KPU Registry ID Number: 1037 **Date submitted: 18th Sept 2017**

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).

Precognitive priming of compound remote associates: Using an implicit creative insight task to elicit precognition.

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

Dr David Vernon

School of Psychology, Politics & Sociology

Canterbury Christ Church University

Canterbury, Kent.

CT1 1QU.

Email: david.vernon@canterbury.ac.uk

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

Precognitive priming refers to the idea that current performance on a task may be facilitated, or primed, by repetitive exposure to the target at a future date (see, Vernon, 2015). Vernon (2015) utilised a modified repetition priming paradigm, with repeated exposure to the target occurring *after* the test rather than prior to it, showing that participants were more accurate to respond to material they were primed with in the future. However, follow up studies attempting to extend this research by focusing on the recall of emotive images failed to elicit any effect (Vernon, 2017), even when using participants with high levels of belief in psi (Vernon, in press). One possibility for the pattern of inconsistent findings may be due to the extent to which completion of the task was reliant upon explicit controlled processes as opposed to implicit automatic processes. For instance, the initial precognitive priming study, which elicited an effect, was reliant more on automatic implicit processes. Whereas the follow up studies utilising the recall of arousing images

were more reliant on conscious explicit processes. Such a possibility would be consistent with the suggestion of others who have argued that psi based effects may be more reliant upon, and more easily elicited by, implicit based tasks compared to explicit tasks (Bargh & Ferguson, 2000; Maier et al., 2014). To some extent this idea is also supported by the recent meta-analysis from Bem, Tressoldi, Rabeyron, and Duggan (2015) which showed more robust precognitive effects for the fast-thinking type tasks, with no clear evidence of precognition when the slower thinking protocols were used. Furthermore, Roe, Anowarun, and McKenzie (2001) have suggested that there may be a direct link between an individual's creativity and psi type behaviours (see also, Cardeña, Iribas, & Reijman, 2012). However, not all have found clear links (e.g., Schlitz & Honorton, 1992), although this may be due to the multi-faceted and heterogeneous nature of creativity (see Holt, Delanoy, & Roe, 2004). Nevertheless, utilising a task that is more reliant on implicit compared to explicit processes, taps into the individual's level of creative insight, and allows for the possibility of priming the target answer (of which there should be only one) may well provide a more consistent mechanism for assessing such precognitive priming. A good candidate task that meets these criteria is the compound remote associates task (Bowden & Jung-Beeman, 2003b).

The compound remote associates task is a standard implicit task for measuring insight and creativity. It involves presenting the participant with three words, e.g., *cake/swiss/cottage* and asking them to come up with a fourth word that is associated with all three, in this instance the answer would be *cheese* (Bowden & Jung-Beeman, 2003b). The new word can pair either before (e.g. cheesecake) or after (e.g. cottage cheese) the three words. Furthermore, to directly assess the level of insight involved in reaching the solution participants can be asked to rate on a Likert type scale the degree to which they felt a solution was based on either effortful thinking or insight (see, Bowden & Jung-Beeman, 2003a).

Hence, the aim of this study is to test whether priming the participants with the answer to a compound remote associate (e.g., cheese) *after* they have completed the task helps them solve the task more accurately compared to when the answers are not primed.

Materials

The experiment will utilise Qualtrics software and a standard keyboard for entering responses. The stimuli will consist of 2 example compound remote associates and two main lists each containing 10 compound remote associates from the normative database produced by Bowden and Jung-Beeman (2003b). Each of the two main lists are matched for the % of participants able to solve them in 15 seconds and the mean solution time (see Table 1). Independent samples t tests comparing the two lists shows no difference in the percentage of participants able to solve the items ($t(18)0.372, p=0.714$) or mean solution time ($t(18)=0.227, p=0.823$).

Table 1 Showing mean (and SD) % of participants solving the items and solution times for each list.

	% of P's solving item in 15sec		Mean solution time	
	Mean	**SD**	**Mean**	**SD**
List 1	47.2	8.24	6.90	0.95
List 2	46.0	6.02	6.99	0.85

A Likert type effort/insight scale, scored 1 to 5, will be used to identify the level of 'insight' the participant used to solve the compound remote associate based on the suggested ratings provided by Bowden and Jung-Beeman (2003a).

