

*Are your ratings data lacking insights?*

# MaxDiff to the Rescue!

*(and it's easy)*



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# Agenda

- What is MaxDiff (*Best-Worst Scaling*)?
  - Overview
  - Case Studies
- Discover MaxDiff
  - Design
  - Analysis
  - Integration
  - Collaboration



# What is MaxDiff?



# MaxDiff is...

...an approach for measuring consumer preference for a list of items. Items could include messages, benefits, images, product names, claims, brands, features, packaging options, and more!

Considering only these 4 desserts, which would you like the Most and which would you like the Least?

(1 of 12)

Most		Least
<input type="radio"/>	Coconut cream pie	<input type="radio"/>
<input type="radio"/>	Tiramisu	<input checked="" type="radio"/>
<input checked="" type="radio"/>	Chocolate layer cake	<input type="radio"/>
<input type="radio"/>	Crème brûlée	<input type="radio"/>



Rank	Item	Score
1	Hot brownie sundae	7.10
2	Chocolate molten cake	6.82
3	Chocolate layer cake	6.22
4	Italian gelato	6.13
5	New York cheesecake	5.90
...	...	...
20	Tiramisu	1.10



# So much information from just two clicks!

- We then know:
  - Chocolate layer cake > Coconut cream pie
  - Chocolate layer cake > Tiramisu
  - Chocolate layer cake > Crème brûlée
- And...
  - Coconut cream pie > Tiramisu
  - Crème brûlée > Tiramisu
- From two “clicks” we learn about 5 of the 6 possible paired comparisons!
  - Coconut cream pie ??? Crème brûlée

Considering only these 4 desserts, which would you like the Most and which would you like the Least?

(1 of 12)

Most		Least
<input type="radio"/>	Coconut cream pie	<input type="radio"/>
<input type="radio"/>	Tiramisu	<input checked="" type="radio"/>
<input checked="" type="radio"/>	Chocolate layer cake	<input type="radio"/>
<input type="radio"/>	Crème brûlée	<input type="radio"/>



# And the results are easy to interpret!

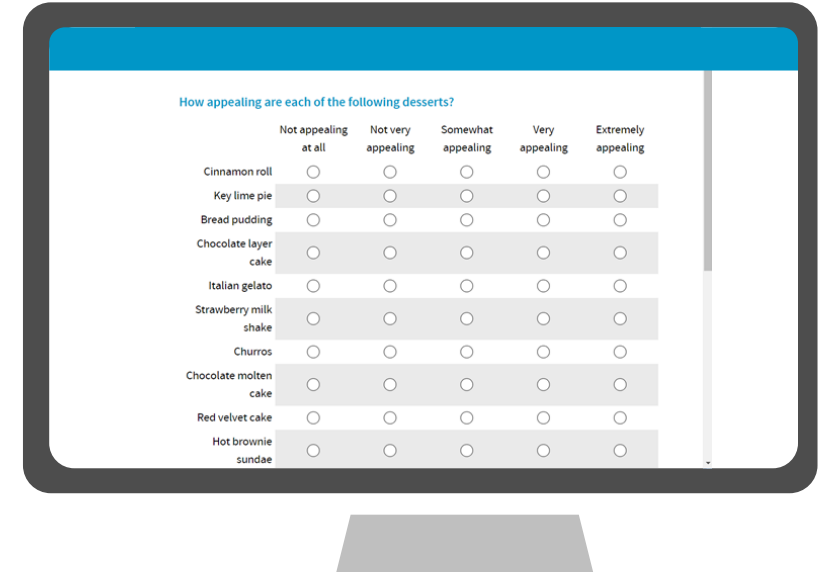
- The scores are placed on a 0-100 scale
- A full rank-ordered list but the results are ratio-scaled so a score of a 5 is twice as great as a score of 2.5!
- Obtain individual-level results

Rank	Item	Score
1	Hot brownie sundae	7.10
2	Chocolate molten cake	6.82
3	Chocolate layer cake	6.22
4	Italian gelato	6.13
5	New York cheesecake	5.90
...	...	...
20	Tiramisu	1.10



# Why do we love it?

- MaxDiff > Ratings Data
  - Greater discrimination among items
  - Greater discrimination between respondents on the item
  - No scale bias
  - Looks great on mobile!



How appealing are each of the following desserts?

	Not appealing at all	Not very appealing	Somewhat appealing	Very appealing	Extremely appealing
Cinnamon roll	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Key lime pie	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Bread pudding	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chocolate layer cake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Italian gelato	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strawberry milk shake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Churros	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Chocolate molten cake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Red velvet cake	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hot brownie sundae	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

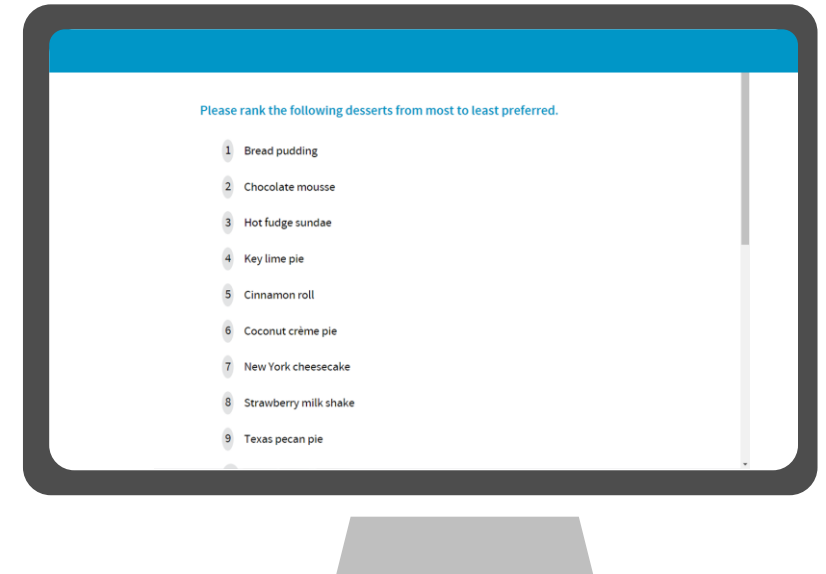


Check out our recent article in the Quirks July Issue!  
[How Good Is Best-Worst Scaling?](#)



