "0" in the CHO file

- No difference in simulations – you can simulate scenarios with as many attributes varying as you wish

How Well Does it Work?

▶ Keith Chrzan has conducted many tests comparing partial-profile (PP) and full-profile (FP) CBC. He concludes:

- PP is overall more efficient (lower statistical efficiency, but less respondent fatigue and simplification heuristics)

- Parameters are quite similar (after adjusting for scale), with only a few isolated differences. PP has larger "scale" than FP

PP and "Flattening" of Importances

▸ Although Chrzan has shown that PP and FP parameters are usually equivalent (after adjusting for scale), Sawtooth Software recently (2004) conducted a split-sample study (n=1000) that suggested that PP parameters may reflect a "flattening" of importances relative to FP

  ▪ "Critical" attributes become less important
  ▪ "Unimportant" attributes become more important

▸ Need additional research to confirm this

Other Observations about PP

▸ Our most recent split-study comparison (2004) shows significantly fewer "reversals" at the individual-level for partial profile than for full profile (9 total attributes, 31 total levels).

 ▪ FP = 5.8 reversals, PP = 3.7 reversals (significant difference $p<0.01$)

▸ Sawtooth Software's most recent study also suggested a "price" bias for PP similar to ACA.

 ▪ Price received 18% importance in PP, but 29% in FP (significant difference $p<0.01$)

▸ Paper by Frazier and Jones (2004) also showed a price bias with PP. Across three studies, PP had an average Price importance of 26%, whereas comparable FP showed importance of 32%. FP had consistently higher price importance in all three studies.

PP and HB

▶ Research by Pinnell and Fridley (Sawtooth Software Conference 2001) suggested problems with HB and PP CBC.

- ▪ Subsequent developments in CBC/HB (version 3.2) suggest that their result was due to overfitting and use of improper "priors" (the defaults in older CBC/HB versions)

- ▪ Reducing the prior variance and increasing the weight of the priors seems to result in better estimation

▶ Even so, you can expect more "noise" at the individual level with PP CBC and HB than with ACA.

- ▪ Suggests needing larger sample sizes

SHELF-FACING DISPLAY

Example

Lighthouse Studio Settings

FREE FORMAT CBC QUESTIONS

Standard CBC layout is great…

Hotel Example

If these were your only choices, which would you choose?

1/10

Hotel:	Marriott's MoutainSide	Marriott's Summit Watch	Park City Marriot
Number of Nights:	5 nights	3 nights	7 nights
Customer Review:	Very good! 4.2/5	Excellent! 4.3/5	Very good! 4.1/5
Free Cancellation:	✔	✔	
Regular Price:	$215/night	$200/night	$199/night
Your Price:	$139/night	$139/night	$159/night

But it has limitations…

▸ Vertical conjoint, designed to look like the website

But it has limitations…

‣ Collect both first choice AND other types of data (consideration set, chip allocation, alternative input methods)

‣ Multiple scenarios ("What would you prescribe if diabetic? What about non-diabetic?")

Chip Allocation Example

For the next several questions, pretend that you are purchasing soft drinks for a party with 20 of your friends. When you get to the store, <u>these are the only choices available</u>. How many of each of these soft drink packages are you likely to purchase?

Fill in the quantity purchased below each item. If you wouldn't purchase any, enter "0".

1/10

| Coke
6 pack
$1.79 | Mountain Dew
12 pack
$3.79 | Store Brand Orange
12 pack
$3.19 |
| A&W Root Beer
6 pack
$1.49 | Store Brand Lemon Lime
6 pack
$2.09 | Pepsi
12 pack
$2.59 |

More Limitations…

▶ Labels for alternative-specific designs

▶ Multiple fixed products where you want to show levels of fixed attributes

▶ Menu-based conjoint

▶ Any time you don't like the way we make things look!

Solution: Custom CBC

▶ Lighthouse and older versions of SSI Web allow you to generate the design and collect data while using your own custom layout for your CBC tasks

▶ Requires use of Free Format questions (may necessitate license upgrade to larger size!)

▶ Also requires some knowledge of HTML

- How many of you are HTML literate?

