How to Use Qualtrics and Measuring Margin of Error

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Agenda

- Time to build your survey: a brief how-to on Qualtrics
- What is margin of error?
- In-class activity

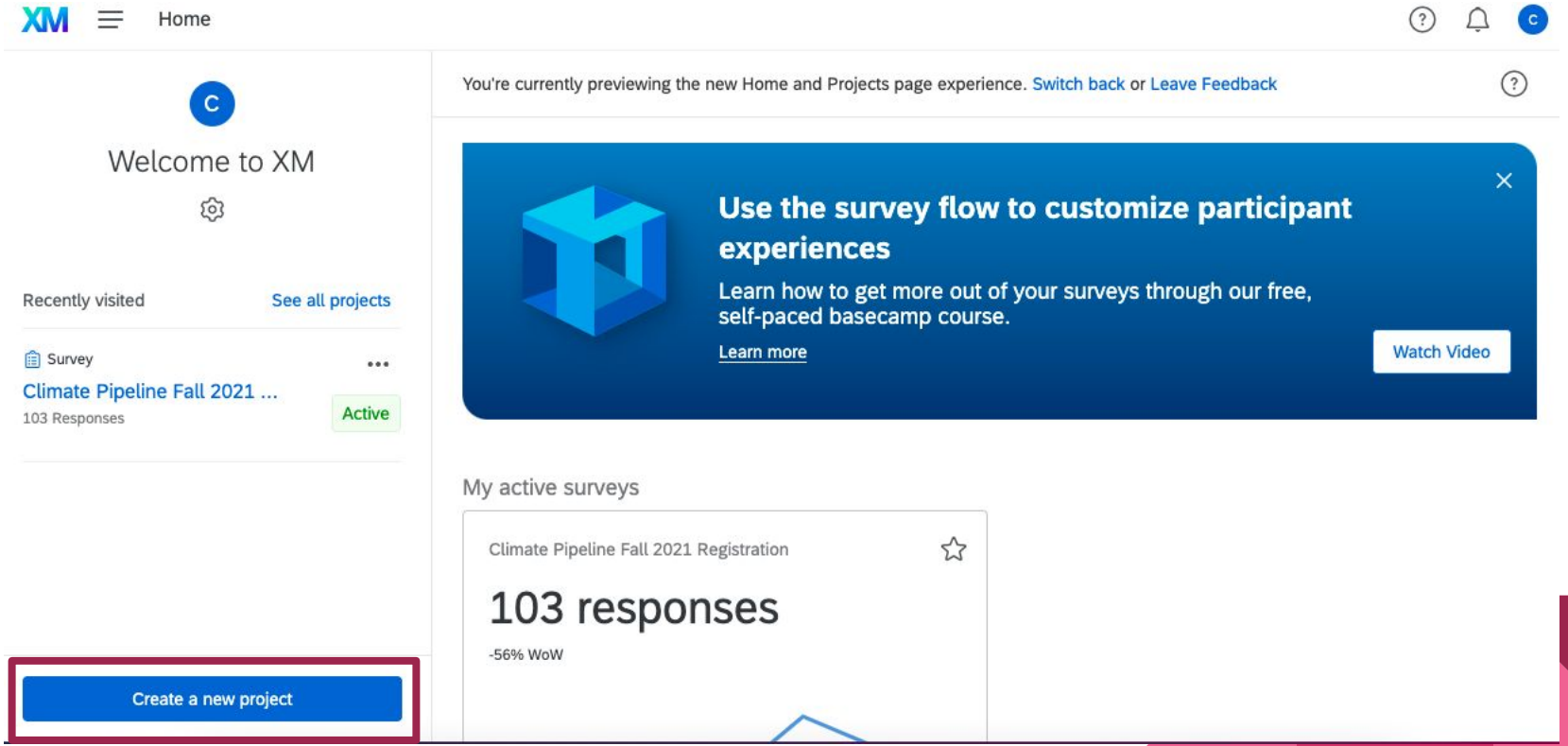
Time to build your survey: a brief tutorial on Qualtrics

Qualtrics is a platform well-designed for fielding academic surveys.

Features include: extensive flexibility for question logic and exporting collected data.

Harvard students have **free** access to this platform.

