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# Primary school pupils' ability to detect fake science news following a news media literacy intervention: Exploration of their success rate, evaluation strategies, self-efficacy beliefs, and views of science news

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**ABSTRACT**

Widespread belief in scientific misinformation circulating online is a critical challenge for democracies. While research to date has focused on psychological, sociodemographic, and political antecedents to this phenomenon, fewer studies have explored the role of media literacy educational efforts, especially with children. Recent findings indicate that children are unprepared for critically evaluating scientific information online and that literacy instruction should address this gap. The aim of this study is to examine the ability to detect fake science news and the evaluation strategies employed by pupils after a news media literacy intervention. In addition, we explore the impact of the news media literacy intervention on their self-efficacy beliefs for detecting fake science news, and on their views of science news. A one-group experimental design was employed with a sample of 74 primary school pupils. A few weeks following a 2-hour media literacy intervention, pupils ranked ten Twitter posts on various scientific topics and were invited to justify their ranking in an open-ended question to unveil their evaluation strategies. Participants also completed one pre-test and one post-test designed to elicit their confidence in their ability to detect fake science news and their views of science news. We averaged pupils' judgement accuracy, categorized student's evaluation strategies, and compared self-efficacy beliefs before and after the intervention. On average, pupils' accuracy when asked to detect fake science news was 68%. This performance is higher than success rates reported in previous studies where no news media literacy intervention was tested. Pupils relied mostly on knowledge in news media literacy to detect fake science news, but also in great proportion on prior scientific knowledge and intuitive reasoning. Fake news self-efficacy beliefs increased significantly after the intervention, but views of science news were not impacted by the intervention. Findings indicate that primary school pupils are capable of careful examination of the credibility of scientific news. Children are regularly exposed to misinformation, and knowledge on how to critically engage with scientific information should be taught as soon as this exposure begins. Our findings suggest that news media literacy training can be successfully facilitated with primary school pupils and could be effective in fighting scientific misinformation from a young age.

**Keywords:** scientific misinformation, news media literacy intervention, fake science news, children

## INTRODUCTION

A dramatic increase in access to scientific information is observed around the globe (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2019) and is accompanied by the viral circulation of fake science news, i.e., information intentionally manipulated to mislead (Council of Canadian Academies [CCA], 2023; North Atlantic Treaty Organization [NATO], 2020). As artificial intelligence becomes

increasingly prevalent in educational settings, concerns regarding ChatGPT's potential to provide false information are even more widespread (Uğraş et al., 2024). For instance, the Pew Research Center found that only 17% of US adults have the skills and confidence to learn new information effectively online (Horrigan, 2019). Nonetheless, people worldwide increasingly consume news and information from social media platforms presenting a high risk of addiction (Karakose et al., 2022) especially in students (Tülübaş et al., 2023). These addictive news platforms lack editorial controls, allowing wide dissemination of misinformation via algorithmic news feeds. Without the necessary digital media literacy skills, people frequently fall victim to dubious claims they encounter in this context.

Undeniably, the quality of scientific information with which we interact largely determines our perceptions and attitudes regarding public issues (UNESCO, 2019). Hence, many organizations now promote efforts that develop students' critical thinking and foster news media literacy. For instance, American universities increasingly teach media literacy to undergraduate students (Jazynka, 2017) and similar efforts are also being proposed from kindergarten to grade 12 (e.g., Conley-Keck, 2019). Indeed, media literacy is reported to be an important predictor of media learning in children, surpassing measures of intelligence (Diergarten et al., 2017). Students with higher media literacy are more motivated to consume information, more skeptical, and more conscious of current events (Maksl et al., 2015).

Despite all the attention the dissemination of misinformation has received, little evidence exists on the effectiveness of promoting news media literacy as a response to online misinformation. Existing scholarly work frequently draws conclusions that rely on observational findings (Jones-Jang et al., 2021). Research into online misinformation has thus far focused on political, economic, and psychological factors (Grinberg et al., 2019). In addition, most studies have focused on misinformation among adults (Guess et al., 2019) or adolescents (Ku et al., 2019; Tseng et al., 2021). Moore and Hancock (2002) tested a 1-hour self-directed series of interactive modules designed to teach concepts and skills for identifying misinformation online and found that the intervention resulted in a higher probability to employ strategies for identifying fake news online.

