Custom SAS Studio Task: Sampling for Binary Responses

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Objective

- In this poster, I demonstrate a method I developed for making binary sample size calculations easier for everyone.
- Let's look at an industry example.
- Suppose you work for a company manufacturing medical devices.
  - Quality engineers sample and test devices to determine if an entire batch/lot meets a minimum level of quality as per the following claim:
    - 95% confidence that the probability of a device passing inspection is at least 99%
- **What is the appropriate sampling plan to meet this claim?**

Methods

- The claim on the previous slide is an example of a **binomial proportion confidence interval**.
- The **sampling plan** refers to values of ***n*** and ***x*** that allow you to meet the claim:
  - *n* = the number of medical devices sampled
  - *x* = the number of successes among the n sampled devices
- You must find the combination(s) of *n* and *x* that result in 95% confidence that the probability of success (*p*) is at least 99%.
  - (Have you solved it yet?)

Methods

- Many different software programs can quickly perform binomial probability calculations. (The math is straightforward.)

- However, you usually provide values for *n* and *x*, and the result is the confidence interval.

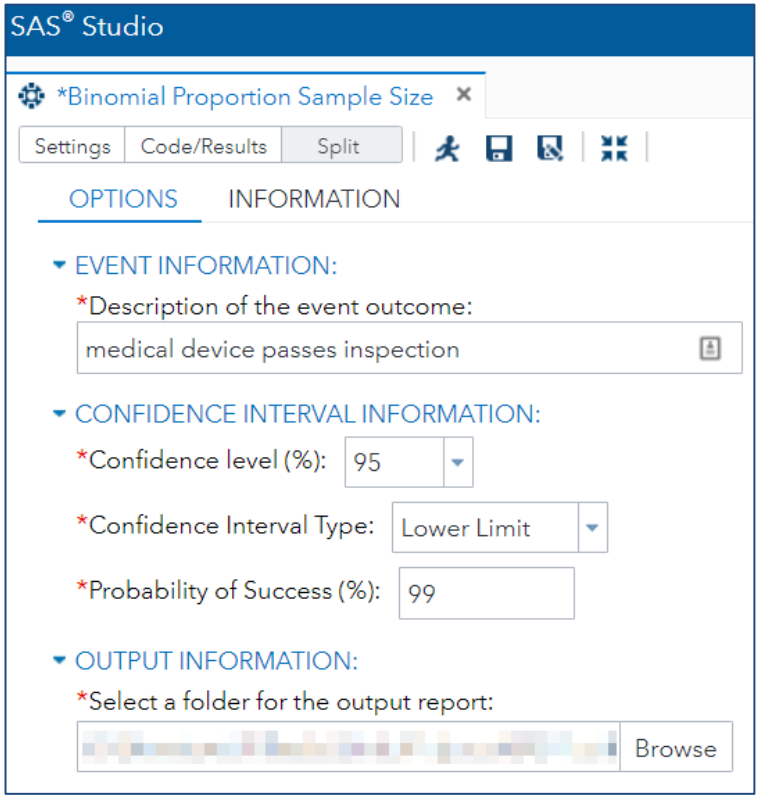
  - This is not what you want. It's the opposite of what you want.

  - Also, there is not just one combination of *n* and *x* that will meet the claim; there are many possible combinations.

- I used SAS Studio to develop a **Custom SAS Studio Task** that incorporates an intuitive user-interface (UI) and can quickly perform these sample size calculations.

Results

- **SAS Studio:** web browser-based SAS programming environment
- **SAS Studio Task:** predefined process with an interface that allows users to specify analysis options
- **Binomial Proportion Sample Size:** custom task I developed
- User provides required inputs and runs the underlying SAS code



Results

- By default, the task creates a PDF report in a user-desginated output folder

- Report includes:
  - Descriptive title (not shown)
  - Header identifying all user inputs
  - Table showing various sampling plans that would meet the claim
  - Footer showing name of user and date/time report was created (not shown)

Event Outcome Description:	medical device passes inspection
Confidence Level:	95%
Lower Confidence Limit:	99%
Statistical Interpretation:	There is 95% confidence that the probability of medical device passes inspection is at least 99%.
Sampling Plan:	To meet the criteria above, select one scenario from the table below.

Sample Size	Maximum Failures	Minimum Successes
299	0	299
473	1	472
628	2	626
773	3	770
913	4	909
1,049	5	1,044
1,182	6	1,176
1,312	7	1,305
1,441	8	1,433
1,568	9	1,559
1,693	10	1,683

Conclusion

- My **Binomial Proportion Sample Size** Custom SAS Studio Task makes calculating sample sizes for binomial experiments easier than ever!
- The UI guides the user through the process of providing all required inputs.
- With the confidence level (%) and probability of success (%) input options, users can calculate sample sizes for an infinite number of claims.
- The underlying SAS code was written to:
  - Optimize speed (code runs in seconds)
  - Produce a detailed PDF report that can be inserted into larger reports or stand alone

Contact

- Thank you for your interest in my poster!

- If you'd like to know more about this or other custom SAS Studio Tasks I am developing, please feel free to contact me:

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