Dummy experiments to determine butterfly size

Butterflies of different colours were found in a meadow; some have patterns and others do not. Their wings are very delicate, so measuring them directly would damage them. Therefore, their size is to be determined indirectly: in a dummy experiment, artificial butterflies (dummies) are designed. It is then observed which dummies are preferentially approached by which butterfly types. These choice patterns are used to infer the probable size of the real butterflies.

1) Aim of the experiment

Design dummies (A-D), carry out several trials and use the simulation output to derive, with reasons, the size class (small / medium / large) of a selected butterfly type.

2) Planning

Task 1: Hypothesis

Formulate a testable hypothesis about dummy choice (1-2 sentences).

Task 2: Design an approach

You have 4 dummies available (A-D). Develop a dummy design that allows you to infer the size of a specific butterfly type as clearly as possible.

Guiding questions:

- Which dummy features do you need to change deliberately so that you can draw conclusions about "size"?
- Which features should remain the same so that you do not unintentionally test something else?

3) Procedure and analysis

Task 3: Run the simulation

1. First choose a target butterfly type (colour + with/without pattern) whose size you want to determine.
2. Create your four dummies (A-D) in the simulation.
3. Carry out at least 5 trials with the unchanged dummy set (better: 8-10).

Save and interpret results

1. Export your charts/results from the simulation and insert them into OneNote. Note which target butterfly type you wanted to investigate with this experimental setup.

2. Use the export to clarify:

- Which dummy is chosen most often by the target type?
- Which size class (small / medium / large) is therefore most likely for the respective colour variants?

⇨ **Answer by referring to your experimental results.**

4) The white butterfly

The white butterfly has 3 unknown characteristics (colour, size and pattern).

Task 4: Run the simulation

1. Refresh the website and think about how you would have to design the dummies in order to find out one of the characteristics. Then export your charts.
2. Now click "Reset". This resets the simulation, but not the characteristics of the white butterfly.
3. Repeat step 1 two more times to find out the other two characteristics of the white butterfly.