Fewer studies have explored children's experience with misinformation or one of its components: fake news (Dumitriu, 2020). Misinformation can include a range of information reliability that moves from verified facts to distortion (e.g., exaggeration and selective use of evidence), or rumor (maybe true and maybe false), and finally to outright falsehoods (lies and fake news) (Hendricks & Vestergaard, 2019). For the purpose of this study, we focused on fake news exclusively.

Studies on children have mainly focused on exploring the vulnerability of students to fake news (Dumitru, 2020; Leu et al., 2007; Loos et al., 2018; Pilgrim et al., 2019). Little rigorous evidence exists documenting the relationship between digital news media literacy and people's ability to distinguish between low- and high-quality news online (Guess et al., 2019), especially in children.

Results reveal that children don't appear concerned with the trustworthiness of the information they encounter on social media. When put in front of a hoax website, at most a third of children recognized the hoax source as fake, and even amongst those who didn't trust the hoax website, very few of them could give reasons that proved that they had indeed identified the information as fake or manipulated (Dumitru, 2020; Leu et al., 2007; Loos et al., 2018; Pilgrim et al., 2019). The methodology used by previous studies, although informative, has some limitations. The idea of these studies is to invite pupils to complete a reading comprehension assignment by inviting them to visit a hoax website depicting an 'endangered animal' such as a tree octopus. After reading about the 'endangered animal' pupils are asked the following question: 'If an organization like Greenpeace asked you to help save this animal, would you sign their petition? Why or why not?' Most pupils agree to sign the petition, and this is interpreted as an inability to detect the hoax or spot fake news without prior any media literacy intervention. The challenge in drawing conclusions from these results mainly comes from the context of the experiment. When given a reading comprehension assignment from a teacher, a trusted professional, most pupils will not have been instructed to verify the source. Moreover, these assignments often refer to fiction work that does not require fact-checking. Nonetheless, it can probably be safely assumed that without any news media literacy training, most children don't have the ability to recognize fake science news. What is more, the effect of educational interventions remains poorly documented (Dumitru et al., 2022).

In this study, we therefore seek to determine whether efforts to promote news media literacy can improve children's ability to correctly evaluate the accuracy of online scientific content. Such a finding would suggest that news media literacy shortfalls are a key factor in why people fall victim to scientific misinformation. We will rely on the exposure to the intervention "real or fake online news?" (*vrai ou faux sur le web*) which was developed by *Agence Science-Presse*, a non-profit press agency that has been reporting science news in Canada for more than 40 years. The French-Canadian press agency has specifically developed the workshop for teaching fake science news detection to primary school students. During a 2-hour workshop facilitated over two 60 minutes sessions, a journalist visits classrooms to explain the phenomenon of fake science news and to help pupils develop the ability to recognize them.

The intervention provides strategies that can help children to evaluate the credibility of sources and identify indicators of problematic content. For instance, one recommendation warns pupils against shocking claims. Importantly, the success of this approach does not necessarily require children to take effortful steps like conducting research. Instead, this intervention aims to provide simple decision rules that help children become more vigilant of false information and develop reflexes to identify them which can be called discernment.

## Research Objectives and Hypothesis

The main objective is to explore primary school pupils' ability to detect fake science news following a news media literacy intervention by assessing success rates and


**Figure 1.** Fake news (pleasantry/prank) discussed as part of the news media literacy intervention. Source: Kruger Sightings [@LastestKruger]. (2018, March 1). We were following a lioness carrying her cub & she was getting really tired. An elephant showed up wanting to… [Post]. X. https://x.com/LatestKruger/status/980344432393375744?lang=en

categorizing pupils' evaluation strategies when discerning between mainstream and fake science news. In addition, we will explore the impact of a news media literacy intervention on self-efficacy beliefs in detecting fake science news and views of science news. The experiment tests three hypothesis:

**H1.** We expect fake news identification capabilities to be greater than what is reported in studies focused on exploring children's vulnerability (0–35%) (Dumitru, 2020). With the hope that the intervention will help children's success rate be at least clearly above chance level (> 50%).

**H2.** We expect fake news self-efficacy beliefs to increase significantly after the news media literacy training. Self-efficacy refers to a self-appreciation of one's ability to deal with prospective situations (Bandura, 1982). We hence expect children to have a more positive self-appreciation of their ability to detect fake science news after the training.

**H3.** We expect views of science news (also referred to as interest towards science news) to increase significantly after the news media literacy training since pupils with higher media literacy are found to be more motivated to consume information (Maksl et al., 2015).

