

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).

A test of reward contingent precall.

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.

Precall represents the supposed positive effect on memory recall that would occur for items that are practised *after* the recall test. Though such an idea is both provocative and controversial (see, Cardena, 2015) there is some evidence to support this, though it is ambiguous. For instance, Bem (2011) showed (Experiment 8 and 9) that practise on a sub-set of items produced a positive effect on recall performance for those items in a *preceding* memory task. However, attempts by others to produce similar effects have met with no success (see e.g., Galak, LeBouf, Nelson, & Simmons, 2012; Ritchie, Wiseman, & French, 2012).

Based on an early model put forward by Stanford (1974) it has been suggested that psi as a process may work at an unconscious level to serve the needs or motives of the individual in an adaptive manner. More specifically he suggests that the strength of a psi based effect would be 'directly and positively related to the importance' (p. 45) of any such motivational object or event. This led to the suggestion that providing a contingent reward, which could be seen as serving the needs/motives of the individual in question, would enhance any psi based effects

(see, Luke, Delanoy & Sherwood, 2008). However, despite repeated attempts to examine the impact of a contingent reward on precall type effects no clear evidence has yet emerged (see, Luke, Roe & Davison, 2008; Luke & Morin, 2014; Luke & Zychowicz, 2014). Nevertheless, the lack of a clear contingent reward effect may be because the type of reward offered did not sufficiently serve the needs and/or motives of the individual (see, Bierman & van Ditzhuijzen, 2006). For instance, previous work has offered participants the opportunity to rate erotic images (Luke et al., 2008) or rate the relative humour of cartoons (Luke et al., 2008; Luke & Zychowicz, 2014). The use of erotic images was suggested to appeal to the primal sex instinct and though not made clear it is possible that the use of humorous cartoons could appeal to the mood of the individual. However, it is not clear that such rewards really achieve their desired aims. For example, no assessment was made regarding participant's perceptions of such a rewards. Second, given the wide availability of erotic images, as well as humorous cartoons, and other such stimuli on the internet it is no longer the case that access to such images is either difficult and/or would represent something unusual. Hence, rather than assume that erotic images or viewing a humorous cartoon would represent an underlying need and/or motivational reward a pre-study survey was conducted on-line to specifically ask participants what type of reward would motivate them.

The on-line study was set up and delivered using Qualtrics software and a standard keyboard for entering responses. It involved asking participants to imagine themselves having the opportunity to take part in a lab based psychology experiment that would take approx. 25mins and to rank the reward options available in terms of what would most motivate them (1) to least motivate them (9). The 9 options listed, which were randomly ordered with each presentation, were:

1. Course based credits
2. The opportunity to view some erotic images
3. The opportunity to participate in another task
4. The opportunity to finish the experiment early and leave
5. A reward of £10
6. The knowledge that I've helped with a research project
7. The opportunity to view some humorous material
8. The opportunity to avoid seeing some negative images
9. A sweet reward such as chocolate or cake

A total of 29 participants took part in the on-line survey which consisted of 27 females and 2 males, with a mean age of 21years. The results can be seen below in Table 1.

Interestingly the most popular option was a £10 reward (chosen by 58.6%) followed by the chance to gain course credits (27.5%). Informatively the least popular option was the opportunity

to view erotic images (79.3%), though this may have been influenced by the gender distribution of the sample which though biased in favour of females is highly representative of a psychology undergraduate cohort. Given the findings from this survey it is more likely that an offer of course credits for participating in a study along with a potential contingent reward of £10 could be more of a motivator and serve the needs of the individual than the opportunity to view either erotic images or humorous material.

Table 1. Showing the percentage of people choosing each of the nine options.

