Candidate Number

301C8

THE UNIVERSITY OF SUSSEX

MSc Examination January (A1) SAMPLE PAPER

ETHICS, PHILOSOPHY AND METHOD

Sample Paper

DO NOT TURN OVER UNTIL INSTRUCTED TO BY THE CHIEF INVIGILATOR

INSTRUCTIONS

Duration: 1 hour

The answers, one to each question, should be marked on the answer sheet provided (place a cross in the relevant box to indicate your answer: a, b, c or d).

There are 15 questions. All questions are equally weighted.

It is to your advantage to attempt every question and use the time available. Be sure to write your candidate number in the space provided.

INSTRUCTIONS

1. Do not write your name anywhere on the question paper or answer sheet.

2. Do not tear off any part of the answer sheet.

3. At the end of the examination the question paper and/or answer book, used or unused, will be collected from you before you leave the examination room.

301C8 Ethics, Philosophy and Method – Sample Paper

Read this description of a (real) study, on which the questions will be based.

Self-control is often regarded as important for human flourishing. According to Muraven and Baumeister (2000) the capacity to exercise sustained self-control (or "will power") is in some ways akin to the use of a muscle. For one analogy, muscles strengthen in the long term when they are worked hard. Just so, Muraven and Baumeister claimed that will power is capable of being strengthened: Practicing self-control over a period of time, say a month, should lead to stronger will power in general. For example, Galliot et al (2007) found that asking people to use their non-dominant hand over two weeks improved their persistence on an anagram task (though see Miles et al, 2016, for evidence against effects of such self-control training). By analogy with muscles that get temporarily tired if they are worked hard, Baumeister et al. (1998) argued that will power is limited and depletable in the short term. They proposed that engaging in tasks requiring self-control would lead to the depletion of a limited resource (on the analogy, the capacity to contract the will power muscle) and thus reduced performance on subsequent self-control tasks. The temporary state of reduced self-control capacity was termed ego depletion.

The existence of ego depletion has been tested using a sequential-task experimental paradigm, in which participants engage in two consecutive tasks. In the experimental (ego-depletion) group, both tasks require self-control. In the control (no depletion) group, only the second task requires self-control whereas the first task requires very little self-control. Consistent with the predictions of the resource depletion model, many studies have found that participants in the experimental group performed worse on the second task relative to participants in the control group. For example, Sripada, Kessler, and Jonides (2014) used a "letter-e task" for the first task. In this task, words are shown one at a time. In the Depletion (hard) version of the task, participants press a button when a word with the letter e is shown, but they must withhold the response if the e is next to or one extra letter away from another vowel. The Control (easy) version is matched in all respects, except that participants press a button whenever a word with the letter e is shown, regardless of where in the word the e appears (i.e., no suppression of prepotent tendencies is required). Self-control was then tested at Phase 2 with a number interference task. In this task, three single-digit numbers between 0 and 3 are presented horizontally on screen. Two numbers are the same, and one (the target) is unique. Participants have to press one of three response buttons that corresponds to the identity of the target number (rather than to the target's position on screen). On congruent trials, the target number's identity corresponds to its position (e.g., the target number is 3, and it appears in the third position to the far right). During incongruent trials, the target number's identity does not correspond to its position (e.g., the target number is 1, and it appears in the second position). Thus the irrelevant position must be suppressed. The reaction time (RT) on these incongruent trials was taken as one measure of ability to exert self-control. Sripada et al recruited participants from a University of Michigan–sponsored online recruitment Web site, mainly University students, staff and faculty; 27 were assigned to each group. Sripada et al. found

that as predicted, RTs in the incongruent condition were longer for the Depletion group (955ms) than the Control group (913 ms), a significant difference of 42 ms.