# METHODS

## Participants

A one-group experimental design was employed with a sample of 74 5th and 6th grade pupils (mean age 11.3 years old) consisting of 38 female pupils (51%) and 36 male pupils (49%). Pupils were enrolled in three French-speaking primary school located in Montreal (Canada) from neighborhoods identified as disadvantaged areas by the *Ministère de l'Éducation* [Ministry of Education] and 36 pupils (35%) were native French speakers. Teachers, parents, gave written consent prior to data collection and the project received ethics approval from the *Comité d'Éthiqe de la Recherche* [Institutional Review Board] of [hidden information for blind review]. Confidentiality of data was ensured by a numerical code that replaced participants' names. The data collected was also password protected and stored in a locked room at Universite de Sherbrooke, QC, Canada.

## News Media Literacy Intervention

The intervention followed the format developed by a science press agency (*Agence Science-Presse*, Canada). It took place over two interactive lectures of 60 minutes each and was facilitated by a journalist. Pupils were invited to discuss the credibility of real scientific news although many ideas presented can be applied to examination of any type of news. They are guided through their careful examination of the picture, the quality of the text, the number of times the news was shared, how specific the news is, etc. but also encouraged to assess the reliability using their prior scientific knowledge.

During the first lecture, a journalist presents three social media posts (e.g., **Figure 1**) depicting science news (2 fakes news and 1 reliable news). After being asked by cold call to explain how they ranked the news reliable or fake, the journalist facilitating the intervention presents different methods to detect fake news with extensive discussion on each:

1. verify the source,
2. verify the author, and
3. verify the details provided (date, time, references, etc.).

Then, children are invited to explore different types of fake science news:

1. errors,
2. pleasantry,
3. hoaxes, or
4. hidden advertising in relation to the intention of the author such as to entertain, to scare, to sell or to anger.

The take-home message shared with the children is that reliable news is based on facts. Consequently, children should keep a critical mindset especially when the content is based on opinions or feelings. Finally, children are presented a list of reliable local news medias and are explained how journalists avoid spreading fake news by using fact-checking processes. In the second lecture, children are working with their peers to conduct web searches on various scientific topics (mosquito repellants, flu medications, polar bears diets, etc.) and invited to share the results of their investigation along with the steps

they took to assess the reliability of the information they are sharing.

### Study Design

The participants completed one pre-test and one post-test designed to elicit their confidence in their ability to detect fake science news and their views of science news. Each pupil also ranked ten Twitter posts on various scientific topics as mainstream or fake science news and was invited to justify the ranking in an open-ended question. Finally, we categorized student's evaluation strategies of fake science news using an inductive approach.

### Instruments

#### *Self-efficacy beliefs questionnaire*

Self-efficacy refers to a self-appreciation of one's ability to deal with prospective situations (Bandura, 1982). Self-efficacy beliefs have numerous implications as they activate and regulate motivation, affect, cognition, and behavior (Bucy & Tao, 2007). In our study, fake news self-efficacy will be measured using tree items that were designed to tap self-appraisals relating to the identification of fake news in the context of online information environments. Questionnaire items were developed using Bandura's (2006) guide for instrument construction. The items read as follows:

1. I can learn to identify reliable science news.
2. I am able to identify fake science news.
3. I can identify involuntary errors in science news.

Pupils rated each item on a four points Likert format ranging from 'disagree', 'partially disagree', 'partially agree', to 'agree'. The reliability was calculated by Cronbach's alpha, which reached 0.70, a value considered satisfactory (Nunally, 1978).

#### *Views of science news questionnaire*

Views of science news refer to students' intentionality and reasoning with respect to science news (Tsai et al., 2019). We adapted the views of science news instruction questionnaire (Tsai et al., 2014). We selected and translated four items from English to French that target specifically the interest dimension of views of science news. The items read as follows:

1. I listen to or read science news.
2. I am interested in science news.
3. I enjoy reading science news.
4. I like to discuss science news with others.

Pupils rated each item on a 4-point Likert format ranging from 'disagree', 'partially disagree', 'partially agree', to 'agree'. The reliability was calculated by Cronbach's alpha, which reached 0.81, a value considered satisfactory (Nunally, 1978).

#### *Fake news identification ability task*

Six to eight weeks following the news media literacy intervention, children were invited to complete a fake news identification task developed specifically for this study. It comprises ten science news posts shared on the social media Twitter that later changed its name to "X" (**Appendix A**). Four posts were true science news while six posts were fake news. Pupils were asked to rank the posts from 'true', 'mostly true', 'mostly false', and 'false' news. They were also given the option to respond, 'I don't know'. Next to their ranking, children were encouraged to share the strategy they based their judgement on. The posts were intentionally simplified by hiding the date and stats (likes and shares) to allow for children to focus solely on the news content, its author, and its source. Simplified posts also allow for a quick completion mimicking the pace of scrolling on social media feeds.

