

## ABSTRACT

Pseudoscience, or scientific research presented with **manipulated data** or conducted with **flawed methods**, has measurable and potentially dangerous impacts on society. With increasing media focus on pseudoscientific data, learning how to **identify pseudoscience** is **vital to the modern public**. As such, this research project seeks to assess if the average person can distinguish pseudoscience from peer-reviewed science based on **context cues** within the writings, such as experimental methods, tone, and organization of the paper. A **critical reading workshop** will be implemented to train individuals to recognize pseudoscience so that they may base important, life-altering decisions on reliable sources.

Individuals in six different age groups will be presented with two medical research articles, one peer-reviewed and one pseudoscientific, and will be asked to label which is which and explain their answers. Afterwards, we will lead a short language workshop designed to develop critical reading skills. Next, we will survey the age groups again. We expect to find close to half of each age group in the sample will be unable to determine the pseudoscientific article from the initial survey. Our estimates may increase for specific age groups based on prior research. After completing our workshop, **we expect meaningfully larger portions of individuals will be able to recognize falsified work**. In summary, the workshop strategy suggests that workshops should be **implemented into educational systems** so that the public is better prepared to analyze scientific research when making important decisions for themselves and their children.



## QUESTION AND BACKGROUND

**Can the average person from a given age range be trained to distinguish pseudoscientific research from peer-reviewed research using a workshop?**

## METHODS (6 age groups, 100 individuals each)

- Individuals will be given two articles (1 pseudoscientific & 1 peer-reviewed)
- They will be asked to distinguish the pseudoscientific article from the peer-reviewed article
- We will then hold 15 min critical thinking workshop to train our sample in recognizing pseudoscience
- We will then readminister the same survey without having revealed the answers
- Our data will be sorted by various age ranges

Small sample size and no controls

Parental bias

Data was not collected blindly

**Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children**  
Wakefield et al.

"**12 children**, consecutively referred to the of pediatric gastroenterology with a history of a pervasive developmental disorder with loss of acquired skills and intestinal symptoms (diarrhea, abdominal pain, bloating and food intolerance), were investigated...

...He received a dose of measles, mumps, and rubella vaccine at age 4-5 years, the day after which **his mother** described a striking deterioration in his behavior that she did link with the immunization...

...We took histories, including details of immunizations and exposure to infectious diseases, and assessed the children. In 11 cases the history was obtained by the senior clinician (JW-S). Neurological and psychiatric assessments were done by consultant staff (PH, MB) with HMS-4 criteria. Developmental histories included a review of prospective developmental records from **parents, health visitors, and general practitioners**. Four children did not undergo psychiatric assessment in hospital; all had been assessed professionally elsewhere, so these assessments were used as the basis for their behavioral diagnosis...

...In eight children, the onset of behavioral problems had been linked, either by the parents or by the child's physician, with measles, mumps, and rubella vaccination..."

Other scientists unable to replicate experimental results

Correlation, not causation

Insufficient explanation for conclusions

## EXPECTED OUTCOMES

We speculate that the results from the survey will emulate the data displayed below.

- Individuals in the 21 to 30 age range will achieve the highest initial and final average of correct responses because they have the highest level of education and are most socially active.
- Individuals in the 10 to 15 age range will show the lowest initial and final average of correct responses because they are still too young to understand the context within the articles.
- After 46 y/o, as age increases, the average decreases as individuals are less often exposed to social interactions and are gradually distanced from critical thinking skills.

Our expected rates of improvement are visualized in Figure 1.

