Real effort task – Finding Letters on Pages (FLP)

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If you need a real-effort task that is boring to do, can be done on screen or with a pen and paper, can have varying difficulty levels, is hard to cheat in, and offers several additional advantages, you are welcome to use the Finding Letters on Pages (FLP) task that I developed. You are welcome to adopt the idea of this task in general, the exact pages that are included here, or to use the file and modify it.

After the letters pages, you can find the 40 questions used in my article (in case you want to adopt them) and then the correct answers for these 40 questions (if you use them, make sure you don't change the pagination of the letters pages).

At the end I include some important remarks on the advantages of this real-effort task, how it can be used, etc. It's highly recommended to read these remarks carefully before designing the experiment.

If you use the "Finding Letters on Pages" (FLP) task, I will appreciate it if you cite the article in which it originally appeared:

Azar, Ofer H. (2019) "Do fixed payments affect effort? Examining relative thinking in mixed compensation schemes." *Journal of Economic Psychology*, 70, 52-66, https://doi.org/10.1016/j.joep.2018.10.004

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This part is optional. You can end it and return the questionnaire any time, even if you choose not to answer any question. For every correct answer you will earn $X.

As you will see, the questions become more and more difficult, so it is recommended to proceed according to their order, up to the point in which you decide that you do not want to continue solving additional questions.

On the following pages different letters are written. In the questions below you are asked to write which letter appears on a certain page, in a certain line, and in a certain position. The position of the letter in the line is counted from left to right. For example, the letter on page 1, line 1, position 3 is s.

1. Page 1 , Line 1 , Position 2
2. Page 1 , Line 5 , Position 6
3. Page 1 , Line 16 , Position 12
4. Page 1 , Line 21 , Position 17
5. Page 2 , Line 3 , Position 21
6. Page 2 , Line 8 , Position 23
7. Page 2 , Line 19 , Position 29
8. Page 2 , Line 23 , Position 31
9. Page 3 , Line 13 , Position 31
10. Page 3 , Line 18 , Position 32
11. Page 3 , Line 21 , Position 33
12. Page 3 , Line 25 , Position 34
13. Page 4 , Line 6 , Position 35
14. Page 4 , Line 12 , Position 36
15. Page 4 , Line 18 , Position 37
16. Page 4 , Line 23 , Position 39
17. Page 4 , Line 31 , Position 40
18. Page 5 , Line 3 , Position 42
19. Page 5 , Line 16 , Position 43
20. Page 5 , Line 21 , Position 45

21. Page 5 , Line 26 , Position 46
22. Page 5 , Line 32 , Position 47
23. Page 6 , Line 6 , Position   48
24. Page 6 , Line 15 , Position 50
25. Page 6 , Line 23 , Position 51
26. Page 6 , Line 28 , Position 53
27. Page 6 , Line 33 , Position 54
28. Page 7 , Line 7 , Position 56
29. Page 7 , Line 16 , Position 57
30. Page 7 , Line 23 , Position 58
31. Page 7 , Line 28 , Position 59
32. Page 7 , Line 33 , Position 60
33. Page 8 , Line 9 , Position 61
34. Page 8 , Line 17 , Position 62
35. Page 8 , Line 24 , Position 63
36. Page 8 , Line 31 , Position 64
37. Page 9 , Line 9 , Position 65
38. Page 9 , Line 17 , Position 66
39. Page 9 , Line 24 , Position 67
40. Page 9 , Line 31 , Position 68

Correct Answers

1. Page 1 , Line 1 , Position 2 – F
2. Page 1 , Line 5 , Position 6 – Y
3. Page 1 , Line 16 , Position 12 – S
4. Page 1 , Line 21 , Position 17 – E
5. Page 2 , Line 3 , Position 21 – M
6. Page 2 , Line 8 , Position 23 – I
7. Page 2 , Line 19 , Position 29 – F
8. Page 2 , Line 23 , Position 31 – L
9. Page 3 , Line 13 , Position 31 – Z
10. Page 3 , Line 18 , Position 32 – E
11. Page 3 , Line 21 , Position 33 – T
12. Page 3 , Line 25 , Position 34 – N

13. Page 4 , Line 6 , Position 35 - I

14. Page 4 , Line 12 , Position 36 – T

15. Page 4 , Line 18 , Position 37 - A

16. Page 4 , Line 23 , Position 39 – T

17. Page 4 , Line 31 , Position 40 – G

18. Page 5 , Line 3 , Position 42 – E

19. Page 5 , Line 16 , Position 43 – F

20. Page 5 , Line 21 , Position 45 – E

21. Page 5 , Line 26 , Position 46 – A

22. Page 5 , Line 32 , Position 47 – A

23. Page 6 , Line 6 , Position 48 - A

24. Page 6 , Line 15 , Position 50 - Y

25. Page 6 , Line 23 , Position 51 – H

26. Page 6 , Line 28 , Position 53 – O

27. Page 6 , Line 33 , Position 54 – T

28. Page 7 , Line 7 , Position 56 - Y

29. Page 7 , Line 16 , Position 57 – C

30. Page 7 , Line 23 , Position 58 – T

31. Page 7 , Line 28 , Position 59 – E

32. Page 7 , Line 33 , Position 60 – T

33. Page 8 , Line 9 , Position 61 – T

34. Page 8 , Line 17 , Position 62 – W

35. Page 8 , Line 24 , Position 63 – L

36. Page 8 , Line 31 , Position 64 – E

37. Page 9 , Line 9 , Position 65 – O

38. Page 9 , Line 17 , Position 66 – M

39. Page 9 , Line 24 , Position 67 – P

40. Page 9 , Line 31 , Position 68 – E

Real effort task – Finding Letters on Pages (FLP)

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The task is to answer which letter appears on a certain page, in a certain line and a certain position. The pages include fonts that becomes smaller from page to page, increasing the difficulty of the task.

