



LATERAL READING:

READING LESS AND LEARNING MORE WHEN EVALUATING DIGITAL INFORMATION

Sam Wineburg & Sarah McGrew
Working Paper N° 2017.A1/Stanford History Education Group
sheg.stanford.edu
September 2017

©Sam Wineburg & Sarah McGrew 2017. All rights reserved. Short sections of text, not to exceed 200 words, may be quoted without explicit permission provided that full credit is given to the source.

:

Abstract¹

The Internet has democratized access to information but in so doing has opened the floodgates to misinformation, fake news, and rank propaganda masquerading as dispassionate analysis. To investigate how people determine the credibility of digital information, we sampled 45 individuals: 10 Ph.D. historians, 10 professional fact checkers, and 25 Stanford University undergraduates. We observed them as they evaluated live websites and searched for information on social and political issues. Historians and students often fell victim to easily manipulated features of websites, such as official-looking logos and domain names. They *read vertically*, staying within a website to evaluate its reliability. In contrast, fact checkers *read laterally*, leaving a site after a quick scan and opening up new browser tabs in order to judge the credibility of the original site. Compared to the other groups, fact checkers arrived at more warranted conclusions in a fraction of the time. We contrast insights gleaned from the fact checkers' practices with common approaches to teaching web credibility.

Keywords: digital literacy, media literacy, expertise, web credibility

¹ The authors thank Joel Breakstone, Teresa Ortega, Mark Smith, Mary E. Ryan, Mike Caulfield, and Susan Monas for comments on a previous draft. Any errors that remain are the responsibility of the authors. This research was supported by a grant from the Spencer Foundation, but no endorsement is intended. Corresponding author: Sam Wineburg, Margaret Jacks Professor of Education and of History (by courtesy), wineburg@stanford.edu

In October 2010 the *Washington Post* broke a story about a fourth-grade history textbook, *Our Virginia: Past and Present*, which claimed that thousands of African Americans fought for the Confederacy, “including two black battalions under the command of Stonewall Jackson” (Sieff, 2010). Given that Jackson died from friendly fire on May 10, 1863, these “Black Confederates” had to be taking up arms at the height of the Civil War, a time when the Union Army was still debating the recruitment of African American soldiers.

There’s one problem with this claim—no evidence supports it. The only Confederate document that addresses drafting Black soldiers is General Orders No. 14, a last-ditch effort to stall a Union victory issued seventeen days before Lee’s surrender at Appomattox on April 9, 1865. With almost all hope lost, the proposal was still so controversial that the Confederate leadership felt compelled to issue a disclaimer: “Nothing in this act shall be construed to authorize a change in the relation which the said slaves shall bear toward their owners.”¹

How, then, did the fraudulent claim that thousands of African Americans took up arms for the Confederacy find its way into materials for school children?

When queried about her sources, author Joy Masoff explained to the *Washington Post* that she conducted her research . . . on the Internet. Among the sources she consulted was the website of the Sons of the Confederate Veterans: “A patriotic, historical and educational organization, founded in 1896, dedicated to honoring the sacrifices of the Confederate soldier and sailor and to preserving Southern Culture” (Sons of Confederate Veterans, 1997).

Some might claim that Joy Masoff, a “digital immigrant” (Prensky, 2001), was out of her league—that today’s students, glued to screens almost since birth, would not have succumbed to such ruses. However, when the prowess of digital natives has been put to the test, it has been proven false time and again (Bennett, 2012; Gasser, Cortesi, Malik, & Lee,

2012; Helsper & Eynon, 2009). Students, it turns out, struggle with nearly every aspect of gathering and evaluating information online. After studying how college students used academic databases, Asher and Duke (2011) summarized, “the majority of students...exhibited significant difficulties that ranged across nearly every aspect of the search process” (p. 73). They quickly abandoned searches when they did not return the desired results, relied only on the first page of results, and based their judgments of credibility primarily on an article’s title and abstract.

In one of the most extensive think-aloud studies to date, Hargittai, Fullerton, Menchen-Trevino, and Thomas (2010) observed over a hundred college students as they searched online. Screen and audio recordings of the sessions produced a trove of data: over 80 hours of tape and 770 pages of transcribed interviews. Students overwhelmingly ceded to Google the responsibility for determining the credibility of information—the higher it ranked in Google’s results, the more reliable they considered the site to be. Another study found that undergraduates ignored the valuable information contained in Google’s snippets (the few sentences accompanying each result), clicking instead on websites in higher positions even when they were “less relevant to the task” (Pan, Hembrooke, & Joachims, 2007, p. 816).

Wiley et al. (2009) found that college students rarely considered where information came from when evaluating reliability, a finding replicated across a range of studies with students of different ages and in different countries (e.g., Barzilai & Zohar, 2012; List, Grossnickle, & Alexander, 2016; Walraven, Brand-Gruwel & Boshuizen, 2009). Young people are more likely to judge a website based on its relevance to their searching needs (Iding, Crosby, Auernheimer, & Klemm, 2009; Julien & Barker, 2009; Walraven et al., 2009), its appearance, or how easy it is

to navigate (Agosto, 2002; Barzilai & Zohar, 2012).

These studies have focused on typical users; studies of what *skilled* users do are less common. Lucassen and Schraagen (2011) studied people active on a car enthusiasts' forum as a proxy for expert knowledge about car engines. Unsurprisingly, people who knew more about cars were better able to detect errors in Wikipedia than those who knew less. Similarly, a group of Dutch researchers compared psychology students and psychology faculty as they selected online sources on psychological topics; faculty spent more time scanning search results while students made more superficial evaluations (Brand-Gruwel, Kammerer, van Meeuwen, & van Gog, 2017). In another study, researchers designated a group of graduate students in educational technology as "experts" and compared their online research processes with those of university freshmen ("novices") (Brand-Gruwel, Wopereis, & Vermetten, 2005). But the authors provided few clues about how experts went about selecting and evaluating information.

The present study set out to understand in greater detail what experts do when judging information online. Before we could tackle this issue, though, we needed to figure out who qualifies as an expert.

We turned to a group of professionals who evaluate sources for a living: historians. Ample research has established how historians *source* documents, interrogating a document's author and the circumstances of its creation as keys to determining its trustworthiness (Wineburg, 1991a, 1998; Leinhardt & Young, 1996; Shanahan & Shanahan, 2008). Shanahan, Shanahan, and Misischia (2011) found wide variations in sourcing among academics from different fields. While mathematicians explicitly ignored the author of a paper, as it "would only

be a distraction and could help in no way with the process of making sense of the text,” historians engaged in “extensive sourcing,” speculating about “who the author was and what he or she represented” (2011, pp. 408-409).

Despite the growth of digital history, the majority of historians still conduct their research in archives of print documents. We thus set out to study a second group whose work is largely done on a computer screen: fact checkers, whose job it is to ascertain truth in digital form. These professionals are charged with evaluating claims and evidence, and spend much of their time vetting digital information.

Finally, we recruited a third group: undergraduates at Stanford University. In 2016, Stanford rejected 95% of its applicants, making it the most competitive university in the United States. Nearly all admitted students were in the top 10% of their high school classes and scored above the 90th percentile on the SAT (Stanford University, 2015). These young people attend a university in the heart of Silicon Valley, where technology startups sprout within campus labs and where computer science is the most popular major (Stanford University, 2017). These students are not garden-variety “digital natives,” but drawn from the tail of the ability distribution and earmarked—at least according to Stanford University brochures—to lead the digital future.

Method

Participants

Historians. Ten historians were recruited; all held the Ph.D. in history and were faculty at four-year colleges and universities in either California or Washington state. Six were male; four were female. Their ages ranged from 39 to 69 ($M = 47$).

Fact Checkers. The fact checkers were all employed at well-regarded news and political fact-checking organizations. Eight were located in New York City or Washington, DC; two were based on the West Coast. As with the historians, six were male and four female. Ages ranged from 23 to 60 ($M = 34$). Two participants held master's degrees while one held a Ph.D.; the rest had bachelor's degrees.

College Students. Students were recruited using fliers posted on campus. Each received a \$25 Amazon gift card for participating. All students were enrolled in the second or third quarter of their first year and were between the ages of 18 and 19; 11 identified as male, 13 as female, and one as non-binary. Every student reported spending at least four hours online each day.

Protocol

We developed a set of six online tasks that took approximately 45 minutes to complete. Our focus was on evaluating digital sources that addressed social and political issues. Space limitations require that we narrow our discussion here to three of the main tasks participants completed (see Table 1).²

Table 1
Main Web Evaluations

Topic	Processes Elicited	Participants could:
Bullying in schools URLs: https://www.acpeds.org/the-college-speaks/position-statements/societal-issues/bullying-at-school-never-acceptable https://www.aap.org/en-us/about-the-aap/aap-press-room/pages/Stigma-At-the-Root-of-Ostracism-and-Bullying.aspx	Evaluations internal and external to a site; comparing sites	Scroll, click on links, and leave the site to access any information online Time Limit: 10 minutes

Minimum wage policy URL: https://www.minimumwage.com/2014/10/denmarks-dollar-forty-one-menu/	Evaluations internal and external to a site	Scroll, click on links, and leave the site to access any information online Time Limit: 5 minutes
Teacher tenure: Funding for plaintiffs in <i>Vergara v. California</i>	Open web search to find out who paid for the \$1.2 million legal fees	Access any information online Time Limit: 5 minutes

Procedure

Sessions with historians and fact checkers were conducted by the authors; sessions with students were conducted by one of the authors and other members of the research team. Participants were asked to complete a series of web-based tasks on a 13-inch MacBook Air. Websites were live and participants were able to search the Internet as they normally do—clicking on links, opening new tabs, and leaving a site to search elsewhere. Participants were encouraged to do what they normally would when evaluating information and determining its trustworthiness. Additionally, they were asked to verbalize their thoughts as they worked through the tasks (Ericsson & Simon, 1993; Pressley & Afflerbach, 1995).³

We used a variety of prompts to encourage natural behavior, including: “You can open up new tabs—do whatever you normally would to learn about a site” and “We’re interested in your take. You can stay on the page or go out to another website, anything you would normally do.” We repeated these instructions at the beginning of each task. We also noted the time limit for each task and gave participants a one-minute warning before time was up. We set time limits because amount of time that people are willing to devote to a website is generally quite short—seconds instead of minutes (Haile, 2014; Nielson, 2011). Researchers at Microsoft found that “dwell time” on websites was “no more than 70 seconds on 80% of the

205,873 pages” that users visited (Liu, White, & Dumais, 2010, p. 382). Efficient search and evaluation strategies are essential to anyone trying to manage the deluge of information that comes across one’s screen.

QuickTime Player version 10 was used to record audio and to capture video of the computer screen. We also used an iPhone 6 to video-record each session in case parts of the QuickTime audio files were muffled.

Data Analysis

We developed rubrics to rate the quality of participants’ conclusions for each task. These rubrics were developed after extensive pilot testing with Ph.D. graduate students and university professors (we describe these rubrics in greater detail in subsequent sections that describe each task).

Two coders (the second author and a research assistant who did not participate in the creation of the rubrics) tested for interrater reliability. We conducted reliability tests on about a quarter of the data, achieving an interrater agreement of 92% across the three tasks (Cohen’s *Kappa* = 0.90).

