Programming Conjoint Experiments

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Two parts to create a conjoint in Qualtrics

- HTML table – display the attributes and characteristics
- Java script code - provides the randomized traits to the HTML table

Candidate A		Candidate B
60	**Age**	40
NDP(f)	**Political Party**	Conservative Party
Female	**Gender**	Male
Muslim	**Religion**	Agnostic
1 year	**Political Experience**	10 years
Bachelor's Degree	**Education**	Bachelor's Degree

Characteristics/traits

Attributes

Code Sources

- https://gist.github.com/aychen5/f075ae5c548a466257f5d2d206320334

- https://github.com/leeper/conjoint-example
  - Randomly assign characteristics proportional to the population
  - Randomly assign a number from a continuous set.
    - Example - randomly assign an age from a given continuous range like 35-75

Java Script code – Seed Number

Seed number

- The code for the conjoint is executed by the respondent's computer
- If the respondent refresh the page then the conjoint code will be re-executed and a different profile might be displayed
- To avoid this we can assign a random number to every profile that is held constant for the user – if they refresh the profile displayed won't change

Generating Seed Number

Qualtrics.SurveyEngine.addOnload(function()

{

!function(a,b){function c(c,j,k){var n=[];j=1==j?{entropy:!0}:j||{};var s=g(f(j.entropy?[c,i(a)]:null==c?h():c,3),n),t=new d(n),u=function(){for(var a=t.g(m),b=p,c=0;q>a;)a=(a+c)*l,b*=l,c=t.g(1);for(;a>=r;)a/=2,b/=2,c>>>=1;return(a+c)/b};return u.int32=function(){return 0|t.g(4)},u.quick=function(){return t.g(4)/4294967296},u["double"]=u,g(i(t.S),a),(j.pass||k||function(a,c,d,f){return f&&(f.S&&e(f,t),a.state=function(){return e(t,{})}),d?(b[o]=a,c):a})(u,s,"global"in j?j.global:this==b,j.state)}function d(a){var b,c=a.length,d=this,e=0,f=d.i=d.j=0,g=d.S=[];for(c||(a=[c++]);l>e;)g[e]=e++;for(e=0;l>e;e++)g[e]=g[f=s&f+a[e%c]+(b=g[e])],g[f]=b;(d.g=function(a){for(var b,c=0,e=d.i,f=d.j,g=d.S;a--;)b=g[e=s&e+1],c=c*l+g[s&(g[e]=g[f=s&f+b])+(g[f]=b)];return d.i=e,d.j=f,c})(l)}function e(a,b){return b.i=a.i,b.j=a.j,b.S=a.S.slice(),b}function f(a,b){var c,d=[],e=typeof a;if(b&&"object"==e)for(c in a)try{d.push(f(a[c],b-1))}catch(g){}return d.length?d:"string"==e?a:a+"\0"}function g(a,b){for(var c,d=a+"",e=0;e<d.length;)b[s&e]=s&(c^=19*b[s&e])+d.charCodeAt(e++);return i(b)}function h(){try{if(j)return i(j.randomBytes(l));var b=new Uint8Array(l);return(k.crypto||k.msCrypto).getRandomValues(b),i(b)}catch(c){var d=k.navigator,e=d&&d.plugins;return[+new Date,k,e,k.screen,i(a)]}}function i(a){return String.fromCharCode.apply(0,a)}var j,k=this,l=256,m=6,n=52,o="random",p=b.pow(l,m),q=b.pow(2,n),r=2*q,s=l-1;if(b["seed"+o]=c,g(b.random(),a),"object"==typeof module&&module.exports){module.exports=c;try{j=require("crypto")}catch(t){}}else"function"==typeof define&&define.amd&&define(function(){return c})}([],Math);

Math.seedrandom('${e://Field/seed2}');

Randomize Attribute Order

Candidate A		Candidate B
60	**Age**	40
NDP(f)	**Political Party**	Conservative Party
Female	**Gender**	Male
Muslim	**Religion**	Agnostic
1 year	**Political Experience**	10 years
Bachelor's Degree	**Education**	Bachelor's Degree