# Why do we love it?

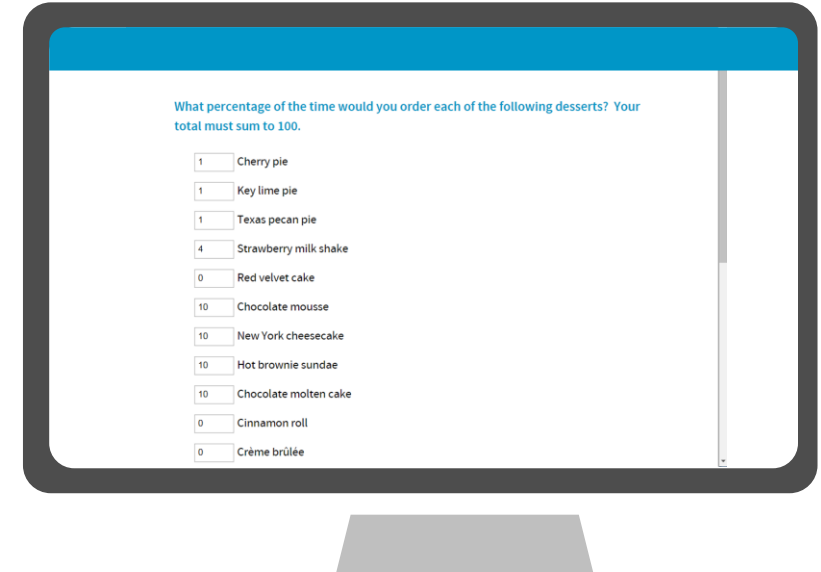
- MaxDiff > Ranking Data
  - Ranking is impractical with >10 items
  - Ordinal scale results
  - What do you report? #1 Rank? Top #1/#2?





# Why do we love it?

- MaxDiff > Constant-Sum Allocation
  - Constant-Sum is impractical with >10 items
  - Making answers to sum to a particular value is difficult!



What percentage of the time would you order each of the following desserts? Your total must sum to 100.

<input type="text" value="1"/>	Cherry pie
<input type="text" value="1"/>	Key lime pie
<input type="text" value="1"/>	Texas pecan pie
<input type="text" value="4"/>	Strawberry milk shake
<input type="text" value="0"/>	Red velvet cake
<input type="text" value="10"/>	Chocolate mousse
<input type="text" value="10"/>	New York cheesecake
<input type="text" value="10"/>	Hot brownie sundae
<input type="text" value="10"/>	Chocolate molten cake
<input type="text" value="0"/>	Cinnamon roll
<input type="text" value="0"/>	Crème brûlée



# MaxDiff exercises tend to be longer

- MaxDiff exercises may take around 3x the amount of time for a respondent to complete versus a rating scale question.
- However, given the issues with rating scales (i.e. scale use bias, straight-lining), having respondents slow down and provide better data seems like a good thing for the conscientious researcher to do.
- Because each respondent provides repeated observations for each item in a MaxDiff, we get a score that tells us how consistent they are, so we know if they are faking it!



[www.sawtoothsoftware.com/maxdiff-video](http://www.sawtoothsoftware.com/maxdiff-video)



# Case Studies



# QSR Menu

## Challenge

A quick service restaurant (QSR) wanted to *optimize* its menu offerings across its many categories by understanding which offerings were most appealing to consumers.

## Solution

A mobile **MaxDiff** study was conducted to understand the relative appeal of each menu offering within a specific category.

## Outcome

The QSR used the MaxDiff results to determine which items it would offer to customers to drive the most interest across its different categories. The data received from prior ratings research lacked the discrimination and clear insights compared to the MaxDiff data and they are so thrilled with the results that they continue to conduct waves of research.



# Hospital Innovation

## Challenge

A hospital needed stakeholder feedback to ***prioritize*** the use of new world-class technological innovation.

## Solution

A **MaxDiff** exercise was fielded among patients, patient families, nurses, physicians, hospital administrators, researchers, local community representatives to determine how they valued each potential priority.

## Outcome

The hospital was able to factor community priorities into planning how this scarce resource could be best utilized in at-risk patient populations.



# Website Optimization

## Challenge

A startup had +20 ideas of content for their landing page. Some of the content would require more real estate than others. In addition, the lower **prioritized content** could show up on subsequent pages.

## Solution

A **MaxDiff** exercise was conducted to prioritize the content and find the optimal combination of that content for the landing page.

## Outcome

While the most valuable top 10 ideas could not fit on one landing page, a set of 11 ideas, swapping out a top 10, gave them a higher value score. A utility correlation matrix also helped determine which ideas should appear together on the subsequent pages.



# Bank Messaging

## Challenge

A financial institution wanted to understand which messages would *reach* customers while visiting the bank's branch and encourage these customers to consider new offerings.

## Solution

A **MaxDiff** study was done to understand the relative appeal of each potential message. Those results were then entered into a **TURF** (Total Unduplicated Reach & Frequency) simulator to ensure the messages would reach consumers.

## Outcome

The financial institution was able to introduce messages that targeted different audiences while not cluttering the space with too much marketing.





# Clinical Research

## Challenge

A clinical research facility was interested in *prioritizing* the 30+ possible claims they could make about their new drug for marketing and communication.

## Solution

A **MaxDiff** study was done to prioritize these claims and results were also entered into a **TURF** simulator.

## Outcome

Three tiers of claims emerged, with four claims very far above the rest of the pack. The client was then able to allocate clinical research funds by trading off the value of the claims and their likelihood of success in clinical studies.



# Product Roadmap

## Challenge

A software company had ideas for feature development but wanted to understand how its users would ***prioritize*** the roadmap.

## Solution

A **MaxDiff** study was done to understand the relative interest in future feature development of the software. A **segmentation** was also done on the MaxDiff results.

## Outcome

There were two clear segments of users, each wanting different product features. Thanks to the results, the software company is able to create a roadmap that satisfies both types of users and continues to run this survey annually.



# Other Applications

- Political campaign promises
- Capital expenditures planning
- Employee benefits packages
- Brand names
- Package designs
- Coupon/Discount offers
- Etc.