Hagger et al (2016) replicated the procedure across 23 different labs, randomly assigning 1126 subjects to the Control group and 1014 to the Depletion group. Subjects were mainly University undergraduates (from different countries, not all English speaking). Hagger found that on the number interference task, incongruent reaction times were longer than congruent reaction times. The results of Hagger et al (2016) for RTs in the incongruent condition (ms) are:

Condition	**M**	**SE**	**N**	
Depletion	943	4	1014	$t(2094) = 0.88$, $p = .771$
Control	937	4	1126	

Hagger et al (2016) concluded that their results cast doubt on the existence of ego depletion. While ego depletion may be shown by other paradigms, for example with more intense or long interventions for depletion, the intervention they did use was one in the literature claimed to be sufficient for producing depletion.

In the following, assume that a direct replication is part of the process of establishing whether a predicted effect can be accepted as established, and thus part of testing the prediction from the theory postulated by the original authors.

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1) What is the theory being put to test?

    a) The capacity to exercise sustained self-control (or “will power”) is in some ways akin to the use of a muscle

    b) Practising self-control over a period of time should lead to stronger will power in general

    c) The ‘difficult’ letter-e task requires self-control

    d) Engaging in tasks requiring self-control would lead to the depletion of a limited resource and thus reduced performance on subsequent self-control tasks

2) What pattern of results would falsify the theory (assuming safe auxiliary hypotheses)?

   a) A nonsignificant difference between the Depletion and Control conditions

   b) The 95% confidence interval containing zero

   c) A Bayes factor testing the difference between conditions of less than a 1/3

   d) All of the above

[Note: If d is the correct answer, no credit will be given for answering a, b or c]

3) What else would falsify the theory?

   a) A Bayes factor testing the difference between conditions close to 1

   b) A significantly higher score for the Control than the Depletion condition

   c) The 95% confidence interval excluding the sample mean difference

   d) All of the above

[Note: If d is the correct answer, no credit will be given for answering a, b or c]

4) What other theory is mentioned but is not directly tested by the study?

   a) Practising self-control over a period of time should lead to stronger will power in general

   b) Engaging in tasks requiring self-control would lead to the depletion of a limited resource

   c) Engaging in the number interference task depletes will power

   d) All of the above

[Note: If d is the correct answer, no credit will be given for answering a, b or c]

5) What background knowledge must be assumed in order for the test to be a test of the theory in 1)?

   a) Subjects were a representative sample of the whole population to which the theory applies

   b) The 'difficult' letter-e task requires self-control

   c) Engaging in tasks requiring self-control would lead to the depletion of a limited resource

   d) All of the above

[Note: If d is the correct answer, no credit will be given for answering a, b or c]

6) In relation to how safe the auxiliary hypotheses were, the researchers need to assume:

   a) That subjects in the two conditions did not differ systematically in ability to persevere before the experiment; and as they did not test this, the assumption is not safe

   b) That the number interference task measures self-control; this claim is partly supported by the finding that incongruent RTs were longer than congruent ones

   c) That a representative sample was selected from the whole population to which the theory applies; and as they used people from University subject pools, probably largely undergraduates, the assumption is not safe

   d) All of the above

[Note: If d is the correct answer, no credit will be given for answering a, b or c]

7) The mean difference between conditions is 943 – 937 = 6 ms. What is the standard error, SE, of the difference between conditions?

a) SE = (mean difference)/ (obtained *t*) = 6/0.88 = 6.8 ms (to the nearest ms)

b) SE = (obtained *t*) / (mean difference) = 0.88/6 = 0.15 ms

c) SE = (mean difference) / (critical value of *t*) = 6/1.96 = 3 ms (given that the critical value of *t* is 1.96)

d) SE = (critical value of *t*) / (mean difference) = 1.96/6 = 0.3 ms (given that the critical value of *t* is 1.96)

8) The critical value for *t*, 2-tailed, at the 5% level is 1.96 for this study. The critical value for t, 1-tailed, at the 5% level is 1.65 for this study. A 95% confidence interval can be calculated to be:

a) 6 +- 1.65*.15 = [+4.2, +7.8]

b) 6 +- 0.88*3 = [+3.4, +8.6]

c) 6 +- 1.96*0.3 = [+5.4, +56.6]

d) 6 +- 1.96*6.8 = [-7.3, +18.3]

