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STUDENT SHOWCASE

Fake News, Fake Science? Reflections on Teaching Introduction to Biological Anthropology in the Era of Trump

Benjamin J. Schaefer
The University of Illinois at Chicago
bschae6@uic.edu

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Introduction

New graduate student instructors in the early stages of putting together a syllabus and lecture slides for their classes can expect adversity. It is challenging to decide which material is important to include in slides and class discussions and which material goes beyond the scope of the class. Each subdiscipline has particular important information that needs to be covered in introductory courses so that students can successfully progress to more in-depth material in higher-level courses. As instructors, we are seen as authority figures in academia regardless of whether or not we have earned our doctoral degrees. It is important to recognize that the material that is covered in class can be taken as scripture by students who want to succeed in the course. In the era of "fake news," it is too common for inaccurate articles about many different topics to be shared and ultimately to pass as rigorous science on social media and in the news. In order to combat and mitigate improper uses of science, it is imperative that we act as interpreters for students who ask questions about difficult topics in class, during office hours, and through email. In this reflection, I discuss ways of combatting "fake news" and suggest strategies for reformulating the ways we teach anthropology in the "fake news" era.

Fake News and Fake Science

The term "fake news" has become prominent due to Donald Trump's use of the term to denounce U.S. news outlets that focused unfavorably on his presidential campaign and the early stages of his presidential career. Despite Trump's admission that he used this term to help mitigate negative commentary (Rosenberg 2018), it is still widely used throughout the American political spectrum in both serious debate and parody. For example, Trump has condemned both CNN and Buzzfeed for their "illegitimate" news reporting. Trump's ambivalence toward science and climate change, and his tendency to rampantly tweet his thoughts on these issues, which are subsequently treated as official statements, all feed into the challenge of separating truth from opinion (Jamieson 2017; Pielke 2018). Now that fake news articles are being shared on social media by Russian

hackers and alt-right media, navigating what is true science and what is not can be difficult. Social media functions as a way to share content quickly so that the readership of an article increases exponentially as it is continuously shared.

However, this issue of "fake news" is not only a problem on social media platforms. It can take many different forms. Predatory journal editors solicit manuscripts from junior faculty and young scholars in order to publish their research for a fee in fraudulent journals. This issue has been running rampant within academia for years and is no secret among academics. For example, the recent article, "Wanion: Refinement of Rpcs," written by Kim Kardashian, Satoshi Nakamoto, and Tomáš Pluskal (2018), was published in *Drug Designing & Intellectual Properties International Journal.* The journal appears to be a typical academic publication, but under closer examination, it is clear that the article was used to expose the journal. Tomáš Pluskal, who wrote the paper, listed Kim Kardashian and Satoshi Nakamoto as co-authors and used the paper as a sting operation to bait the journal into publishing fake research.[5] As I was writing this article, I was asked by Lambert Academic Publishing to publish and sell my public health research. Though I was not interested in selling research for profit (and doing so is completely contradictory to my own ideas about the production of knowledge), I discovered that Lambert Publishing is a content farm that actively solicits academics to publish their research with no peer-review process (Stromberg 2018). Identifying these types of articles can be easy for seasoned academics, but for first generation college students, or students who have not been exposed to this kind of situation, it may not be as easy to come to the same conclusion about acceptable work.

Academics can quickly brush off poorly designed research and "fake news" when it surfaces on the Internet or in journals, but eager students who want to learn and impress their professor may not find such sources so simple to dismiss. Anthropologists who specialize in biological anthropology borrow methodologies and theories from the subdisciplines of anthropology and other academic disciplines to augment their interpretation of their data. The line between what is considered acceptable research and what is considered biased science or even modern eugenics is very thin, and scientific ideas can be used inappropriately to produce inaccurate or extreme conclusions (e.g. Erlick 2018). For example, Madison Grant, known for his 1916 best-selling manuscript, *The Passing of the Great Race,* was commended by Charles Davenport, a future president of the American Association of Physical Anthropologist (Marks 2012). Once the book was translated into German, Grant was excited to receive a fan letter from Adolf Hitler, who found the text inspiring and scientifically meritable (Marks 2012; Spiro 2009). Other well-known early biological anthropologists such as Aleš Hrdlička and Earnest Hooton would go on to serve under Madison Grant on the American Board of Eugenics, along with many American geneticists and evolutionary biologists during the 1920s

[5] Kim Kardashian is an American reality television personality and socialite. Satoshi Nakamoto is the name used by the unknown person or persons who developed Bitcoin, authored the Bitcoin whitepaper, and deployed the technology.