Additional analyses varied by task. These included tracking the time participants took to settle on a conclusion; whether they stayed on or left a site, and, if they left, which other sites they visited; and whether they took steps to find out more about the individuals or groups behind the sites they consulted.

Results

Task 1: Bullying

Participants evaluated articles about bullying on the websites of the American Academy of Pediatrics (“the Academy”) and the American College of Pediatricians (“the College”). Despite the similarity in names, the two organizations couldn’t be more different. The Academy, established in 1932, is the largest professional organization of pediatricians in the world, with 64,000 members and a paid staff of 450. The Academy publishes *Pediatrics*, the field’s flagship journal, and offers continuing education on everything from Sudden Infant Death Syndrome to the importance of wearing bicycle helmets during adolescence.

By comparison, the College is a splinter group that in 2002 broke from its parent organization over the issue of adoption by same-sex couples. It is estimated to have between 200-500 members, one full-time employee, and publishes no journal (Throckmorton, 2011). The group has come under withering criticism for its virulently anti-gay stance, its advocacy of “reparative therapy” (currently outlawed for minors in nine U.S. states), and incendiary posts (one advocates adding P for pedophile to the acronym LGBT, since pedophilia is “intrinsically woven into their agenda”) (American College of Pediatricians, 2015). The Southern Poverty Law Center has labeled the College a hate group that is “deceptively named” and acts to “vilify gay people” (Lenz, 2012; Southern Poverty Law Center, 2016). The College’s portrayal of research findings on LGBT youth has provoked the ire of the nation’s leading scientists, including Francis Collins, the former director of National Institutes of Health, who wrote that “the American College of Pediatricians pulled language out of context from a book I wrote . . . to support an ideology that can cause unnecessary anguish and encourage prejudice. The information they present is misleading and incorrect” (as cited in Bradshaw, Weight, & Packard, March 3, 2011).⁴

A quick glance at the College’s site might lead one to conclude that it is a politically neutral medical organization (Turban, 2017). The website bears an official-looking logo and

the motto “Best for Children.” An anodyne “About Us” page informs the reader that the College “produce[s] sound policy, based upon the best available research, to assist parents and to influence society in the endeavor of childrearing.” At the same time, the College does not mask its social positions. The “Mission of the College” states: “We recognize the basic father-mother family unit, within the context of marriage, to be the optimal setting for childhood development.” The College’s “Position Statements” are transparent on issues ranging from abortion (prematurely and unnecessarily ending a human life) to corporal punishment (effective under certain circumstances).

Participants began by evaluating an article on the College website entitled “Bullying at School: Never Acceptable,” where a section labeled “Prevention” advises schools to refrain from recognizing any students as particularly at risk of being bullied:

By focusing a program upon the special characteristic or activity of one student or group, the school opens the floodgates for other programs promoted by its advocates, i.e. over issues involving religion, ethnicity, stature, intelligence, race, or even athletic abilities. By focusing anti-bullying programs, instead, on the topic of *general* respectfulness, the school...avoids the pitfalls of calling undue attention to a particular group or perhaps venturing into controversial teachings. (Trumbull, 2013)

Multiple studies have shown that students who identify as LGBT are more likely to be bullied than their heterosexual peers—over 80% of LGBT students were “verbally harassed” and over 40% were “physically harassed at school...because of their sexual orientation,” according to a study cited in the White House Conference on Bullying (Espelage, 2011, p. 65). Yet, the College implies that programs to reduce bullying against LGBT students amount to “special treatment,”

and that these programs may “validat[e] individuals displaying temporary behaviors or orientations” (Trumbull, 2013).

The website of the 64,000-member American Academy of Pediatrics bears a logo and trademarked motto as well. Resources and professional education opportunities for members are featured, including details on membership, the group’s history since its founding in 1930, and opportunities to browse books and journals that it publishes. Participants viewed an article on the Academy website entitled “Stigma: At the Root of Ostracism and Bullying.” The article describes a symposium in which six papers were presented, including “Discrimination and Stigmatization of Non-heterosexual Children and Youth.” Additional presentations focused on factors that might place youth at risk for bullying, such as weight, sexual orientation, race, and income (American Academy of Pediatrics, 2014).

Participants were given up to five minutes per site to evaluate the trustworthiness of each as a source of information about bullying. If they did not explicitly compare the two sites before the ten minutes were up, we asked: “If you had to say which website was more reliable and which was less reliable, what would you say?”

We developed a rubric to characterize the quality of the conclusions participants reached about the sites: we awarded two points for specific, correct, and warranted descriptions of the sites, one point for vague or indecisive evaluations, and zero points when participants reached wrong conclusions (such as equating both organizations in terms of trustworthiness).

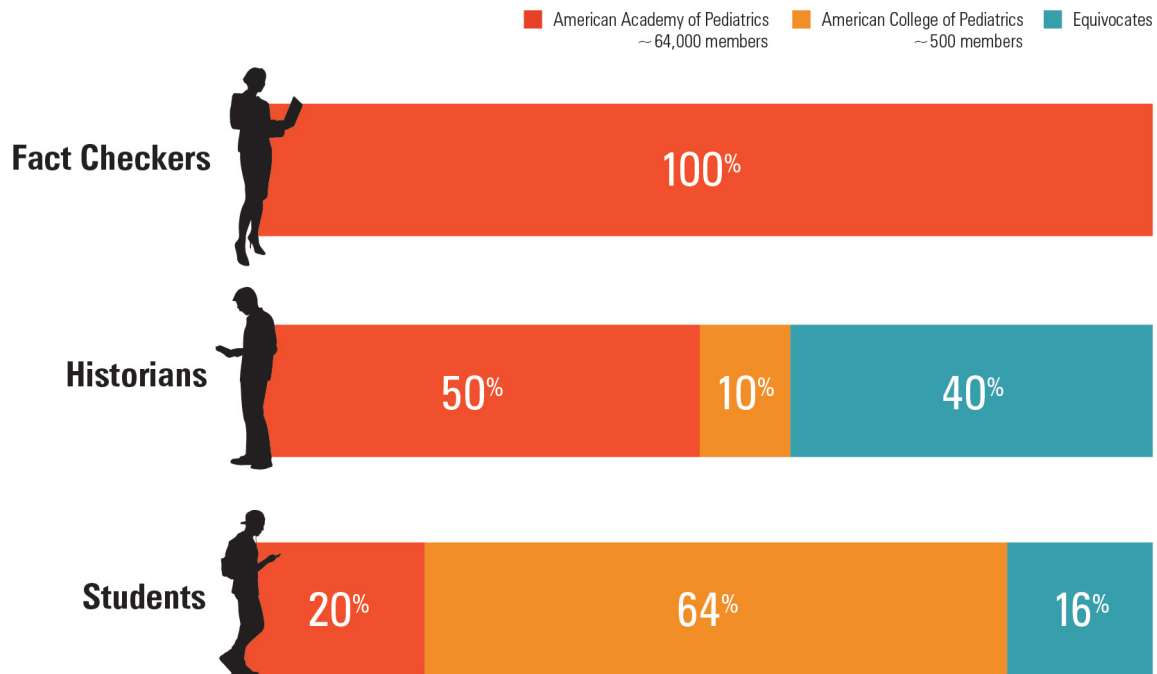
For the College website, a Kruskal-Wallis nonparametric analysis of variance indicated significant differences in the conclusions reached by participants on the College

website: fact checkers had a perfect mean score of 2 ($SD = 0$); historians, 0.7 ($SD = 0.95$); and students, .16 ($SD = 0.37$) ($H(2)$ corrected for ties = 27.5, $p < .001$). Follow-up Mann-Whitney U tests showed significant differences between fact checkers and historians ($p = .003$) and fact checkers and students ($p < .001$).

There were also significant differences in the quality of conclusion scores for the Academy site ($H(2)$ corrected for ties = 25.2; $p < .001$). Fact checkers again had a perfect score ($M = 2$, $SD = 0$), historians a 1.2 ($SD = 0.79$), and students a 0.4 ($SD = 0.58$). Follow-up Mann-Whitney U tests yielded significant differences between fact checkers and historians ($p = .01$), fact checkers and students ($p < .001$), and historians and students ($p = .007$).

There were striking differences in which site participants judged the most reliable. Every fact checker unreservedly viewed the Academy's site as the more reliable; historians often equivocated, expressing the belief that both sites were reliable; and students overwhelmingly judged the College's site the more reliable (see Figure 1).

Figure 1. Percentage of participants in each group selecting the College or the Academy as more reliable.




Taking Bearings. Fact checkers' success was closely tied to what we think of as *taking bearings*, a concept borrowed from the world of navigation. Exploring an unfamiliar forest, experienced hikers know how easy it is to lose their way. Only foolhardy hikers trust their instincts and go traipsing off. Instead they rotate their compass's bezel to determine *bearings*—the angle, measured in degrees, between North and their desired destination. Obviously, taking bearings on the web is not as precise as measuring an angle in degrees. It begins, however, with a similar premise: When navigating unfamiliar terrain, first gain a sense of direction.

Checker C's approach exemplified the advantages of taking bearings. He spent a mere eight seconds on the College's landing page before going elsewhere. "The first thing I would do

is see if I can find anything on the organization,” he said as he typed the organization’s name into Google. He clicked on Wikipedia’s entry about the College and read that it is a “socially conservative association of pediatricians...founded in 2002...as a protest against the [American Academy’s] support for adoption by gay couples.” Wikipedia’s entry linked to sources including a *Boston Globe* story (“Beliefs drive research agenda of new think tanks,” Kranish, 2005), a report from the Southern Poverty Law Center (“American College of Pediatricians Defames Gays and Lesbians in the Name of Protecting Children,” Lenz, 2012), and a brief from the American Civil Liberties Union (“Misinformation from Doctors . . . Out to Hurt Students?,” Coleman, 2010).

It was a full minute and twenty seconds before Checker C returned to the College’s article on bullying. Reading the abstract that he had glanced at in the task’s opening seconds (see Figure 2), he paused at the phrase “no group should be singled out,” and remarked that this is “often code for, you know, kids who are more likely to be bullied—students of color or gay or queer children,” adding, “That’s the kind of thing that I never would have known if I had just looked at [the article on bullying].”

Figure 2. Abstract of “Bullying at School: Never Acceptable” (emphasis added).



The screenshot shows the website of the American College of Pediatricians. The header includes the college's logo, name, and tagline "Best for Children", along with the text "Health Professionals". A breadcrumb trail indicates the user's location: "You are here: Home > The College Speaks > Position Statements of the College > Societal Issues >". The main heading is "Bullying at School: Never Acceptable", dated "American College of Pediatricians – October 2013". The abstract text reads: "ABSTRACT: No child should be harassed for his or her unique characteristics. Schools should encourage an environment of respectful self-expression for all students, and no group should be singled out for special treatment. Parental involvement should be a school's primary method of resolution with programs emphasizing general respectfulness serving to set the tone in the classrooms."

Rendered in under two minutes, Checker C's conclusion was not only an accurate evaluation of the bullying article but also of the rest of the College's website, which presents an anti-gay stance throughout.⁵ Overall, fact checkers left the landing page of the College in about half a minute ($M = 32$ s, $SD = 29$ s). In contrast, historians took almost three times as long ($M = 88$ s, $SD = 103$ s) (eight of the 10 left the landing page, two did not). The 16 students who left the landing page (nine never did) took an average of 100 seconds ($SD = 52$ s).

