

## *ESP*

Your friend claims he “has ESP”. Being properly skeptical, you decide to test his claim. Here is your plan.

You will get ten volunteers to sign their names on identical cards, and seal the cards in identical envelopes. You will then shuffle the pile of envelopes, and hand them to your friend. Using his alleged powers of extrasensory perception, he will distribute the envelopes back to the volunteers, trying to match each person with the one containing the proper signature.

Of course, it will be quite stunning if, when the ten volunteers open the envelopes, they all find their own signatures. If that happens you will certainly believe he really does have ESP.

But that’s unlikely. Chances are he’ll match some people with their signatures and miss others. You need to know how well an ordinary non-ESP-endowed person might do just by chance. Then you can decide how many matches your friend needs to make to convince you that he does have some mystical insight.

Before actually conducting this test then, you need to simulate it. You may use either your calculator or the random number table to determine how many matches you would consider to be “statistically significant”. Write a report in which you clearly explain your procedure, show the results of at least 20 trials, and state your conclusion.

	Components	Comments
<b>Think</b>	<b>Creates a successful simulation:</b> <ul style="list-style-type: none"> <li>○ randomizes the order of the envelopes</li> <li>○ avoids giving any envelope out twice</li> </ul>	
<b>Show</b>	<b>Conducts the simulation:</b> <ul style="list-style-type: none"> <li>○ describes the method clearly</li> <li>○ shows the results of 20 trials, clearly labeled</li> <li>○ defines the correct response variable</li> </ul>	
<b>Tell</b>	<b>States a conclusion:</b> <ul style="list-style-type: none"> <li>○ establishes a reasonable decision rule</li> <li>○ justifies the rule</li> <li>○ does not confuse the model with the actual test to be conducted</li> </ul>	

Components are scored as **Essentially correct**, **Partially correct**, or **Incorrect**

**1: The Method**

- E: randomizes order of envelopes; avoids giving any out twice
- P: randomizes order but allows repetitions OR uses  $P(\text{match}) = 10\%$
- I: uses an inappropriate model (ex: 1 = match, 0 = miss)

**2: The Simulation**

- E: explains the procedure well, clearly labels 20+ runs, and counts the number of matches
- P: meets only two of these requirements
- I: meets fewer than two of these requirements

**3: Interpretation**

- E: establishes a standard of proof requiring an unusual number of matches consistent with the simulation and justifies that rule based on the simulation, in the proper context
- P: fails to justify the decision rule OR confuses the model with reality OR uses % or mean number of matches
- I: fails to address the issue of statistical significance

**Scoring**

- AP Score:
  - 4 = EEE
  - 3 = {EEP; also EPP if the P's are very good}
  - 2 = {EEI, EPP, PPP; also EPI if the P is very good}
  - 1 = {EPI, PPI}
- Grade: A = 4, B = 3, and so on, with +/- determined by the quality of partially correct responses and the clarity of communication.

Name \_\_\_\_\_

AP Score \_\_\_\_\_

Grade \_\_\_\_\_