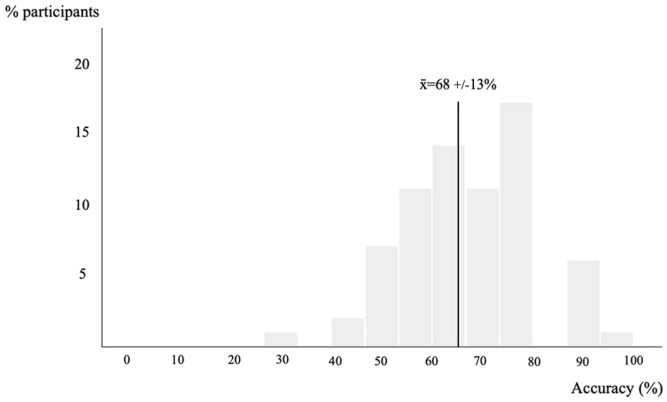


**Figure 2.** Distribution of average accuracy scores to the fake news detection task (Source: Authors)

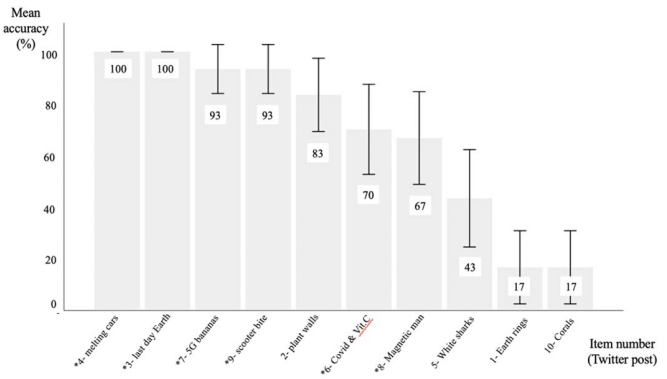


**Figure 3.** Success rate per item of the fake news detection task (error bars: 95% CI, *fake news) (Source: Authors)

## FINDINGS

**H1.** In line with our hypothesis, fake news identification capabilities revealed to be significantly greater than what is reported in studies focused on exploring children's vulnerability (0–35%) (Dumitru, 2020). Pupils were on average 68% accurate (standard deviation [SD] = 13%) when invited to identify fake science news, the success rate being clearly above chance level (> 50%) (**Figure 2**).

Success rate per item is presented in **Figure 3**. The highest scoring items (4, 3, 7, and 9) are all fake science news posted, respectively by three sensationalist private accounts and one satirical parody of a renowned French media "*Le Figaro*". The lowers scoring items (5, 1, and 10) were reliable news posted, respectively by Canada's public broadcasting network, a French science periodical, and a Canadian science periodical destined to young adolescents.

The evaluation strategies used by pupils were grouped into four emerging categories that allowed them to explore to what

**Table 1.** Categories of evaluation strategies used by pupils

| Category | Description | Example of pupils' responses |
|---|---|---|
| 1. Prior knowledge in science | Knowledge and beliefs about natural phenomena unrelated to news media literacy. | 'Metal can't melt, hence it's fake news.'<br>'It's fake, we can't count how many days we have left on earth.'<br>'It's fake because I don't think a sea animal could like plastic.' |
| 2. Superficial news media knowledge | Knowledge about apparent features of a news, e.g. checkmark of a verified account, altered photo, etc. | 'The picture looks photoshopped. It can't be trusted.'<br>'It's fake, the account is not verified.'<br>'The account is not verified, but it's real news.' |
| 3. Substantial news media knowledge | Knowledge about latent features of a news, e.g. distinction between opinion and fact, media reliability, etc. | 'This local media (la Presse) is trustworthy and reliable.'<br>'It looks fake because I've never heard of this account and its name is weird.'<br>'The author is giving her opinion here.' |
| 4. Logical or intuitive reasoning | Perception unrelated to the assessment of the reliability of the information. | 'All opinions are equally valid.'<br>'It's impossible.'<br>'I don't know much about corals.' |