Free Format - Parameters

▶ Header 1, Header 2, Footer similar to all other question types
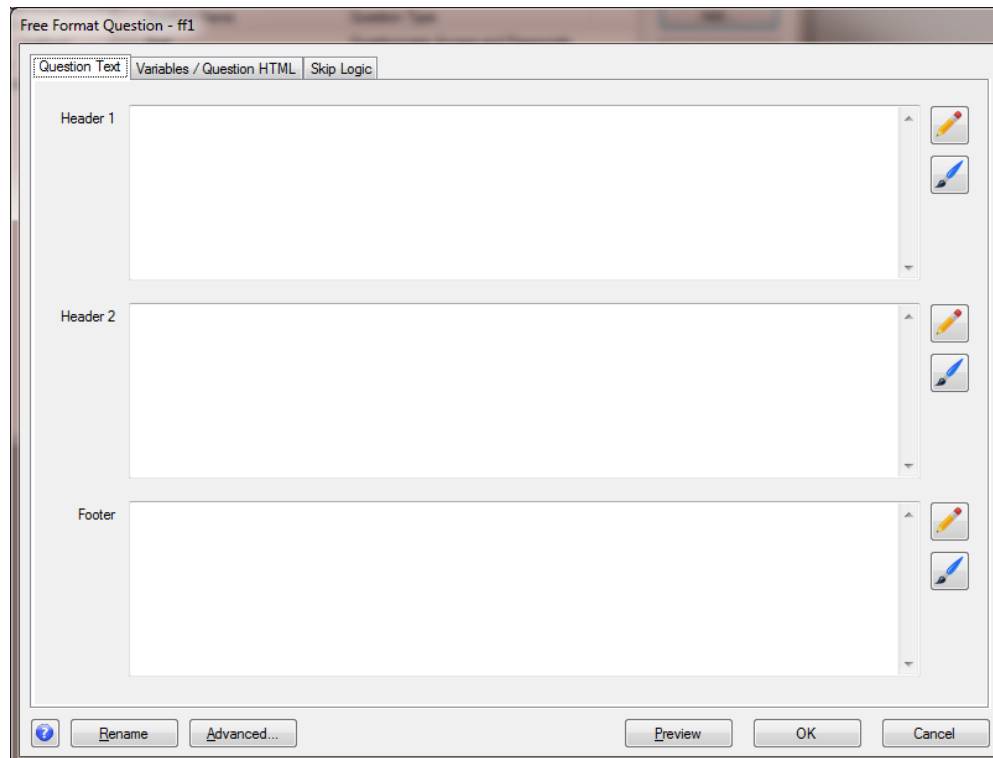
Free Format – Adding Variables

▸ Power of free format is ability to customize questions, data collection
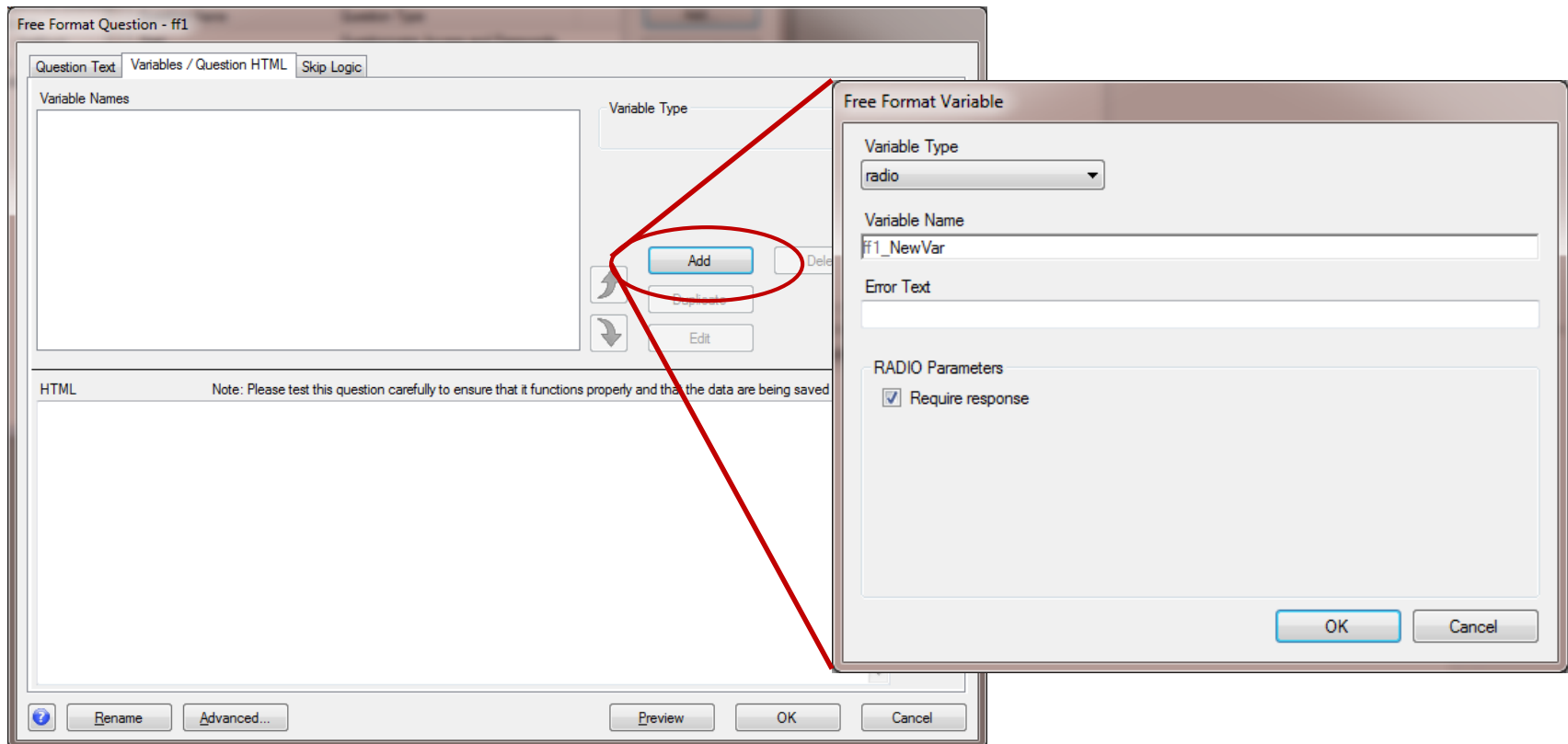
Supported variable types