(Marks 2012). There are debates about the extent of Hooton's involvement in the eugenics movement during his early and later career (Giles 2012). One of the most notable historical examples of the influence of biological anthropology was the use of anatomy and measurements of basic human variation in Nazi medicine to determine who was ethnically Jewish and to create the racial definitions used by the National Socialist German Worker's Party (*Nationalsozialistische Deutsche Arbeiterpartei*) to separate "true Aryans" from others (Alexander 1949; Tenenbaum 1956). More contemporary research from Julie Bakker (2018) suggesting that MRI brain scans can detail variations in brain development and functional connectivity associated with transgender individuals in childhood is another example of this thin line. Though this research is interesting, it could lead parents to believe that transgender children can be identified before birth and they could decide whether or not to abort the fetus. The same is true for current practices of prenatal screening for Down Syndrome and other developmental disorders.

This type of research is marketed as "revolutionary" and can subsequently be passed off as acceptable science and then reproduced in the academy. Because biased science is often used to subjugate people, we, as researchers, need to be reminded of the ethical concerns beyond publication. Despite current processes used to redress problematic scientific investigations, it is too common for students to conduct a search on the library website with a keyword and use the first source available or to only use the course reading materials and not venture away from them. Encouraging students to do outside reading and find interesting studies can be challenging, but it provides an additional teaching opportunity to discuss good and bad academic literature. It is easy to discuss controversial or negative publications if they were published decades ago, such as research with the Yanomamö or Ishi (Borofsky 2005; Scheper-Hughes 2001). However, no discipline is immune from problems in recently published articles that may not be read critically or addressed with peer review.

Outside Science in the Classroom

For new graduate students, teaching their first courses or developing a new syllabus for a course is both exciting and scary. Deciding which readings and chapters are relevant to include can be challenging because we have the agency to decide what is important. My faculty mentors shared their entire Introduction to Biological Anthropology curriculum with me to help ease the stress. While editing and changing some of the assigned readings, I left some of the older literature and paired it with more current sources to use as a teaching tactic to help my students think critically about the material. Doing this showed students where the discipline is today and how far it has come over the years. These materials could not be simply regurgitated when it came time for homework and exams. For first year students and students who want to just pass the course, it is easy to take everything at face value and retain it as "fact" without understanding the implications from the language used during a particular time period.

The role of the instructor is to weave together the course material so that the students understand and retain the information in a way that progresses their academic journey.

Most of my students this past semester were anthropology majors, though some were from outside departments such as biology and history. At the beginning of the semester, I asked each student why he or she was taking my Introduction to Biological Anthropology course. Most answered that they wanted to go into forensic anthropology, while some needed it as a prerequisite to complete the major. Regardless of their intent, their interest came from watching popular crime dramas that utilize forensic science to solve cases, such as *Bones*, *CSI*, and *Criminal Minds*. Though these shows are entertaining, the science behind the plots is dramatized to identify the perpetrator in forty-five minutes or less. These types of shows have produced what is termed the "CSI Effect," a distorted expectation about the reality of forensic science (Schweitzer and Saks 2007).

In a "fake news" era when popular science articles are being widely shared on social media sites, it is easy for students to read these articles as fact. Rather than immediately putting down these articles or dismissing questions from outside reading, I decided to entertain the "fake news" ideas being introduced by my students. As the semester progressed, it appeared that everything science related was "fake" and there was no "truth." I asked students to post articles that they wanted to discuss in class on our online class page. In tandem with the course readings, this allowed students to have a safe space to ask questions about current news and popular science and to get an educated answer instead of reading the comments on a Facebook post.