Time to build your survey: a brief tutorial on Qualtrics



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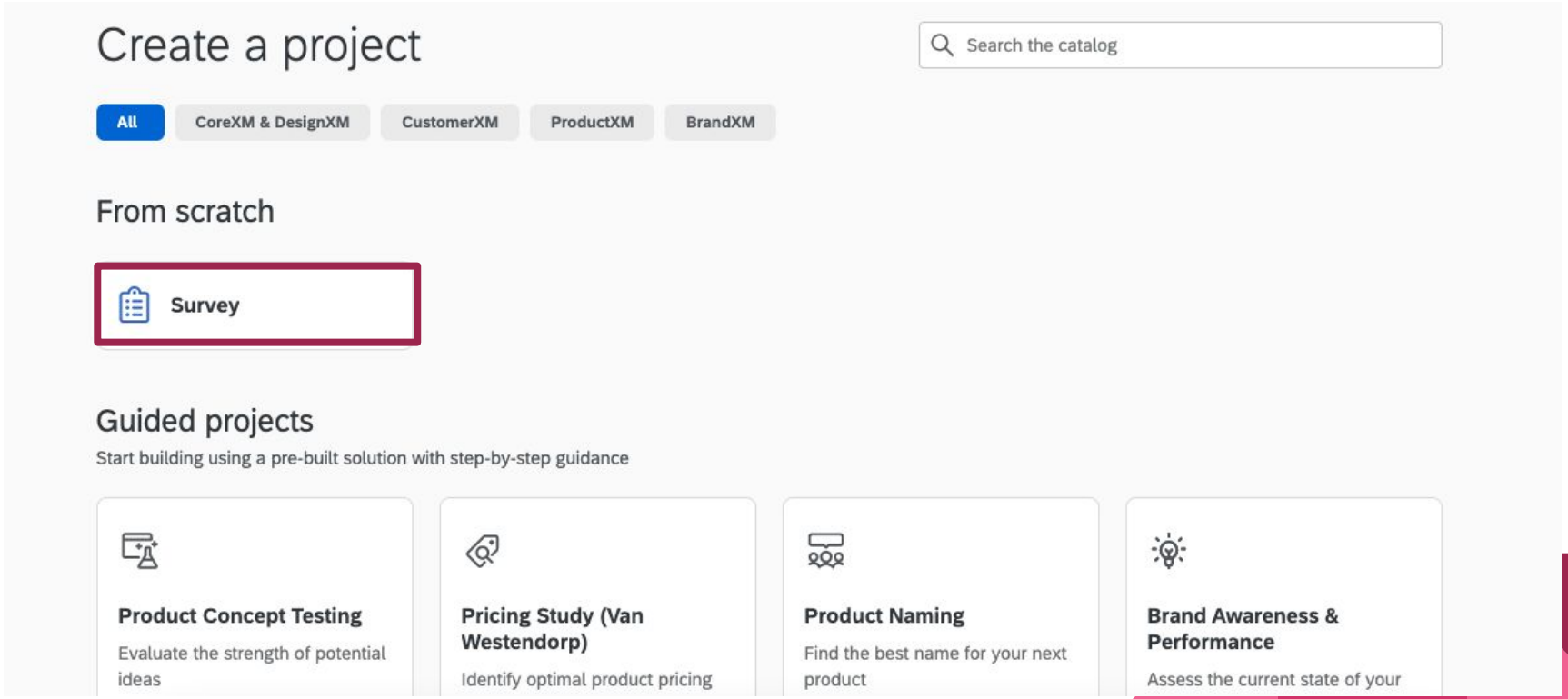

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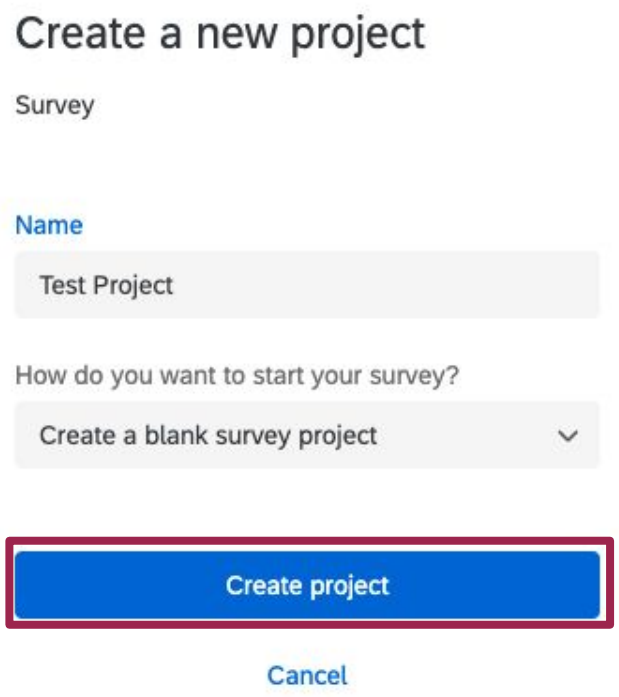