Fact checkers' comments as they left the landing page (see Table 2) showed an immediate impulse to take bearings. They understood the web as a maze filled with trap doors and blind alleys, where things are not always what they seem. Their stance toward the unfamiliar was cautious: while things *may* be as they seem, in the words of Checker D, "I always want to make sure."

Table 2

Examples of Fact Checkers' Comments Upon Leaving the Landing Page

Checker	
A	"I immediately want to know more about [the College]. So I'm going to go to About Us."
D	"My first move to figure out whether something is reliable is to click on the About Us page. . . . At face, the American College of Pediatricians sounds pretty formal, but I always want to make sure."
E	"I want to learn a lot more about the American College of Pediatricians."
H	"It's kind of hard to tell how mainstream this organization is, so I might open another tab just to read a little bit more about, if this is the main American pediatricians' professional organization or if this is a splinter group for some reason."

Historians' Reading. Two of ten historians resembled fact checkers in how they took

bearings. Leaving the landing page after a 20-second glance, Historian H opened the site's "Resources" tab and clicked on the link to focusonthefamily.com to confirm that it was in fact the organization founded by evangelist Dr. James Dobson. He returned to the College's "Resources" page, but this time with a hypothesis: "They probably have an agenda to quote, cure, unquote homosexuality, which is another fundamentalist point of view." Historian S also left the College's site in less than half a minute. Googling the organization's name, he clicked on a *Breitbart* headline, "American College of Pediatricians On Same-Sex Marriage Ruling: A Tragic Day for America's Children." He concluded that the College is "a heavily ideological site."

Historians H and S were the exceptions. Asked whether the website of the splinter group or the 64,000-member Academy was the more trustworthy site, five of their colleagues equivocated. Seven of the historians never took bearings; one did so only after analyzing the bullying article for four minutes. After ten minutes of review, most scholars had learned virtually nothing about the respective agendas of the two pediatrics organizations.

Historians were often taken in by the College's name and logo; its .org domain; its layout and aesthetics; and its "scientific" appearance, complete with abstract, references, and articles authored by medical doctors. Reading the "Bullying at School" article, Historian M commented on the presence of a scientific abstract and references, compared the site to WebMD, and noted that it was signed by a doctor (true, but it was not something she verified, since she never left the landing page). She concluded:

I think I would probably find this pretty reliable on the basis that it's written by an expert, it's citing expert opinions, it's been reviewed by at least some people from the

College of Pediatricians, so it agrees with an expert opinion. But it is still nonetheless still an opinion piece, it's just an opinion piece that I agree with, and...reflects the opinion of a group that I want to know the opinion of.

There was no basis for Historian M's far-reaching conclusions other than the surface features of the site, its presentation of information, and the M.D. listed after the author's name.

One feature played a key role in shaping historians' judgment: the presence of references at the bottom of the College's entry. Seven of 10 historians explicitly commented on them (see Table 3), viewing citations to *Pediatrics* and the *Journal of Criminology*, among others, as conferring legitimacy on the article's content.

Table 3

Historians' Comments About References

Historian	Comments
A	"It has references to kind of standard scientific literature, of backing up some of its claims so it has a kind of authoritative tone to it."
B	"I would look at the references and see who the [author] is citing."
E	"These are all references to professional journals so that definitely reinforces my sense that it's a genuine site and that the information found here can be trusted."
I	"I am looking at some of the footnotes and they all seem like perfectly credible sources. . . . I can trust this site."
K	"Who are they actually citing? So <i>Pediatrics</i> , okay, so they're citing real journals so I trust them a little bit more. . . . So the citations suggest that it has some reputable characteristics."
L	"I like to look at the sources to see where they are getting things. These are all academic journals as opposed to random Google News, which you never know about."
N	"I am looking at the references now and to what extent they're linked up to

	journals that strike me as peer-reviewed journals and have some kind of credibility. So, they all seem to come from something that strikes me—I don't know, <i>Pediatrics</i> —but I assume it seems to be in some kind of academic form.”
--	--

^aNot all references were to scientific articles. Among the 10 references, one was to Free Dictionary, two to Yahoo News blogs, one to Alliance Defense Fund, and the rest to refereed journal articles.

Students' Reading. By the end of ten minutes, only three of the 25 students had successfully distinguished between the stances of the College and the Academy. Fully 60% of students chose the College as the *more* reliable site. Even the five who favored the Academy learned little about the vast differences between the two organizations.

Few students had the sense or inclination to take bearings when landing on an unfamiliar site. Nine of the 25 never left the original site; those who did tended to click on links that spoke to a personal interest rather than a search designed to find out more about the organization behind the website. Student 19, who planned to major in either ancient Greek or bioengineering, based her evaluation almost exclusively on features like the organization's name (“sounds pretty legitimate”); the site's layout, which included bullet points (“nice to understand quickly”) and section headings (“that's really smart”); and the absence of banner ads (“makes you focus on the article”). Largely on the basis of graphic design, she concluded that the College's page was the more reliable of the two: “What struck me was how [the College's site] was laid out.” Student 19's approach was representative of how the majority of students conducted their evaluations (see Table 4).

Table 4

Students' Comments About Why They Trusted the College's Webpage

Reason for	Examples of Reasoning
------------	-----------------------

<p>conferring trustworthiness</p>	
<p>Scientific Presentation: abstract, references, authored by a medical doctor</p>	<p>“This seems like it’ll be pretty promising. There’s an abstract, so I feel like this is like a research thing.” (Student 12)</p> <p>“So now I see an abstract, which makes me think that this is a very research-based paper. . . . This seems like a very scientific article, because everything is in list form and very specific. The diction and the language is pretty scientific in general. I like that they are citing their sources with links and stuff.” (Student 15)</p> <p>“It’s written by a doctor. . . . There’re references. Seems like a legitimate article.” (Student 20)</p>
<p>Usefulness: amount of information, clarity and accessibility of article</p>	<p>“It has a very clear title on what its view of bullying is. . . . I really like how it’s laid out with the little headings to easily find what you need, and bullet points are always easier to look through also. And the references are really useful if I were to be doing research project, because then I could just look at these references afterwards. Yeah, I think this would be a useful site. It does seem like they have a lot of information.” (Student 13)</p> <p>“If I were writing a paper...then I would choose [the College] over [the Academy] simply because this just provides more information relevant to the topic.” (Student 6)</p> <p><i>Answering which is more reliable, after looking at both sites:</i> “The [College article] because that actually gave me more information about bullying.” (Student 11)</p>
<p>Graphic design: pleasant layout, color scheme, lack of advertisements</p>	<p>“They seemed equally reliable to me. I enjoyed the interface of the [College website] better. But they seemed equally reliable. They’re both from academies or institutions that deal with this stuff every day.” (Student 5)</p> <p>“Nice how there’s not really any advertisements on this site. Makes it seem much more legitimate.” (Student 19)</p>
<p>Organization’s Apparent Authority: name, logo, URL</p>	<p>“I can automatically see this source and trust it just because of how official it looks—American College of Pediatricians, even the font and the way the logo looks makes me think this is a mind hive that compiled this.” (Student 7)</p>

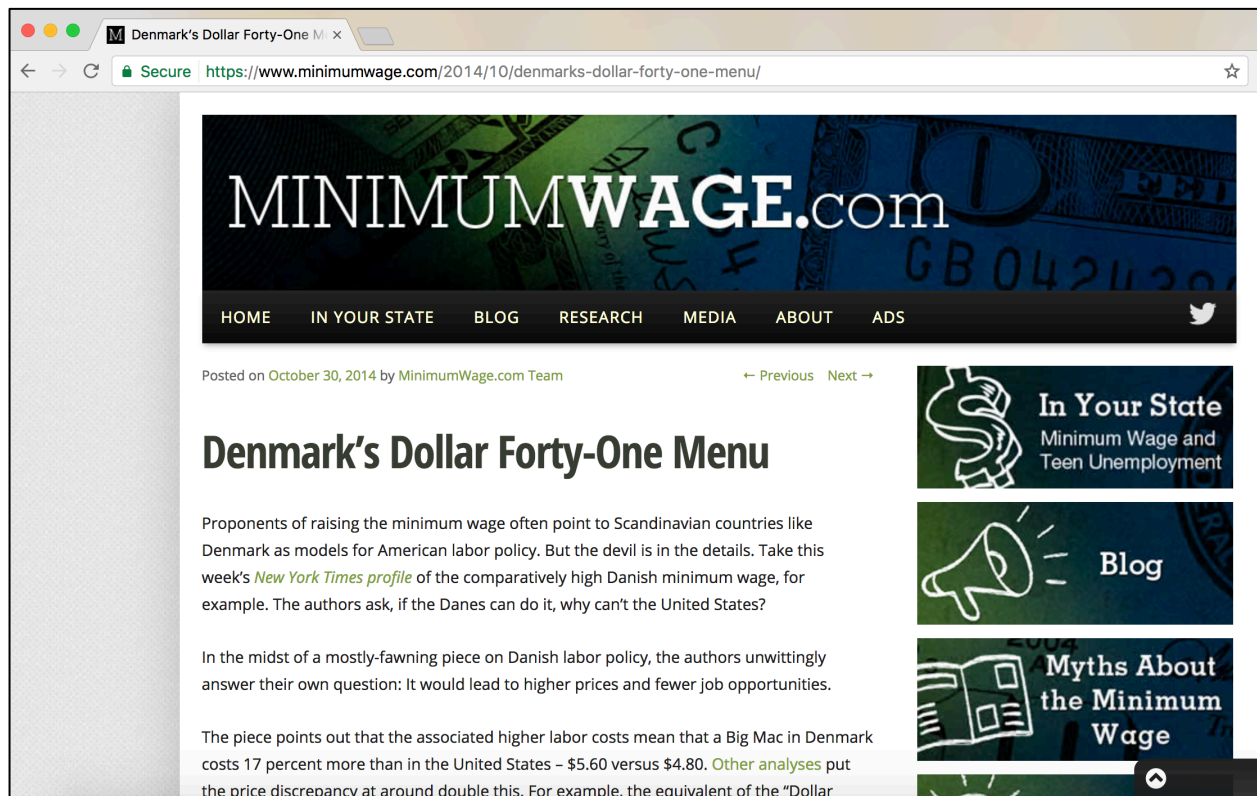
	<p><i>First statement on arriving at the site: “American College of Pediatricians. Seems like a credible website, run by pediatricians.” (Student 16)</i></p> <p><i>First statement on arriving at the site: “.org. So this looks like it might have been subsidized by a government agency.” (Student 18)</i></p>
--	--

Three of the 25 students selected the Academy as more trustworthy because they learned something about, and rejected, the College’s ideological stance. Two of the three stumbled upon information that provided insight into the College’s views, but did not deliberately seek it out. Only one student in 25 took bearings in a way that could be compared to the fact checkers’ approach. Even then, the student spent nearly four minutes reading “Bullying at School: Never Acceptable” before leaving the site.

Task 2: Minimum Wage

Participants evaluated an article entitled “Denmark’s Dollar Forty-One Menu” on the website minimumwage.com (see Figure 3). The article argues that if the U.S. followed the example of Denmark and raised wages, it would face higher food prices and diminished job opportunities. The article links to stories in the *New York Times* and *Columbia Journalism Review*, while the website includes tabs for research reports and news stories. Its “About” page says it is a project of the Employment Policies Institute (EPI), a group described as a “nonprofit research organization . . . [that] sponsors nonpartisan research which is conducted by independent economists at major universities.”