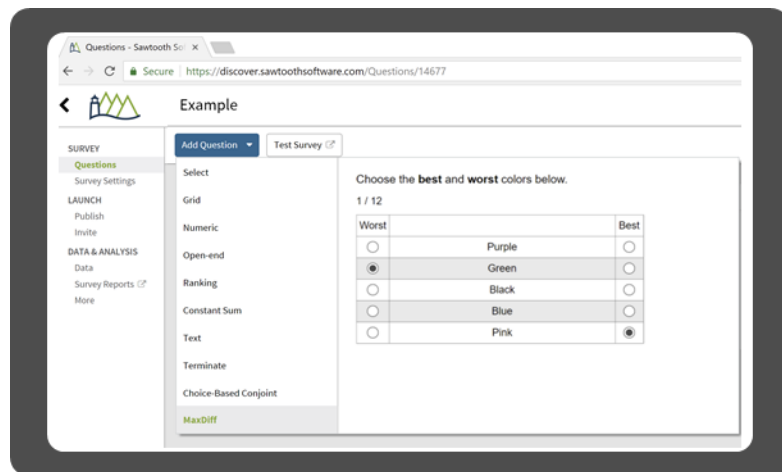


# MaxDiff in Discover



# What is Discover?

- Discover is Sawtooth Software's web-based survey platform that makes choice analytics easier than ever before!
- Create basic MaxDiff and Choice-Based Conjoint surveys for the web in an easy-to-use interface. Analyze your data and explore the results in a simulator.



The screenshot shows the Discover web interface displaying survey results in a simulator. The browser address bar displays "https://discover.sawtoothsoftware.com/Questions/14677". The page title is "Example". The simulator shows a table of results for 19 items. The table has columns: Item, Label, Average, Lower 95% CI, and Upper 95% CI. The items are ranked by their average scores.

Item	Label	Average	Lower 95% CI	Upper 95% CI
1	Crème brûlée	2.82	2.37	2.86
2	Italian gelato	2.50	2.29	2.72
3	Belgian waffle ice cream cone	2.92	2.72	3.11
4	Churros	1.71	1.52	1.91
5	French silk pie	2.51	2.32	2.70
6	Cinnamon roll	2.40	2.19	2.61
7	Coconut creme pie	2.40	2.15	2.65
8	Apple pie	3.22	3.00	3.45
9	Chocolate molten cake	4.32	4.09	4.55
10	Mango lassi	1.12	0.95	1.29
11	Chocolate mousse	3.59	3.38	3.81
12	Bread pudding	1.30	1.12	1.49
13	Hot fudge sundae	4.26	4.05	4.46
14	Salted caramel sundae	3.07	2.86	3.28
15	Vanilla milk shake	2.18	1.97	2.38
16	Strawberry milk shake	2.00	1.79	2.21
17	Chocolate layer cake	4.11	3.89	4.33
18	Lemon meringue pie	2.73	2.47	2.99
19	Fan	1.47	1.27	1.67



# For \$3,000 a year, your subscription includes:

## Features

- Free tech support
- Free upgrades
- Free hosting
- Unlimited surveys
- Unlimited questions per survey

## Question Types

- MaxDiff  
*(30 items)*
- Choice-Based Conjoint  
*(8 attributes, 15 levels per attribute)*
- Select
- Grid
- Numeric
- Constant Sum
- Drag & Drop
- Open-End
- Text
- Terminate

## Programming

- Skip patterns
- Script Logic/Data Piping
- Survey Styles
- Randomize Responses
- HTML
- JavaScript
- CSS

## Analysis

- Bayesian estimation  
*(individual-level utilities)*
- Online Simulator Tool



# Step 1 - Develop item list and possible prohibitions

Bread pudding

Cherry pie

Chocolate layer cake

Chocolate molten cake

Chocolate mousse

Churros

Cinnamon roll

Coconut crème pie

Crème brûlée

French silk pie

Hot brownie sundae

Hot fudge sundae

Italian gelato

Key lime pie

New York cheesecake

Peach cobbler

Red velvet cake

Strawberry milk shake

Texas pecan pie

Tiramisu



# Prohibitions example

1. Clean eating areas (floors, tables, and chairs)
2. Clean bathrooms
3. Has health food items on the menu
4. Typical wait time is about 5 minutes in line
5. Typical wait time is about 15 minutes in line
6. Prices are very reasonable
7. Your order is always completed correctly
8. Has a play area for children
9. Food tastes wonderful
10. Restaurant gives generously to charities





# Step 2 – Choose the # of items and # of sets

- Number of items
  - 3 to 5 items per set
  - Don't show more than half of the total items in a set
  - More than 5 items per set is detrimental
- Number of sets\*

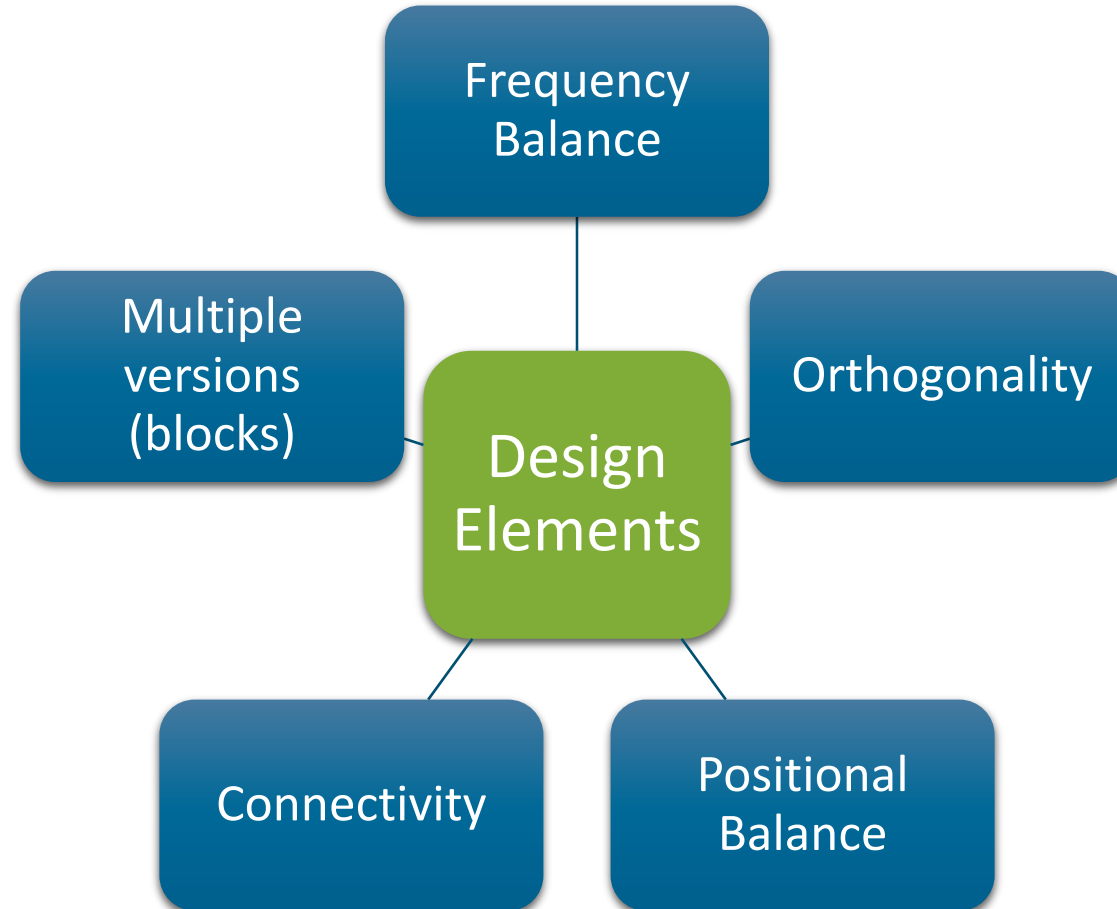
$$\frac{\text{\# tasks X \# items per task}}{\text{Total \# items}} \geq 3$$

