

# Training Critical Thinking Ability: Using Questions as a Guide

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## Introduction

Consider the following news headlines:

**“Google Offers a Pi Calculator to Test Your Mathematical Savviness” \***

\*A real headline!

**“Stonehenge Resets for Daylight Saving Time?”**

**“Pfizer ‘Page 132’ Warns Against Unprotected Sex After COVID-19 vaccine”**

For many people, judging whether a random headline from social media is real or fabricated is difficult, and our sharing intentions would be influenced by other factors such as familiarity and how emotional evocative the news is rather than its accuracy<sup>1</sup>.

In order to improve discernment, critical thinking is essential in term of fake news detection, and there are some studies demonstrating that questioning technique in classroom settings can help improve critical thinking.

Question for current study: Can questioning techniques be used to train critical thinking ability during online sessions to target more participants with a broader age range?

## Methods & Materials

**Participants:** 256 workers from Prolific who have not completed a graduate degree in any fields.

**Stimuli:** Either a shorty story or a piece of critical reading, approximately 850 words.

**D.V.:** Article type (short story or critical reading)  
Question type (reflective guiding questions or general questions asking for feelings)

### Short Story Example:

“Not far away, the policeman on the beat moved up the avenue impressively. I looked at him. The impressiveness was habitual and not for show, for spectators were few. The time was barely 10 o'clock at night.

Trying doors as he went, twirling his club with many intricate and artful movements, turning now and then to cast his watchful eye adown the pacific thoroughfare, the officer, with his stalwart form and slight swagger, made a fine picture of a guardian of the peace.”

### Critical Reading Example:

“As new U.S. cases of the pandemic coronavirus set a daily high of more than 75,000, FDA's Vaccines and Related Biological Products Advisory Committee (VRBPAC) held a 9-hour virtual meeting to discuss a regulatory pathway that could permit the widescale use of a COVID-19 vaccine that has only minimal evidence of safety and efficacy.”

## Question Manipulation

### Reflective Question Group (N=128): received reflective guiding questions

Overall, do you think the evidence is persuasive?

Extremely persuasive  Somewhat persuasive  Neither persuasive nor unpersuasive  Somewhat unpersuasive  Extremely unpersuasive

Please illustrate why you think that the above evidence is persuasive/unpersuasive.

If you were a member of the FDA, will you grant the vaccines an EUA?

Definitely yes  Probably yes  Might or might not  Probably not  Definitely not

Please illustrate why you would/would not grant the vaccines an EUA.

### General Question Group (N=128): Received general questions asking for feelings after reading the article

Do you like this article?

Like a great deal  Like somewhat  Neither like nor dislike  Dislike somewhat  Dislike a great deal

Please illustrate why you like/dislike this article

What is your least favorite part of this article?

Please illustrate why you don't like this part of the story that you mentioned from the previous question.

## Analysis Plan & Fake News Example

A 2x2 between subject ANOVA will be conducted to compare the effects of our two independent variables (article type – short story or critical reading and questions type – reflective or general) on fake news discernment and sharing likelihood, which are our dependent variables.

### Fake News Example:



### Stonehenge Resets for Daylight Saving Time?

Stonehenge, a prehistoric monument consisting of several large stones arranged in a circle in Wiltshire, England, was built sometime around 2500 B.C. The stones at Stonehenge are moved every year to accommodate for daylight saving time.

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## Hypothesis & Implications

- We hypothesize that after controlling for educational level, **going through reflective questions would enable participants to show a short-term boost in critical thinking ability**, thus being able to discern quality information from fake news.
- We also hypothesize that critical thinking ability would be **domain-general**.
- **Implications for future:** Future studies could aim at making the training session into a long-term program in forming critical thinking habits and expanding the program to a broader audience.

### References

1) Pennycook, G., & Rand, D. G. (2021). The Psychology of Fake News. Trends in Cognitive Sciences, 25(5), 388–402. <https://doi.org/10.1016/j.tics.2021.02.007>