1	**2**	**3**	**4**	**5**
Strategic, effortful thinking allowed you to figure out the answer	Somewhere between 1 and 3	Didn't immediately know the answer, but you didn't have to think about it much either	Somewhere between 3 and 5	You just 'knew' the answer; it 'popped' into your head.

A revised paranormal belief scale (Tobacyk, 2004) will also be used to assess participants' belief in anomalous events.

Design

The experiment will consist of the following six phases. First there is an *information phase* followed by *demographic* and *belief capture phases* then an *exposure phase* followed by a *cue priming phase* and finally a *check and debrief phase.* In the information phase participants will read through an information outline of the study explaining the task and providing an example compound remote associate and clearly explaining the different appropriate ratings (from 1 to 5) to indicate the level of effort/insight used. It will also highlight the essential criterion of being a native English speaker to take part. The demographic and belief capture phases will require participants to provide demographic information, confirm that they are a native English speaker and complete the paranormal belief scale. In the exposure phase participants will initially be presented with one more example compound remote associate, to ensure that they know what is

required. Then, each participant will be randomly presented with all 20 of the compound remote associates from the 2 main lists, one at a time, and required to complete each item within 15 seconds. Following the completion of each item participants will be presented with a Likert type scale (from 1 to 5) and asked to rate whether the solution was arrived at more by effort or insight. Or whether they failed to answer the question in time. Once this phase has been completed participants will then be randomly presented with the answers from one of the two lists and required to type the answer into a text box whilst thinking about the meaning of the word. This cue priming phase will then be repeated. The non-primed cues will present a baseline against which performance on the compound remote associates task for those items that are *later* primed will be compared. Finally, participants will complete an attention check phase asking them whether they left their PC and/or switched applications during the study, how motivated they were to complete the task (on a scale from 1=unmotivated to 5=very motivated), how pleasant they found the task (on a scale from 1=unpleasant to 5=very pleasant) and also be given debrief information relating to the aim of the study along with additional contact information.

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 accuracy for completing the compound remote associates that are primed *after* the main task will be significantly higher compared to those that are not primed.

Exploratory:

Correlation between precognitive priming score and level of insight/effort will be examined using the effort/insight scale adapted from Bowden and Jung-Beeman (2003a).

Correlations between precognitive priming score and paranormal belief will be examined using the Revised Paranormal Belief Scale (Tobacyk, 2004) to see if there is any relationship evident.

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

The aim will be to recruit an opportunity sample of 161 participants from advertised web-links who meet the criterion (i.e., native English speaker) and complete all aspects of the study.

Each participant will complete a total of 40 trials. This is made up of the 20 trials in the main compound remote associates task (10 of which will be primed and 10 unprimed) followed by the 10 priming trials which are repeated (i.e., a 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.)**

Only data from participants who meet the criterion of being a native English speaker and complete the compound remote associates task, both of the post recall priming phases and the attention manipulation check will be included in the main analysis.

The main dependent measure is 'level of accuracy', which will be counted as the number of items from the compound remote associate task (CRAT) correctly answered within 15 seconds. The correct answer will be taken as the 'solution' provided by Bowden and Jung-Beeman (2003b). The level of accuracy for correctly completed compound remote associates that are primed will be compared to the level of accuracy for those that are not primed using a repeated measures t test with 2 conditions: primed CRAT vs. unprimed CRAT.

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

Given the emphasis on a timed response and the requirement for participants to type in their answer to each CRAT they may incorrectly spell the solution and/or only partially enter a solution or enter an incorrect solution.

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 solution.

Any partial input will also be assessed by two external judges, blind to the aims of the study, to ascertain whether they sufficiently identify the appropriate solution.

In both of the above cases the criterion for judging whether a solution is correct is that there is a 50% or more level of mapping between the letters and placements of the incorrectly spelled/partially typed input and the given solution of the CRAT by Bowden and Jung-Beeman (2003b). Hence, if the level of mapping is below 50% the response will be classified as incorrect.

If, in either of the above cases, the two external judges cannot agree on a classification of correct/incorrect then a third independent judge will act as arbiter and classification will be based on the majority view (i.e., 2 out of 3).

Incorrect solutions will not be included in the analysis.