Figure 3. “Denmark’s Dollar Forty-One Menu” on minimumwage.com.



Despite their nonpartisan declarations, minimumwage.com and the Employment Policies Institute are the products of Berman and Company, a Washington, DC-based public relations firm that lobbies on behalf of the restaurant and hotel industries. Berman’s specialty, in the words of the *New York Times*, is to create “official-sounding nonprofit groups to disseminate information on behalf of corporate clients” (Lipton, 2014). None of this information, however, is available on minimumwage.com or the Employment Policies Institute website. A 2013 *Salon* article characterized the tactics of Berman and Company with the headline, “Industry P.R. Firm Poses as Think Tank” (Graves, 2013).

Participants were given up to five minutes to evaluate minimumwage.com. They could

use any Internet resources (including leaving the site) to help them; we repeated the instructions to do what “they would normally would do” when landing on an unfamiliar site.

Participants who had not reached the Employment Policies Institute website after five minutes were given this prompt: “Minimumwage.com is paid for by another person or organization.

Spend up to three minutes to figure out who is behind this site.”

We used the following rubric to rate participants’ responses:

Score	Description
0	Evaluates minimumwage.com based on surface features; does not identify connection to the Employment Policies Institute.
1	Determines that the Employment Policies Institute sponsors minimumwage.com, but learns nothing about the Employment Policies Institute.
2	Determines that the Employment Policies Institute sponsors minimumwage.com; describes the Employment Policies Institute as a non-profit and non-partisan think tank or research organization.
3	Determines that the Employment Policies Institute sponsors minimumwage.com; describes the Employment Policies Institute as an advocacy organization or raises substantial questions/concerns about its trustworthiness.
4	Determines that the Employment Policies Institute sponsors minimumwage.com and is a front site created by Berman and Company, a public relations firm.

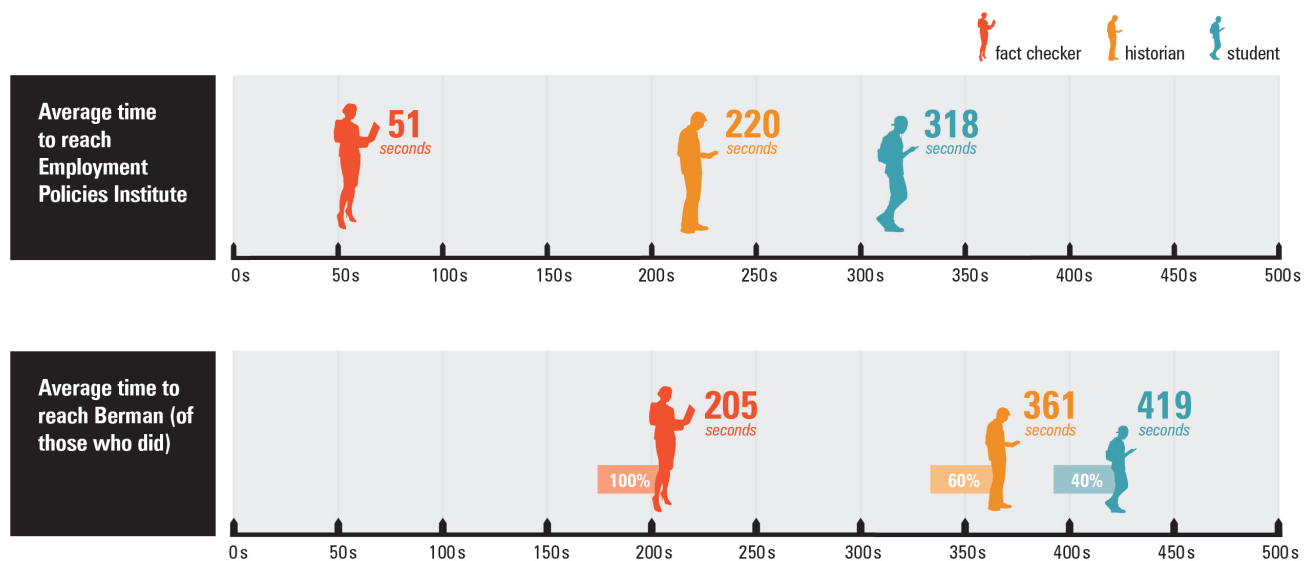
There were dramatic differences in what fact checkers, historians, and students learned during the task’s eight minutes. Before prompting, fact checkers’ conclusions averaged 3.3 ($SD = .82$) on a 5-point scale, versus historians’ average of 1.3 ($SD = 1.4$) and students’ .52 ($SD = 1.16$). A Kruskal-Wallis test showed significance ($H(2)$ corrected for ties = 21.4, $p < .001$); follow-up Mann-Whitney U tests showed differences among fact checkers and historians ($p = .003$) and fact checkers and students ($p < .001$).

Without prompting, and in less than a minute, the fact checkers learned that EPI was minimumwage.com’s parent (See Figure 4; $M = 51$ s, $SD = 43$ s). Historians took nearly four times as long ($M = 3$ min, 40 s, $SD = 2$ min). Six of the 10 needed to be prompted to find EPI.

Among the three groups, students took the longest to get to EPI: an average of 5 minutes and 18 seconds ($SD = 1 \text{ min}, 24 \text{ s}$); the overwhelming majority of students (four-fifths) needed prompting.

Every fact checker concluded that Richard Berman (or Berman and Company) sponsored EPI and minimumwage.com. Only six historians did so, and those who did took nearly twice the time as checkers ($M_{\text{checkers}} = 3 \text{ m}, 25 \text{ s}, SD = 1 \text{ min}, 42 \text{ s}$; $M_{\text{historians}} = 6 \text{ m}, SD = 2 \text{ min}, 35 \text{ s}$). Only forty percent of students made it to Berman and Company; those that did took an average of nearly seven minutes ($M = 6 \text{ min}, 59 \text{ s}, SD = 1 \text{ min}, 51 \text{ s}$).

Figure 4. Average time for participants to determine Employment Policies Institute's sponsorship of minimumwage.com; average time and percentage of each participant group to determine Richard Berman or Berman and Company's sponsorship of both websites.



Reading Laterally. Fact checkers learned more about minimumwage.com and did so in less time than the others. They employed a powerful heuristic for taking bearings: *lateral reading*. Fact checkers almost immediately opened up a series of new tabs on the horizontal

axis of their browsers before fully reading the article.

Checker A glanced at “Denmark’s Dollar Forty-One Menu” for six seconds before clicking on the page’s “About” tab, where she learned that the site was “a project of the Employment Policies Institute.” She used keyboard shortcuts (pressing the command key while clicking) to open the link to the Employment Policies Institute site in a new tab alongside *minimumwage.com* (see Figure 5). After just three seconds on EPI’s home page, she went to their “About Us,” scanned the bland description (“Founded in 1991, the Employment Policies Institute is a non-profit research organization dedicated to studying public policy issues”), and quipped, “This is profoundly *not* helpful.” In just over a half minute, she opened a new tab and Googled Employment Policies Institute.

Figure 5. Checker A’s lateral reading.



Scanning Google’s snippets, Checker A skipped the first four results and selected SourceWatch’s entry on EPI: “So this says it’s one of several front groups created by a PR firm.” She scrolled until she hit a linked quotation from a *New York Times* reporter who

“detailed his visit to the EPI, saying, ‘I didn’t see any evidence at all that there was an Employment Policies Institute office.’” One minute and twenty-seven seconds into the task, she clicked on SourceWatch’s citation for this quote, which led to a *National Public Radio* story, “A Closer Look at How Corporations Influence Congress.” Rather than reading it, Checker A used Command-F to search for EPI and corroborate the claims made by SourceWatch. A little over two minutes into the task, she had EPI sized up:

Obviously this isn’t a legitimate organization, based on the reporting of this *New York Times* reporter. He talks about actually going there, he doesn’t see any evidence at all that they actually had an office, there are no employees, all the staff there actually work for the PR firm.

Only then did she return to her original starting place, minimumwage.com, declaring, “[The *New York Times* reporter] is right. It’s a very legitimate looking website, but clearly, this is also advancing an agenda.”

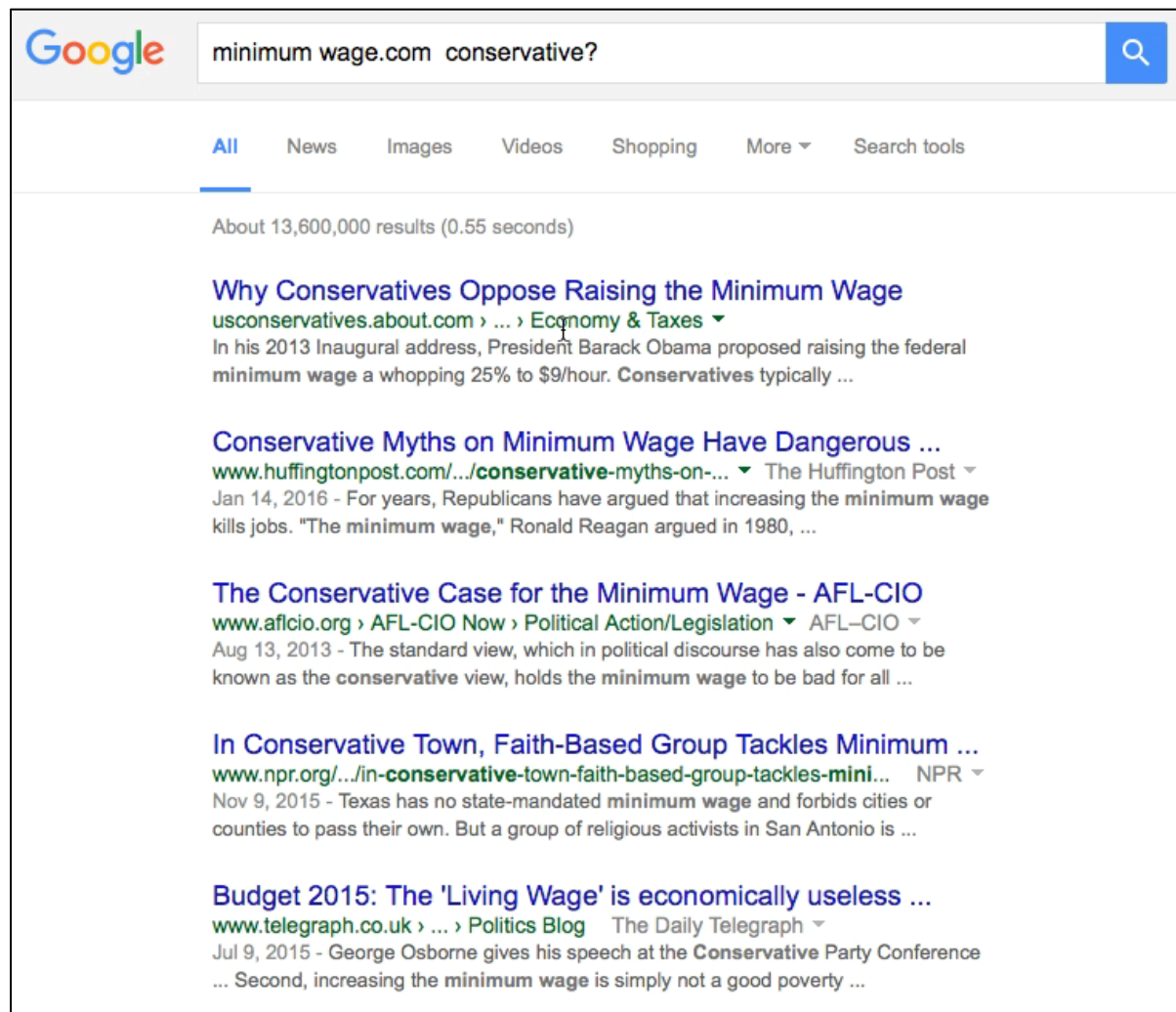
With breakneck speed, Checker A deftly traversed a digital morass, ignoring massive amounts of material (she barely read the original article) to conclude that minimumwage.com and EPI were not what they seemed. Though slightly less efficient, the other checkers largely mirrored Checker A’s lateral approach. The average time they took to leave the starting page was just over half a minute ($M = 37$ s, $SD = 41$ s). None accepted EPI’s description at face value; instead, they read laterally, visiting an average of six sites before concluding that minimumwage.com and EPI were cloaked sites that represented corporate interests.