Choice	Credits	Erotic images	Another task	Leave early	£10 reward	Helping out	Humorous material	Avoid negative	Chocolate / cake
1st	27.59	0.00	0.00	0.00	58.62	10.34	0.00	0.00	3.45
2nd	44.83	0.00	3.45	0.00	27.59	3.45	0.00	0.00	20.69
3rd	20.69	0.00	3.45	6.90	3.45	37.93	3.45	0.00	24.14
4th	3.45	3.45	20.69	10.34	3.45	20.69	31.03	0.00	6.90
5th	0.00	0.00	31.03	3.45	3.45	17.24	34.48	3.45	6.90
6th	3.45	6.90	3.45	41.38	0.00	6.90	17.24	13.79	6.90
7th	0.00	6.90	27.59	20.69	3.45	0.00	6.90	20.69	13.79
8th	0.00	3.45	3.45	13.79	0.00	3.45	6.90	55.17	13.79
9th	0.00	79.31	6.90	3.45	0.00	0.00	0.00	6.90	3.45

Hence, the aim of the current study is to examine the effect of a contingent reward of £10 on precall performance. The study will examine two hypotheses:

H_{A1} = Post recall practise of images will lead to greater recall of those images compared to those not practised.

H_{A2} = A contingent reward of £10 will lead to greater levels of precall compared to no reward

Materials

The experiment will be conducted in a psychology lab using a Super RiteMaster computer tower installed with Windows 7 enterprise and an Intel(R) Core(TM)2 Duo CPU processor with SuperLab 5.0 (Cedrus Corporation) presentation software. A diffuse star field image will be used along with a 1-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; $t(18)1.51$, $p=0.149$) they differ significantly in terms of valence (Positive: 7.36; Negative: 2.32; $t(18)29.27$, $p=0.001$). 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 (see Appendix A). To record and assess participants' belief in the paranormal/ESP two scales will be administered. The first is the revised paranormal belief scale (Tobacyk, 2004) and the second is the Survey of Scientifically Unaccepted Beliefs (Irwin & Marks, 2013).

Design

Participants will be randomly allocated to one of the two conditions in the study (*Contingent reward vs. No reward*). Each of these conditions consists of the following seven phases. First there is an *information and consent phase*, then *belief phase* followed by a *relaxation induction phase* then an *exposure phase* followed by a *recall phase*, a *post-recall practise phase* and finally a *question phase*. In the information and consent phase participants will read through an information sheet providing a broad outline of the study (however no specific details will be given) and provide informed consent to take part. This will be followed by participants completing the two paranormal belief scales and also providing demographic information on age and gender. In the relaxation induction phase they will be presented with a star field image fit to full screen, along with a 1-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 (see Appendix B). 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 two 5-point Likert type questions asking how motivated they were to complete the task and how enjoyable the task was.

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_{A1} = Precall effect: Post recall practise of images will lead to greater recall of those images compared to those not practised.

H_{A2} = Contingent reward: Those offered a contingent reward of £10 will exhibit greater levels of precall (precall score – baseline score) compared to those not offered a reward

Exploratory:

Correlations between precall scores and paranormal belief will be examined using the two scales 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 88 participants to 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 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 practise 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 will be counted as the number of images correctly recalled out of 20. The *precall* score will represent the number of correctly recalled images that are subsequently

repeated. The *baseline* score will represent the number of correctly recalled images that are not repeated.

Analysis to confirm H_{A1} will be conducted using a repeated measures t test with 2 conditions: precall score vs baseline score.

Analysis to confirm H_{A2} will be conducted using a between measures t test with 2 conditions: contingent reward vs no reward.

Alongside the accurate recall of the images participants may incorrectly spell the name of the image seen. 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.

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. However, as there are 2 conditions (contingent reward vs no reward) and 4 sequences of image rotations (see Appendix A) to ensure an even distribution across these permutations an opportunity sample 88 participants will be recruited and tested.

9. The methods for randomization in the experiment.

The 20 images viewed by each participant will be randomly presented using the inbuilt randomisation procedure of the SuperLab 5.0 software so that each participant views the images in a distinct order. The SuperLab randomisation algorithm is based on a time seed referring to the number of microseconds elapsed since the computer was started up.

To reduce the opportunity of possible bias in allocating participants to a condition an experimental management system (Sona Systems see: <https://canterburyccu.sona-systems.com/Default.aspx?ReturnUrl=%2f>) will be used so that participants sign themselves up for the study and pick a timeslot that suits them. Hence, neither the Research Assistant (RA) nor the Primary Investigator (PI) are involved in enrolling participants.