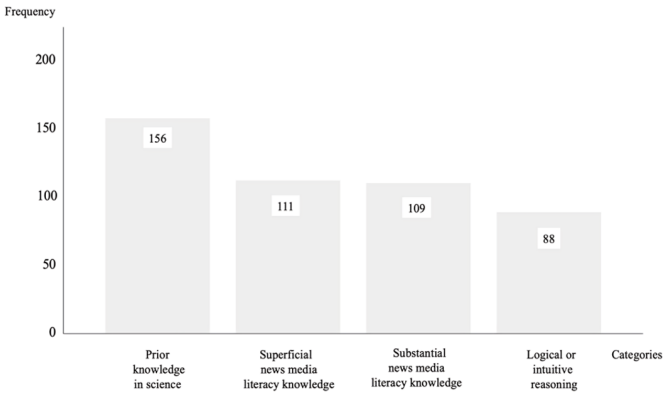


**Figure 4.** Frequency of use of four categories of evaluation strategies for distinguishing fake from reliable scientific news (Source: Authors)

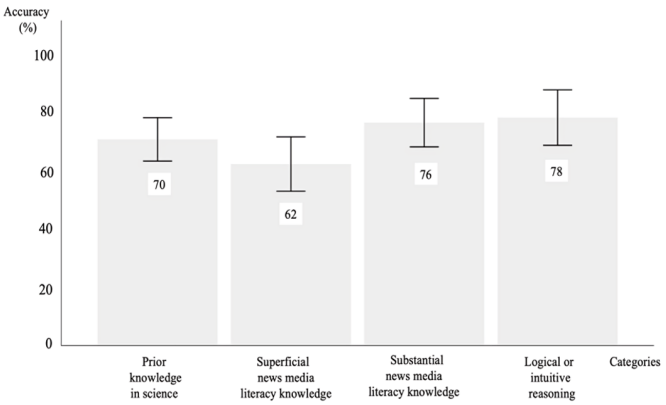


**Figure 5.** Accuracy of fake news detection associated with the four categories of evaluation strategies for distinguishing fake from reliable scientific news (error bars: 95% CI) (Source: Authors)

extend children were relying on the content of the intervention (category 3). The four categories are, as follows:

1. Prior knowledge in science
2. Superficial news media knowledge
3. Substantial news media knowledge
4. 4-Logical or intuitive reasoning (unrelated to news media literacy).

A description and examples of pupils' responses for each category is presented in **Table 1**.

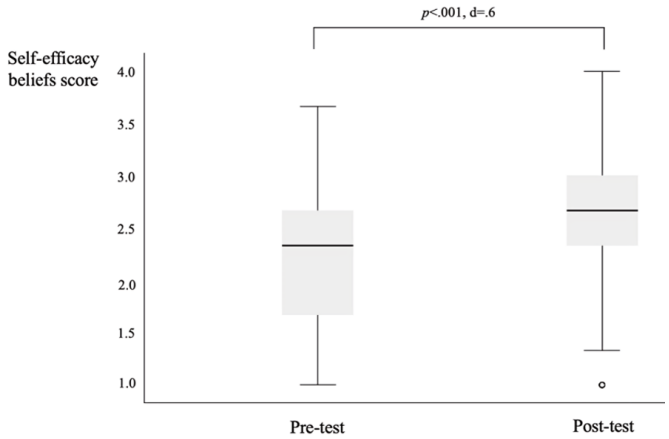


**Figure 6.** Self-efficacy beliefs in the ability to detect scientific fake news scores before and after the news media literacy training (error bars = 1 SE) (Source: Authors)

The most frequently used strategy is the use of prior knowledge in science, followed by superficial and substantial news media literacy knowledge almost equivalently, and finally the logical or intuitive reasoning evaluation strategy (**Figure 4**).

A one-way ANOVA was performed to compare the success rate in the four categories of evaluation strategies (**Figure 5**) and revealed that there was not a statistically significant difference in accuracy between them ($p$ = .06).

**H2.** As expected, fake news self-efficacy beliefs increased significantly after the news media literacy training. A paired samples t-test was conducted, and the results indicate a significant difference between self-efficacy beliefs score before the intervention (mean [M] = 2.25; SD = .62) and after the intervention (M = 2.64; SD = .68); t [58] = 4.804, $p$ < .001, d = .6, large effect size).

In addition, a Pearson product-moment correlation coefficient was computed to assess the relationship between self-efficacy beliefs score and pupils' success rate at the fake news detection task. There was a weak, positive correlation between the two variables, r = .13, N = 69; however, the relationship was not significant (p = .28). The self-efficacy belief score did not appear to be associated with the pupils' success rate at the fake news detection task (**Figure 6**).