9) After much discussion a group of researchers decides that the minimal interesting value below which a real population difference would be theoretically meaningless is 5 ms. Thus, they decide the null region is [-5, +5]. For the sake of argument, assume you accept their judgment. What follows from the principles of inference from intervals?

a) The confidence interval is contained within the null region, so the null region hypothesis can be accepted

b) The null region is contained within the confidence interval so the data are insensitive and no conclusion follows

c) The null region is contained within the confidence interval, so the null region hypothesis can be accepted

d) The null region is entirely outside of the confidence interval so the null region hypothesis can be rejected

10) To calculate a Bayes factor a model of H1 is needed. In the original study the difference between conditions was 42 ms. The within-condition SDs were each about 100 ms. A plausible model of H1 could be:

a) A half-normal with an SD of 42 ms, because 42 ms is the best estimate of the mean population effect

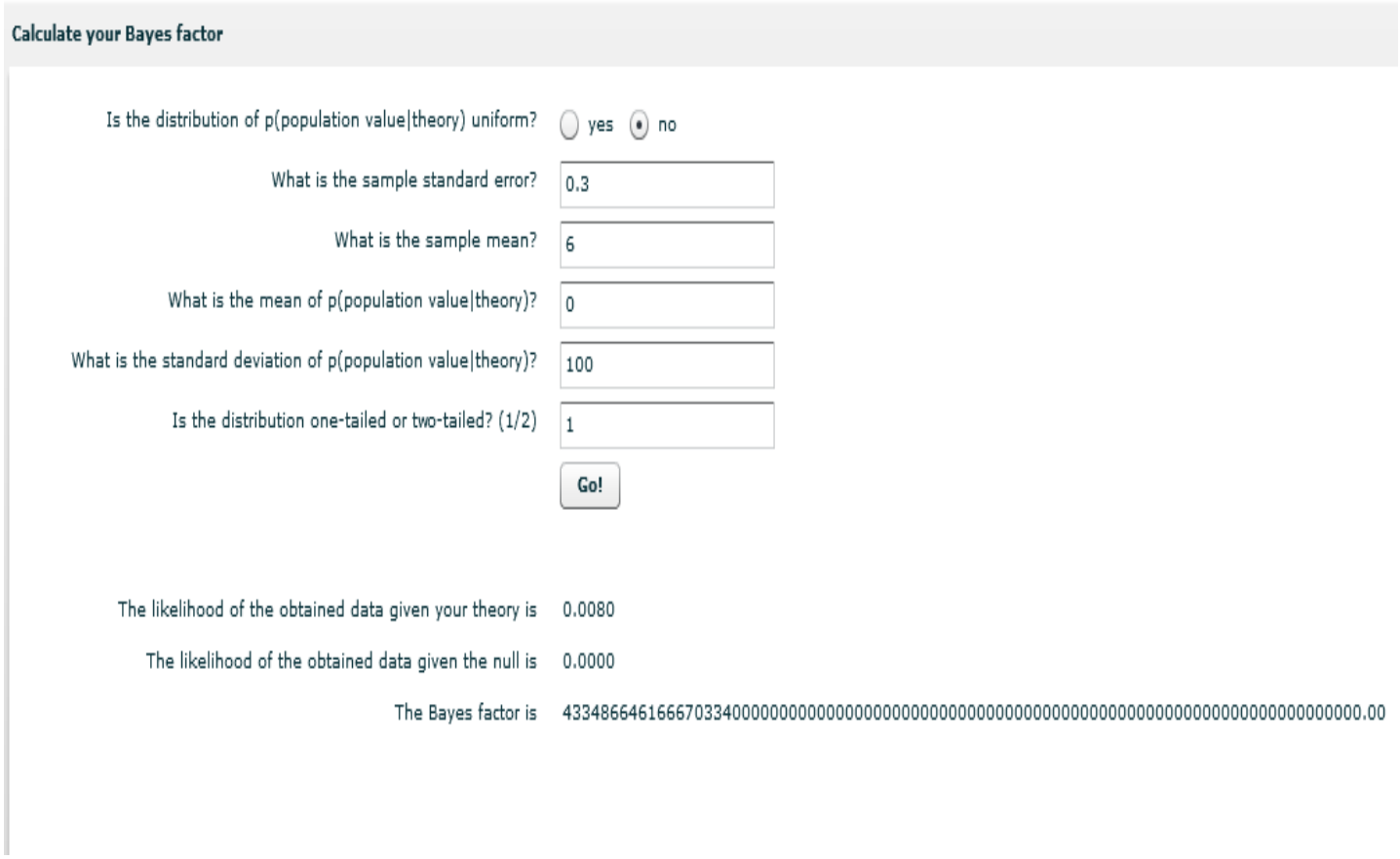
b) The uniform [0, 42] because a uniform makes few assumptions