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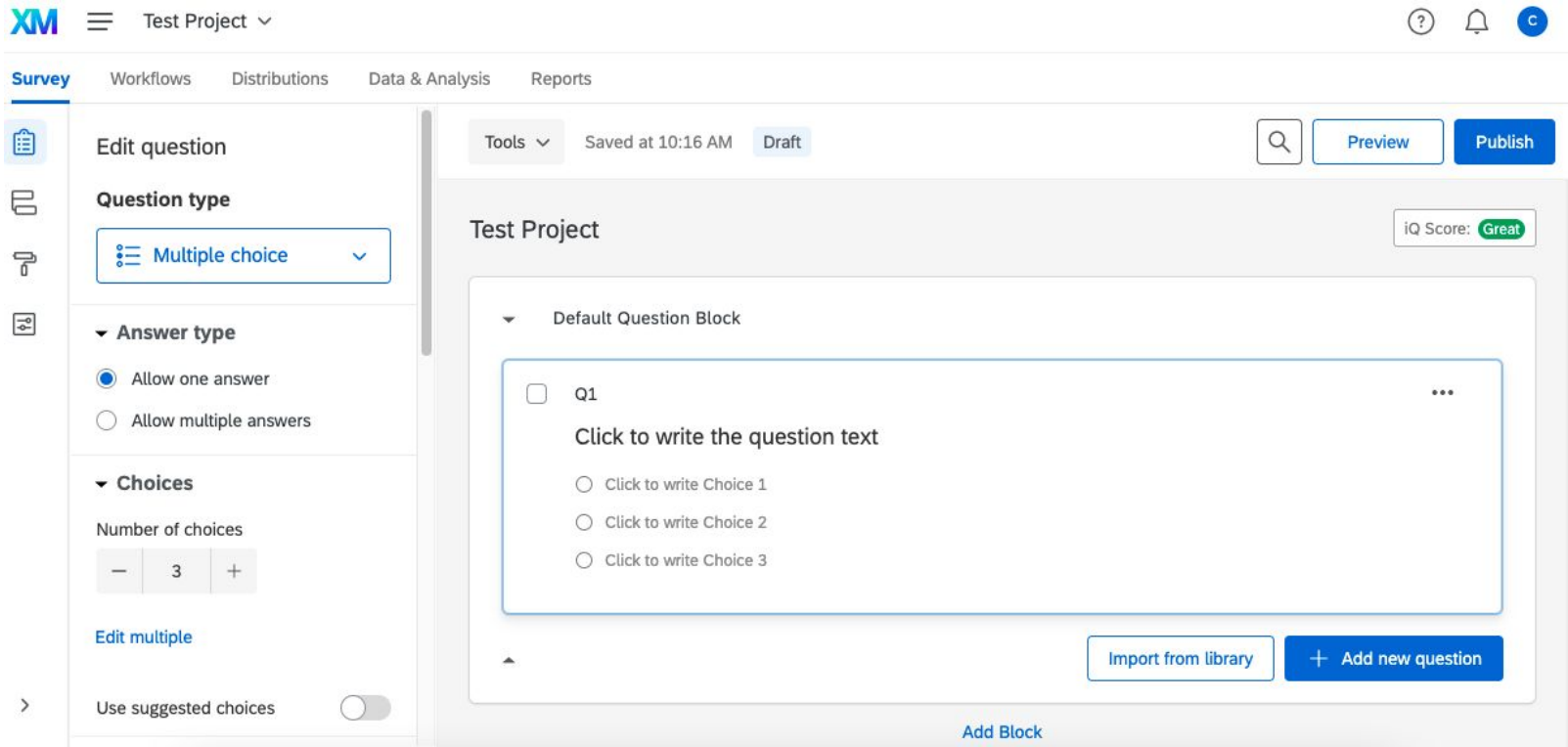

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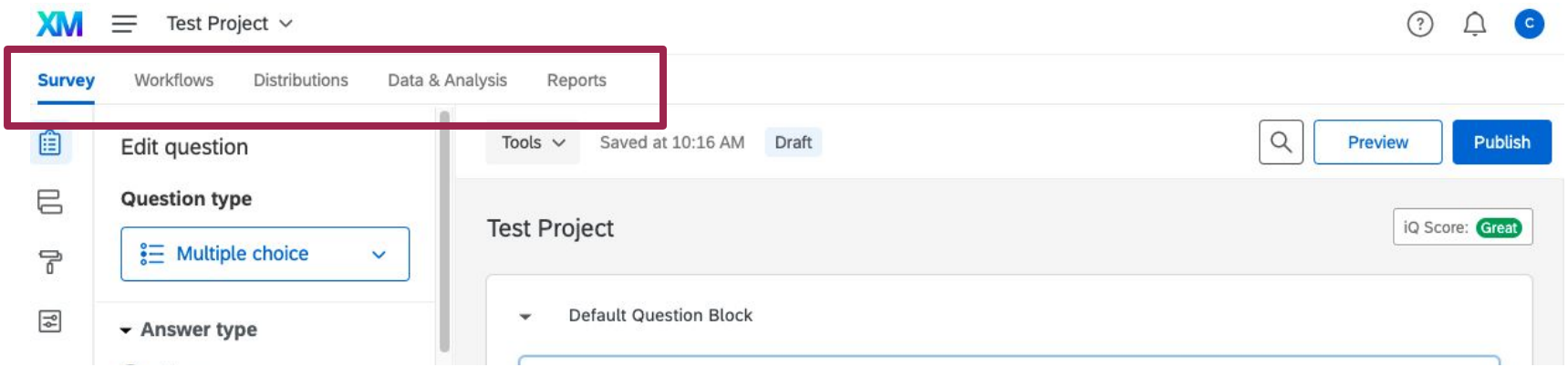
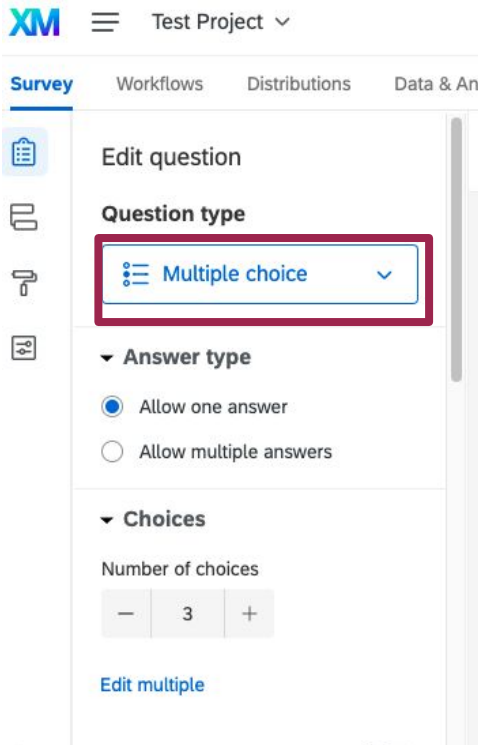