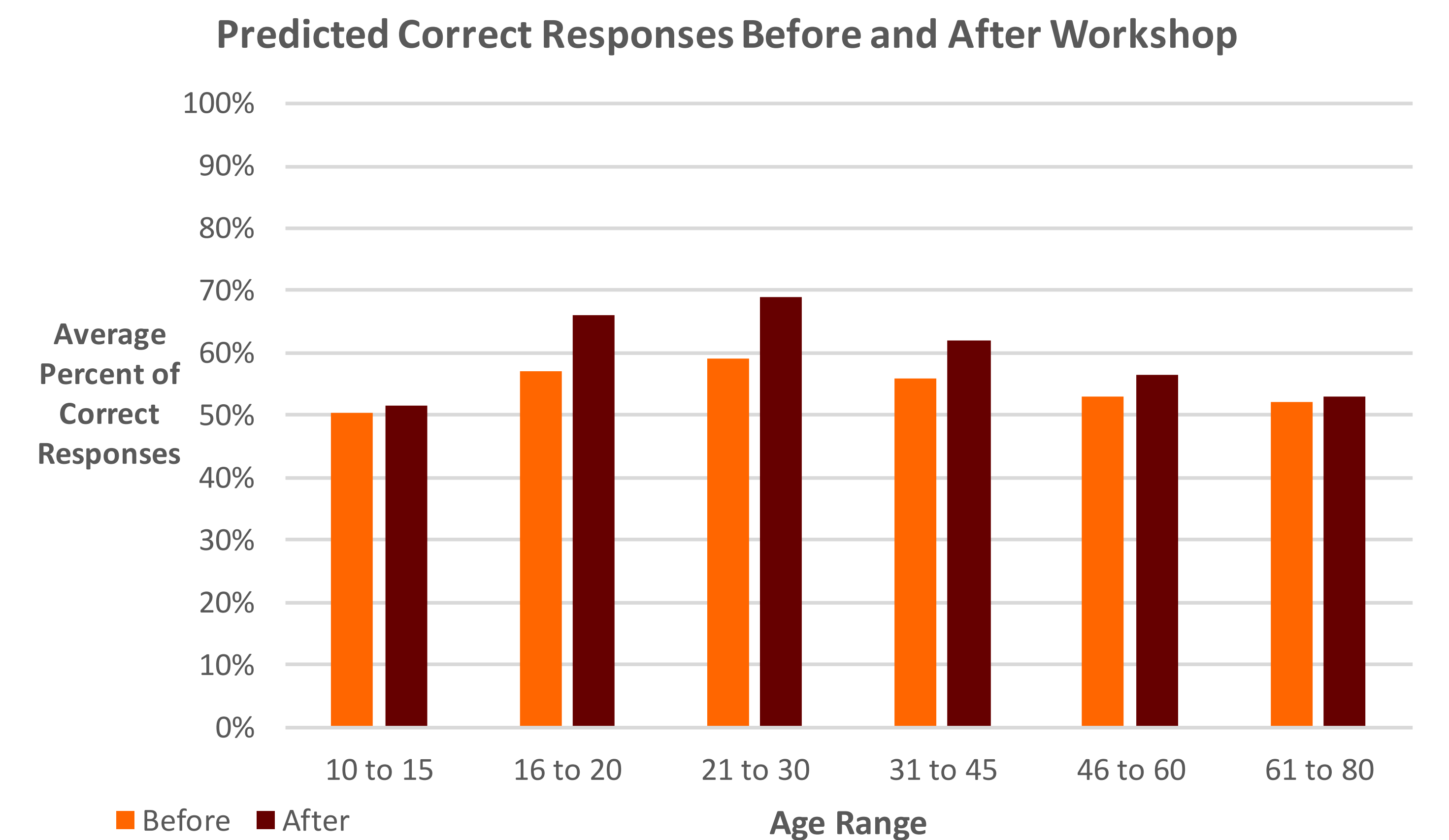


Figure 1. The predicted response differences before and after the workshop by age group

## CONCLUSION

We found critical reading workshops have the potential to meaningfully increase public awareness of pseudoscience. Therefore, more workshops and classes should be implemented into educational systems to better prepare citizens to analyze public information. Given the expected success of our strategy, further research into the ability of the general public to distinguish pseudoscience is clearly supported.

## REFERENCES

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