c) A normal with a mean of zero and an SD of 100 because the theory allows effects in both directions

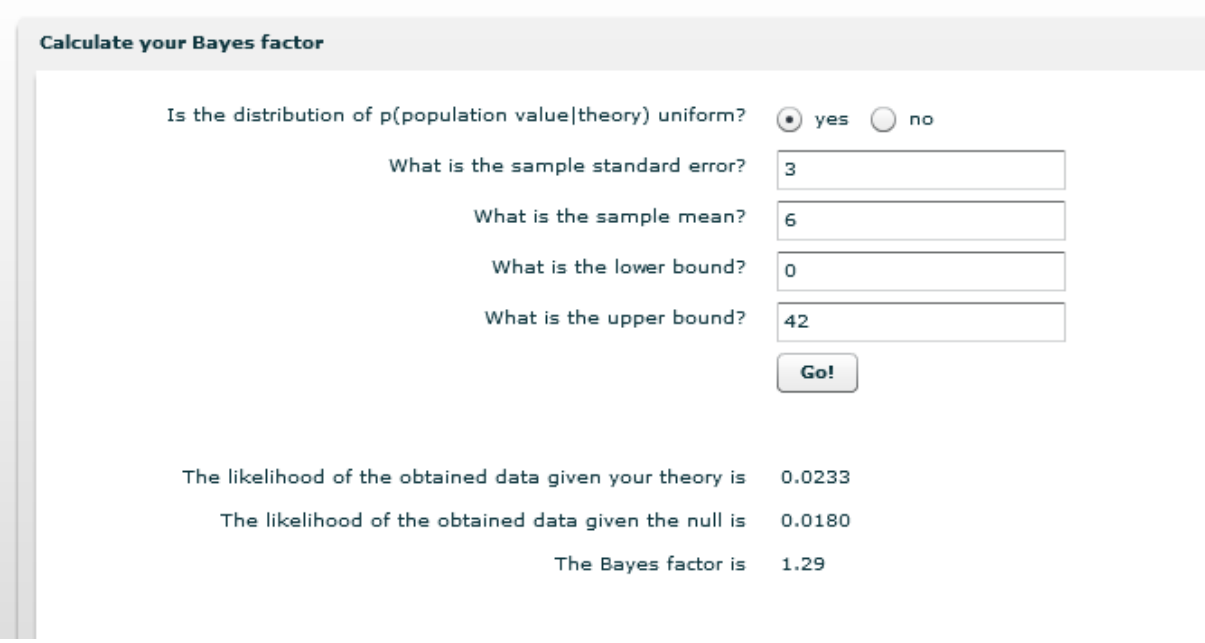
d) A half-normal with an SD of 100 because 100 is our best estimate of the within-condition SDs

11) Which of the following images shows an appropriate use of the Bayes factor calculator for this problem:

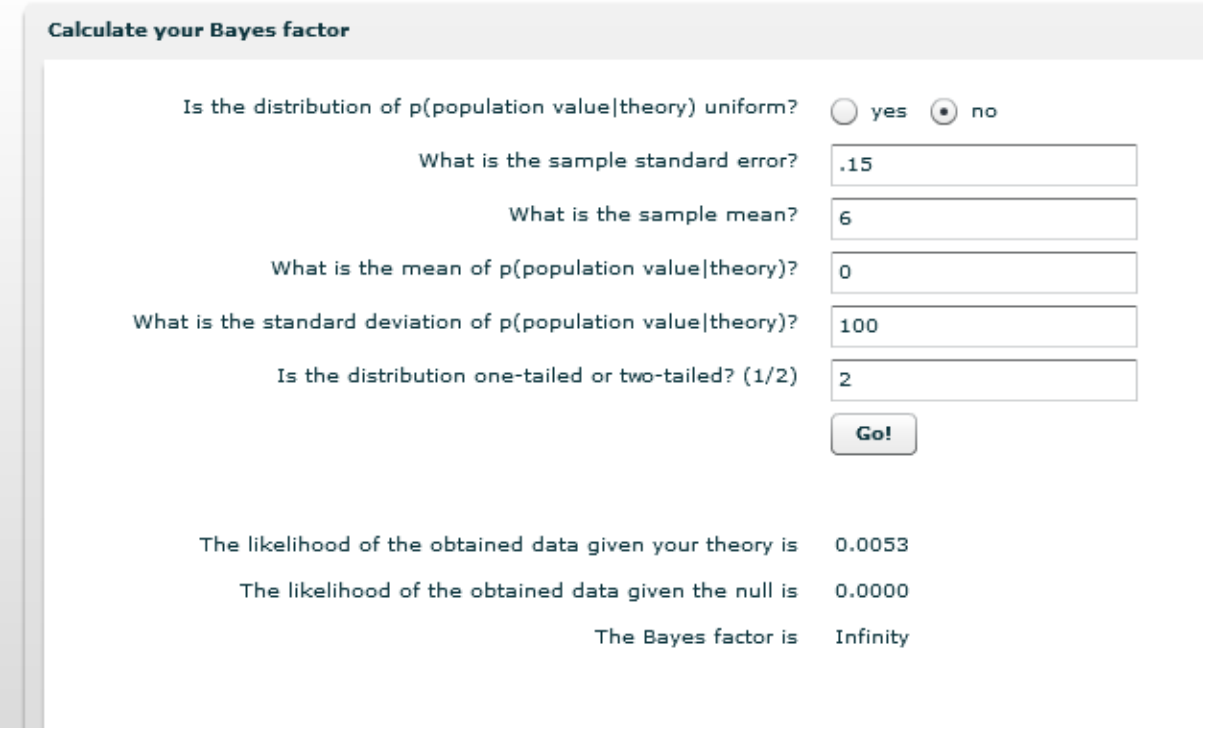
a)