Candidate A		Candidate B
1 year	**Political Experience**	10 years
High School Diploma	**Education**	College Diploma
Muslim	**Religion**	Muslim
Male	**Gender**	Non-binary
40	**Age**	60
Conservative Party	**Political Party**	Bloc Quebecois

Randomize Attribute Order

```
var attRaw= ["Gender", "Age", "Religion", "Political Experience", "Political Party",
"Education"];

var att = ["Gender", "Age", "Religion", "Political Experience", "Political Party",
"Education"];

var attributes = ["","","","","","",""];

//Randomize the order of attributes
for (i=0; i<attRaw.length;i++){
var rand1 = Math.floor(Math.random()*((attRaw.length-i)-0));
attributes[i] = att[rand1];
att.splice(rand1, 1); }
```

Setup Traits and Randomly Select from Trait List

Candidate A		Candidate B
People's Party	**Political Party**	NDP(f)
60	**Age**	50
Bachelor's Degree	**Education**	College Diploma
Non-binary	**Gender**	Female
Muslim	**Religion**	Jewish
10 years	**Political Experience**	5 years

Create variables for traits associated with each attribute

```
var vgender = ["Male", "Female", "Non-binary"];

var vage = ["40", "50", "60"];

var vreligion = ["None", "Agnostic", "Jewish", "Muslim", " Catholic", "Buddhist",
"Protestant"];

var vexp= ["1 year", "5 years", "10 years"];

var vparty = ["Liberal Party", "Conservative Party", "NDP", "Bloc Quebecois", "Green Party",
"People's Party"];

var vedu = ["High School Diploma", "College Diploma", "Bachelor's Degree", "Master's
Degree", "PhD"];
```

Use math.random to randomly select traits for each attribute for candidate A

```
var gender_a = vgender[Math.floor(Math.random()*vgender.length)];

var age_a = vage[Math.floor(Math.random()*vage.length)];

var religion_a = vreligion[Math.floor(Math.random()*vreligion.length)];

var exp_a =  vexp[Math.floor(Math.random()*vexp.length)];

var party_a = vparty[Math.floor(Math.random()*vparty.length)];

var edu_a = vedu[Math.floor(Math.random()*vedu.length)];
```

Use math.random to randomly select traits for each attribute for candidate B

```
var gender_b = vgender[Math.floor(Math.random()*vgender.length)];

var age_b = vage[Math.floor(Math.random()*vage.length)];

var religion_b = vreligion[Math.floor(Math.random()*vreligion.length)];

var exp_b =  vexp[Math.floor(Math.random()*vexp.length)];

var party_b = vparty[Math.floor(Math.random()*vparty.length)];

var edu_b = vedu[Math.floor(Math.random()*vedu.length)];
```

Index attributes

```
var gender_index = attributes.indexOf("Gender");

var age_index = attributes.indexOf("Age");

var religion_index = attributes.indexOf("Religion");

var exp_index = attributes.indexOf("Political Experience");

var party_index = attributes.indexOf("Political Party");

var edu_index = attributes.indexOf("Education");
```

Example: “Religion”, “Education”, “Age”, “Gender”, “Political Experience”, “Political Party”

- var age_index = attributes.indexOf("Age")
- Age first appears in the “2” position in this randomization
- We are saving age’s position to variable “age_index”

Piece all of the randomized characteristics and attributes into one array for each candidate

//Candidate A

```
{
att_a_traits=[]
att_a_traits[gender_index] = gender_a,
att_a_traits[age_index] = age_a,
att_a_traits[religion_index] = religion_a,
att_a_traits[exp_index] = exp_a,
att_a_traits[party_index] = party_a,
att_a_traits[edu_index] = edu_a
}
```

Candidate A		Candidate B
People's Party	**Political Party**	NDP(f)
60	**Age**	50
Bachelor's Degree	**Education**	College Diploma
Non-binary	**Gender**	Female
Muslim	**Religion**	Jewish
10 years	**Political Experience**	5 years