**H3.** Contrary to our expectations, views of science news score didn't increase significantly after the news media literacy training. A paired samples t-test was conducted, and

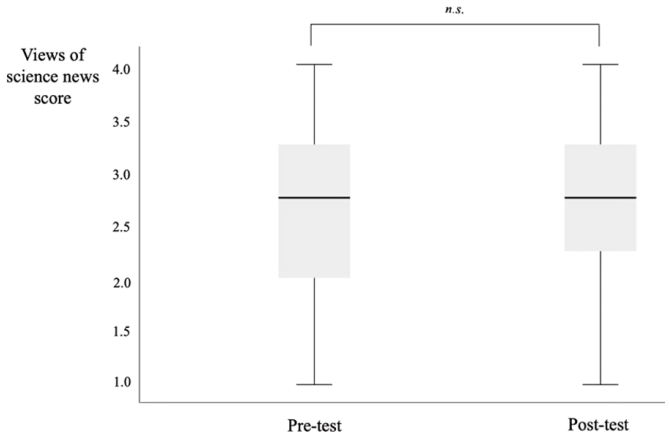


**Figure 7.** Views of science news scores before and after the news media literacy training (error bars = 1 SE) (Source: Authors)

the results don't indicate a significant difference between views of science news scores before the intervention (M = 2.74; SD = .72) and after the intervention (M = 2.68; SD = .79; $p$ = .12).

Finally, a Pearson product-moment correlation coefficient was computed to assess the relationship between views of science news score and pupils' success rate at the fake news detection task. There was a weak, negative correlation between the two variables, r = −.05, N = 70; however, the relationship was not significant ($p$ = .71). The views of science news score did not appear to be associated with the pupils' success rate at the fake news detection task (**Figure 7**).

## DISCUSSION

The main purpose of this investigation was to examine to what extent children can identify fake science news after participating in a news media literacy intervention which models reliable news evaluation strategies (**H1**). We also explored the impact of the news media literacy intervention on self-efficacy beliefs in the ability to identify fake science news (**H2**) and on views of science news (**H3**). In the following section we discuss the key findings of this study and their implications.

### Comparison of Accuracy Judgement of Our Sample vs. Descriptive Studies

Previous studies have found that children are vulnerable to scientific misinformation, but that for most news media literacy interventions, neither the long-term nor short-term efficacy is tested, resulting in poor reliability of the available training and interventions (Dumitru et al., 2022). In our study, accuracy discernment was found to be higher than in descriptive studies where children didn't participate in a news media literacy intervention. Mean accuracy (68%) was close to twice as high as the most optimistic results (35%) reported for the 10–12 years old age group (Loos et al., 2018). This observation is based on an instrument using authentic recent Twitter posts about various scientific claims from fields ranging from astronomy, to health, and biology, etc. The evaluation strategies used by pupils suggests that they are capable of mobilizing news media literacy knowledge as much, if not more than prior scientific knowledge (**Figure 4**). These findings suggest that such an intervention is suitable for 5$^{th}$–6$^{th}$ graders, and potentially even younger primary school pupils. However, it is unclear if the intervention might have supported evaluation of both fake and reliable science news. The most accurate judgements were associated with fake news while the least accurate judgements were associated with reliable news. These results suggest that the intervention might have supported an evaluation of inaccurate scientific information at the expense of accurate scientific information. The strategies that were explored during the intervention might have made source reliability more salient to pupils, which would have encouraged them to doubt the credibility of scientific information more spontaneously.

Pupil's growing awareness or evaluation strategies could also have made them hyper vigilant and hinder their accuracy judgement of reliable news. A scoring system that rewards identification of reliable scientific information more clearly, e.g., negative adjustment for wrongly labeling some news as fake news, might have provided us with a more accurate portrait of pupils' ability to detect fake science news. Alternatively, it could be that it is inherently easier to detect fake news than to recognize reliable news. The reasoning process associated with detecting fake news requires involves raising a suspicion while recognizing reliable news requires to conclude that no suspicion exists. Finally, the results could have been influenced by item effects (Roozenbeek et al., 2021, 2022). It could have been harder than we anticipated to reject the inaccurate scientific information in the fake news detection task which could have led pupils to pay more attention to the cues and led to more caution. More studies are needed to examine how to validate and assess the psychometric value of fake news identification tasks, for instance by exploring the effects of item plausibility and prior knowledge (Barzilai et al., 2023).