▶ Radio

▶ Checkbox

▶ Select (Combo Box)

▶ Text (Numeric)

▶ Text (One-line Text Box)

▶ Textarea (Multi-line Text Box)

▶ Hidden

SSI Script in CBC

▸ CBC/Web includes specialized scripts

- Display Attribute & Level Text for CBC design, even if randomized
- Store CBC answers back into the right spots in the data file – less coding work on the back end!

Setting Up a CBC Free Format

▸ Create a Free Format question

- Name should start with prefix such as FFTASK indexed by the "RAN#" portion of the reserved CBC question names (such as FFTASKRAN1, FFTASKRAN2, etc.)

- Place each Free Format question on same page as its corresponding CBC question (preferably above it)

- Generate HTML for question layout
    - I recommend stealing layout from existing CBC questions by previewing and then viewing the source code

- Insert SSI Scripting that taps into design

- Insert script to record answers

- Test ONE question before adding others!

Deconstructing a CBC Task

▶ Table, Row and Data Cell HTML tags define the shape and layout of the contents of the task

- <table> indicates a new table, </table> indicates that you've finished a table

- <tr> - begin new row within the table, </tr> closes the current row.

- <td> - new data cell in the table, </td> - end of contents of current data cell

Which would you rather be in 30 years?			
Income Status	**Rich**	**Poor**	**Middle Class**
Hair Status	**Bald**	**Full head of hair**	**Receding hairline**
Family	**No family**	**Large family (10+ children)**	**One ex-spouse but two great kids**
	○	○	○

NONE: I would rather die than end up like any of these people.

Deconstructing a CBC Task

Which would you rather be in 30 years?

	Rich	Poor	Middle Class	NONE: I would rather die than end up like any of these people.
Income Status				
Hair Status	Bald	Full head of hair	Receding hairline	
Family	No family	Large family (10+ children)	One ex-spouse but two great kids	

▸ Within each cell, we need to show data

- Fixed labels are hard-coded into the HTML
  - <td>Income Status</td>
- CBC Design information must be dynamically inserted
  - [%CBCDesignLevelText (CBCQuestionName, ConceptPosition#, LevelTextPosition#) %]
  - <td>[%CBCDesignLevelText(CBCRAN1,1,3)%]</td>

Deconstructing a CBC Task

Which would you rather be in 30 years?

Income Status	Rich	Poor	Middle Class	NONE: I would rather die than end up like any of these people.
Hair Status	Bald	Full head of hair	Receding hairline	
Family	No family	Large family (10+ children)	One ex-spouse but two great kids	

▸ Response to Stimuli need to be stored

- Using SSI Script allows us to automatically unscramble concept randomization/sorting.

  <td class="input_cell clickable">

  [%RadioSelect(FFTaskRandom1_response, CBCDesignConceptValue(cbc_Random1, 1))%]

  </td>

WARNING!!!

▶ You must carefully check your HTML syntax for each custom CBC question to ensure that you have referred to the variable names correctly for each choice task. *A mistake can invalidate a task, or potentially your entire CBC study.*

- Visually inspect each custom CBC task, running under Local Web Server, comparing each standard CBC task with each custom built task. The attribute levels presented in each task should match.

- Compare answers you THOUGHT you gave with answers recorded in the data file

CSS Hooks

▶ Select Question

- Question type: <div class="select">

- See Following Slide for details

▶ Numeric Question

- Question type: <div class="numeric">

▶ CBC Template

- Question type: <div class="cbc">

- Attribute Labels: <div class="label_text">

- Level Text: <div class="level_text">

- Alternating Color #1: <div class="alt_color1">

- Alternating Color #2: <div class="alt_color2">

JavaScript Functions

▶ Many JavaScript functions exist to help you set up Free Format questions correctly. Consult program help for more details

- General Web Interviewing (CiW) Help | Composing Web Surveys | Composing Questions| JavaScript in SSI Web

HTML & CSS Help

▸ Lots of online resources

■ www.w3school.org

■ www.htmlgoodies.com

▸ Preview CBC question, then right-click and "View Source".

▸ Program Help file ("F1" Key) has lots of specific information on CSS in Lighthouse Studio

▸ Text editor can help you add HTML tags correctly

▸ Books are abundant, cheap

▸ Hire a high school / local college student!

QUESTIONS?

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