The PI will also create a list of participants to ensure an even distribution across the two conditions (contingent reward vs no reward) and four stimulus rotations, with equal numbers of participants viewing each type of stimulus rotation (see Appendix B) from 1 to 88. The PI will randomly allocate participants to this list in blocks of 16 using a random number generator (see, <https://www.random.org/>) to identify where in the block the first participant should be placed. For example, in the first block participant 1 will be placed in position 13 which refers to the 3rd practise list (Study 4_Expt_P3). The second participant will then be entered into position 14, which consists of practise list 3 (P3) with a contingent reward (CR). This would continue for all 16 participants until all positions in the first block are filled. This means that on reaching the last position number participant allocation will rotate around the early positions in this block. For example, if participant 4 is entered into position 16 participant 5 will be entered into position 1. For the second block of 16 the random number generator will be again to identify where in the block the first participant (in this instance participant 17) will be entered. This procedure will continue until all 88 positions have been filled. The RA will then run the participants in this sequence as they sign themselves up for the study.

10. A detailed description of the experimental procedure.

Consistent with previous work all participants will be made aware that the experiment tests for ESP, although precisely how it tests for this will not explained until they have completed the experiment. Each participant will be tested individually in a quiet room. They will begin by reading through a general information sheet and completing a consent form. For those allocated to the contingent reward condition the instruction sheet will inform them that if their ESP score is above chance they will immediately win £10 in cash. During the experiment the participants precall score will be calculated by the experimenter as the number of recalled images that are repeated compared to those that are not. When recall of the repeated images is higher than those not repeated the participant will win the reward. If the precall score is either the same as or lower

than the baseline score they will not win a reward. No mention of a cash reward will be made to those in the non-contingent condition.

Following this all participants will complete paper versions of the two paranormal belief scales and provide some information on age and gender. Participants will then turn to face a computer screen with an instruction screen stating: 'When you are ready to begin press any key'. Once they depress any key on the keyboard they will be told that they are about to see an image of stars and hear some music and that the aim of this is to help them relax. Once again, they will press any key to continue on to the image of a starfield along with some relaxing new-age type music which will play for 1 minute. At the end of this another instruction screen will appear with the following message: 'You will now be presented with a selection of both positive and negative images. Each image will remain on screen for 3.5 seconds. Please attend to the images'. For those allocated to the conditional reward condition the instructions will again include information stating that should their ESP score be above chance that they will immediately win a £10 reward. The instructions end by stating that the participant should 'Press any key' to begin. Once a key is depressed the computer will then present all 20 arousing images in a random sequence. Each trial image is shown on screen for 3500ms along with its identifying label in font Ariel size 36pt. Once all images have been shown a surprise recall instruction screen will appear saying 'Your task now is to recall as many of the images you have just seen and write their names down on the sheet provided. You have 3 minutes to do this. You can write them in any order and spelling doesn't matter. Participants will then be given 3 minutes to complete this section of the task. At the end of the 3 minutes the computer will sound a tone and instruct the participant to stop writing and hand their response sheet to the experimenter. Once this is done they press any key to continue and will see another instruction screen telling them that they will now see a subset of images from the list just seen. Again each image will remain on screen for 3.5 seconds and to attend to the images. Participants simply press any key to move through this stage during which a practise list of 10 images (5 positive and 5 negative) will be presented one at a time as before. After this participants will be asked to recall the 10 images just seen by writing down their names on the sheet provided and handing it to the experimenter. They will be given 2 minutes to do this and at the end of this time the computer will sound a prompt and instruct them to stop writing and hand their response sheet to the experimenter. The same 10 images will then be shown again followed by another recall test. Once the post-recall practise phase has been completed all participants will be asked to complete two 5-point Likert scale questions asking them how motivated they were to complete the task (e.g., 1=strongly motivated; 5=strongly unmotivated) and how pleasant they found the task overall (e.g., 1=very pleasant; 5=very unpleasant). Finally, participants will be given a debrief information sheet explaining the aims of the study and providing contact details of the Principal Investigator (PI) should they wish to obtain more information.