$$\frac{?? \times 4}{10} \geq 3$$

*\*If the number of items is large, showing each item at least 3 times can result in a long survey (i.e. 50 items means 30 sets), therefore, other approaches (i.e. Bandit, Sparse) may be better*



# What makes a good design?



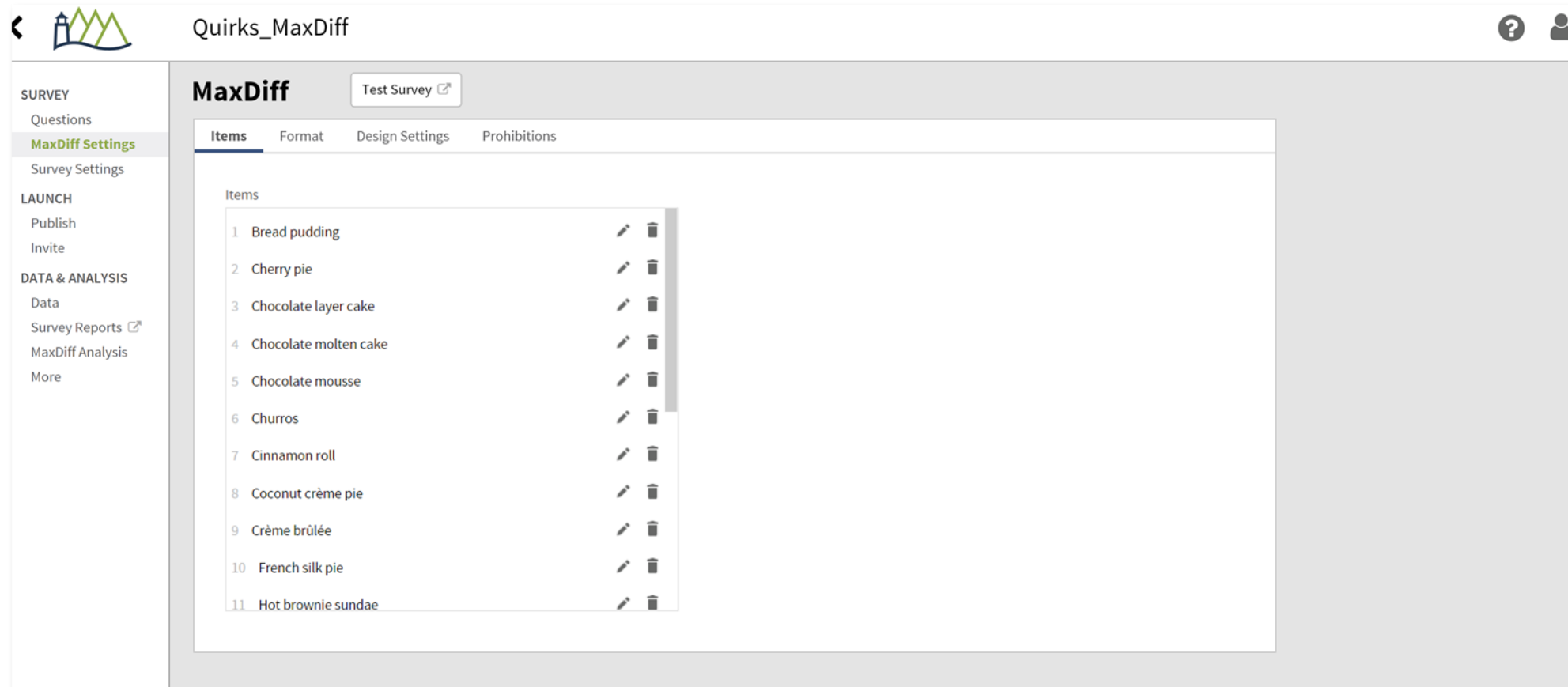
# Using Discover MaxDiff

The screenshot shows the Discover MaxDiff interface for a survey titled "Quirks\_MaxDiff". The left sidebar contains navigation options: SURVEY (Questions, Survey Settings), LAUNCH (Publish, Invite), and DATA & ANALYSIS (Data, Survey Reports, More). The "MaxDiff" option is highlighted in the sidebar. The main content area shows a question configuration window with the title "Choose the best and worst colors below." and a progress indicator "1 / 12". A table lists five color options: Purple, Green, Black, Blue, and Pink. The "Green" option is selected as the "Best" choice, and the "Pink" option is selected as the "Worst" choice.

Worst		Best
<input type="radio"/>	Purple	<input type="radio"/>
<input checked="" type="radio"/>	Green	<input type="radio"/>
<input type="radio"/>	Black	<input type="radio"/>
<input type="radio"/>	Blue	<input type="radio"/>
<input type="radio"/>	Pink	<input checked="" type="radio"/>



# Paste your list of items



The screenshot shows the 'MaxDiff' configuration page for a survey titled 'Quirks\_MaxDiff'. The interface includes a left-hand navigation menu with sections for 'SURVEY', 'LAUNCH', and 'DATA & ANALYSIS'. The 'MaxDiff Settings' option is highlighted under the 'SURVEY' section. The main content area is titled 'MaxDiff' and contains a 'Test Survey' button and four tabs: 'Items', 'Format', 'Design Settings', and 'Prohibitions'. The 'Items' tab is active, displaying a list of 11 items, each with a number, a name, and edit/delete icons.