### Impact of the News Media Literacy Intervention on Self-Efficacy Beliefs and Views of Science News

In line with the effects on the ability to detect fake science news, the news media literacy intervention had a moderate positive effect on self-efficacy beliefs in accuracy judgement regarding fake science news. One potential explanation for the effect of the intervention on self-efficacy beliefs besides the improvement in accuracy judgement is the practical nature of the intervention. Bandura (2006) identifies four main sources of self-efficacy beliefs:

1. mastery experiences,
2. vicarious experiences,
3. verbal persuasion, and
4. psychological state.

The hands-on learning activities included in the intervention and the interactive facilitation of the intervention could have provided not only mastery experiences, but also vicarious experiences, i.e., observing peers succeed or achieve mastery at detecting fake science news.

Contrary to our expectations, the news media literacy intervention had no significant effect on views of science

news. It could be argued that the intervention was simply too short to impact students' views of science news. The relevance of access to reliable scientific information might need to be more salient in the intervention to increase the interest in science news significantly. It might also be plausible that impacting pupils' affective dispositions towards science news may require extended and exhaustive instruction and a classroom culture that values this interest.

### Limitations and Future Directions

We were challenged by an unexpectedly low rate of parental consent to their child's participation in our study (49%, 74/151) possibly due to lower socio-economic background of the pupils or parents' low language proficiency that didn't allow them to understand the consent forms that were provided in French or English. We were therefore compelled to use a single-group experimental design where our success rate results were compared to those previous studies that obviously differ in their experimental settings. Hence, the absence of a control group limits the interpretation of the results regarding the impact of the intervention on the ability to detect fake science news. An upcoming study might use a control or active control to measure the impact of the intervention more precisely and assess any long-lasting impact on the ability to detect fake science news, but also self-efficacy beliefs and views of science news. Additionally, our results could be impacted by a social desirability bias which is limitation of research relying on self-reported data such as self-efficacy belief scales. Pupils might have answered in a way that presents them in a socially acceptable light, potentially overestimating their capacity to identify fake news.

Our study is based on a single intervention that will likely have a limited impact. Future work could explore how it can be combined with additional instruction and practice to detect scientific misinformation. For instance, an investigation could examine how educators might encourage students to further reflect on the trustworthiness of news after a news media literacy intervention.

A logical next step could also be to explore over a lengthier period how spontaneously pupils critically evaluate scientific information after a news media literacy intervention. For that purpose, using more authentic contexts such as assignments, homework or literature search could help shed light on pupils' relationship with scientific misinformation. In addition, the results of recent studies (Barzilai et al., 2023; Micallef et al., 2021; Yang et al., 2021), suggest the benefits of using games to support evaluation of both misinformation and reliable information. A future study could better examine the contribution of these games by comparing the impact from an interactive lecture-based intervention. In addition, further research with larger samples would be needed to allow the use of more sophisticated statistical analysis that would account for potential confounding variables using, for example mixed methods. A more systematic exploration of the different types of fake news and how pupils' detection strategies vary across these types could also help to guide the design of medial literacy interventions for fake news identification.

## CONCLUSION AND IMPLICATIONS

Even though fake news' societal impacts are known, the solutions to address the issue are more difficult to identify. The results of this study demonstrate that following a news media literacy intervention focused on misinformation, primary school pupils show a more encouraging ability to detect fake science news. The intervention appears to have allowed the pupils to tell apart misleading and reliable scientific information better than their peers from descriptive studies or than chance level. The pupils' accuracy judgements are based on evaluation strategies stemming mainly from news media literacy, but also in a significant proportion of prior scientific knowledge and intuitive reasoning. In addition, their judgement accuracy was no different when relying on news media literacy knowledge than scientific knowledge or intuitive reasoning. These findings suggest that primary school pupils are capable of careful examination of the credibility of scientific news. Children are regularly exposed to misinformation, and knowledge on how to critically engage with scientific information should be taught as soon as this exposure begins. Our findings suggest that news media literacy training can be successfully facilitated with primary school pupils.

**Author contributions: GAD:** conceptualization, data curation, formal analysis, funding acquisition, investigation, methodology, project administration, resources, software, supervision, validation, visualization, writing – original draft, writing – review & editing; **AH, AG, & MEC:** conceptualization, writing – review & editing; **JND:** conceptualization, writing – review & editing, funding acquisition, methodology; **AM, AL, & AK:** data curation; **JPAB:** conceptualization, supervision, validation, project administration, writing – review and editing. All authors approved the final version of the article.

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**Declaration of interest:** The authors declare that they have no competing interests.