My course covered the general topics that are the basis of every Introduction to Biological Anthropology course and the articles shared with me followed a similar pattern, focusing on evolution, the concept of race, and human biology. It came as no surprise that at a big university in the Southeast, my students submitted articles that covered topics that Donald Trump mentioned on his Twitter account or other official White House correspondence.[6] The submissions were not offered because they supported or did not support Trump's political platform, but because students understood that the majority of his rhetoric was built on falsehoods and incorrect statistics. For example, some of the popular science articles that students submitted were online think pieces about the U.S.-Mexico border wall that included rhetoric about immigration and race.

Vaccines

Many of the articles dealt with vaccinations, food, or diet. Articles about vaccinations questioned the relationship between autism and the measles, mumps, and rubella (MMR) vaccination. Some students were hesitant about receiving new vaccines (Taylor et al. 2014). Instead of pointing them in the direction of articles that recounted the controversy, I used popular science articles in tandem with my lecture slides and notes

[6] Donald Trump's personal twitter account: @realdonaldtrump

about the Columbian Exchange and emerging diseases. I weaved these areas together so that instead of isolating students who were previously ignorant about this issue, a sense of community within the classroom was fostered while we critically analyzed the information beyond the popular science articles.

The biggest question that resulted from the anti-vaccination ("anti-vaxxer") movement was whether vaccines indeed cause autism. The history of this concern dates to the 1990s when Dr. A. J. Wakefield and colleagues published a paper stating that there was no causal relationship between the MMR vaccine and autism (Wakefield et al. 1998). However, Wakefield subsequently suggested in a video that that there was indeed a causal relationship, contradicting the published paper. This was the accelerant that flamed the vaccine debate that continues to exist around the world. It was not until the mid-2000s that the Editor-in-Chief of *The Lancet*, Dr. Richard Horton, received information that Dr. Wakefield had been paid by attorneys seeking to file a lawsuit against vaccine manufacturers. By 2010, the paper was retracted and Dr. Wakefield was banned from practicing medicine in the United Kingdom by the General Medical Council.

Other hypotheses about the contents of the MMR vaccine came under scrutiny from those who continued to believe that there is a link between vaccines and autism. Ethylmercury was used as a preservative in the vaccine to until the early 2000s when the FDA requested that drug companies report the amounts of mercury in their products. At this time, ethylmercury was not as well studied as methylmercury, both of which were ultimately removed from the vaccine altogether even though multiple studies suggested that there is no causal effect between ethylmercury and autism (DeStefano et al. 2013).

In this example, rather than reading through multiple articles and trying to pick apart what each author was saying about the vaccine controversy, it was easier to work through what we knew (collectively as a class) and what we wanted to investigate. The biochemistry and more specialized terminology appeared to be a little more difficult for students to understand, but by breaking down what each of the mercuries are and what their function were, the differences were illuminated and easily understood. The major focus of the argument was that the vaccine was the causal agent, but pieces of this argumentative puzzle suggested otherwise. This issue was not new to my students, but they wanted a concrete comprehensive answer since there are so many publications arguing both ways despite the controversy being about twenty-five years in the making.

I used our class discussions to raise issues that went beyond the MMR vaccine and that addressed modern medicine in general. Theoretically, with the removal of ethylmercury from the vaccine, the incidence of autism should be mitigated. The plethora of scientific evidence argues that there is no connection between the removal of mercury from the MMR and autism; the incidence rate actually increased over time (Autism Spectrum Disorder 2018). Additionally, the class discussed other issues. How were the research studies designed? What statistical tests were used to test the hypotheses about this topic? In general, how would every single vaccine that is administered during childhood have something in common that would cause autism? The answer is that there is no common criterion and autism research concludes that the development of autism is

caused by either genetic predisposition, environmental factors, or a combination of both, and not by vaccines.

Aliens

It came as no surprise that some students shared articles relating to a possible connection between Peruvian mummies and aliens. Even though a considerable amount of media attention focused on these "anomalies" in Peru, many "ancient alien" theorists have pointed to Peru as a place showing direct evidence of alien involvement.[7] Though I find this area of pseudoscience/pseudoarchaeology interesting in jest, as an Andean bioarchaeologist it became worrisome when major media outlets began to pick up stories about the "Nasca three-fingered alien," the "Ata alien skeleton," and elongated "alien skulls." In March 2018, multiple news outlets began reporting on these topics and all suggested that researchers were claiming these specimens had non-human DNA.