Historians’ Reading. Historians took longer, on average, to go from minimumwage.com to EPI than fact checkers took to conclude that *both* sites were the

products of Berman and Company. Before prompting, only four of ten historians connected minimumwage.com to the Employment Policies Institute. As in the previous task, Historians H and S were the outliers. They left the landing page four times as fast as the others, averaging 26 seconds; their eight colleagues averaged 2 minutes, 5 seconds. Both were efficient lateral readers, wasting little time before opening additional tabs. Three of their colleagues, on the other hand, remained stuck on minimumwage.com for the entire task.

Even when some of the historians sought to read laterally—opening new tabs to research minimumwage.com or the Employment Policies Institute—they lacked essential searching skills. For example, a minute into the task, Historian K tried to learn more about minimumwage.com by opening a new tab to search for the name of the organization. But instead of putting the name of the organization in quotation marks and adding keywords like “funding” or “who is behind,” she typed [minimum wage.com] into the search bar, separating “minimum” from “wage” and adding no additional terms. The outcome was an entire page of results issued by the very organization she was trying to investigate. Sensing a dead end, she added [conservative?] to the search bar, which produced yet another page of fruitless results (see Figure 6).

Figure 6. Historian K's search results for [minimum wage.com conservative?]



Stymied, the historian abandoned lateral reading and returned to the original “Denmark’s Dollar Forty-One Menu” page, no wiser than before. She clicked the page’s “Research” tab to engage in a more familiar task: “Let me see how I can interpret the legitimacy of their research.” Historian K was not alone: her colleagues fumbled such basic moves as putting terms in quotation marks so that Google could search for contiguous terms. Each of these historians was an astute reader, but reading skills alone weren’t enough to pull

back the curtain from a cloaked website.

Students’ Reading. Students struggled to get to the bottom of minimumwage.com. They either spent too much time *reading vertically*, staying on the page and reading as they might a print document, or they engaged in *fluttering*, aimlessly moving across the screen, “touching or not touching pieces of information ... unconscious to its value and without a plan” (Kirschner & Von Merriënboer, 2013, p. 171). When five minutes were up and before being prompted, 80% of students had devoted *no time* to investigating who was behind minimumwage.com.

Although some students left the landing page quickly, their exit was a far cry from the strategy of taking bearings. Instead, they meandered to different parts of the site, making decisions about where to click based on aspects that struck their fancy. A prospective chemical engineering major quickly glanced at “Denmark’s Dollar Forty-One Menu” before scrolling to the bottom of the page and clicking on “In Your State,” an interactive map where users could click on different states and compare minimum wage rates and unemployment statistics. He spent two minutes playing with it, longer than he spent reading the initial article. Other students engaged in similar kinds of fluttering, clicking on features that piqued their curiosity rather than those that would justifiably inform their judgment about the trustworthiness of the site (see Table 5).

Table 5

Students’ Fluttering on Minimumwage.com

Links Clicked	Student’s Comment while Clicking	Clicking Sequence
https://www.mi	“It’s interesting how the Media page is kept very	Visited “Media” page after

nimumwage.com/media/	minimalistic, and then you click on other things [clicking on ‘News Reports,’ which leads to an EPI page] and it brings you to different pages [clicks back to ‘Media’ page]. But I think it’s actually smart to keep that elsewhere just to organize it.” (Student 19)	visiting the “Home,” “Myths,” “Research,” and “In Your State” pages.
https://www.mimumwage.com/research/	“I don’t really want to read their blog, and I’m not interested right now in what’s my state’s minimum wage and teen unemployment. . . . And videos and graphics are too time consuming.” (Student 3)	Explaining her reasoning for clicking on the “Research” page instead of the “Blog,” “In Your State,” or “Video and Graphics” pages.
https://www.mimumwage.com/news/	“I like the layout of the blog, I think it’s also just very clear and everything’s very cleanly laid out in a single column. Same with this [‘Research’] page. . . . Oh, and then here’s a description of the website. Um, this is a pretty cool page too.” (Student 12)	Clicked through several pages of the website, including “Home,” “In Your State,” “Blog,” “Research,” “About,” and “Myths.” On each page, she focused comments on appearance and organization of each page.
https://www.mimumwage.com/media/	“Maybe this is an impartial website. Is there any such thing [clicks to ‘Videos and Graphics’ page] as an impartial website? I don’t know. [reading advertisements posted on site] ‘Unhappy New Year,’ ‘If 7 out of 10 doctors said you were sick, you would listen.’” (Student 1)	Clicked to “Media” and “Videos and Graphics” pages after viewing the “Home” and “In Your State” pages.

Task 3: *Vergara v. California*

In May 2012, lawyers in California filed a lawsuit on behalf of nine public school students, including one named Beatriz Vergara. They argued that the system of teacher tenure in California violated the state constitution by denying equal protection to students with ineffective teachers. In June 2014, a California Superior Court ruled in favor of the nine students. The case cost more than a million dollars to prosecute, a sum that typically exceeds the spending money of nine adolescents. In fact, the legal team was hired and financed by David Welch, a Silicon Valley entrepreneur who founded the organization Students Matter.

The press, however, often omitted this detail. What made for good copy was a David-versus-Goliath tale of adolescents taking on a powerful teachers’ union: nine students, mostly

students of color, courageously confronting a rotten bureaucracy and demanding better teachers. A news item on the website of KABC, the Los Angeles ABC affiliate, reported that “The verdict is a win for nine students who sued the state saying that tenure policies have made it impossible for bad teachers to be fired” (“California Teacher Tenure,” 2014). It made no mention of Students Matter, David Welch, or any of the big money that backed the suit.

Unlike the two previous tasks, this one began with a paper stimulus: the 379-word article from KABC. We gave participants time to read the article before telling them that the nine students had a million-dollar legal bill. We then asked them to spend five minutes searching for who paid the tab. Participants needed to, as it were, “follow the money” by locating information that named Students Matter, and ultimately David Welch, as the main backer of the lawsuit.

Vergara was a politically charged case with far-reaching implications. Students Matter argued that the case was about getting rid of laws that were “handcuffing schools from doing what’s best for kids when it comes to teachers” (“Vergara v. California,” *n.d.*); the California Teachers Association painted it as a “lawsuit brought by wealthy corporate special interests looking to eradicate educators’ professional and due process rights” (“Vergara v. State of California,” *n.d.*). Given these conflicting claims and the number of bona fide news sources and partisan sites that were writing about the case, site selection and verification were essential. If participants could verify that Welch was the source of the plaintiffs’ funding across bona fide sources, they could be more certain that they had successfully navigated politically muddy waters to arrive at the correct answer.

The 25 Stanford students were the fastest in identifying Welch as the source of funding

($M = 1$ minute, 42 seconds, $SD = 86$ s). Fact checkers and historians were slower. Historians took 2 minutes, 1 second ($SD = 56$ s), and checkers averaged 2 minutes, 8 seconds ($SD = 93$ s). Although they were the slowest to reach their conclusions, fact checkers were the most selective when it came to the sites they visited, and took the most time to verify their answers.

We rated the quality of participants' conclusions using a 5-point scale. Participants were given a 0 if they never identified Welch; a 1 if they identified Welch but did so only through a questionable source; a 2 if they identified *and* verified Welch's role based on two or more questionable sources; a 3 if they identified Welch using a bona fide source; and a 4 if they identified and verified Welch's role through at least one bona fide source and one additional source. (We defined bona fide sources as those with well-established credentials, such as the *Los Angeles Times* or the *Wall Street Journal*.)

Using our rubric, the fact checkers' conclusions merited a 3.6 ($SD = 0.70$), versus historians' 2.4 ($SD = 1.3$) and students' 2.3 ($SD = 1.5$). Fifteen students scored a 0, 1, or 2, while all but one of the fact checkers' responses scored a 3 or 4. A Kruskal-Wallis test showed significance ($H(2)$ corrected for ties = 27.5, $p < .001$); follow-up Mann-Whitney U tests showed differences between fact checkers and students ($p = .016$).

The differences between the students' and the fact checkers' approaches can be seen by comparing Checker D with Student 17, a mathematical and computational science major. Both identified Welch in under a minute (34 seconds for the student, 50 seconds for the checker). The student spent just a few seconds on the results yielded by searching for [vergara v california]. He looked at the first result he came to (the Students Matter page), but quickly returned to the search results, reminding himself, "I'm looking for the 'who paid.'" He

selected vergaratrial.com, a partisan site created by the California Federation of Teachers, where he located Welch's name. He never commented on the website's political slant nor whether he found it trustworthy; he simply located Welch's name and accepted it as fact.

Checker D initially searched for [vergara v california] before quickly adjusting it to [vergara v. california court records]. As she scrolled down the results, she said, "I'm coming up with a lot of different information. I'd rather click on some press reports." She skipped the first three results, all of which were affiliated with Students Matter, along with vergaratrial.com and cacs.org (an organization she did not recognize), and instead opened articles from three news organizations and Wikipedia. Exhibiting what we call *click restraint*, she spent nearly 20 seconds scanning the results page and reading the snippets before clicking on any link. Although she opened four additional tabs (see Figure 7), her use of keyboard shortcuts meant that her eyes and focus never wavered from the results page.

Figure 7. Checker D's search results showing the sites she opened.

vergara v california court records

Web News Shopping Videos Maps More Search tools

About 391,000 results (0.53 seconds)

Vergara v. California Case Summary - Students Matter
studentsmatter.org/our-case/vergara-v-california-case-summary/
 With the help of Students Matter, nine California public school children filed the statewide lawsuit *Vergara v. California* against the State of California in May ...
 Victory - Timeline - Dismissal Statutes - Why Teachers?

Timeline - Students Matter
studentsmatter.org/our-case/vergara-v-california-case-status/timeline/
 The California Superior Court sets the start date for the *Vergara v.* ... parents and teachers gather at the courthouse to support the plaintiffs and the case. After the ...

[PDF] Tentative Decision - Students Matter
studentsmatter.org/wp-content/uploads/2014/06/Tentative-Decision.pdf
 Jun 10, 2014 - BEATRIZ VERGARA, a minor, by Alicia) Case No. ... In *Butt v. State of California* (1992) 4 Cal. 4th 668,, Supreme Court held that a school ...

