PSYC 51.09: Problem Set 2

Overview

This problem set is intended to solidify the concepts you learned about in this week's lectures and readings. *After attempting each question on your own*, you are encouraged to work together with your classmates in small groups, and/or to post and answer questions on the course's Canvas site. ***You must clearly indicate who your collaborated with and submit your own (uniquely worded) responses.***

Please upload your problem set to Canvas (as a Word or PDF file) before the due date. No late submissions will be accepted.

Readings and ungraded questions

1. Read Chapter 2 of *Foundations of Human Memory*. What were your thoughts on the reading? **(Ungraded)**

Graded questions

1. Suppose the table below contains data you've collected from one participant in a recognition memory experiment. They were tested with 20 items (TRIAL) which included a mix of targets and lures (STATUS). For each item, they made a 7-point CONFIDENCE judgement: 1 = sure it was not on the list; 7 = sure it was on the list.

   (a) Plot (by hand) the ROC curve for this participant. Be sure to label axes and put numbers on the axes. Show your work!

   (b) Draw (and label) a dotted line on the ROC curve to indicate what it would look like for a participant who mixed up the instructions and reversed the ratings scale in their responses (i.e., they responded 1 if they were sure the item was *old* and 7 if they were sure the item was *new*).

   (c) Draw another (labeled) dotted line on the ROC curve to indicate what it would look like for a participant who responded normally, except that they rounded all of their responses to 7 if they internally judged their confidence at 5 or higher (in other words, draw the ROC curve when responses of 5, 6, or 7 below are all replaced with 7)

TRIAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
STATUS	T	L	T	T	T	L	L	L	T	L	L	T	L	L	T	T	L	L	T	T
CONFIDENCE	4	5	2	6	6	4	6	3	6	2	4	5	2	1	3	4	6	1	7	2

2. Consider some aspect of recognition memory that neither strength-based models (e.g., strength theory, the Yonelinas familiarity-recollection model, and the variable-recollection model) nor scanning models (e.g., serial self-terminating scan, serial exhaustive scan, parallel search models) can explain. Outline some ideas for extending (or combining) one or more of these models in a way that could help to account for that phenomenon. (**3 paragraphs**)

Recap

- Yonelinas familiarity-recollection model

The Yonelinas Familiarity-Recollection Model

- You recollect details with probability R. You *don't* recollect the details with probability 1 - R.

- If you recollect an item, you say "yes" to whether you've seen it before. (Effectively the item has infinite strength.)

- If you *don't* recollect an item, you now rely on familiarity. If the item's strength is above a threshold, you respond "yes" (with probability F_{target}) and otherwise you respond "no" (with probability 1 - F_{lure})

Conditional probability

- p(x | y): “probability of x given y”
- Given that you observe y, what’s the probability of x?
- If x and y are independent, p(x | y) = p(x)
- If observing y provides some evidence for x that you wouldn’t have assumed initially, then p(x | y) > p(x)

Conditional probability

- What are the chances of rolling a fair 6-sided die and getting a 3?

  p(rolling 3) =

- What if I told you that when I use my lucky die rolling device I always get a 6?

  p(rolling 3 | lucky device) =

- What if I told you that it was sunny out?