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

The precognitive priming accuracy score reported by Vernon (2015) produced an effect size of $d = 0.26$. Adopting an alpha criterion of 0.05 (two-tailed), coupled with a test that has the statistical power of 0.9, the required sample size can be calculated using Howell's (1996) sample calculation of:

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

where power of 0.9 as a function of significance at 0.05 (two-tailed) translates into a δ score of 3.30 (Appendix Power Tables from Howell, 1996). Hence, $N = (3.3/0.26)^2$ gives: 12.69^2 which equals 161. 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 161 participants.

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 two pathways, using an inbuilt Mersenne Twister pseudorandom number generator (PRNG), with the proviso that the PRNG evenly select the two 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) using a compound remote associates task. It will stress that in order to take part in the study they need to be a native English speaker. It will then explain that each compound-remote-associates problem consists of three words (e.g., cottage, swiss, cake) and that their task is to come up with a fourth word that can form a compound or is semantically related with each of the three problem words (e.g., cheese can join with cottage, swiss and cake to form cottage cheese, swiss cheese and cheesecake). They will also be informed that for each solution they will need to identify, using a 5-point Likert type scale, whether the solution was achieved by strategic effortful thinking or more by insight. Once participants have read through the information page, confirmed that they are a native English speaker and provided informed consent they will 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 all 20 of the compound remote associates in a random sequence. Each CRAT trial will be presented for 15 seconds, during which participants will be required to enter the 'solution' to the item by typing the answer into a text box using the keyboard. Once they have typed in their solution a 5-point Likert scale will be shown asking them to rate whether the solution was arrived at by effortful thinking or insight. Or whether they failed to answer the question in time. After they have completed all 20 trials the computer will then show them a selection of 10 answers (either from List 1 or 2) randomly presented one at a time and require them to type each answer into a text box whilst thinking about the meaning of the word. This priming phase will then be repeated. After the second priming phase has been completed two Likert type questions relating to motivation and pleasantness will be presented. Participants will also complete an 'attention check' screen which will ask them if at any time during the study they shifted screens to check emails, looked away from their PC, or were distracted by something else going on around them. Finally, participants will be shown an information/debrief screen containing contact details of the Principal Investigator (PI) should they wish to obtain more information.

References

Bargh, J. A., & Ferguson, M. J. (2000). Beyond behaviourism: on the autmaticity of higher mental processes. *Psychological Bulletin, 126*, 925-945.

Bem, D. J., Tressoldi, P., Rabeyron, T., & Duggan, M. (2015). Feeling the future: A meta-analysis of 90 experiments on the anomalous anticipation of random future events. *F1000 Research, 4*, 1-33. doi: 10.12688/f1000research.7177.2

Bowden, E. M., & Jung-Beeman, M. (2003a). Aha! Insight experience correlates with solution activation in the right hemisphere. *Psychonomic Bulletin & Review., 10*, 730-737. doi: 10.3758/BF03196539

Bowden, E. M., & Jung-Beeman, M. (2003b). Normative data for 144 compound remote associate problems. *Behavior Research Methods, Instruments & Computers., 35*(4), 634-639.

Cardeña, E., Iribas, A. E., & Reijman, S. (2012). Art and psi. *The Journal of Parapsychology, 76*(1), 3-25.

Holt, N. J., Delanoy, D., & Roe, C. A. (2004). *Creativity, subjective paranormal experiences and altered states of consciousness.* Paper presented at the Parapsychological Association, 47th Annual Convention.

Maier, M. A., Buchner, V. L., Kuhbandner, C., Pflitsch, M., Fernandez-Capo, M., & Gamiz-Sanfeliu, M. (2014). Feeling the future again: Retroactive avoidance of negative stimuli. *Journal of Consciousness Studies., 21*(9-10), 121-152.

Roe, C. A., Anowarun, A., & McKenzie, E. (2001). Sender and receiver creativity scores as predictors of performance at a ganzfeld ESP task. *Journal of the Society for Psychical Research., 65*, 107-121.

Schlitz, M., & Honorton, C. (1992). Ganzfeld psi performance within an artically gifted population. *Journal of the American Society for Psychical Research., 86*, 83-98.

Vernon, D. (2015). Exploring precognition using a repetition priming paradigm. *Journal of the Society for Psychical Research., 79*(919), 65-79.

Vernon, D. (2017). Exploring precall using arousing images and utilising a memory recall practise task on-line. *Journal of the Society for Psychical Research., 81*(2), 65-79.

Vernon, D. (in press). Attempting to elicit a precall effect using emotive images and participants with high levels of belief in psi. *Journal of Consciousness Studies.*