Helper or Hinderer

Most college students recognize the difference between naughty and nice, right? What about children less than a year old—do they recognize the difference and show a preference for nice over naughty? In a study reported in the November 2007 issue of *Nature*[1], researchers investigated whether infants take into account an individual's actions towards others in evaluating that individual as appealing or aversive, perhaps laying for the foundation for social interaction. In one component of the study, 10-month-old infants were shown a "climber" character (a piece of wood with "google" eyes glued onto it) that could not make it up a hill in two tries. Then they were alternately shown two scenarios for the climber's next try, one where the climber was pushed to the top of the hill by another character (*helper*) and one where the climber was pushed back down the hill by another character (*hinderer*). The infant was alternately shown these two scenarios several times. Then the child was presented with both pieces of wood (the helper and the hinderer) and asked to pick one to play with. The researchers found that 14 of the 16 infants chose the helper over the hinderer.

In this activity, you will be exploring the following research question:

Are infants able to notice and react to helpful or hindering behavior observed in others?

[1] J. K. Hamlin, K. Wynn, & P. Bloom. (2007). Social evaluation by preverbal infants. *Nature, 450*, 557–559.

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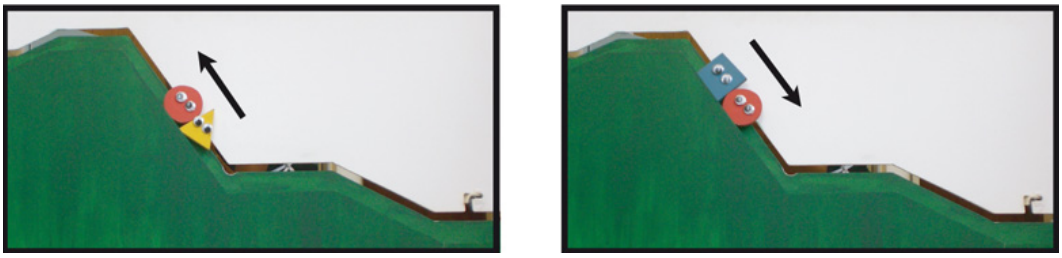
Before you begin, we would like you to watch the videos that were shown to the infants in the experiment. You can view them here:

- http://campuspress.yale.edu/infantlab/media/



Helping and hindering habituation events. On each trial, the climber (red circle) attempts to climb the hill twice, each time falling back to the bottom of the hill. On the third attempt, the climber is either bumped up the hill by the helper (left panel) or bumped down the hill by the hinderer (right panel).

Discuss the Following Questions

1. What proportion of the infants in the observed data chose the helper toy?

2. What does that suggest about the answer to the research question? Explain.

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Suppose for the moment that the researchers' conjecture is wrong, and infants *do not* really show any preference for either type of toy. In other words, infants just randomly pick one toy or the other, without any regard for whether it was the helper toy or the hinderer.

3. Write the statistical hypothesis for the "no preference" model.

4. If the no preference model is "truth", how likely do you think it is that 14 out of 16 infants would choose the helper toy? Explain.

The "Just-by-Chance" (No Preference) Model

Consider the argument that that infants have no preference for either the helper or the hinderer. If that argument is true, then you would expect that any infants selecting the helper is only because of random chance—not due to any underlying psychological tendency of infants to prefer helpers to hinderers.

The good news is that this "just-by-chance" process (i.e., random chance) can be modeled using the same chance devices that you have been using in the course thus far. Under the assumption of "just-by-chance", the process of infants selecting toys can be modeled by randomly selecting either a helper or a hinderer. After the random selection, it can be determined how many infants "chose" the helper. This process can be repeated a large number of times to simulate the percentage of infants selecting the helper under this "no preference" model.

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Summary of the Simulation Process

The key to answering the research question in this activity is to determine how likely the observed result (14 of 16 infants choosing the helper) is under the assumption that infants have no preference for either the helper or the hinderer. The "no preference" model is again the "just-by-chance" model—infants randomly select either the helper or hinderer.

To determine this likelihood, you will model the process of 16 hypothetical infants making their selections using random chance. Then, you can count how many of these "infants" choose the helper toy. This process can be repeated many times to obtain a distribution of results that would be expected under the "no preference" or "just-by-chance" model.

The observed result of 14 of 16 infants choosing the helper can then be evaluated in light of this distribution to determine how likely it would be to obtain such a result (or a more extreme result) under the assumption of random chance. As such, the observed result can provide evidence to help answer the research question.

5. Draw a picture of the sampler (model) that you will use to generate outcomes from the "just-by-chance" model. In the picture, be sure to (1) indicate the type of sampling device used (mixer, spinner, etc.); (2) label all the elements in your sampling device; (3) label the probability associated with each element; and (4) indicate the Repeat and Draw values you will use.

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Simulating Data from the Hypothesized Model

In this study, a trial represents each of the 16 infants choosing a toy. The trial ends when 16 toys have been chosen randomly.

- Carry out a single trial of the simulation in TinkerPlots™.
- Plot the outcomes from the trial.

6. What is the summary measure from the plot that you will be **collecting**?

- Collect the appropriate summary measure.
- Carry out 499 more trials (500 trials total) of the simulation in TinkerPlots™.
-

Evaluating the Hypothesized Model

- Plot the results from the simulation.

7. Sketch a plot of the results below.

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8. Describe the shape, center, and variation for the distribution of results.

9. Is the observed result from the original experiment likely or unlikely under the hypothesized model? Explain.

10. What does your answer to Question #9 suggest about whether infants are able to notice and react to helpful or hindering behavior observed in others? Explain.

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MODEL

The model has two outcomes– one for Helper and one for Hinderer. Each is equally likely.

SIMULATE

Randomly generate 16 outcomes from the model. For each trial, compute the number of Helpers. Generate many trials.

EVALUATE

Compile all of the numerical summary measures into a single distribution, Evaluate the initial questions by deciding whether the observed result of 14 Helpers is likely under the hypothesized model.