## Study Registration For the KPU Study Registry
### https://koestlerunit.wordpress.com/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).**

Testing precall using emotive images and participants with high levels of belief in psi.

**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 *response times*, but did find that participants were more *accurate* to respond to material they would see again in the future (Vernon, 2015). A follow-up study attempted to extend this by incorporating emotive images and a recall task that focused only on accuracy (Vernon, in prep). However, this study found no evidence of precall. Nevertheless, it was noted that the lack of a precall effect could have been influenced by the failure to include a relaxation induction, that the images were insufficiently arousing (see, Maier et al., 2014), and that the participants completing the task may have been overly sceptical with regards to their belief in psi. Hence, the current study aims to address these points by running a precall study that incorporates a relaxation induction, utilises images that are more arousing and recruit participants with a higher level of belief in psi phenomena. Once again, the current study will utilise an on-line method of delivery to reduce any possible bias and the research question is: 'will post-recall practice lead to greater recall of arousing images compared to those not practiced'.

*Materials*

The experiment will utilise Qualtrics software and a standard keyboard for entering responses. A diffuse star field image will be used along with a 3-minute clip of new-age type music called 'Stargazing' to create the relaxation induction. The stimuli will consist of two main lists each containing 10 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. Whilst the images have been matched for mean arousal level (Positive: 6.53; Negative: 6.23; t(18)1.51, p=0.149) but differ significantly in terms of valence (Positive: 7.36; Negative: 2.32; t(18)29.27, p=0.001). Importantly, the positive images used in this study are significantly *more* arousing than those used in the previous study (Current Positive: 6.53; Previous Positive: 5.86; t(22)2.65, p=0.05). Furthermore, the negative images used in this study are both significantly more negative than those in the previous study (Current Negative: 2.31; Previous Negative: 3.52; t(22)4.75, p=0.001), and significantly more arousing(Current Negative: 6.23; Previous Negative: 5.78; t(22)2.23, p=0.05). The 2 main lists have been further divided to produce 8 sub-lists each containing 10 images (5 positive and 5 negative) with each sub-list matched for mean valence and arousal levels.

A revised paranormal belief scale (Tobacyk, 2004) will be used to assess participants' belief in anomalous events and classify them as *high-believers* or *low-believers*. This classification will be based on the mean scores reported by Tobacyk (2004), see Table 1 below.

**Table 1**. Showing mean and SD of the population sample (based on N of 217 students from the southern USA) reported by Tobacyk (2004).

|  | Traditional religious belief | Psi | Witchcraft | Superstition | Spiritualism | Extra life form | Precognition | Full Scale |
|---|---|---|---|---|---|---|---|---|
| **Mean** | 6.3 | 3.1 | 3.4 | 1.6 | 2.8 | 3.3 | 3.0 | 89.1 |
| **SD** | 1.2 | 1.5 | 1.7 | 1.2 | 1.4 | 1.3 | 1.3 | 21.9 |

Hence, participants with a 'full scale' score of >89.1 will be classified as **high-believers** and those with a 'full scale' score of <89.1 will be classified as **low-believers**.

*Design*

The experiment will consist of the following six phases. First there is an *information capture phase* followed by a *relaxation induction phase* then an *exposure phase* followed by a *recall phase*, a *post-recall practice phase* and finally a *check phase.* In the information capture phase participants will read through an introduction to the study, provide demographic information and complete the paranormal belief scale. In the relaxation induction phase they will be presented with a star field image on screen, cropped to 700px wide and 525px high, along with a 3-minute clip of new-age type music. This will be followed by the exposure phase during which they will be presented with all 20 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 5 positive and 5 negative images) which will be matched for valence and arousal levels with the images not repeated. Participants will be exposed to this sub-list two times and each time have an opportunity to recall the 10 images. The non-repeated images will represent a baseline against which recall performance of the repeated images in the *previous* task will be compared. Finally, they will complete the check phase which asks them whether they left their pc and/or switched applications at all during the study.

**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: $H_A$ = level of recall accuracy for the images that are repeated *after* the main recall task will be significantly higher 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 classified as *high-believers* to complete all aspects of the on-line study.

Each participant will complete a total of 40 trials. This is made up of the 20 trials in the main recall task (10 of which will represent the 'to be repeated' items and 10 of which represent the 'control items') and a further 10 trials in the post-recall practice phase which is repeated twice (total of 20 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 20, 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 are classified as *high-believers* and complete both of the post recall practice phases will be included in the main analysis. However, data from those who drop out part way through will be clearly summarized to address the possibility of a bias in 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 $\delta$ 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 classified as *high-believers* 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. The PRNG uses the Unix timestamp, counted in milliseconds, as the seed for the random number generator.

## 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 participants will be shown an image of a starfield along with some relaxing new-age type music for 3 minutes with a verbal prompt to encourage them to relax. This will be followed by a relaxation manipulation check which asks participants to rate on a scale from 1 (completely tense) to 10 (completely relaxed) how they feel at that moment in time. Once completed the

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computer will then present all 20 arousing images in a random sequence. Each trial image is shown on screen for 3000ms along with its identifying label in font Ariel size 36pt. 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 10 images (5 positive and 5 negative) one at a time as before. After this participants will be asked to recall the 10 images just seen by typing in their names using the keyboard. The same 10 images will then be shown again followed by another recall test. 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.