



The Journal of *News Science*

Vol. 15, No. 3, Ser.59, Autumn 2026, P. 1- 4

Journal homepage: <https://www.mjourcom.ir/>

DOI : <http://doi.org/10.22034/lrsi.2026.570903.1505>

Open Access

ORIGINAL ARTICLE

Applying Popper's Philosophy of Science to Addressing the Challenges of Presenting Science News in the Media

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Received: January 4, 2026

Accepted: September 2, 2026

EXTENDED ABSTRACT

Introduction:

A portion of misinformation or fake news in the media is related to pseudoscience. Pseudoscience refers to a claim, belief, or practice that is presented as scientific but does not adhere to valid scientific methodology. This deviation is grounded in the non-testability and non-falsifiability of hypotheses; consequently, rejecting it appears difficult. The large number of supporters of pseudoscience exists due to the insufficient realism of science education and emotion-driven media.

It should be noted that improving the effective relationship between science and the media can help enhance public understanding of science in society. Today, the media play a central role in transmitting scientific information to the general public. However, the dissemination of misinformation or pseudoscientific content can have negative consequences for public understanding of science and technology. This issue becomes particularly important under conditions in which science and technology are rapidly evolving. In this study, we aim to examine the extent to which the principle of falsifiability is observed in the media coverage of scientific events by domestic media outlets, in order to determine how falsifiability, as one of the fundamental principles of science, can function as a guide for the media in presenting scientific content. Through this approach, we seek to demonstrate that attention to falsifiability in the media presentation of scientific content can lead to improved quality of scientific content, increased public awareness, and a reduction in the dissemination of misinformation and pseudoscience. The overall objective of this research is to examine the position of Popper's philosophy of science in the quality of scientific content published by the media.

Method:

To test the hypotheses, content analysis was employed on materials labeled as scientific and published by the media under study. For this purpose, scientific articles and news items were collected from the IRIB, ISNA, IRNA, and Mehr news agencies. These are among the major news agencies in the country and are frequently used as news sources by many media outlets, including social media. By examining new scientific events and the news and information promoted and shared by the media, the coverage of five current topics-artificial intelligence, climate change, disease outbreaks, astronomy, and capital relocation-in the aforementioned news agencies was selected as the research population. A purposive sampling method was used to extract articles related to scientific topics from the most recent three-month period. At this stage, only content based on scientific theories (a scientific theory relies on empirical and measurable evidence, such as Newtonian gravity or Einstein's theory of relativity) was collected, while content based on philosophical theories (which deal with abstract and ethical concepts, such as liberalism or Marxism) or logical theories (which are based on rules and principles of reasoning, such as Aristotelian logic or mathematical logic) was excluded.

Findings:

After applying the methodological requirements for selecting scientific news, a total of 147 news items from Asr-e Iran, 123 from IRNA, 106 from ISNA, 121 from IRIB, and 22 from Mehr were analyzed over the three-month period from Tir to Shahrivar 1404 (July–September 2025). Sixteen indicators were derived from the six criteria of Popper's principle of falsifiability and analyzed in Table 1.

In Asr-e Iran, the indicator "novelty of content" had the highest priority, while "limitations" had the lowest priority. In IRNA, the indicators "clear definition," "novelty of content," and "lack of bias" had the highest priority, while "accountability" had the lowest priority. In ISNA, the indicators "measurability," "falsifiability," "predictability," "empirical data," "empirical analysis," and "novelty of content" received the highest priority at 100%, whereas "diversity of viewpoints" had the lowest priority. In IRIB, the indicators "clear definition," "measurability," "falsifiability," "predictability," "empirical data," "empirical analysis," "novelty of content," and "lack of bias" were observed in 100% of cases and ranked highest, while "limitations" ranked lowest. Finally, in

Mehr, the indicators "clear definition," "measurability," "falsifiability," "predictability," "empirical data," "empirical analysis," "novelty of content," and "lack of bias" ranked highest at 100%, whereas the indicators "accountability," "limitations," and "diversity of viewpoints" were not observed in any of the scientific news items analyzed.

Overall, across all news agencies, the indicators "novelty of content," "lack of bias," "clear definition," "measurability," "predictability," "empirical data," "empirical analysis," and "falsifiability" ranked highly, while the indicators "future research," "diversity of viewpoints," "limitations," and "accountability" ranked low.

Conclusions:

Based on the data, the criteria of theoretical transparency, falsifiability, and empirical analysis were given significant priority by news agencies or their journalists and were observed without hesitation. However, the criterion of uncertainty received extremely little attention, and media outlets and/or journalists did not consider it important in published scientific news, which is noteworthy. Interestingly, in Mehr News Agency, the criterion of uncertainty was observed in only 5% of news items labeled as scientific. If uncertainty is not taken into account in science, its negative effects can also undermine the principle of falsifiability. This criterion—namely, acknowledging uncertainty—has been emphasized more than other criteria in primary sources such as the book by Friedman, Dunwoody, and Rogers (2012). These two principles are among the core components of Popper's theory, and observing them can enhance the credibility of media content labeled as scientific.

In addition, the criteria of criticizability and lack of bias were observed by news agencies with averages between 50% and 60%, a level that may be fragile. For example, in IRNA, which is a government-affiliated news agency, the criterion of criticizability was observed in 51% of news items and lack of bias in 52%, which cannot be considered acceptable. This situation is even more fragile for Mehr News Agency, where the figures fall below 50%.

One noteworthy result of this study is that, overall, in terms of observing Popper's falsifiability criteria in scientific news, the news agencies rank respectively as ISNA, IRIB, IRNA, Mehr, and Asr-e Iran.

Data Availability Statement

Data available on request from the authors.

Acknowledgements

The authors would like to thank anonymous reviewers.

Ethical considerations

Not applicable.

Funding

Not applicable.

Conflict of interest

The authors declare no conflict of interest.

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Cite this article: Afghahi, E. & Yousefi, S.F., (2026), The Application of Popper's Philosophy of Science in Addressing the Challenges of Presenting Science News in the Media, *News Science*, 15 (3), 1-4.

DOI : <http://doi.org/10.22034/lrsi.2026.570903.1505>



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Publisher: Press Institute for Contemporary International Journalism (PICIJ)