- "Survey": edit your survey.
- "Workflows": manage various tasks associated with your project.
- "Distributions": distribute your survey.
- "Data & Analysis": view responses, conduct initial analyses, and download your collected responses for analysis with stronger tools outside of the platform.
- "Reports": View your survey results and create custom reports.

Time to build your survey: a brief tutorial on Qualtrics

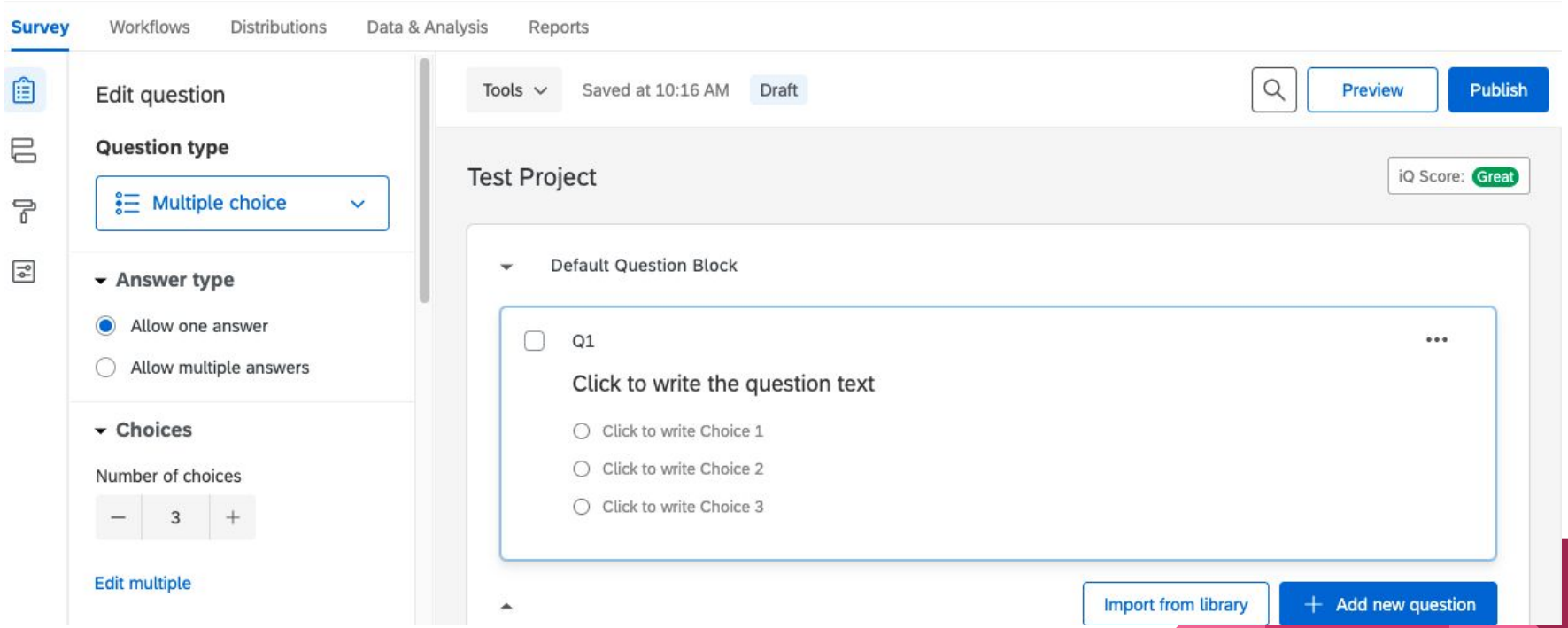


Back to editing your survey!