Item ID	Item Name	Edit	Delete
1	Bread pudding		
2	Cherry pie		
3	Chocolate layer cake		
4	Chocolate molten cake		
5	Chocolate mousse		
6	Churros		
7	Cinnamon roll		
8	Coconut crème pie		
9	Crème brûlée		
10	French silk pie		
11	Hot brownie sundae		



# Specify your question text, labels and layout

The screenshot shows the 'MaxDiff' configuration interface for a survey titled 'Quirks\_MaxDiff'. The interface is divided into a left sidebar and a main content area. The sidebar contains navigation options: 'Back to My Surveys', 'SURVEY' (with sub-items 'Questions' and 'MaxDiff Settings'), 'Survey Settings', 'LAUNCH' (with sub-items 'Publish' and 'Invite'), and 'DATA & ANALYSIS' (with sub-items 'Data', 'Survey Reports', 'MaxDiff Analysis', and 'More'). The main content area has tabs for 'Items', 'Format', 'Design Settings', and 'Prohibitions'. The 'Format' tab is active, showing a 'Question Text' field with the text 'Considering only these 4 desserts, which would you like the *Most* and which would you like the *Least*?'. Below this is a 'Question Layout' section with a dropdown menu set to 'Best - Items - Worst'. A table below the dropdown shows the layout for the 'Best', 'Items', and 'Worst' categories. The 'Best' column has a radio button, the 'Items' column has the text 'Blue', 'Green', 'Red', and 'Yellow', and the 'Worst' column has a radio button. Below the table are three text input fields for 'Best Label' (containing 'Most'), 'Worst Label' (containing 'Least'), and 'Items Label'.

Quirks\_MaxDiff

MaxDiff

Test Survey

Items **Format** Design Settings Prohibitions

Question Text

Considering only these 4 desserts, which would you like the *Most* and which would you like the *Least*?

Question Layout

Best - Items - Worst

Best	Items	Worst
<input type="radio"/>	Blue	<input type="radio"/>
<input type="radio"/>	Green	<input type="radio"/>
<input type="radio"/>	Red	<input type="radio"/>
<input type="radio"/>	Yellow	<input type="radio"/>

Best Label

Most

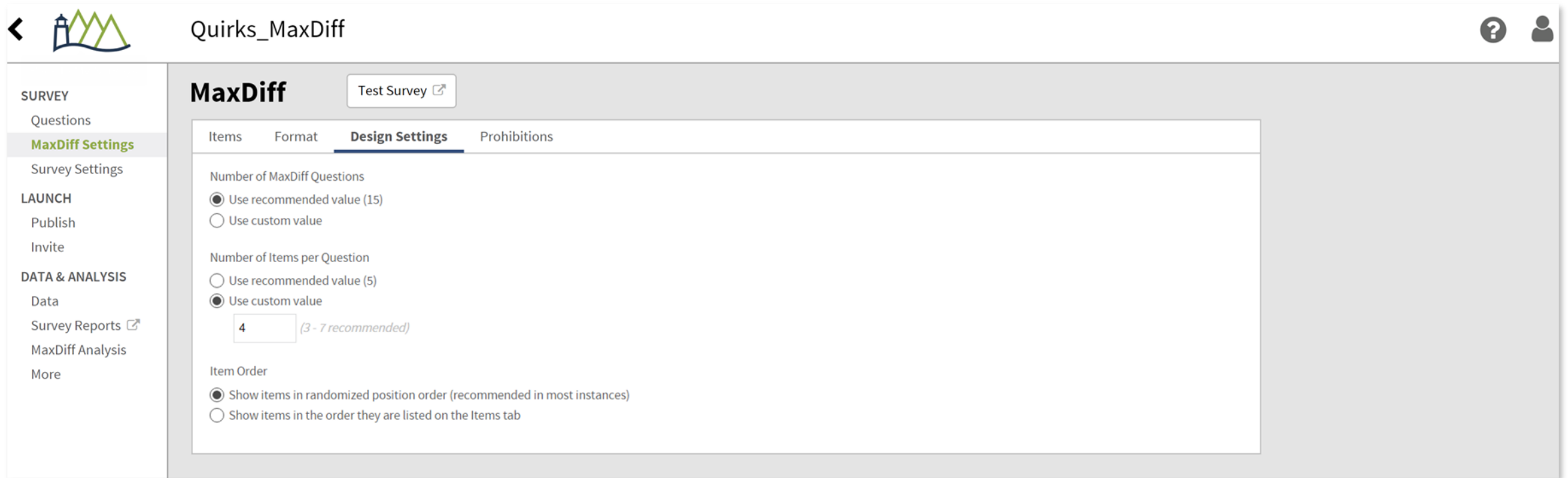
Worst Label

Least

Items Label



# Specify how many items per set and # of sets



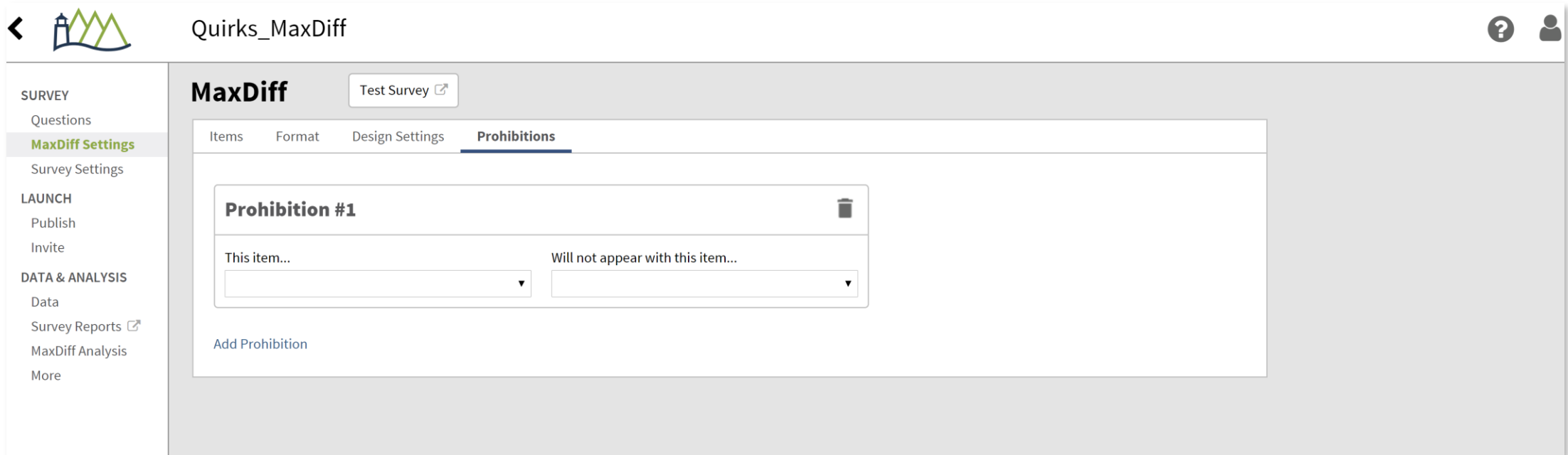
The screenshot shows the 'MaxDiff' settings page for a survey titled 'Quirks\_MaxDiff'. The interface includes a left-hand navigation menu with categories: SURVEY (Questions, MaxDiff Settings, Survey Settings), LAUNCH (Publish, Invite), and DATA & ANALYSIS (Data, Survey Reports, MaxDiff Analysis, More). The 'MaxDiff Settings' section is active, showing tabs for Items, Format, Design Settings (selected), and Prohibitions. A 'Test Survey' button is located at the top right of the settings area. The 'Design Settings' tab contains the following options:

- Number of MaxDiff Questions:**
  - Use recommended value (15)
  - Use custom value
- Number of Items per Question:**
  - Use recommended value (5)
  - Use custom value

A text input field contains the value '4', with a note '(3 - 7 recommended)' next to it.
- Item Order:**
  - Show items in randomized position order (recommended in most instances)
  - Show items in the order they are listed on the Items tab



# Add prohibitions (if applicable)



The screenshot shows the 'MaxDiff' settings interface for a survey titled 'Quirks\_MaxDiff'. The left sidebar contains navigation options: SURVEY (Questions, MaxDiff Settings, Survey Settings), LAUNCH (Publish, Invite), and DATA & ANALYSIS (Data, Survey Reports, MaxDiff Analysis, More). The main content area is titled 'MaxDiff' and includes a 'Test Survey' button. Below this, there are tabs for 'Items', 'Format', 'Design Settings', and 'Prohibitions'. The 'Prohibitions' tab is active, showing a 'Prohibition #1' card with a trash icon. The card contains two dropdown menus: 'This item...' and 'Will not appear with this item...'. Below the card is an 'Add Prohibition' button. The top right corner of the interface has a help icon and a user profile icon.




# Preview your exercise

Considering only these 4 desserts, which would you like the *Most* and which would you like the *Least*?

1 / 15

Most		Least
<input type="radio"/>	New York cheesecake	<input type="radio"/>
<input type="radio"/>	Crème brûlée	<input type="radio"/>
<input type="radio"/>	Strawberry milk shake	<input type="radio"/>
<input type="radio"/>	Chocolate molten cake	<input type="radio"/>

[Back](#) [Next](#)


0%  100%

Considering only these 4 desserts, which would you like the *Most* and which would you like the *Least*?

1 / 15

Most		Least
<input type="radio"/>	Bread pudding	<input type="radio"/>
<input type="radio"/>	Hot fudge sundae	<input type="radio"/>
<input type="radio"/>	Italian gelato	<input type="radio"/>
<input type="radio"/>	Tiramisu	<input type="radio"/>

[Back](#) [Next](#)