A British tabloid newspaper, *The Sun,* reported on the three-fingered white "human-like figures" found in Peru that were believed to be alien (Knox 2018) and the story was subsequently picked up by a reputable Australian news agency (News Corp Australia 2018). The article reported that "researchers" and Professors Konstantin Korotkov and Dr. Edson Vivanco claimed that these mysterious beings were not human.[8] Interestingly, the researchers' examination of both the DNA and body came to the same conclusion: that they were indeed human. Yet a simple sentence, "They appear human, but are not," offered with no conclusive evidence, fomented speculation (Knox 2018). However, as my class and I read this article together, going over the "scientific claims" raised more questions than answers. My response was as follows:

> Who are these "researchers"? They do not list anyone that I am familiar with who conducts research in Peru. Let's Google these people's names and find out their affiliation and where they are currently located. It is very possible that I am not familiar with them, but I do not believe that any reputable scientist would look at these objects and automatically jump to an alien conclusion.

A student Googled the names of the individuals and found that Professor Konstantin Korotkov is the Deputy Director of the Saint-Petersburg Federal Research Institute of Physical Culture and a member at New Earth University.[9] Dr. Edson Vivanco is listed as a Peruvian surgeon without any medical school or hospital affiliation. In just a few seconds of Googling these individuals, the claims that were reported lost any merit and could immediately be rejected. Talking it through with my students, we discussed the fact that

[7] See the History Channel series "Ancient Aliens"

[8] Many articles will lead with "researchers said" in some form so it invites the reader to continue reading despite the fact that no name is cited. This is quite common in pseudoscientific articles. In this example, the paper also cited two individuals who do not conduct bioarchaeological research.

[9] https://newearth.university/members/dr-konstantin-korotkov/

it is a good idea to question what people are claiming. Doing some background checking is just good research practice. Scholars may hold a doctorate in one field, but have no credibility in a completely different field. In this example, the individuals' doctoral and physician status are questionable at best. Affirming that Googling someone is an acceptable practice was a double-edge sword. I received many notifications on my Academia.edu page because my students learned and applied these techniques while perhaps also questioning my authority to be their professor.

Conclusion

Throughout the semester, students became more engaged with the readings, the course material, and the social media articles that were brought into class. Introducing this pedagogical tool appeared to be extremely helpful for teaching students to critically analyze the presented material. The initial questions the students raised throughout the semester could now be easily answered. Including "bad" and "fake science" in my class augmented and improved their research and analytical skills, which can be used in other classes and throughout life. I wanted to give students the tools necessary to critically read both content shared online and academic literature. Following the criteria shown below can help students evaluate whether a source is reputable and useful regardless of whether it is academic literature or a popular science news article. These tools have helped my students determine whether research articles are useful in their research papers for my course and other courses outside anthropology. It should be noted that every researcher has his or her own nuances for literature review and this list can be extended. The onus is on us as academics and scholars, with or without a doctorate, to not only lecture on the course material, but to prepare our students with the tools they need to sift through "fake science" and "fake news" in this era.

Table 1. Critically Analyzing Scientific Information

Research Tool	Reason
Google the researcher	There is no harm in researching an individual's credentials when reading published research or being quoted in a news article.
Determine how the research design was constructed	If the research design is constructed in a way that would set up bias for the researcher, or a high margin of inter-observer error, then be cautious and examine the article carefully. Investigate what the null hypothesis and alternative hypothesis are in the research design.
Investigate how statistics are used	In many disciplines in the past, a ".05 statistical significance cult" persisted in which research would only be published if it met this statistical significance. This skewed research for decades, especially in the health sciences, but has since become less common. It is also important to relate the p-value to the null and alternate hypotheses and investigate the claims.
Identify comparable research	Finding comparable studies identifies whether there are similar findings or debate about the topic. This can build a general literature review about the topic and help track research progress on the topic.

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