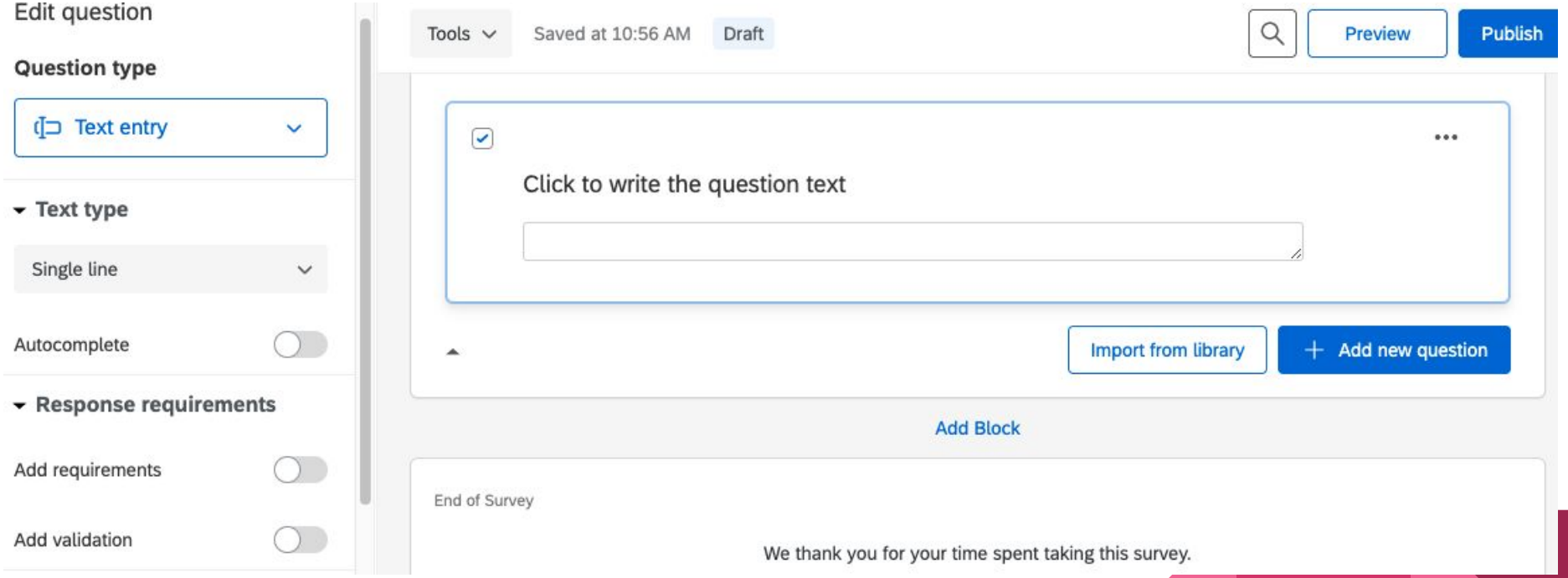
- Qualtrics includes a variety of question types that you can include.
- Click the question type box to select your preferred question type and the options below to customize even further.

Some examples include:

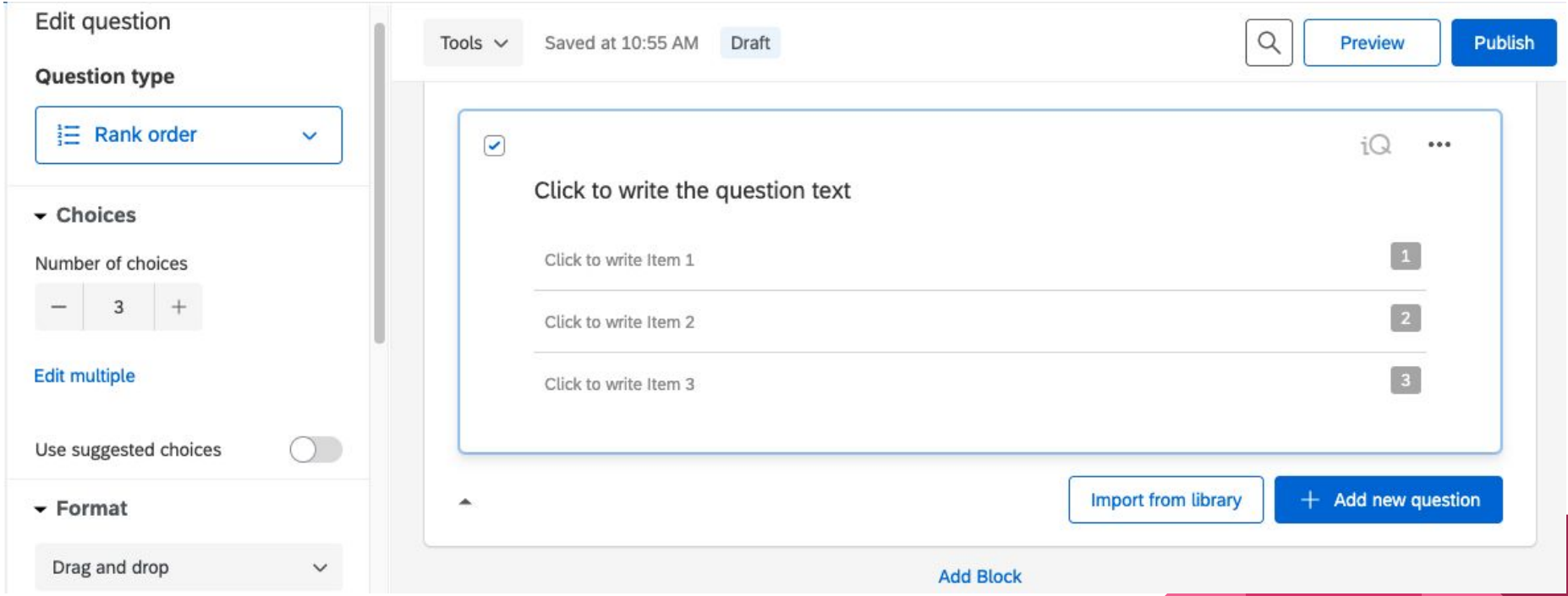
Multiple choice



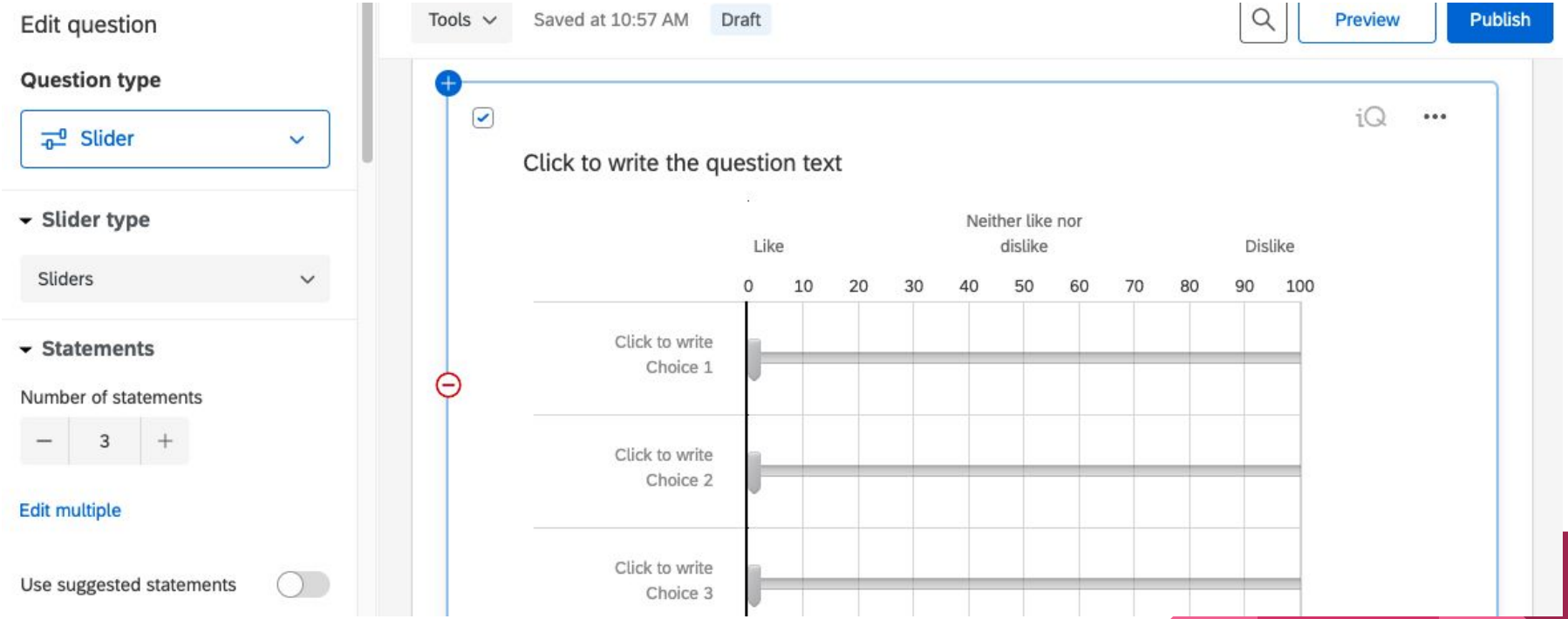
Text entry


Edit question
Question type
Text entry
Text type
Single line
Autocomplete
Response requirements
Add requirements
Add validation
Tools
Saved at 10:56 AM
Draft
Preview
Publish
Click to write the question text
Import from library
Add new question
Add Block
End of Survey
We thank you for your time spent taking this survey.

