BADE Images Documentation

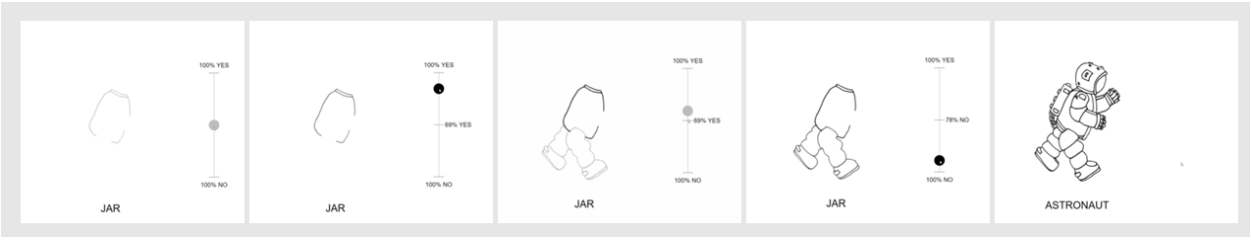
Overview

The BADE Images task (Lavigne et al., 2020a, 2020b) was originally designed to assess the bias against disconfirmatory evidence (BADE) using neuroimaging (e.g., fMRI, EEG) and is an improvement upon the previously used “Animal BADE” (Lavigne et al., 2015). BADE Images is inspired by previous behavioural versions of BADE and was adapted from the Metacognitive Training (MCT) for Psychosis Program (module 2) designed by Moritz & Woodward (2007; http://clinical-neuropsychology.de/metacognitive_training-psychosis.html).

Modifications from previous iterations of BADE tasks were necessary to create a suitable task to assess brain activity. The major difference is that the scenarios are images and the different sentences describing the scenarios from behavioural BADE are now displayed by showing partial images. In addition, participants only rate a single, rather than multiple interpretations, on a given trial. The different interpretations are created as separate conditions for this task (as was done with Animal BADE). The main idea remains; participants are presented with a partial image and are asked to rate whether they belief the full image is of the word listed below the partial image. Then they are presented with a second image which shows a little more of the true image and asked to re-rate. Finally, a third image is displayed which shows the full image. The procedure of this “Picture BADE” task was heavily based on the Animal BADE procedure (Image 1 → Rating → Image 2 → Re-Rating).

Procedure

In this task, participants are presented with partial line drawings of images (e.g., astronaut) and asked to rate whether they believe the full image is of the word listed. In this version of the task, three images are shown and the trial proceeds as follows: Image 1 → Rating → Image 2 → Rating → Image 3. Image 2 reveals more of the picture than image 1, and image 3 shows the full picture with the correct word underneath it.



Original Development

Approximately 360 images were either created by hand or found via Google Image Search. Each image was edited in GIMP 2 by erasing portions of the image to identify potential lure images within them (e.g., jar as a lure image of astronaut above). If more than one lure image was identified, then each was created and noted for later discussion within the research team.

Approximately 80 images underwent pilot testing, whereby each image was split into a series of 6-7 steps, and potential lures were listed beside each image. Piloters (8-10 people: lab members, family and friends not involved in image creation) were to rate how much each image looked like each word beside it and the highest-rated lures and images were selected for that image. Due to time constraints, the remaining images were not piloted and lures were determined via consensus of the research team.

The original neuroimaging version used a dichotomous yes-no response interface rather than a rating scale, leading to 4 possible response patterns given two responses per trial (one each to image 1 and image 2): Yes-Yes, Yes-No, No-Yes, and No-No. The online versions of this task have re-implemented the rating scale, but kept these conditions.

Yes-Yes and No-No are “confirm” conditions, whereas Yes-No and No-Yes are “disconfirm” conditions. For example, if a participant responds Yes to image 1 and No to image 2, they initially thought the picture looked like the word listed, but changed their mind after being presented with further evidence (a more complete picture).

Two images were created for each condition for each of the 360 images, leading to 2880 images. The most compelling lures were selected first to create the yes-no condition, and the remaining conditions were determined by selecting the strongest conditions via consensus of the research team. The following two pages show example images for each of the four conditions with the image “iron”. Note the differences in the word being rated for each condition.

Stimulus Bank

The stimulus bank contains 352 images, each with partial images for all of the 4 conditions.