Piece all of the randomized characteristics and attributes into one array for each candidate

```
//Candidate B
{
att_b_traits=[]
att_b_traits[gender_index] = gender_b,
att_b_traits[age_index] = age_b,
att_b_traits[religion_index] = religion_b,
att_b_traits[exp_index] = exp_b,
att_b_traits[party_index] = party_b,
att_b_traits[edu_index] = edu_b
}
```

Create list of IDs to use when setting traits and attributes

```
a_list = ["a1","a2","a3","a4","a5","a6"];
att_list = ["att1", "att2", "att3", "att4", "att5", "att6"];
b_list = ["b1","b2","b3","b4","b5","b6"];
```

Assign the IDs from **a_list** like “a1”, “a2”, “a3” …. to each item in

```
att_a_traits=[]
att_a_traits[gender_index] = gender_a,
att_a_traits[age_index] = age_a,
att_a_traits[religion_index] = religion_a,
att_a_traits[exp_index] = exp_a,
att_a_traits[party_index] = party_a,
att_a_traits[edu_index] = edu_a
```

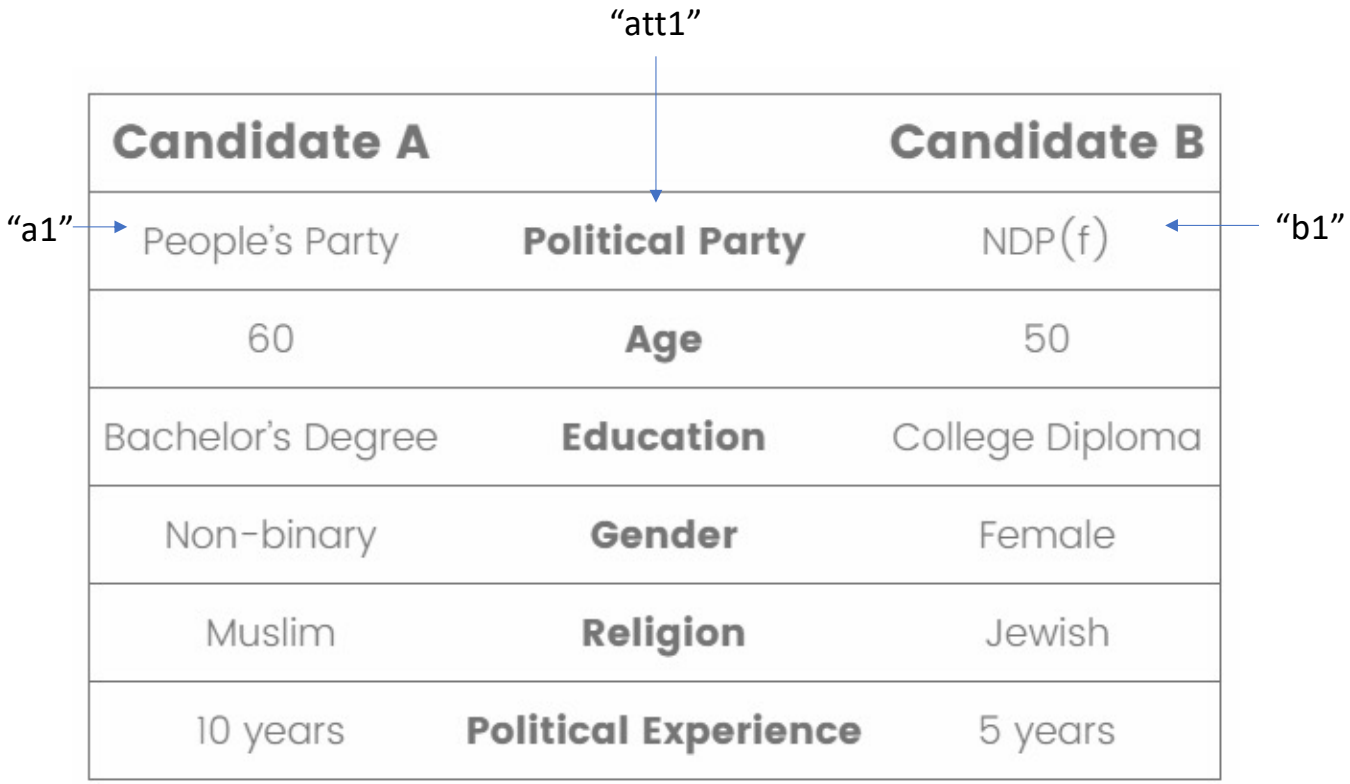
Example: Political Party, Age, Education, Gender, Religion, Political experience