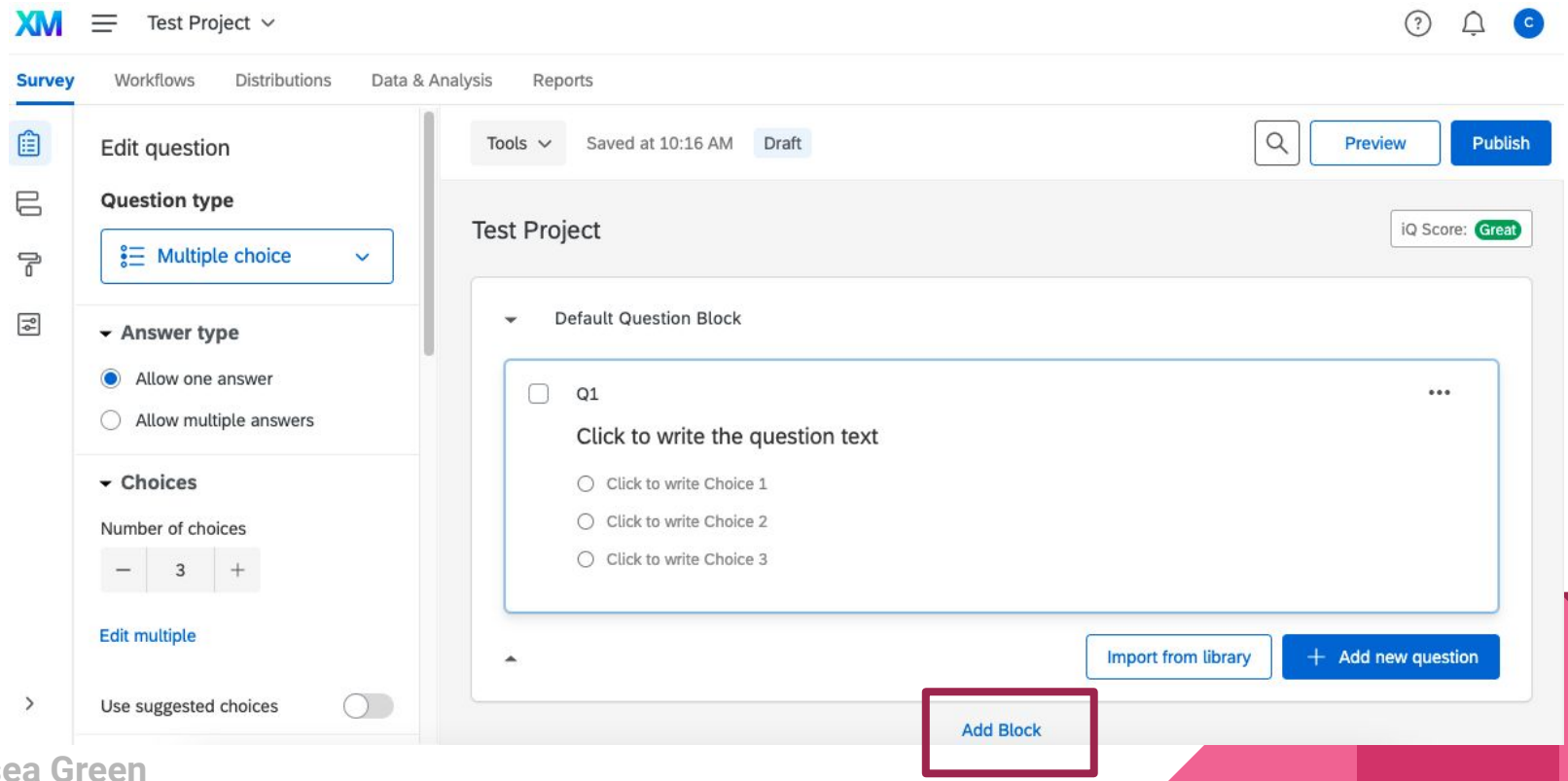
Rank order


Edit question
Question type
Rank order
Choices
Number of choices
3
Edit multiple
Use suggested choices
Format
Drag and drop
Tools
Saved at 10:55 AM
Draft
Preview
Publish
Click to write the question text
Click to write Item 1
Click to write Item 2
Click to write Item 3
1
2
3
Import from library
Add new question
Add Block

Slider


Edit question
Question type
Slider
Slider type
Sliders
Statements
Number of statements
3
Edit multiple
Use suggested statements
Tools
Saved at 10:57 AM
Draft
Preview
Publish
Click to write the question text
Like
Neither like nor dislike
Dislike
0 10 20 30 40 50 60 70 80 90 100
Click to write Choice 1
Click to write Choice 2
Click to write Choice 3

Additional features: Block options



What are block options?

- Blocks are sets of questions within your survey. Check out this page for more details.
- Blocks can also be useful for organizing your questions, particularly should you decide to field a longer survey.
- If you're concerned about question ordering effects, you may also choose to randomize questions *within* blocks.

What are block options?