  p(rolling 3 | sunny) =

The Yonelinas Familiarity-Recollection Model

- p(“yes” | target) = R + (1 - R)F_{target}

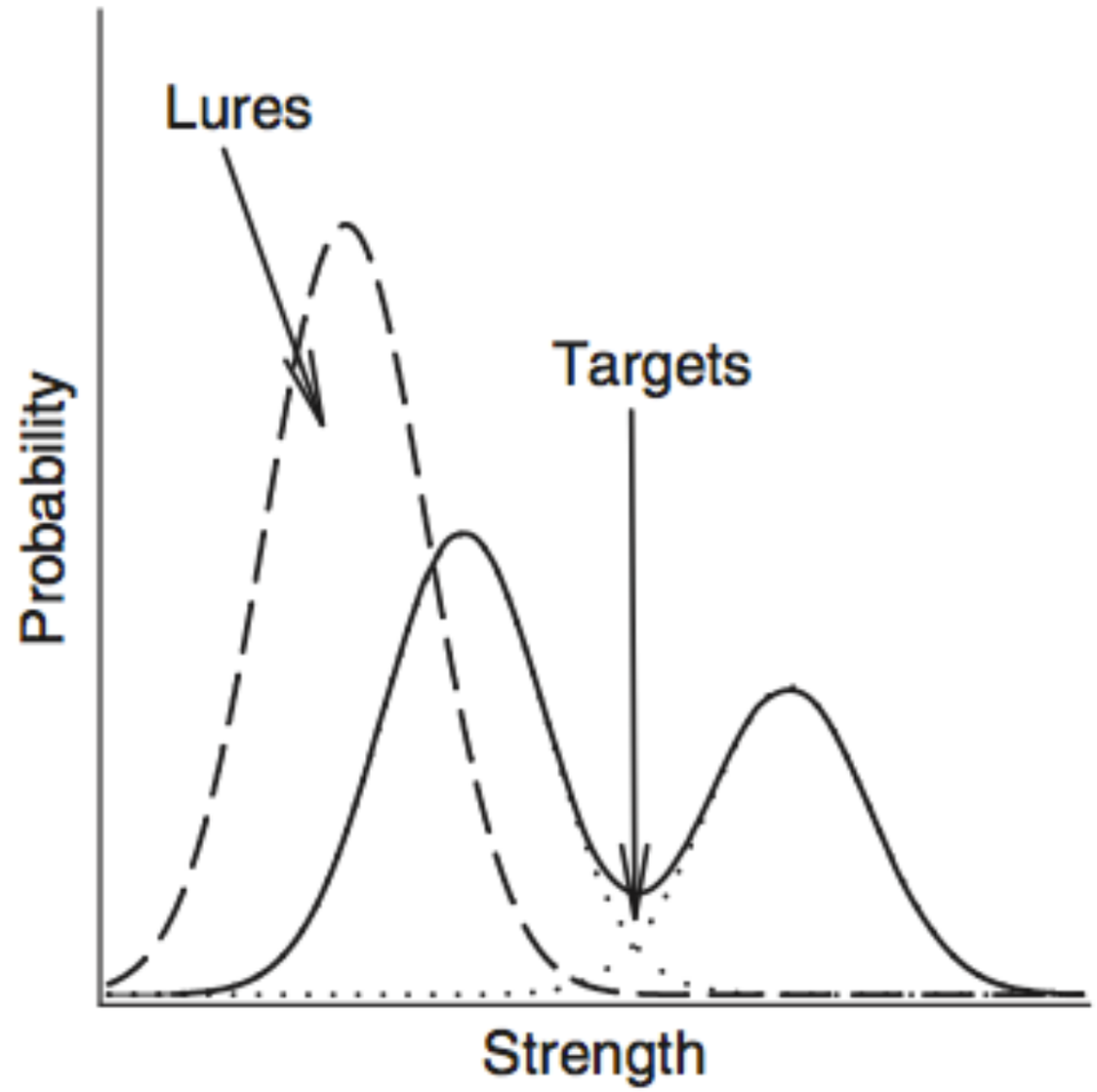
- p(“yes” | lure) = F_{lure}

The Yonelinas Familiarity-Recollection Model

- What would the lure and target distributions look like for this model?

The Variable-Recollection model

- Also suggests there are two processes (recollection and familiarity)
- Does not require recollected items to have infinite strength
- Studying an item (always) increases familiarity
- Sometimes there's an extra "boost" from recollection (drawn from a Gaussian)



Do you need two processes?

- Occam's Razor…
- What would you need to show in order to be convinced?