ID Mapping in HTML Table

Candidate A		Candidate B
a1	att1	b1
a2	att2	b2
a3	att3	b3
a4	att4	b4
a5	att5	b5
a6	att6	b6

Political party was randomly selected to be the first attribute.

In java script coding, this is position “0”, since it is first it gets assigned the first ID from the ID lists, in this case “a1” “att1” “b1”. I chose not to start my ID list at 0.



Set html values in conjoint table

```
for(i=0;i<6;i++){

document.getElementById(a_list[i]).innerHTML = att_a_traits[i];
document.getElementById(att_list[i]).innerHTML = attributes[i];
document.getElementById(b_list[i]).innerHTML = att_b_traits[i];
}
```

Candidate A		Candidate B
1 year	**Political Experience**	10 years
Protestant	**Religion**	Agnostic
Female	**Gender**	Male
50	**Age**	60
People's Party (f)	**Political Party**	Green Party
College Diploma	**Education**	High School Diploma

Set html values in conjoint table

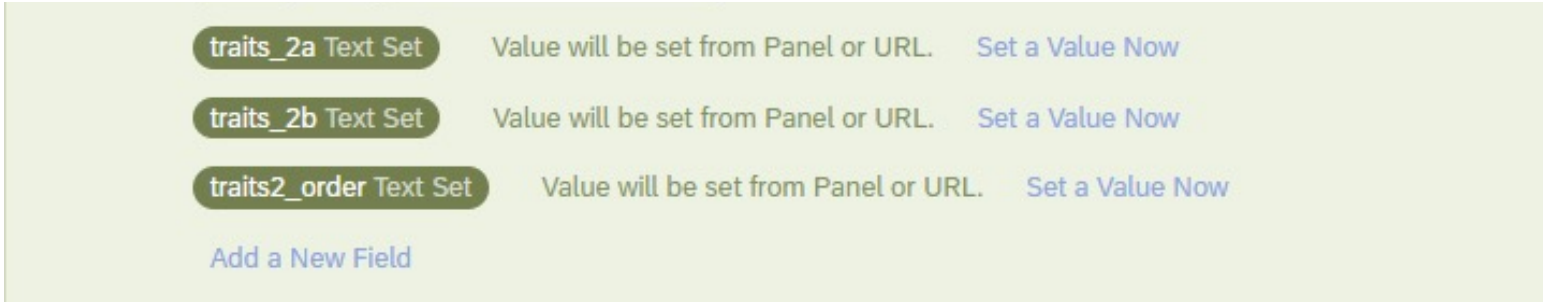
```
for(i=0;i<6;i++){

//Trait list A

{if ((att_a_traits[gender_index] =="Female") && (att_a_traits[party_index]=="Liberal Party"))
 att_a_traits[party_index]="Liberal Party(f)"}

//Trait list B

 {if ((att_b_traits[gender_index] =="Female") && (att_b_traits[party_index]=="Liberal Party"))
att_b_traits[party_index]="Liberal Party(f)"}

document.getElementById(a_list[i]).innerHTML = att_a_traits[i];
document.getElementById(att_list[i]).innerHTML = attributes[i];
document.getElementById(b_list[i]).innerHTML = att_b_traits[i];
}
```