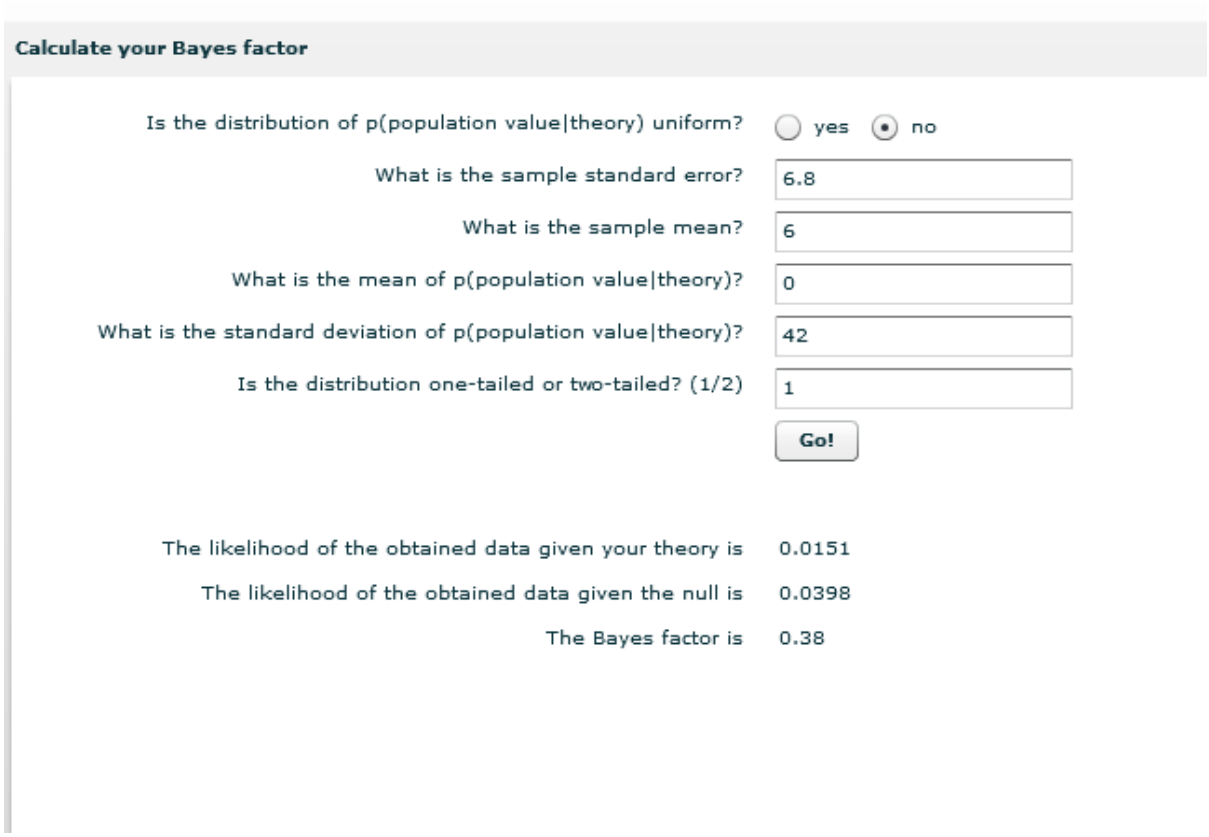
b)


Calculate your Bayes factor
Is the distribution of p(population value|theory) uniform?
yes
no
What is the sample standard error?
3
What is the sample mean?
6
What is the lower bound?
0
What is the upper bound?
42
Go!
The likelihood of the obtained data given your theory is
0.0233
The likelihood of the obtained data given the null is
0.0180
The Bayes factor is
1.29

c)


Calculate your Bayes factor
Is the distribution of p(population value|theory) uniform?
yes
no
What is the sample standard error?
.15
What is the sample mean?
6
What is the mean of p(population value|theory)?
0
What is the standard deviation of p(population value|theory)?
100
Is the distribution one-tailed or two-tailed? (1/2)
2
Go!
The likelihood of the obtained data given your theory is
0.0053
The likelihood of the obtained data given the null is
0.0000
The Bayes factor is
Infinity

d)



12) The Bayes factor shows that:

a) There is substantial evidence for H1

b) The result is non-significant

c) There is not much evidence one way or the other and the results do not yet falsify the theory by conventional standards

d) There is substantial evidence for the point null hypothesis and against H1 so the results count against the theory tested

13) The Bayes factor compared to the t-test:

a) Are similar in that both in this case indicate evidence for H0

b) Differ in that one has to have a pre-specified stopping rule for the t-test but one does not for the Bayes factor

c) Are similar in that both have the function of controlling Type I error rates

d) All of the above

[Note: If d is the correct answer, no credit will be given for answering a, b or c]

14) The hard core of the research programme could plausibly be stated as:

a) Engaging in tasks requiring self-control would lead to the depletion of a limited resource and thus reduced performance on subsequent self-control tasks

b) Practising self-control over a period of time should lead to stronger will power in general

c) The capacity to exercise sustained self-control (or “will power”) is in some ways akin to the use of a muscle

d) Engaging in tasks requiring self-control would lead to the depletion of a limited resource

15) The research by Hagger et al (2016) contributes to the research programme in:

a) A progressive way because it is very informative and useful to know there is evidence against the prediction of a protective belt hypothesis

b) Neither a progressive nor a degenerating way because their results were insensitive

c) A degenerating way because they found evidence against the prediction of a protective belt hypothesis

d) A degenerating way because the procedure of the original experiment was found to produce insensitive results

End of paper