Vergara v California: The Case in Context
cacs.org/research/vergara-v-california-case-context/
 Jun 16, 2014 - Last Tuesday, Los Angeles Superior Court Judge Rolf M. Treu made history by striking down five statutes in the California Education Code ...

Vergara
www.vergaratrial.com/
 An information clearinghouse for the Vergara trial in California. ... "The way you ensure high-quality public education is through collaboration. ... deep-pocketed financial backers of Vergara have an anti-union track record and that this lawsuit is ...

Vergara v. California - Wikipedia, the free encyclopedia
https://en.wikipedia.org/wiki/Vergara_v._California Wikipedia
 Vergara v. California. Seal of California.svg. Court, California superior courts ... Board of Education (1954) and the California Supreme Court cases of Serrano v.

Vergara Lawsuit Targets Teaching Profession - California ...
www.cta.org/vergara California Teachers Association
Vergara v. ... The brief notes that the court's blanket ruling invalidating the five California ... The State of California has also appealed the Vergara decision. ... not through court cases brought by phony front groups created by PR firms and ...

Vergara v. California: The Most Important Court Case You've ...
www.thedailybeast.com/.../vergara-v-california-the-most-... The Daily Beast
 May 29, 2014 - You didn't know that nine California kids were suing their state over substandard teaching at their public schools? You should—it's an example ...

California court rules teacher tenure creates impermissible ...
<https://www.washingtonpost.com/...court.../8be4f64a-...> The Washington Post
 Jun 10, 2014 - In a 16-page ruling, in the case of *Vergara v. California*, Treu struck down three state laws as unconstitutional. The laws grant tenure to teachers ...

Judge Rejects Teacher Tenure for California - The New York Times
<https://www.nytimes.com/.../california-teacher-tenure-laws-ruled-unconstitutional.html>
 Jun 10, 2014 - LOS ANGELES — A California judge ruled Tuesday that teacher ... Arne Duncan, brings a close to the first chapter of the case, *Vergara v.*

Checker D went first to Wikipedia, where she skipped over most of the entry by using the “Contents” menu to navigate to “Litigants.” There, she read that “funding for the plaintiff school students was provided by David Welch, a Silicon Valley entrepreneur.” She then clicked on the *Washington Post* article she had opened in a different tab. She used the command-F shortcut to search for Welch’s name and confirmed his role in the case.

Checker D took 16 seconds longer than Student 17 to find Welch’s name. However, she was more purposeful in the sites she opened, more discerning in the information she considered trustworthy, and more thorough in ascertaining that David Welch was indeed the money behind *Vergara v. California*.

Historians. Historians were only slightly better than students in the quality of their conclusions ($M_{\text{historians}} = 2.4$ versus $M_{\text{students}} = 2.3$). Although several historians excelled, quickly locating Welch’s name and verifying his role on trusted sites, two of them relied exclusively on partisan or questionable sources and made no attempt to verify their conclusions.

A third, Historian N, never made it to Welch. He searched for [Vergara v. California] and started with Wikipedia. Rather than using it to quickly locate Welch, Historian N went directly to the references to find “a link to the case itself.” For nearly three minutes, he examined the original court brief (number BC484642), scrolling up and down the PDF document, pausing at “Procedural History” and learning that the plaintiffs argued that the California Educational Code violated the equal protection clause of the state constitution. After searching in vain for the plaintiffs’ backers, he abandoned Wikipedia and initiated a new search, adding “plaintiffs” and “attorneys” to his original query.

He clicked on the first result (studentsmatter.org, Welch’s organization) and went to

“Our Team,” where he recognized the name of the lead attorney (“someone I know ... the Solicitor General under Bush”). By the end of the task the only thing he could say was that the plaintiffs were represented by a “team with deep legal pockets.”

He was correct, but then again, this was the *starting point* for the task—participants were told legal fees in this case were “over a million dollars” and that their goal was to find out who paid them. By the task’s end, this historian was no closer to answering the question than when he started. How come?

The simplest answer was that Historian N did what historians are trained to do: search for primary sources. Had the task been to write a history of the *Vergara* case, initiating the research process with the court briefing might’ve made sense. However, when the goal was to quickly ascertain who backed the teenagers, a close reading of a labyrinthine legal document—which, as it turned out, never mentioned Welch—took precious time and sapped limited energy.

Limitations

The purpose of this exploratory study was to better understand the nature of expertise in the evaluation of online information. We recognize, however, that any task that involves researchers peering over the shoulders of participants creates an artificial environment that can distort what people ordinarily do. Despite imperatives to “do what you normally do,” it must be odd to be shown sites not of one’s choosing and given one-minute warnings to stop searching. Studies are needed that observe people evaluating sites in more natural settings. At the same time, we reasoned that tasks without time limits threaten ecological validity—just-in-time searches are generally matters of minutes or seconds, not hours (Liu et al., 2010; Nielsen, 2011).

It's also possible that a different sample of sites might have yielded different results. We sampled sites that covered a range of topics and perspectives and that varied in the extent to which they revealed their agendas. But even within the categories we selected, there are innumerable options, each with unknown content effects. More extensive research is needed to know if the strategies we identified are generalizable across topics, sites, and searches.

Additionally, it may have been the case that participants didn't put forth their best efforts, although we find that unlikely. Our sample was comprised of people with high levels of self-regard and intellectual confidence. Looking foolish, especially when rendering judgments about issues of social and political moment, would threaten that self-regard.

We are also aware that professional fact checkers were not the only possible group of experts we could have sampled. Others, such as Wikipedia editors who have earned the highest badges, specialists in cyber security, and professional librarians and information scientists, are also worthy of study. In their approach to websites, two of the ten historians resembled the fact checkers more than their fellow historians. Small sample sizes exaggerate differences: we can't rule out the possibility that doubling or tripling our sample would have produced different results. Studies that require intensive protocol analysis are always a trade-off between sample size and available resources. That said, a sample of 45 nearly hour-long protocols is on the higher end in this genre of research.

Discussion

The participants in this study were all capable individuals. Historians had strings of esteemed publications to their credit and held coveted positions in a field where such positions are increasingly rare. The fact checkers worked for prestigious publications and rubbed shoulders

with famous authors who depended on them to get things right. Our college students were the gifted winners of the college admissions lottery at the nation's most competitive university. Yet, despite our participants' abundant talents, there were unmistakable differences in how they navigated the web.

Only two of the ten historians adroitly evaluated digital information. Their colleagues were often indistinguishable from college students in their meandering searches and general befuddlement. Both groups often fell prey to the same digital ruses. Considering our participants' intellectual caliber, we are left to ask: What is it about the Internet that bedevils intelligent people? Why are they often no wiser after reviewing a website than before? What did fact checkers do that allowed them to quickly and accurately discern the trustworthiness of information? How is it that they often spent less time on a website but ended up learning more?

The answer lies with two concepts we introduced earlier: *taking bearings* and *lateral reading*. In order to *take bearings*, this imperative is issued to the searcher: before diving too deeply into unfamiliar digital content, make a plan for moving forward. Taking bearings is what sailors, aviators, and hikers do to plot their course toward a desired destination. Although correct bearings do not guarantee that travelers will reach that destination, heading in the right direction substantially increases their chances. To take bearings, web searchers obviously don't use a physical compass. But they need metaphorical compasses just as much as hikers need real ones.

The act of taking bearings separated the fact checkers from nearly everyone else. Evaluating the pediatrics websites, checkers took bearings in every instance before rendering judgment; historians did so only a quarter of the time and students did so barely at all. Because errors could cost them their jobs, fact checkers were keenly attuned to the web's wiles. They

understood that websites do not sprout by spontaneous generation but are designed, created, and financed by groups seeking to promote particular—and often partisan—interests. Taking bearings helped checkers get a fix on these interests.

In an Internet teeming with cloaked sites and astroturfers (front groups pretending to be grassroots efforts), taking bearings often assumes the form of *lateral reading*. When reading laterally, one leaves a website and opens new tabs along a horizontal axis in order to use the resources of the Internet to learn more about a site and its claims. Lateral reading contrasts with vertical reading. Reading vertically, our eyes go up and down a screen to evaluate the features of a site. Does it look professional, free of typos and banner ads? Does it quote well-known sources? Are bias or faulty logic detectable? In contrast, lateral readers paid little attention to such features, leaping off a site after a few seconds and opening new tabs. They investigated a site by leaving it.

Paradoxically, a key feature of lateral reading is *not reading*. Efficient searchers intelligently ignore massive amounts of irrelevant (or less crucial) text when making an informed judgment about the trustworthiness of digital information. But lateral reading doesn't take place in a vacuum. It requires knowledge of *sources*, knowledge of how the Internet and searches are *structured*, and knowledge of *strategies* to make searching and navigating effective.

Fact checkers relied on a robust knowledge of sources to inform their decisions. They understood and distinguished among an array of online sources, including how sites are spread across the political spectrum (*Daily Kos* is liberal, *Daily Caller* conservative). They recognized the characteristics that generally make a source reliable or ones that act as fallible proxies for reliability. On its “About Us” page, the Employment Policies Institute describes itself as “a non-

profit research organization dedicated to studying public policy issues.” Checker A’s reaction was simply, “This is profoundly *not* helpful.” She knew that a nonprofit status does not stamp an organization as unquestioningly altruistic. In contrast, high school students trying to decide if the Employment Policies Institute was nonpartisan were often swayed by its nonprofit status (McGrew, Ortega, Breakstone, & Wineburg, 2017).

Knowledge of sources was therefore necessary but not sufficient. Fact checkers also possessed knowledge of online structures, particularly how search results are organized and presented. They knew that the first result was not necessarily the most authoritative, and they spent time scrolling through results, often scanning the entire first page (and sometimes the second and third) before clicking on any links. They understood how search engine optimizers use sophisticated keywords and other techniques to game results, pushing some sites to the front of the line and more authoritative information to the back. Students, on the other hand, often clicked on the first results, rarely articulating a rationale for why they selected them (a finding well-documented by others; e.g., Hargittai et al., 2010; Kirschner & Von Merriënboer, 2013; Pan et al., 2007).

Lateral reading relies on canny strategies and techniques for navigating the Internet. Although knowing how to right click to open a new tab might seem purely technical, for our participants it proved anything but. Indeed, the failure to right click thwarts lateral reading, piling new windows on top each other and making it impossible to quickly scan multiple sources. Another key to lateral reading involves choosing keywords and putting quotation marks around phrases so that Google locates them as a single unit. Without this knowledge, Historian K was stymied in her attempt to get to the bottom of minimumwage.com.

Even possessing this knowledge did not guarantee success. Historians and students easily distinguished between the *New York Times* and the *National Enquirer*, and most of the students right-clicked with ease and fluidity. By any measure of critical thinking, our participants were far above average. But this was not enough.

Yet, even the most critical thinkers are susceptible to cognitive biases that steer them in the wrong direction. The majority of historians and students in our sample fell victim to what Tversky and Kahneman (1974) called the *representativeness heuristic*, “in which probabilities are evaluated by the degree to which A resembles B” (p. 1124). In a series of classic experiments, they showed how people from all walks of life ignored crucial information when deciding whether Steve (“shy and withdrawn” with a “need for order and structure” and “a passion for detail”) belonged to the category of librarians or farmers. Subjects blithely disregarded base rates, forming judgments about the degree to which Steve was “representative of, or similar to, the stereotype of a librarian” (p. 1124). Facing “intricate and less transparent problems” (p. 1130), even professional statisticians, who should have known better, succumbed to the biases of the representativeness heuristic.