- Depending on your audience, you may choose to present some respondents with certain blocks and not others.
- You also may choose to **randomly assign** respondents with certain blocks of questions. This can be particularly useful for running survey experiments to test hypotheses!

Eg. Do **social environmental norms** (A) or **financial motivations** (B) better incentivize people to drive less?

Example: using blocks for experiments

Block A contains a question about participants' driving intentions, worded like this:

Our data indicates that individuals from similar backgrounds to yours drive less because they are concerned about the environment. How many hours per week do you intend to spend driving this fall? (enter # of hours)

Block B contains a question about participants' driving intentions, worded slightly differently:

Studies show that driving less saves individuals between $20 to $100 per month. How many hours per week do you intend to spend driving this fall? (enter # of hours)

Time to build your survey: a brief tutorial on Qualtrics

Additional features include:

- Requiring responses to certain questions
- Implementing "validation checks" to make sure that individuals taking your survey actually qualify for participation or are paying attention.

Eg. Are you over the age of 18? If the answer is yes, the condition is met and the respondent will be able to proceed through the survey. If the answer is no, you can create a customized message that notifies the individual they are not eligible to participate in your survey.

What is margin of error?

There is a 95% chance that your sample mean is expected to vary this much from the population mean. (Assuming 95% for this presentation, because that's the standard across social science.)

Margin of error is the amount you expect your sample mean to vary from the true population mean.

Eg. There is a 95% chance that 67% of Harvard students believe that climate change is highly concerning, **with a margin of error of ± 4%.** (this is not actually true - just a pedagogical example!)

Is there a difference between margin of error and confidence interval?

A very slight one, but they are extremely closely related. Let's take our example again: There is a 95% chance that 67% of Harvard students believe that climate change is highly concerning, **with a margin of error of ± 4%.**

Margin of error: ± 4%.

Confidence interval: 67% ± 4%**,** often written as (63%, 71%).

Confidence level: 95%.

What is margin of error?

The size of your margin of error is a function of your sample size, confidence interval, and sample error.

This is why when creating your own surveys, you want to start by estimating the sample size you need based on the margin of error you're okay with.

Otherwise, you're selecting a sample size and hoping that margin of error will be low enough for your audience to respect it!

When do we care about calculating margin of error?

When you're stuck with a particular sample size (you only have access to a certain number of people) and want to know what margin of error you should expect to see.

Eg. I survey a representative sample of 100 Harvard students. Then, I find in my sample that 67% of Harvard students consider climate change to be highly concerning. What's my margin of error?

There is a 95% change that 67% of Harvard students believe that climate change is highly concerning, **with a margin of error of ± ___%.**

When do we care about calculating margin of error?

Let's assume that we are sampling less than 10% of the total population (so we can use the simpler formula, without finite population correction or sampling without replacement correction.

There is a 95% change that 67% of Harvard students believe that climate change is highly concerning, **with a margin of error of ± ___%.**

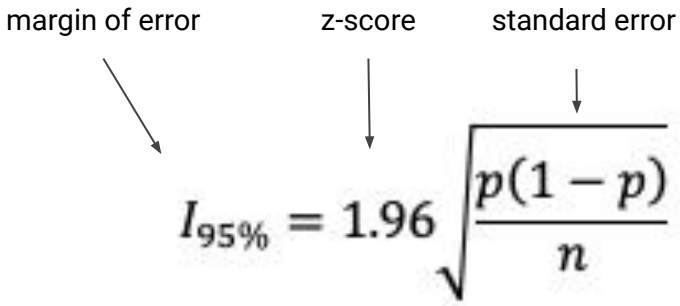
n = sample size

$I_{95\%}$= margin of error (the interval we are trying to find!)

p= sample proportion

When do we care about calculating margin of error?

Here is the formula for finding the margin of error for a sample proportion:



In our case, the z-score is 1.96 because we care about calculating the margin of error with a 95% confidence level.

When do we care about calculating margin of error?

Here is the formula for finding the margin of error for a sample proportion:

$$I_{95\%} = 1.96\sqrt{\frac{p(1-p)}{n}}$$

Since we've already run the survey and collected the data, let's plug in the sample proportion we found (67%, or .67) into the formula for p.

When do we care about calculating margin of error?

Done! We know that we sampled 100 people, so let's plug into into our n:

$$I_{95\%} = 1.96\sqrt{\frac{.67(1-.67)}{n}}$$

When do we care about calculating margin of error?

Perfect. Now, let's crunch the numbers and we get...

$$I_{95\%} = 1.96\sqrt{\frac{.67(1-.67)}{100}}$$

When do we care about calculating margin of error?

Perfect. Now, let's crunch the numbers and we get...

$$I_{95\%} = .09216$$

Now we can officially say: There is a 95% change that 67% of Harvard students believe that climate change is highly concerning, **with a margin of error of ± 9.216%.**

In-class activity

Start creating your surveys! Work with your group to navigate the Qualtrics website, sharing your tips and tricks as you begin crafting survey questions for your research topics.