KPU Registry ID Number: 1019 Date submitted: 21st December 2015

Study Registration For the KPU Study Registry

The registration information for the study is given below. Each section can be expanded as needed.

1. The title or name of the experiment (for listing the experiment in the registry).

Exploring precall using arousing images and utilising a memory practice task on-line.

2. The name, affiliation, and email address for the lead experimenter(s) for the study.

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3. A short description or abstract of the purpose and design of the experiment.

An initial attempt to examine possible precall effects using a modified priming task showed no evidence of precognition when looking at the *response times*, but did find that participants were more *accurate* to respond to material they would see again in the future (Vernon, 2015). This may indicate that a memory task relying primarily on accuracy of performance, such as a memory recall task, could be a more sensitive measure of precognition. Whilst previous attempts at this have produced mixed results (see, Galak et al., 2012; Ritchie et al., 2012) it may be possible to bolster potential precall effects by utilising arousing images (see, Maier et al., 2014; Lobach, 2009) within a paradigm that requires participants to remember and recall the stimuli during the post-recall practice phases to help facilitate possible precall effects. Finally, by running the study on-line it will be possible to eliminate any potential influence the experimenter could have over participants taking part.

Hence, the aim of this study will be to use an on-line paradigm to present a selection of arousing images that participants then have to recall. Following the recall phase they will then be presented with a random sub-set of images to view and recall four times.

The research question is simply: 'will post-recall practice lead to greater recall of those items compared to items not practiced'.

Materials

The experiment will utilise Qualtrics software and a standard keyboard for entering responses. A revised paranormal belief scale (Tobacyk, 2004) will be used to assess participants' belief in anomalous events, particularly precognition. The stimuli consist of two lists each containing 14 arousing images from the International Affective Picture Systems (IAPS) database (Lang, Bradley & Cuthbert, 2005). One list contains positively arousing images and the other negatively arousing images. The two lists have been matched for mean arousal level (Positive: 5.90; Negative: 5.77; t(26)0.548, p=0.589) but differ significantly in terms of valence (Positive: 7.19; Negative: 3.44; t(26)16.36, p=0.001). These 2 lists have been further divided to produce 8 sub-lists each containing 14 images (7 positive and 7 negative) with each sub-list matched for mean valence and arousal levels.

Design

The experiment will consist of four phases. First there is an *information capture phase* then an *exposure phase* followed by a *recall phase* and then the *recall practice phase.* In the information capture phase participants will provide demographic information and complete a paranormal belief scale. During the exposure phase they will be presented with all 28 arousing images. Following this they will complete a surprise recall task. Once the recall task has been completed participants will then be randomly presented with one of the 8 sub-lists (containing 7 positive and 7 negative images) which will be matched for valence and arousal levels with the images not repeated. Participants will be exposed to this sub-list four times and each time have an opportunity to recall the 14 images. The non-repeated images will represent a baseline against which recall performance of the repeated images in the *previous* task will be compared.

4. A statement or list of the specific hypothesis or hypotheses being tested, and whether each hypothesis is confirmatory or exploratory. (confirm/explore guidance)

Confirmatory: H_A = there will be a difference in the level of recall accuracy of the images that are repeated *after* the main recall task compared to those that are not repeated.

5. The planned number of participants and the number of trials per participant.

The aim will be to recruit an opportunity sample of 90 participants who complete all aspects of the on-line study.

With each participant completing 28 trials in the main recall task (14 of which will represent the 'to be repeated' items and 14 of which represent the 'control items'). Participants will then

complete a further 14 trials in the post-recall practice phase and this will be repeated 4 times (total of 56 trials).

6. A statement that the registration is submitted prior to testing the first participant, or indicating the number of participants tested when the registration (or revision to the registration) was submitted.

This study has yet to be started.