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- Show the bank of all stimulus (=all the pictures=dataset).
    - 1372 img1, 1372 img2, 352 img3
    - https://docs.google.com/spreadsheets/d/1KVnUQnehD1wUX794E5SAZWqm5VcVn4DQbOwaSvaY_Pg/edit?usp=sharing

- Explain how did we choose them
- Which/How many trials have we extracted from this stimulus bank for the pre/post? Why did we choose these? How did we randomize them?
    - 8 practices pre-post version

- 40 trials for pre-post version
  - PRE

img1	img2	img3
CORN	CORN	CORN
PILLOW	PILLOW	CANOE
FISHBOWL	FISHBOWL	FISHBOWL
COFFEE	COFFEE	SCISSORS
CHRISTMAS TREE	CHRISTMAS TREE	DRESS
KEY	KEY	KEY
BREAKFAST	BREAKFAST	RING
FOOTBALL	FOOTBALL	FOOTBALL
CROWN	CROWN	CROWN
PACKAGE	PACKAGE	WASHING MACHINE
TENT	TENT	TENT
GOLF COURSE	GOLF COURSE	SAILBOAT
BACKPACK	BACKPACK	BACKPACK
CAKE	CAKE	CAKE
SCORPION	SCORPION	MONKEY
SUNFLOWER	SUNFLOWER	SUNFLOWER
NOSE	NOSE	GARBAGE CAN
UMBRELLA	UMBRELLA	BAT
CHESTNUT	CHESTNUT	SNAKE
FIREPLACE	FIREPLACE	FIREPLACE
LADYBUG	LADYBUG	LADYBUG
CLOUD	CLOUD	ACORN
BOOK	BOOK	BOOK
SQUIRREL	SQUIRREL	BEEHIVE
HOUSE	HOUSE	CAROUSEL
MILK	MILK	ANGEL
CARROT	CARROT	CARROT
GRASSHOPPER	GRASSHOPPER	GATE
AIRPLANE	AIRPLANE	AIRPLANE

POND	POND	SWING SET
INK BOTTLE	INK BOTTLE	TELEPHONE
ANCHOR	ANCHOR	ANCHOR
ROCKET	ROCKET	ROCKET
JACKET	JACKET	IRON
STRAWBERRY	STRAWBERRY	STRAWBERRY
WINDMILL	WINDMILL	WINDMILL
MOUSE	MOUSE	MOUSE
NEEDLE	NEEDLE	TURKEY
CACTUS	CACTUS	CACTUS
PUDDING	PUDDING	PALM TREE

- What are their categories (e.g., YY, YN, NY, NN)?
    - PRE:
        - Practice: 2 NN, 2 NY, YN, 2 YY
        - Trials: 10 NN, 10 NY, 10 YN, 10 YY
- How can the stimulus bank be used to change the trials of the task (auto/manually)?
    - Can't be done automatically yet

Data outputs

- What variables did we extract & analyze for this experiment? How did we score them (specify each variable of the macros)
    - Logfiles
        - Subject
            - Participant ID
        - Language
            - French or English
        - Session
            - Session number
        - Date
            - Date of the experiment: YYYY-MM-DD
        - Condition
        - Condition_type
        - Rating_img1
            - Participant rating on image 1
        - Rating_img2
            - Participant rating on image 2
        - Rt_img1

            - Number of seconds between appearance of image 1 and participant's rating on img 1
        - Rt_img2
            - Number of seconds between appearance of image 2 and participant's rating on img 2
    - Computed scores
        - Response_condition
            - If rating_img1<0 && rating_img1<=rating_img2
              Then “NN"
            - Else if rating_img1<0 && rating_img1<rating_img2
              Then “NY"
            - Else if rating_img1>0 && rating_img1>rating_img2
              Then “YN”
            - Else if rating_img1>0 && rating_img1<=rating_img2
              Then “YY”
        - Match
            - If response_condition == condition
              Then TRUE
              Else FALSE
        - Degree_change
        - Acc_confirm
        - Acc_disconfirm
        - Total_acc
        - Ratingchg_correctC
        - Ratingchg_correctD
        - Ratingchg_incorrectC
        - Ratingchg_incorrectD
        - Total_ratingchg
        - Rt_correctC
        - Rt_correctD
        - Rt_incorrectC
        - Rt_incorrectD
        - Total_rt

Demo

- Link to the demo of the task

References

Lavigne, K. M., Metzak, P. D., & Woodward, T. S. (2015). Functional brain networks underlying detection and integration of disconfirmatory evidence. NeuroImage, 112, 138-151. doi:10.1016/j.neuroimage.2015.02.043

Lavigne, K. M., Menon, M., & Woodward, T. S. (2020a). Functional Brain Networks Underlying Evidence Integration and Delusions in Schizophrenia. Schizophr Bull, 46(1), 175-183. doi:10.1093/schbul/sbz032

Lavigne, K. M., Menon, M., Moritz, S., & Woodward, T. S. (2020b). Functional brain networks underlying evidence integration and delusional ideation. Schizophr Res, 216, 302-309. doi:10.1016/j.schres.2019.11.038