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**Title: Cue-approach training** can be extended to faces and fractals and is linked to memory

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**Deliberate exertion of effortful self-control often fails when trying to make life style changes, highlighting the importance of targeting automatic processes for behavioral change. We present novel results of the cue-approach task showing that it can be used to change preferences towards a wide range of stimuli such as faces and fractals.**

**Two independent cue-approach experiments were conducted: 28** participants (16 females, ages 18-32, mean 24.8 ± 3.8) completed the task with face stimuli, and another **24** participants (14 females, ages 18-27, mean 23.2 ± 2.1) completed the task with fractal stimuli.

Since we could not perform the regular Auction to obtain WTP for faces and fractals, we developed a novel binary ranking tool that allowed us to obtain an individual measure of ranking for the items. We split the items based on the rankings and defined half of the items as higher valued (HV) and the other items as lower valued (LV).

The cue-approach task has been shown to reliably change preferences of both face and fractal stimuli. Images of 60 faces or fractals were presented on the screen for 1 sec. Participants were instructed to press a button as fast as they could only when they heard a tone. Out of the 60 items 20 or 24 (10 or 12 HV and 10 or 12 LV) were consistently associated with the tone in the face and the fractal task, respectively. The items were presented 12 times each during training. In the probe phase, participants were presented with pairs of items from the same value category (128 choices per type) that had similar rankings, but only one of the items in each pair was associated with the signal in the training phase (e.g. GoHV vs. NoGoHV). Participants were asked to choose one item per trial based on their preferences. To measure the success of training we compared the ratio of choices of the Go vs. NoGo items (within HV or LV pairs).

In order to keep compatibility with previously collected data, in the results analysis we referred only to the top and bottom 14 stimuli as HV and LV items.

We found that faces associated with the go-signal during training were chosen significantly more during probe: for HV items 58% of trials p=0.003; LV items in 58% of trials, p=0.03.

We found that fractals associated with the go-signal during training were chosen significantly more during probe: for HV items 64% of trials p=0.002; LV items in 61% of trials, p=0.03.

We tested the memory for the items and how memory was linked to change in preference.

We found in the fractals task that memory for Go-pairing was positively correlated with proportions of Go items selected (r=0.57, p=0.004 for HV and r=0.6, p=0.002 for LV items). This finding was not noted in the faces task.

Thus, we show that **cue-approach training can influences choices for items which do not have a previous strong preference and experience such as faces and fractals. In these samples it seems that memory mediated the effect for the fractals but not for the faces. The ability to change preference towards faces suggest a novel therapeutic (Attentional Bias Modification, ABM) approach for depression to enhance liking of happy faces. The fractals result suggest that every item can be trained and changed and thus this is a more generalized mechanism.**

**The known neural mechanism of face processing will allow us to track the underlying neural mechanisms of the preference change in the task.**