The following additional information is needed for studies that include confirmatory analyses:

7. Specification of all analysis decisions that could affect the confirmatory results, including: the specific statistical test for each confirmatory hypothesis, whether the test is one-sided or two-sided, the criterion for acceptable evidence, any transformations or adjustments to the data, any criteria for excluding or deleting data, and any corrections for multiple analyses. Checklists and examples for registering classical analyses, permutation and bootstrap analyses, Bayesian analyses, and classification analyses are provided in the statistics registration document. (This information can be included in section 4 above for simple experiments.)

Level of accuracy, which will be counted as the number of images correctly recalled out of 28, will be examined using a repeated measures t test with 2 conditions: repeated images vs. non-repeated images.

Alongside the accurate recall of the images participants may incorrectly spell the name of the image seen or only partially enter the name due to time restrictions. The following procedure will be maintained in each case respectively:

All incorrectly spelled items will be viewed by two external judges, blind to the aims of the study, to ascertain whether they sufficiently identify the appropriate image.

It is also possible, though unlikely given the explicit timed countdown on screen, that a participant may be part-way through entering the name of an image when the software automatically moves on to the next stage thereby cutting off the input part way through.

In any such instance the partial input will be assessed by two external judges, blind to the aims of the study, to ascertain whether they sufficiently identify the appropriate image. A key criterion here will be that there is more than a 50% level of mapping between the letters and placements of the partially typed input and the name of the image.

Only data from participants who complete all four of the post recall practice phases will be included in the main analysis. Data from those who drop out part way through will be clearly summarized to address the possibility of a bias recall responses.

The statistics test will be 2-tailed to allow for the possibility that post-recall repetition of the images *could* impair recall performance (see, Ritchie et al., 2012) and utilise a p value of 0.05, including 95% confidence intervals and Cohen's effect sizes.

8. The power analysis or other justification for the number of participants and trials.

Bem (2011) reported on two precall tasks (Experiments 8 and 9) which produced a combined average effect size of $d = 0.305$. Adopting the standard alpha criterion of 0.05 (two-tailed), coupled with a test that has the statistical power of 0.8, the required sample size can be calculated using Howell's (1996) sample calculation of:

$$N = \left[\frac{\delta}{d}\right]^2$$

where power of 0.8 as a function of significance at 0.05 (two-tailed) translates into a δ score of 2.80 (Appendix Power Tables from Howell, 1996). Hence, $N = (2.80/0.305)^2$ gives: 9.18^2 which equals 84. Thus, to ensure sufficient statistical power and also avoid the possible criticism of optional stopping the aim will be to recruit an opportunity sample of 90 participants to complete all aspects of the study.

9. The methods for randomization in the experiment.

Once participants access the initial welcome screen the Qualtrics software will pseudo-randomly allocate them to one of the four pathways, using an inbuilt Mersenne Twister pseudorandom number generator (PRNG), with the proviso that the PRNG evenly select the four pathways.

10. A detailed description of the experimental procedure.

The study begins by initially presenting an information page on screen informing the participant they are about to take part in a study that tests for extra sensory perception (ESP). Once informed consent is obtained participants progress to the information capture page and enter demographic information and complete the revised paranormal belief scale (Tobacyk, 2004). Following this the computer will present all 28 arousing images in a random sequence. Each trial begins with a fixation cross presented centre screen for 500ms followed by an image appearing on screen for 3000ms. Once all images have been shown participants will complete a surprise recall test where they will be asked to recall all the images they can in any order by typing in the name of the image using the keyboard. After they have completed the recall phase the computer will then show them a random selection of 14 images (7 positive and 7 negative) one at a time as before. After this participants will be asked to recall the 14 images just seen by typing in their names using the keyboard. The same 14 images will then be shown again followed by another recall test and this will be repeated a total of 4 times. Once the post-recall practice phase has been completed a 'check' screen will ask them if at any time during the study they shifted screens to check emails, looked away from their PC, wrote down the words etc. to help their recall. Finally, participants will be shown an information/debrief screen containing contact details of the Principal Investigator (PI) should they wish to obtain more information.