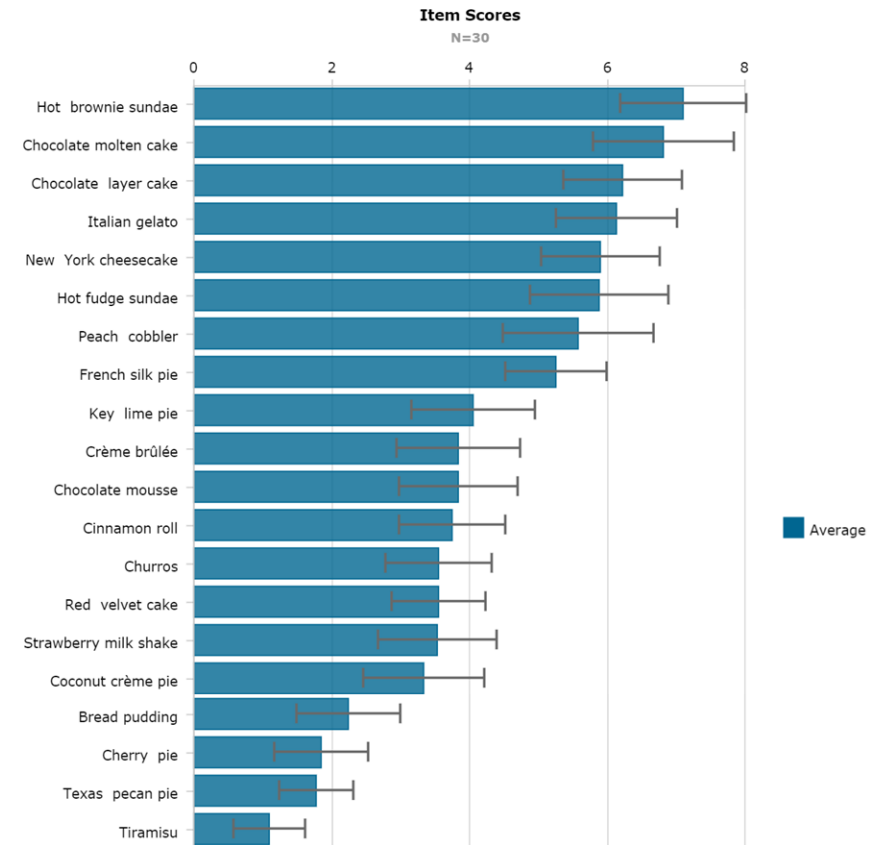
0%  100%





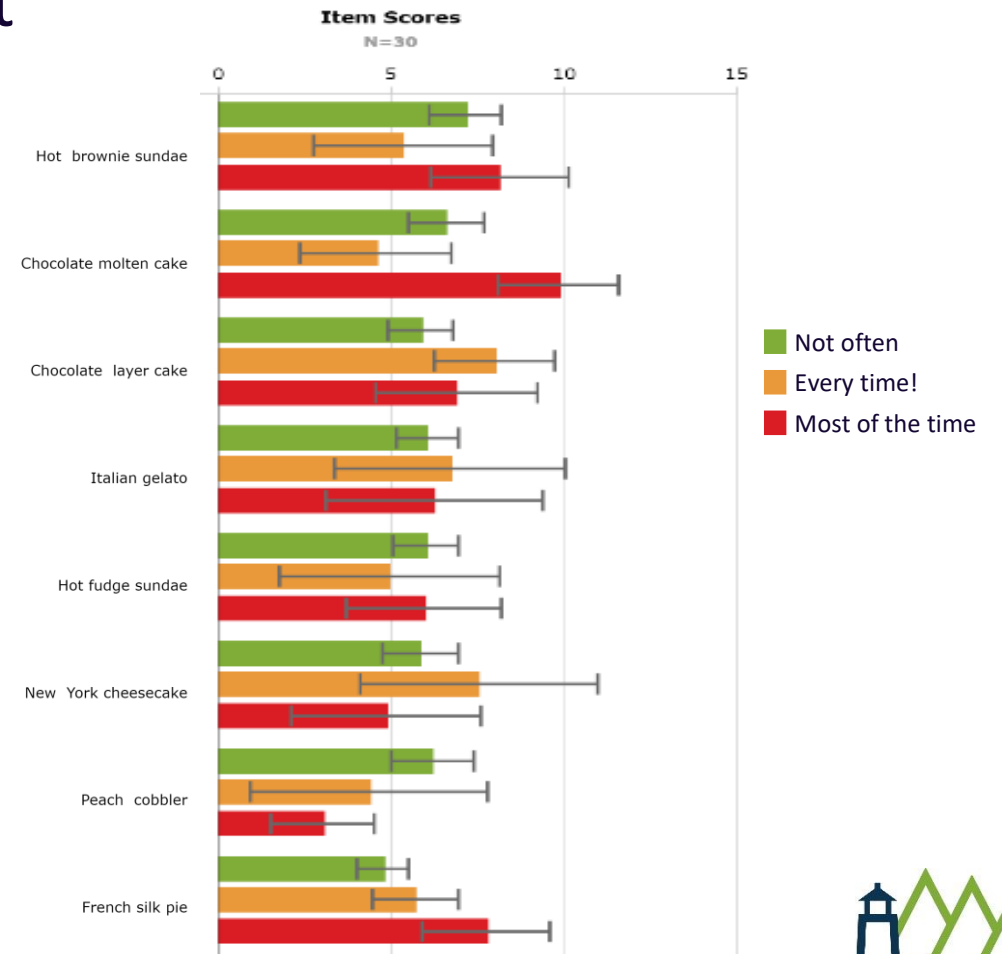
# Analyze your data

- Discover has an automatic built in estimation tool to create individual-level scores using Bayesian analysis
  - You get an easy-to-read report that you can open in Excel
  - The scores are placed on an easy-to-interpret 0-100 scale
  - Ratio-scaled data, so a score of a 10 is twice as great as a score of a 5!



# Explore your results

- See values for the sample, or by segment
- Weight your data
- Merge in external data
- Show 95% confidence intervals



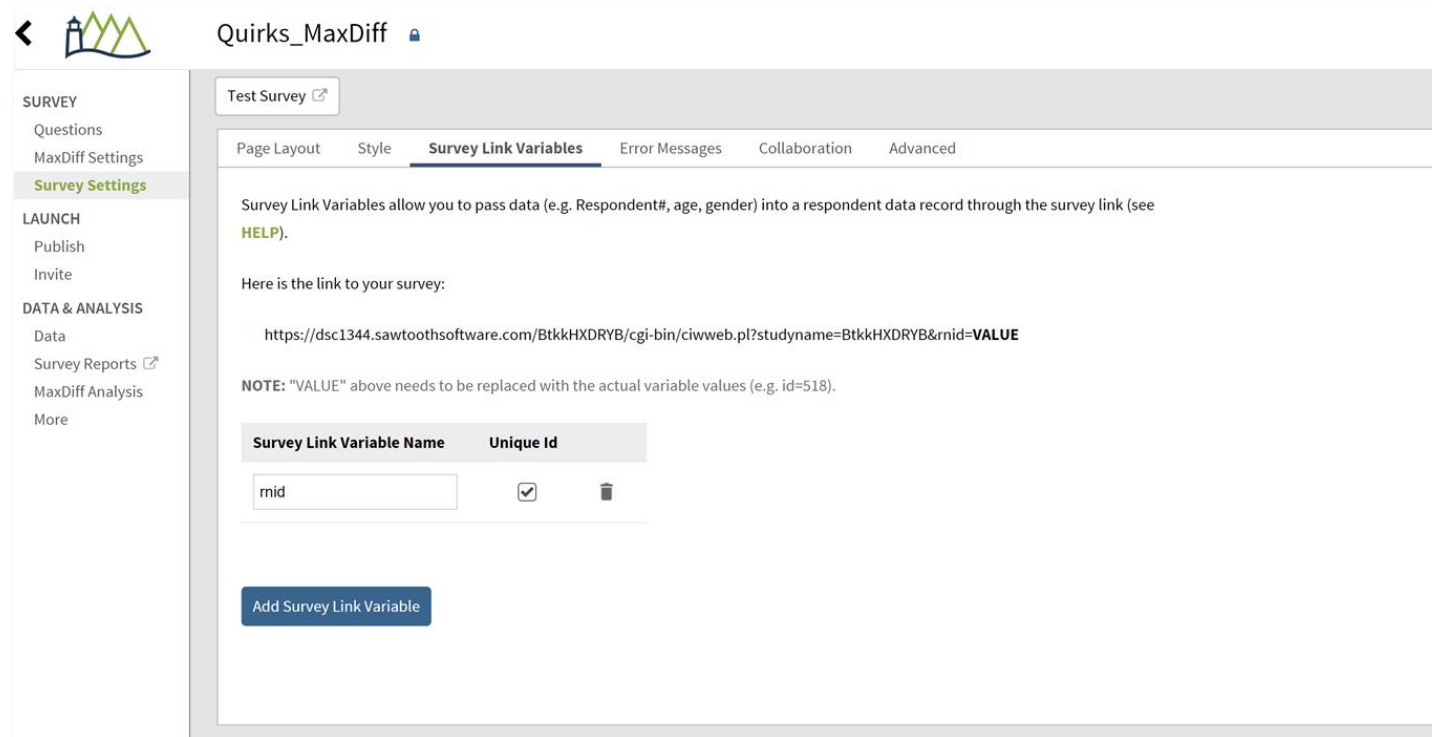
# Coming soon!