**Availability of data and materials:** All data generated or analyzed during this study are available for sharing when appropriate request is directed to corresponding author.

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## APPENDIX A: FAKE SCIENCE NEWS DETECTION TEST

**Post 1**

Expected accuracy judgment: Reliable news


Translation into English:
Earth could soon be surrounded by rings! How could that be?
Will Earth soon be surrounded by rings? The earth could soon be surrounded by rings ... because of the debris buildups in its orbit.

Source: Science&Vie [@science_et_vie]. (2022, August 1). La Terre pourrait bientôt être ornée d'anneaux! Mais comment? [Post]. X. https://twitter.com/science_et_vie/status/1554196518969565185

**Post 2**

Expected accuracy judgment: Reliable news


Translation into English: Education–Plant walls for teaching
Education–Plant walls for teaching
Hundreds of Drummondville schoolchildren will be able to grow berries, vegetables, herbs and other plants in their ...

Source: La Presse [@LP_LaPresse]. (2022, July 31). Éducation | Des murs végétaux pour enseigner [Post]. X. https://x.com/LP_LaPresse/status/1553669945736642560

**Post 3**

Expected accuracy judgment: Fake news


Translation into English: NASA has calculated the last day of life on earth, and here's how long we have left.
The last day of life on Earth has been calculated by NASA: The universe is an infinite, miraculous place full of ...

Source: Angélique Viau Soin et voyance [@AngeliqueViau]. (2022, July 10). Le dernier jour de la vie sur Terre aurait été calculé par la NASA, et voici le temps qu'il nous reste [Post]. X. https://x.com/AngeliqueViau/status/1546075702826500097

**Post 4**

Expected accuracy judgment: Fake news


Translation into English: You won't believe it: these cars literally melt under the scorching heat!

Source: CultureG.officiel [@culturegoffi]. (2021, November 2). Vous n'hallucinez pas: ces voitures fondent littéralement sous la chaleur torride! [Post]. X. https://x.com/culturegoffi/status/1455662235653746691

**Post 5**

Expected accuracy judgment: Reliable news


Translation into English: White sharks in the Atlantic: no reason to fear, say experts
On the contrary, they would like us to change the reputation of these large fish.

Source: Radio-Canada Acadie [@iciacadie]. (2022, August 3). Requins blancs en Atlantique : aucune raison d'avoir peur, disent des experts [Post]. X. https://x.com/iciacadie/status/1554885345581223937

**Post 6**

Expected accuracy judgment : Fake news


Translation into English: How can I prevent Covid-19 with vitamin C powder?
Shanghai physician Dr Richard Cheng recommends 5-10 grams of pure vitamin C powder for adults ...

Source: EetR_National[@EetR_National]. (2020, April 19). Comment prévenir le Covid-19 avec la vitamine C en poudre? [Post]. X. https://x.com/EetR_National/status/1251869441123594243

**Post 7**

Expected accuracy judgment: Fake news


Translation into English: Even bananas are contaminated with 5G ... one of my vaccinated kids bought this without even realizing it!!!! Damn 5G chip–controlling their thoughts IGA verdun (local grocery store chain)

Source: Patrick Koppes [@KoppesPatrick]. (2022, February 4). Même les bananes sont contaminées par le 5G... un de mes enfants vaccinés a acheté ça sans même le réalisé!!! Maudite puce 5G -contrôle leurs pensées IGA -Verdun [Post]. X. https://x.com/KoppesPatrick/status/1489667347438870535

**Post 8**

Expected accuracy judgment: Fake news


Translation into English: Nermin Halilagic, the magnetic man

Source: Paris Match [@ParisMatch]. (2022, January 25). Nermin Halilagic, l'homme-aimant [Post]. X https://x.com/ParisMatch/status/824214263224942593

**Post 9**

Expected accuracy judgment: Fake news


Translation into English: Paris: A raging electric scooter bites a rider
A 28-year-old woman is being treated at Lariboisière hospital after being bitten by a potentially raging electric scooter ...

Source: Le Gorafi [@le_gorafi]. (2022, July 1). 1er juillet 2019 : Paris : Une trottinette électrique enragée mord un usagé [Post]. X. https://x.com/le_gorafi/status/1542765088981094400

**Post 10**

Expected accuracy judgment: Reliable news


Translation into English: Corals love the taste of plastic.

Source: https://twitter.com/CuriumMag/status/981532089806974976 Account was closed. Original article: https://curiummag.com/miam-plastique-video/