It should be noted that all those in the contingent reward condition who win the reward will immediately be given this and sign a receipt.

Appendix A: Showing the 4 practise lists and 4 baseline lists of images with valence and arousal levels.

Practise 1	IAP#	Valence	Arousal	No practise baseline	IAP#	Valence	Arousal
War	2683	2.62	6.21	Skydivers	8185	7.57	7.27
Gun	2811	2.17	6.9	Pilot	8300	7.02	6.14
Grave	3005.1	1.63	6.2	Gymnast	8470	7.74	6.14
Suicide	6570	2.19	6.24	RollerCoaster	8490	7.2	6.68
Solider	9160	2.81	6.04	Money	8501	7.91	6.44
Astronaut	5470	7.35	6.02	Toilet	9301	2.26	5.28
Hiker	5629	7.03	6.55	Police	6834	2.91	6.28
Skier	8030	7.33	7.35	Ship	9600	2.48	6.46
Sailing	8080	7.73	6.65	Accident	9910	2.06	6.2
HangGlider	8161	6.71	6.09	Fire	9921	2.04	6.52
Mean		4.76	6.43	Mean		4.92	6.34

Practise 2	IAP#	Valence	Arousal	No practise baseline	IAP#	Valence	Arousal
Skydivers	8185	7.57	7.27	War	2683	2.62	6.21
Pilot	8300	7.02	6.14	Gun	2811	2.17	6.9
Gymnast	8470	7.74	6.14	Grave	3005.1	1.63	6.2
RollerCoaster	8490	7.2	6.68	Suicide	6570	2.19	6.24
Money	8501	7.91	6.44	Solider	9160	2.81	6.04
Toilet	9301	2.26	5.28	Astronaut	5470	7.35	6.02
Police	6834	2.91	6.28	Hiker	5629	7.03	6.55
Ship	9600	2.48	6.46	Skier	8030	7.33	7.35
Accident	9910	2.06	6.2	Sailing	8080	7.73	6.65
Fire	9921	2.04	6.52	HangGlider	8161	6.71	6.09
Mean		4.92	6.34	Mean		4.76	6.43

Practise 3	IAP#	Valence	Arousal
Sailing	8080	7.73	6.65
HangGlider	8161	6.71	6.09
Skydivers	8185	7.57	7.27
Pilot	8300	7.02	6.14
Gymnast	8470	7.74	6.14
Suicide	6570	2.19	6.24
Solider	9160	2.81	6.04
Toilet	9301	2.26	5.28
Police	6834	2.91	6.28
Ship	9600	2.48	6.46
Mean		4.94	6.26

No practise baseline	IAP#	Valence	Arousal
Hiker	5629	7.03	6.55
Skier	8030	7.33	7.35
Astronaut	5470	7.35	6.02
RollerCoaster	8490	7.2	6.68
Money	8501	7.91	6.44
Gun	2811	2.17	6.9
Grave	3005.1	1.63	6.2
War	2683	2.62	6.21
Accident	9910	2.06	6.2
Fire	9921	2.04	6.52
Mean		4.73	6.51

Practise 4	IAP#	Valence	Arousal
Astronaut	5470	7.35	6.02
Hiker	5629	7.03	6.55
Skier	8030	7.33	7.35
RollerCoaster	8490	7.2	6.68
Money	8501	7.91	6.44
War	2683	2.62	6.21
Gun	2811	2.17	6.9
Grave	3005.1	1.63	6.2
Accident	9910	2.06	6.2
Fire	9921	2.04	6.52
Mean		4.73	6.51

No practise baseline	IAP#	Valence	Arousal
Pilot	8300	7.02	6.14
Gymnast	8470	7.74	6.14
Sailing	8080	7.73	6.65
HangGlider	8161	6.71	6.09
Skydivers	8185	7.57	7.27
Suicide	6570	2.19	6.24
Solider	9160	2.81	6.04
Toilet	9301	2.26	5.28
Police	6834	2.91	6.28
Ship	9600	2.48	6.46
Mean		4.94	6.26

Appendix B: Showing the position of each condition (P1 – P4 refers to the practise lists and CR refers to contingent reward) and the allocation of participants.