- TURF Analysis (**T**otal **U**nduplicated **R**each & **F**requency)
  - “If we can only offer three desserts, which three should we offer so that as many people as possible have at least one dessert that they like?”
- Conduct simulations, projecting “market choices”
  - “If we offered just these three desserts, how many respondents would prefer the peach cobbler?”




# Integration

- Working with a panel company? Using another survey software tool? Use Discover's survey link variables to pass data into a respondent's record.



The screenshot displays the 'Survey Link Variables' configuration page in the Discover survey software. The page title is 'Quirks\_MaxDiff'. The left sidebar contains navigation options: SURVEY (Questions, MaxDiff Settings, Survey Settings), LAUNCH (Publish, Invite), and DATA & ANALYSIS (Data, Survey Reports, MaxDiff Analysis, More). The main content area has tabs for Page Layout, Style, Survey Link Variables (selected), Error Messages, Collaboration, and Advanced. A 'Test Survey' button is at the top. The text explains that Survey Link Variables allow passing data (e.g., Respondent#, age, gender) into a respondent data record through the survey link (see HELP). Below this, a sample link is shown: `https://dsc1344.sawtoothsoftware.com/BtkkHXDRYB/cgi-bin/ciwweb.pl?studname=BtkkHXDRYB&rnid=VALUE`. A note states: "NOTE: 'VALUE' above needs to be replaced with the actual variable values (e.g. id=518)." A table lists the configured variable:

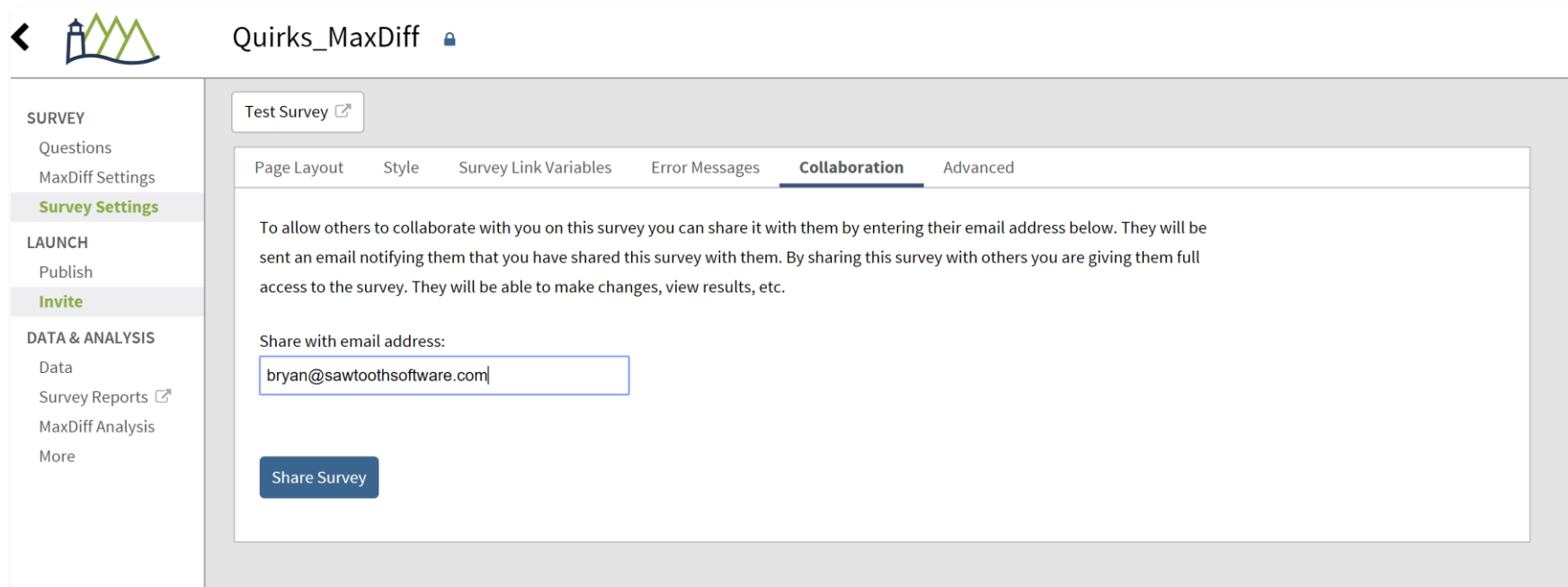
Survey Link Variable Name	Unique Id
mid	<input checked="" type="checkbox"/> 

An 'Add Survey Link Variable' button is located at the bottom of the table.



# Collaboration

- Share your survey with others by entering their email address. They will be able to make changes, view results, etc.



The screenshot displays the 'Quirks\_MaxDiff' survey configuration page. On the left is a navigation sidebar with categories: SURVEY (Questions, MaxDiff Settings, Survey Settings), LAUNCH (Publish, Invite), and DATA & ANALYSIS (Data, Survey Reports, MaxDiff Analysis, More). The main content area is titled 'Test Survey' and has tabs for Page Layout, Style, Survey Link Variables, Error Messages, Collaboration (selected), and Advanced. The Collaboration tab contains the following text: 'To allow others to collaborate with you on this survey you can share it with them by entering their email address below. They will be sent an email notifying them that you have shared this survey with them. By sharing this survey with others you are giving them full access to the survey. They will be able to make changes, view results, etc.' Below this text is a label 'Share with email address:' followed by a text input field containing 'bryan@sawtoothsoftware.com'. A 'Share Survey' button is located at the bottom of the input area.



# Start using Discover today!

- Email [sales@sawtoothsoftware.com](mailto:sales@sawtoothsoftware.com) to get set up right away!
- We will follow up in an email with a link to the recording and additional details



# Want to learn more?

- Join us at one of our in-person workshops!
  - July 16-20 in Park City, UT
  - Sept 19-20 in Rotterdam, Netherlands
  - October 8-11 in San Diego, CA
  - November in Sydney, Australia
- Check out our free webinar series
  - <http://sawtoothsoftware.com/training/webinars>
- Sign up for our Research Rockstar e-course on MaxDiff
  - Coming soon!



# Questions?



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# References

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