Store values as embedded data fields

```
Qualtrics.SurveyEngine.setEmbeddedData('traits_2a',
att_a_traits.join("|"));

Qualtrics.SurveyEngine.setEmbeddedData('traits2_order',
attributes.join("|"));

Qualtrics.SurveyEngine.setEmbeddedData('traits_2b',
att_b_traits.join("|"));

});
```

Java script code – Recording characteristics for analysis

- Record the list of characteristics for candidate A, candidate B, and the attribute order in an embedded data field in Qualtrics so this information can be exported with the survey data
- Add embedded data field to the survey flow in Qualtrics



Java script code – Recording characteristics for analysis

Candidate A		Candidate B
50	**Age**	50
College Diploma	**Education**	Bachelor's Degree
Muslim	**Religion**	Agnostic
Green Party	**Political Party**	Bloc Quebecois
5 years	**Political Experience**	1 year
Non-binary	**Gender**	Non-binary

traits_2a: 50|College Diploma|Muslim|Green Party|5 years|Non-binary

traits_2b: 50|Bachelor's Degree|Agnostic|Bloc Quebecois|1 year|Non-binary

traits2_order: Age|Education|Religion|Political Party|Political Experience|Gender

```
<style type="text/css">table, td {
align:center;
argin-left:auto;
margin-right:auto;
text-align:center;
table-layout:auto;
 border-collapse:collapse;
 border-spacing:0;
 font-size:15pt;
 border-top: thin solid;
border-bottom: thin solid;
padding:7px;

}
th {
height:60px;
width:9px;
border: 1px solid black;
border-collapse: collapse;
 border-spacing:0;
}

table td:first-child {
border-left: thin solid;
border-spacing:0;
}

table td:last-child {
border-right: thin solid;
border-spacing:0;
```

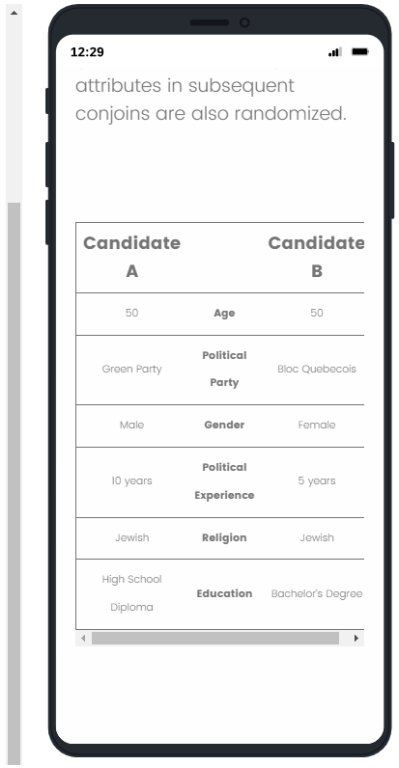
HTML code that builds the table

This first part of the code controls the look of the table

Candidate A		Candidate B
50	**Age**	50
College Diploma	**Education**	Bachelor's Degree
Muslim	**Religion**	Agnostic
Green Party	**Political Party**	Bloc Quebecois
5 years	**Political Experience**	1 year
Non-binary	**Gender**	Non-binary

```
}
@media screen and (max-width:720px){
 table, td {
 font-size:75%;
}

@media screen and (max-width:330px){
 table, td {
font-size:60%;
 }
}
</style>
<center>
<div style="overflow-x:auto">
```

This part of the HTML code controls changes the size of the text based on respondent's display – helpful for mobile devices



```
</style>
<center>
<div style="overflow-x:auto">


<table center>
<tbody>

<tr>
 <td style="font-weight: bold; font-size: 1.25em;">
Candidate A</td>
 <td>&amp;nbsp;</td>


<td style="font-weight: bold; font-size:
1.25em;">Candidate B</td>
</tr>

</center>
```