Something similar was going on when historians and college students evaluated the site of American College of Pediatricians. The site resembled what participants expected from a bona fide medical venue: an impressive sounding name; an official logo and motto (“Best for Children”); an .org URL; and no overt signs that might raise eyebrows (flashing banner ads, misspellings, irregular fonts, and broken links). Moreover, the article about bullying conformed to what people expect from a scientific text (Meyer, 2017): it had an abstract, brief section headings, and references studded with names of reputable journals like *Pediatrics* and *Journal of*

Criminology. The website's very blandness worked to its advantage. One historian thought that even though the site lacked the "interactive features a website might provide," it did not detract from its authority because, in his opinion, it was "just meant to be a useful resource for people to learn about bullying."

While acknowledging that deploying heuristics can be "economical" and "effective," Tversky and Kahneman (1974, p. 1131) emphasized their negative qualities (indeed, the representativeness heuristic was the crowning example of a "cognitive bias"). Our data provide ample evidence that something akin to the representativeness heuristic steered many of our participants down the wrong path. At the same time, our work shines a light on how some heuristics—skillfully deployed under the right circumstances—can be powerful aids when navigating a complex problem space.

In evaluating digital information, we distinguish between widely used but flawed *weak heuristics*, such as using a domain designation as a proxy for trustworthiness, and *strong heuristics*, like lateral reading, which not only save time but often lead to more accurate judgments than more complex methods. Over the past two decades, Gigerenzer and colleagues (see Gigerenzer & Gaissmaier, 2011, for review) have redeemed heuristics from the dungeon of cognitive biases and demonstrated how they can help problem solvers make decisions "more quickly, frugally, and/or accurately than more complex methods" (2011, p. 454). Lateral reading fits this definition. Fact checkers read less and learned more—with a speediness that often left other participants in the dust.

Similar strong heuristics have been identified in a growing number of fields (Gigerenzer, 2007). For example, in criminal profiling, police have relied on complicated mathematical

models to predict where a repeat offender is most likely to live, considering multiple inputs to predict probabilities. A fast and frugal alternative that bested more complex methods is the “circle” heuristic, which draws a circle around the two farthest-flung crime locations and predicts that the offender will live in the center (Snook, Taylor, & Bennell, 2004). In emergency medicine, researchers devised a fast and frugal heuristic to help doctors decide when a patient complaining of chest pain should be assigned to the coronary care unit. A simple question tree of three yes-or-no answers “sent fewer patients who suffered from a heart attack wrongly into a regular bed and also nearly halved physicians’ high false-alarm rate” (Gigerenzer & Gaissmaier, 2011, p. 468).

We have focused a great deal on speed, and we shall come back to that presently. While the college students were faster at finding the name of the financial backer in the *Vergara* case, their speed came at the expense of quality. Students arrived at David Welch’s name by promiscuous clicking, often without regard to a source’s impartiality. Fact checkers took longer not because of faulty search strategies or unhelpful keywords, but because they slowed down to review search results. They showed *click restraint*. Before pressing on any of the results, they mined Google’s snippets for the wealth of information they contain. They examined each URL, considered the source of the information, and scanned the brief but fecund sentence fragments before alighting on a link to click. A searcher’s first click is often destiny, either putting searchers on a path toward warranted conclusions or sending them into the wilderness of infinite regress. Click restraint tips the balance toward the former.

On our other tasks, fact checkers were both quicker and more accurate in reaching decisions. Speed matters. Had participants been given an hour to complete each task, they surely

would've reached better conclusions. Doing so, however, would have detached these tasks from reality. Depending on what they're searching for, people spend various amounts of time surfing the web. But, as researchers have discovered, the amount of time people spend on a typical search is some variation of "not very long" (Nielson, 2011).

That's because people do not have hours to research every social or political question they encounter. Too many issues confront us in our already busy lives. There are emails from organizations asking us to donate, volunteer, sign petitions; debates to watch and choices to make about how to vote; arguments posed in comment sections to respond to or ignore; news articles to pass on, Facebook posts to like, tweets to re-tweet. Facing this onslaught, we need efficient strategies for separating truth from falsehood, good arguments from bad. Consider the daunting challenge faced by California voters trying to sift through seventeen separate initiatives on the 2016 ballot: plans to increase the tobacco tax, ban plastic bags, limit the sale of ammunition, legalize recreational marijuana, require porn stars to wear condoms while filming, approve a bond to build new schools, repeal the death penalty or make it easier to mete out, and so on. If the average voter spent ten minutes researching each initiative, we would consider this an act of responsible citizenship. The question for our age is this: How do we make those ten minutes *count*?

This is neither a plea to banish books nor to turn all reading into ten minute exercises. Close reading, the careful, analytic search for pattern, detail, and nuance, is essential to any thoughtful curriculum (Shanahan, 2012; Wolf, 2007). But when the goal is to quickly get up to speed, the close reading of a digital source, when one doesn't yet know if the source can be trusted (or is what it says it is)—proves to be a *colossal* waste of time.

In the last few years, Connecticut, Washington, Rhode Island, and Utah have all passed legislation related to the teaching of media literacy and digital citizenship. Other states have similar legislation in the works (see medialiteracynow.org). But what if the problem is not that we're failing to teach media literacy, but that we're teaching the wrong kind?

It is impossible to rule out this possibility after surveying some of the most widely available materials for teaching web credibility. These materials often share a common feature: they provide checklists to help students decide whether information should be trusted, ranging from ten questions to as many as 30 (see Common Sense Media, 2012; Media Education Lab, *n.d.*, News Literacy Project, *n.d.*). Long or short, checklists focus students on a website's most easily manipulated features. For example, college library websites often advise students to use "Five Criteria for Web Evaluation," which are based on an article from the Internet's Stone Age (Kapoun, 1998). These five criteria ("Authority, Accuracy, Objectivity, Currency, and Coverage,")—or variations on the theme (including the CRAAP test: "Currency, Relevance, Authority, Accuracy, and Purpose")—can be found on websites hosted by the University of Alaska Fairbanks to Illinois State and everywhere in between.⁶

Even if we set aside the concern that students (and the rest of us) lack the patience to spend fifteen minutes answering questions about a single site, a bigger problem remains: designating an author, throwing together a reference list, and making sure a site is free of typos doesn't confer credibility. Recall that the Employment Policies Institute not only carried an .org domain but was labeled a 501c(3) "charitable organization." When the Internet is characterized by polished web design, search engine optimization, and organizations vying to appear trustworthy, such guidelines create a false sense of security. In fact, relying on checklists could

make students *more* vulnerable to scams, not less. Fact checkers succeeded on our tasks not because they followed the advice we give to students. They succeeded because they didn't.

Checkers never consulted a list of questions before initiating a search. The elements emphasized by the checklists—what an organization claims on its “About” page, an .org URL, a physical address and contact information—were taken with a grain of salt. That's because the checklist approach cuts searchers off from the most efficient route to learning more about a site: finding out what the rest of the web has to say. This was the biggest lesson we learned from watching these experts: They evaluated unfamiliar websites by leaving them. For fact checkers, the direct route to credibility was indirect.

Before we set out on this study, the chief fact checker at a national publication told us what she tells her staff: “The greatest enemy of fact checking is hubris.” Even for seemingly innocuous topics, fact checkers are taught to be wary of the “duck test,” a homey example used to illustrate the logic of *abduction*, the process of making inferences based on an entity's most observable characteristics. While a site may look like a duck, swim like a duck, and quack like a duck, these professionals spend their days swimming in an Internet teeming with broad-billed, web-footed creatures, only some of which turn out to be ducks. Before conferring “duckness,” fact checkers do what fact checkers are trained to do: *they check*.

The immensity of the Internet makes it impossible to be familiar with every entry Google spits out. In this treacherous terrain, the most thoughtful response is to become skeptical of one's own intelligence. Hubris on the web takes the form of trusting our eyes and brains to examine the look of a page and its content in order to determine reliability. In contrast, taking bearings, practicing lateral reading, and engaging in click restraint remind us that our eyes deceive, and

that we, too, can fall prey to professional-looking graphics, strings of academic references, and the allure of .org domains. Practicing these strategies is an admission that we are more astute when we turn to the entire web than when we try to brave it alone.

Rather than making students slog through strings of questions about easily manipulated features on a single website, we should be teaching them that the World Wide Web is, in the words of blogger and Internet critic Mike Caulfield (2017), “a *web*, and the way to establish authority and truth is to use its web-like properties.” This is what professional fact checkers do.

It is what we should be teaching students to do as well.

References

- Agosto, D. E. (2002). A model of young people's decision-making in using the Web. *Library & Information Science Research*, 24(4), 311–341. doi:10.1016/S0740-8188(02)00131-7
- American Academy of Pediatrics (2014). Stigma: At the root of ostracism and bullying. Retrieved from <https://www.aap.org/en-us/about-the-aap/aap-press-room/pages/Stigma-At-the-Root-of-Ostracism-and-Bullying.aspx>.
- American College of Pediatricians (2015). "P" for pedophile. Retrieved from <https://www.acpeds.org/p-for-pedophile>.
- Asher, A. D., & Duke, L. M. (2011). Searching for answers: Student research behavior at Illinois Wesleyan University. In L. M. Duke & A. D. Asher (Eds.), *College libraries and student culture: What we now know* (pp. 71-86). Chicago, IL: ALA Editions.
- Barzilai, S., & Zohar, A. (2012). Epistemic thinking in action: Evaluating and integrating online sources. *Cognition and Instruction*, 30(1), 39-85. doi:10.1080/07370008.2011.636495
- Bennett, S. (2012). Digital natives. In Z. Yan (Ed.), *Encyclopedia of cyber behavior: Volume 1* (pp. 212-219). Hershey, PA: IGI Global.
- Bradshaw, W., Weight, D. G., & Packard, T. (2011, May 3). Same sex attraction not a matter of choice. *The Salt Lake Tribune*. Retrieved from <http://archive.sltrib.com/printfriendly.php?id=51356807&itype=cmsid>
- Brand-Gruwel, S., Kammerer, Y., van Meeuwen, L., & van Gog, T. (2017). Source evaluation of domain experts and novices during Web search. *Journal of Computer Assisted Learning*, 33, 234-251. doi:10.1111/jcal.12162
- Brand-Gruwel, S., Wopereis, I., & Vermetten, Y. (2005). Information problem solving by