Attractive characteristics of the FLP task

This task provides several attractive characteristics for use in experiments:

1. It is extremely boring to do this task, since it is just counting lines and letters, without anything that is intellectually challenging. This means that you will not have a lot of noise in your data resulting from some subjects who enjoy the task while others do not enjoy it, as with solving mazes, solving algebra questions, summing numbers in matrices, etc.

2. People are probably less heterogeneous in their ability to count lines and letters than to solve algebra questions or sum numbers. This means that you will have relatively little noise in the data coming from diverse abilities of participants.

3. The task can be done either on a screen or with a pen and paper.

4. You can measure effort in several ways: the number of attempted questions, the number of questions solved correctly, or the amount of time invested.

5. The task is relatively not time consuming (per question), which means you can have many questions, and obtain a large variation in behavior (in the various measures of effort).

6. Modifying the size of the letters affects the difficulty of the task (smaller letters imply more lines on the page and more letters in a line and therefore a more difficult task). This means that you can change the difficulty as the participants proceed in the experiment. Moreover, it is clear to participants that the difficulty is increasing when the letters become smaller, so if you want your participants to know in a credible manner that difficulty is changing, this task achieves this goal. Changing the difficulty from easy to hard as participants proceed in the questions (with a proper level of incentives) can also ensure that many subjects choose to quit solving questions somewhere in the middle (not solving every question), which is important if you want to measure effort.

7. Participants have no easy way to cheat (such as using a calculator for a task of solving algebra questions).

8. This task can be used for experiments with children or others who have very partial education (it's enough that they know to count and know the alphabet). In principle

you can even replace the letters with symbols for subjects who don't even know the alphabet.

Important remark on designing the experiment

As with many other tasks measuring effort, when a participant decided that he does not want to continue solving questions, he should be allowed to quit and go home or at least do something fun (go online on a computer, use his phone, read, etc.). Because if he has to stay in the lab and he cannot do anything other than watching the other participants as they continue and get bored himself, this may not be more fun than continuing with the task, and then you don't measure effort versus leisure but rather effort of doing a task versus effort of getting bored.

Possible variations in using the FLP task

Finding Letters on Pages with Increasing Difficulty (FLP-ID)

If you want a measure of effort with variation between subjects, where subjects respond to incentives and the environment allows them to decide in an informed manner how much effort to exert, then increasing the difficulty of questions but keeping constant the reward for a correct answer can achieve this (as was done in the *Journal of Economic Psychology* article in which this task was originally used). You create a set of questions that start from the first pages and continue to the last pages, and because the font becomes smaller, the task becomes harder. Notice also that the larger the position number of the letter in the line, the more counting is required to get it right, and the harder the question.

If you prefer fewer letter pages, you can decrease the font also on the same page, and/or use the idea that a higher position number on the line means more counting effort, to vary effort with less than nine pages.

The reward for a correct answer should stay constant regardless of the question difficulty, being high enough that everyone answers the first and easiest question, but low enough that many subjects do not solve all the questions until the difficult ones at the end. Then a typical subject should have some cut-off point of difficulty, solve questions until this point, and stop solving after this point. Due to subject heterogeneity this cut-off point can differ between subjects, and different subjects will exert different amounts of effort and attempt a different number of questions (yielding also a different number of correct answers).

Finding Letters on Pages with Constant Difficulty (FLP-CD)

If you need a task with a constant difficulty, simply use questions that choose the page number randomly, and not go systematically from the first pages to the last. Alternatively, you can just have all pages with the same letter size. You can also decrease the font but at the same time reduce the position on the line (e.g., finding the fourth letter in a line on a page

with small letters may require a similar effort to finding the tenth letter in a line on a page with bigger letters).

If you want subjects to have an optimal cut-off point (which can differ between subjects based on their time value and disutility of effort) but have a constant difficulty of questions, you can adopt a decreasing reward schedule, where the first questions are paying more than the next ones and so on.

Harder tasks based on FLP

If you need tasks that require more effort (e.g., because you want the reward for each question to be higher and then the task should be more time consuming), you can vary the task in several ways, for example:

1. The subject should find several letters in different locations and combine them to one "word" (that needs not be a real word), and only if all of these letters (the entire "word") are correct, he gets paid for the task.
2. After the subject finds the letter, there is a table with a conversion of each letter to a number (making the table not alphabetical would make it harder), and the subject should find this number and write it. Or to make it harder, the subject can be required to add that number from the table to the numbers of page, line and position in the question.
3. Based on both of the two previous ideas, an even harder task can require the subject to find several letters, convert all of them to numbers based on a table, and then report several correct numbers (being entitled for one reward only if all numbers are correct). The subject can also be required to add up or multiply the different numbers obtained, if a more challenging task is needed.

If you use the "Finding Letters on Pages" (FLP) task, I will appreciate it if you cite the article in which it originally appeared:

Azar, Ofer H. (2019) "Do fixed payments affect effort? Examining relative thinking in mixed compensation schemes." *Journal of Economic Psychology*, 70, 52-66, https://doi.org/10.1016/j.joep.2018.10.004

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