Candidate A		Candidate B
50	**Age**	50
College Diploma	**Education**	Bachelor's Degree
Muslim	**Religion**	Agnostic
Green Party	**Political Party**	Bloc Quebecois
5 years	**Political Experience**	1 year
Non-binary	**Gender**	Non-binary

```
<center>
<tr>

 <td id="a1"> </td>
  <td style="font-weight: bold;" td id="att1">  </td>
  <td id="b1"> </td>
 </tr>


 <tr>
  <td id="a2"> </td>
  <td style="font-weight: bold;" td id="att2"> </td>
  <td id="b2"> </td>
 </tr>


 <tr>
  <td id="a3"> </td>
  <td style="font-weight: bold;" td id="att3"> </td>
  <td id="b3"> </td>
 </tr>
```

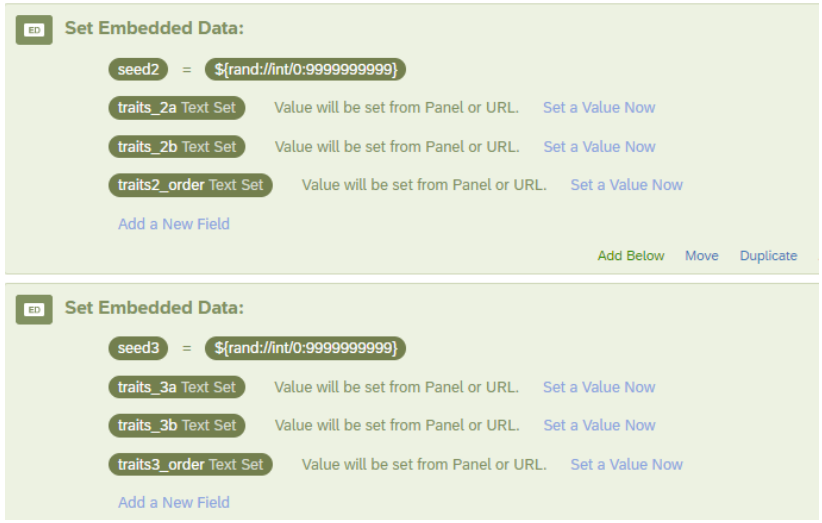
Candidate A		Candidate B
50	**Age**	50
College Diploma	**Education**	Bachelor's Degree
Muslim	**Religion**	Agnostic
Green Party	**Political Party**	Bloc Quebecois
5 years	**Political Experience**	1 year
Non-binary	**Gender**	Non-binary

```
 <tr>
  <td id="a4"> </td>
  <td style="font-weight: bold;" td id="att4"> </td>
  <td id="b4"> </td>
 </tr>

 <tr>
  <td id="a5"> </td>
  <td style="font-weight: bold;" td id="att5"> </td>
  <td id="b5"> </td>
 </tr>

 <tr>
  <td id="a6"> </td>
  <td style="font-weight: bold;" td id="att6"> </td>
  <td id="b6"> </td>
 </tr>


</tbody>
</table>
</div>
</center>
```

Candidate A		Candidate B
50	**Age**	50
College Diploma	**Education**	Bachelor's Degree
Muslim	**Religion**	Agnostic
Green Party	**Political Party**	Bloc Quebecois
5 years	**Political Experience**	1 year
Non-binary	**Gender**	Non-binary

Creating Subsequent Conjoints

- If you want to randomize the order of the attributes in the next conjoint – copy and paste the code
    - Change seed number
    - Create additional embedded data felid that will capture the traits
- If you want the order of the attributes to stay the same for subsequent conjoints



Creating Subsequent Conjoints

Candidate A		Candidate B
50	**Age**	50
College Diploma	**Education**	Bachelor's Degree
Muslim	**Religion**	Agnostic
Green Party	**Political Party**	Bloc Quebecois
5 years	**Political Experience**	1 year
Non-binary	**Gender**	Non-binary

traits4_order: Age|Education|Religion|Political Party|Political Experience|Gender

var att 1= p2a_order[0]; (Age)
var att2 =p2a_order[1]; (Education)
var att3 = p2a_order[2]; (Religion)
var att4 = p2a_order[3]; (Political Party)
var att5 = p2a_order[4]; (Political Experience)
var att6 = p2a_order[5]; (Gender)

var attributes = [att1, att2, att3, att4, att5, att6]