- experts and novices: Analysis of a complex cognitive skill. *Computers in Human Behavior*, 21(3), 487-508. doi:10.1016/j.chb.2004.10.005
- California teacher tenure law unconstitutional, judge says. (2014, June 10). Retrieved from <http://abc7.com/education/california-teacher-tenure-law-unconstitutional/106228/>.
- Caulfield, M. (2017, March 20). How “news literacy” gets the web wrong [Blog post]. Retrieved from <https://hapgood.us/2017/03/04/how-news-literacy-gets-the-web-wrong/>.
- Coleman, T. (2010). Misinformation from doctors . . . out to hurt students? Retrieved from <https://www.aclu.org/blog/speakeasy/misinformation-doctorsout-hurt-students>.
- Common Sense Media. (2012). Identifying high-quality sites. Retrieved from <https://www.common Sense Media.org/educators/lesson/identifying-high-quality-sites-6-8>.
- Ericsson, K. A., & Simon, H. A. (1993). *Protocol analysis: Verbal reports as data* (Rev. ed.). Cambridge, MA: MIT Press.
- Espelage, D. (2011). Bullying and the lesbian, gay, bisexual, transgender, questioning (LGBTQ) community. Retrieved from https://www.stopbullying.gov/at-risk/groups/lgbt/white_house_conference_materials.pdf.
- Gasser, U., Cortesi, S., Malik, M., & Lee, A. (2012). *Youth and digital media: From credibility to information quality*. Cambridge, MA: Berkman Center for Internet and Society.
- Gigerenzer, G. (2007). *Gut feelings: The intelligence of the unconscious*. New York, NY: Viking.
- Gigerenzer, G., & Gaissmaier, W. (2011). Heuristic decision making. *Annual Review of Psychology*, 62, 451-482. doi:10.1146/annurev-psych-120709-145346
- Graves, L. (2013, November 13). Corporate America’s new scam: Industry P.R. firm poses as

- think tank! *Salon*. Retrieved from
http://www.salon.com/2013/11/13/corporate_americas_new_scam_industry_p_r_firm_poses_as_think_tank/.
- Haile, T. (2014, May 9). What you think you know about the web is wrong. *Time*. Retrieved from <http://time.com/12933/what-you-think-you-know-about-the-web-is-wrong/>.
- Hargittai, E., Fullerton, L., Menchen-Trevino, E., & Thomas, K. Y. (2010). Trust online: Young adults' evaluation of web content. *International Journal of Communication*, 4, 468-494. doi:1932-8036/20100468
- Helsper, E. J., & Eynon, R. (2010) Digital natives: Where is the evidence? *British Educational Research Journal*, 36(3), 503-520. doi:10.1080/01411920902989227
- Iding, M. K., Crosby, M. E., Auernheimer, B., & Klemm, B. (2009). Web site credibility: Why do people believe what they believe? *Instructional Science*, 37, 43-63. doi: 10.1007/s11251008-9080-7
- Julien, H., & Barker, S. (2009). How high school students find and evaluate scientific information: A basis for information literacy skills development. *Library & Information Science Research*, 31, 12-17. doi:10.1016/j.lisr.2008.10.008
- Kapoun, J. (1998). Teaching undergraduates Web evaluation: A guide for library instruction. *College and Research Libraries News*, 59, 522-533.
- Kirschner, P. A., & van Merriënboer, J. J. G. (2013). Do learners really know best? Urban legends in education. *Educational Psychologist*, 48(3), 169-183. doi: 10.1080/00461520.2013.804395
- Kranish, M. (2005, July 31). Beliefs drive research agenda of new think tanks: Study on gay

- adoption disputed by specialists. *Boston Globe*. Retrieved from http://archive.boston.com/news/nation/washington/articles/2005/07/31/beliefs_drive_research_agenda_of_new_think_tanks/.
- Leinhardt, G., & Young, K. M. (1996). Two texts, three readers: Distance and expertise in reading history. *Cognition and Instruction*, 14, 441-486.
doi:10.1207/s1532690xci1404_2
- Lenz, R. (2012). American College of Pediatricians defames gays and lesbians in the name of protecting children. Retrieved from <https://www.splcenter.org>.
- Lipton, E. (2014, February 9). Fight over minimum wage illustrates web of industry ties. *New York Times*. Retrieved from <http://www.nytimes.com/2014/02/10/us/politics/fight-overminimum-wage-illustrates-web-of-industry-ties.html>.
- List, A., Grossnickle, E. M., & Alexander, P. A. (2016). Undergraduate students' justifications for source selection in a digital academic context. *Journal of Educational Computing Research*, 54(1), 22-61. doi:10.1177/0735633115606659
- Liu, C., White, R. W., & Dumais, S. (2010). Understanding web browsing behaviors through Weibull analysis of dwell time. *Proceedings of the 33rd International ACM SIGIR Conference on Research and Development in Information Retrieval*. Geneva, Switzerland.
- Lucassen, T., & Schraagen, J. M. (2011). Factual accuracy and trust in information: The role of expertise. *Journal of the American Society for Information Science and Technology*, 62(7), 1232-1242. doi:10.1002/asi.21545
- McGrew, S., Ortega, T., Breakstone, J., & Wineburg, S. (2017). The challenge that's bigger than

fake news: Teaching students to engage in online civic reasoning. *American Educator*, 1-13.

McGrew, S., & Wineburg, S. (2017). "Reading Less and Learning More: Expertise in Evaluating the Credibility of Online Information," Paper presented at the annual meeting of the American Educational Research Association, San Antonio, TX.

Media Education Lab. (n.d.) Who do you trust? Retrieved from <http://mediaeducationlab.com/secondary-school-unit-2-who-do-you-trust>.

Meyer, K. (2017) How to present scientific findings online. Retrieved from <https://www.nngroup.com>.

News Literacy Project (n.d.). Ten questions for fake news detection. Retrieved from www.thenewsliteracyproject.org/sites/default/files/GO-TenQuestionsForFakeNewsFINAL.pdf.

Nielsen, J. (2011). How long do users stay on web pages? Retrieved from <https://www.nngroup.com>.

Pan, B., Hembrooke, H., & Joachims, T. (2007). In Google we trust: Users' decisions on rank, position, and relevance. *Journal of Computer-Mediated Communication*, 12, 801-823. doi:10.1111/j.1083-6101.2007.00351.x

Prensky, M. (2001). Digital natives, digital immigrants. *On the Horizon*, 9(5), 1-6. doi: 10.1108/10748120110424816

Pressley, M., & Afflerbach, P. (1995). *Verbal protocols of reading: The nature of constructively responsive reading*. Hillsdale, NJ: Erlbaum.

Sons of Confederate Veterans (1997). Black history month, Black Confederate heritage.

Retrieved from <http://www.scv.org/documents/edpapers/blackhistory.pdf>.

Shanahan, C., Shanahan, T., & Misischia, C. (2011). Analysis of expert readers in three disciplines: History, mathematics, and chemistry. *Journal of Literacy Research*, 43, 393-429. doi:10.1177/1086296X11424071

Shanahan, T. (2012, June 18). What is close reading? [Blog post]. Retrieved from <http://shanahanonliteracy.com/blog/what-is-close-reading#sthash.mxxi0paG.rtlrn0KW.dpbs>

Shanahan, T., & Shanahan, C. (2008). Teaching disciplinary literacy to adolescents: Rethinking content-area literacy. *Harvard Educational Review*, 78(1), 40–59.

Sieff, K. (2010, October 20). Virginia 4th-grade textbook criticized over claims on black Confederate soldiers. *The Washington Post*. Retrieved from www.washingtonpost.com.

Snook, B., Taylor, P. J., & Bennell, C. (2004). Geographic profiling: The fast, frugal, and accurate way. *Applied Cognitive Psychology*, 18, 105-121.

Southern Poverty Law Center. (2017). Active hate groups 2016. Retrieved from <https://www.splcenter.org/fighting-hate/intelligence-report/2017/active-hate-groups-2016>.

Stanford University. (2017). Facts 2017: Academics. Retrieved from <http://facts.stanford.edu/academics/undergraduate-facts>.

Stanford University. (2015). Our selection process: Applicant profile. Retrieved from <http://admission.stanford.edu/basics/selection/profile15.html>.

Throckmorton, W. (2011, October 6). The American College of Pediatricians versus the American College of Pediatrics: Who leads and who follows? [Blog post]. Retrieved

from <http://www.patheos.com/blogs/warrenthrockmorton/2011/10/06/the-american-college-of-pediatricians-versus-the-american-academy-of-pediatrics-who-leads-and-who-follows/>.

Todd, P. M., & Gigerenzer, G. (2017). What is ecological rationality? In P. M. Todd and G.

Gigerenzer (Eds.), *Ecological rationality: Intelligence in the world* (pp. 1-37). New York, NY: Oxford.

Trumbull, D. (2013). Bullying at school: Never acceptable. Retrieved from

<http://www.acpeds.org/the-college-speaks/position-statements/societal-issues/bullying-at-school-never-acceptable>.

Turban, J. (2017, May 8). The American College of Pediatricians is an anti-LGBT group [Blog post]. Retrieved from <https://www.psychologytoday.com>.

Tversky, A. & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases.

Science, 185(4157), 1124-1131. doi:10.1126/science.185.4157.1124

Vergara v. California. (n.d.). Retrieved from <http://studentsmatter.org/case/vergara/>.

Vergara v. State of California. (n.d.). Retrieved from <http://www.cta.org/Vergara>.

Wineburg, S. (1998). Reading Abraham Lincoln: An expert/expert study in the interpretation of historical texts. *Cognitive Science*, 22, 319-346.

Wineburg, S. S. (1991). Historical problem solving: A study of the cognitive processes used in the evaluation of documentary and pictorial evidence. *Journal of Educational Psychology*, 83, 73-87.

Wineburg, S., & McGrew, S. (November 1, 2016). Why students can't Google their way to truth.

Education Week.

- Walraven, A., Brand-Gruwel, S., & Boshuizen, H. (2009). How students evaluate information and sources when searching the World Wide Web for information. *Computers & Education*, 52(1), 234-246. doi:10.1016/j.compedu.2008.08.003
- Wiley, J., Goldman, S. R., Graesser, A. C., Sanchez, C. A., Ash, I. K., & Hemmerich, J. A. (2009). Source evaluation, comprehension, and learning in Internet science inquiry tasks. *American Educational Research Journal*, 46(4), 1060-1106. doi: 10.3102/0002831209333183
- Wolf, M. (2007). *Proust and the squid: The story and science of the reading brain*. New York, NY: HarperCollins.

Footnotes

¹ General Orders #14. Freedmen and Southern Society Project, University of Maryland, <http://www.freedmen.umd.edu/csenlist.htm>, accessed January 3, 2017.

² In addition to the tasks presented here, the full protocol included 1) brief evaluations of four static sites, 2) an open web search on a historical question with contemporary ramifications, and 3) locating the registrant of a website. The findings from those tasks are broadly consistent with what we present here. A description of the full protocol is available from the authors.

³ After introducing each task, we refrained from speaking unless the participant fell completely silent. In that case, questions like, “What are you thinking?” were used to encourage participants to verbalize their thoughts.

⁴ The statement from Collins, which was posted on the National Institutes of Health website, is also available via the Web Archive:

http://web.archive.org/web/20110727115017/http://www.nih.gov/about/director/04152010_state_ment_ACP.htm.

⁵ The stance is prominent in other parts of the website, such as a “Position Statement” entitled “On the Promotion of Homosexuality in the Schools,” which states that “the homosexual lifestyle carries grave health risks”; that “validating a student’s same-sex attraction during the adolescent years is premature and may be harmful;” and “sexual reorientation therapy can be effective.” Retrieved from <https://www.acped.org/wordpress/wp-content/uploads/On-the-Promotion-of...pdf>.

⁶ The University of Alaska/Fairbanks guide is located at <https://library.uaf.edu/l101-evaluation>, while Illinois State University’s is <https://guides.library.illinoisstate.edu/evaluating/craap>.