Position	Participant	Condition	Position	Participant	Condition
1	5	Study 4_Expt_P1	13	37	Study 4_Expt_P3
2	6	Study 4_Expt_P1_CR	14	38	Study 4_Expt_P3_CR
3	7	Study 4_Expt_P2	15	39	Study 4_Expt_P4
4	8	Study 4_Expt_P2_CR	16	40	Study 4_Expt_P4_CR
5	9	Study 4_Expt_P3	1	61	Study 4_Expt_P1
6	10	Study 4_Expt_P3_CR	2	62	Study 4_Expt_P1_CR
7	11	Study 4_Expt_P4	3	63	Study 4_Expt_P2
8	12	Study 4_Expt_P4_CR	4	64	Study 4_Expt_P2_CR
9	13	Study 4_Expt_P1	5	49	Study 4_Expt_P3
10	14	Study 4_Expt_P1_CR	6	50	Study 4_Expt_P3_CR
11	15	Study 4_Expt_P2	7	51	Study 4_Expt_P4
12	16	Study 4_Expt_P2_CR	8	52	Study 4_Expt_P4_CR
13	1	Study 4_Expt_P3	9	53	Study 4_Expt_P1
14	2	Study 4_Expt_P3_CR	10	54	Study 4_Expt_P1_CR
15	3	Study 4_Expt_P4	11	55	Study 4_Expt_P2
16	4	Study 4_Expt_P4_CR	12	56	Study 4_Expt_P2_CR
1	24	Study 4_Expt_P1	13	57	Study 4_Expt_P3
2	25	Study 4_Expt_P1_CR	14	58	Study 4_Expt_P3_CR
3	26	Study 4_Expt_P2	15	59	Study 4_Expt_P4
4	27	Study 4_Expt_P2_CR	16	60	Study 4_Expt_P4_CR

5	28	Study 4_Expt_P3	1	79	Study 4_Expt_P1
6	29	Study 4_Expt_P3_CR	2	80	Study 4_Expt_P1_CR
7	30	Study 4_Expt_P4	3	65	Study 4_Expt_P2
8	31	Study 4_Expt_P4_CR	4	66	Study 4_Expt_P2_CR
9	32	Study 4_Expt_P1	5	67	Study 4_Expt_P3
10	17	Study 4_Expt_P1_CR	6	68	Study 4_Expt_P3_CR
11	18	Study 4_Expt_P2	7	69	Study 4_Expt_P4
12	19	Study 4_Expt_P2_CR	8	70	Study 4_Expt_P4_CR
13	20	Study 4_Expt_P3	9	71	Study 4_Expt_P1
14	21	Study 4_Expt_P3_CR	10	72	Study 4_Expt_P1_CR
15	22	Study 4_Expt_P4	11	73	Study 4_Expt_P2
16	23	Study 4_Expt_P4_CR	12	74	Study 4_Expt_P2_CR
1	41	Study 4_Expt_P1	13	75	Study 4_Expt_P3
2	42	Study 4_Expt_P1_CR	14	76	Study 4_Expt_P3_CR
3	43	Study 4_Expt_P2	15	77	Study 4_Expt_P4
4	44	Study 4_Expt_P2_CR	16	78	Study 4_Expt_P4_CR
5	45	Study 4_Expt_P3	1	86	Study 4_Expt_P1
6	46	Study 4_Expt_P3_CR	2	87	Study 4_Expt_P1_CR
7	47	Study 4_Expt_P4	3	88	Study 4_Expt_P2
8	48	Study 4_Expt_P4_CR	4	81	Study 4_Expt_P2_CR
9	33	Study 4_Expt_P1	5	82	Study 4_Expt_P3
10	34	Study 4_Expt_P1_CR	6	83	Study 4_Expt_P3_CR
11	35	Study 4_Expt_P2	7	84	Study 4_Expt_P4
12	36	Study 4_Expt_P2_CR	8	85	Study 4_Expt_P4_CR

