The Baloney Detection Kit: Have we got what it takes?

Meghan Hansen
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Dr. J. Muir
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In his book The Demon-Haunted World: Science as a Candle in the Dark, Carl Sagan explains what he calls the baloney detection kit. This kit is a toolbox used by scientists to examine any new ideas that "are offered for consideration." (Sagan 1997, p. 210) Even though he is speaking specifically about scientists looking for evidence of extraterrestrial life, this same kit could be used for the detection of fallacious evidence and arguments in any setting, not only in the sciences, as it contains simply the "tools for skeptical thinking" (Sagan 1997, p. 210) Are we, collectively, as a society, able to use this toolkit? In this essay, I will posit that we have lost all of the tools in our toolkit, and that to find the tools again, our education must change

What is the Baloney Detection Kit?

As Sagan himself says, the toolkit contains the "tools for skeptical thinking." [i](Sagan 1997, p. 210, also see footnote) These tools have, for the most part, been grouped under the heading of scientific method, or logical thinking. Many of these tools are the rules of logic, and more specifically, those rules known as fallacies. Fallacies can be separated into three groups.

The first group consists of fallacies of relevance. They are: argument from ignorance; appeal to inappropriate authority; both types of the *ad hominem* attack (abusive and circumstantial); appeal to emotion; appeal to pity, and appeal to force. These fallacies can be grouped under the heading of *non sequitur*, meaning that the conclusion drawn from the premises of the argument does not follow. This group of fallacies is the one that makes up the largest part of the baloney detection kit. The

other two groups, fallacies of presumption and of ambiguity, are also of note. The fallacies of presumption that concern this argument mostly are those of false cause (mistaken reasoning of causal relations) and begging the question (assuming the conclusion in the premise of an argument). The fallacies of ambiguity are no less relevant on the whole, but they have a less dynamic effect.[1]

The other tools in the toolkit are more directly linked to the sciences, such as quantification, multiple hypotheses, falsifiability of the propositions, and Occam's Razor. Though they can be applied outside of the sciences- Occam's Razor states that if two hypotheses work equally well, the simpler one is most likely correct- their primary function is within the scope of science.

These tools are very powerful, when used properly. Unfortunately, our society seems to have lost the ability to use these tools. Is this truly the case, or have we simply lost the tools altogether?

The dropping of the tools

We have not accidentally dropped our tools, and been unable to pick them up again. We haven't even realized that they have gone missing. Education in North America has been slowly changing since the time of Benjamin Franklin and Thomas Jefferson. Both of these two gentlemen proposed reforms to the school system.

"Franklin's proposal for an academy includes among its curricular guidelines a strong recommendation to exploit the opportunity the audience of boys assembled

[1] For more details on fallacies, see Chapter 4 of Copi & Cohen's Introduction to Logic.

together affords for education in the civic capacities of oratory and debate." (Pangle, p. 170) He introduces an educational reform meant to educate solely for the public citizen. This is the beginning of American style education. It lead to "state-supported school curricula and textbooks that would marry a non-sectarian Protestant Christian public spirit with the ethos of self-government and commercial and agrarian enterprise that was the moral core of the new republic" (Pangle, p. 172) Jefferson added to this by further dividing the schools into "wards", where the community could become involved in the education of their own young. From these two reforms, the smaller communities began to dictate more of the curriculum, and the country as a whole less.

More than two hundred years later, the President of the United States, George Bush (Sr.) outlined the goals of his educational policy during the State of the Union address in 1990. He numbered among these goals: "expanding programs to prepare disadvantaged preschool children to learn; ... a sharp increase in the percentage of students who complete high school; ... the need to assess student performance at critical stages in education; ... school discipline." (Pangle, p. 163) He touches on many of the issues that are of concern to today's parents and educators. However, while speaking about education, it was striking "how little the president had to say about the *content* of education" (Pangle, p. 163) The President encourages the students to stay in school, where they will be prepared for learning, and assessed at critical stages, but he mentions only in passing what it is that the students will be learning in these classrooms. In the past, the president would have expounded on the civic and moral and religious content of the education to be given the students while in school. Now,

instead, he “kept these higher and more important themes of education out of his discussion of the institutions and policies of organized public schooling.” (Pangle, p. 165) The reforms of Franklin and Jefferson have eliminated the content of education in North America. These reforms have affected not only the public school system, but also the system of higher education, which then produces more teachers “whose spirits have been formed in substantial part by a higher education many of whose guiding lights are anything by sympathetic to ... republican tradition, patriotism, piety, property rights, and family.” (Pangle, p. 180) These reforms to the content of education have affected the souls of students and teachers, and caused some of the tools that are used for skeptical inquiry to be eliminated from education.

Which tools were dropped? Why does it matter?

People have become very gullible without the tools with which to protect themselves. They no longer have any way of distinguishing the truth from a well-crafted hoax. Says Sagan, “because the intellectual currency has been so debased, because credulity... is so rampant, because skeptical thinking is so rarely practiced, no parody is too implausible.” (Sagan 1997, p. 237) The intellectual currency he refers to is none other than that same toolkit for baloney detection. What is missing from the toolkit exactly? The tools that have been lost are the primary tools of skepticism: the fallacies of relevance and presumption, as well as the other scientific tools. The fallacies of ambiguity are of lesser importance to skeptical thinking than the fallacies of relevance

and presumption and the other scientific tools, so they will be put aside for the purposes of this argument.

The set of tools labeled as the fallacies of relevance are able to expose some of the most blatant and rampant examples of poor or fallacious reasoning. One of the most rampant cases of fallacious reasoning in North America today, in the form of an appeal to inappropriate authority, concerns paid celebrity endorsements of products, many of these sold on television. Take for an example the plethora of different types of exercise equipment advertised on national television. Many North Americans are coerced into buying these items, even though they do not need them, and will probably never use them, because they have seen a well-known, very athletic-looking celebrity say, on national television, that this particular system has worked for them, and it is the only one they will ever use. So what? That statement doesn't mean that this is the best machine. More likely what it means is that the particular company that manufactures it was willing to pay the celebrity the most money for his or her time. This is only one example of the appeal to authority.

Another type of advertisement uses the appeal to pity, a special case of the appeal to emotion, to raise funs for children in third world countries. This is not to say that these children that they are trying to help do not deserve to get clean water and the chance to go to school. The method used to collect money for this worthy cause, however, is based on a fallacious argument. For the skeptic, the emotions raised by the advertising would have no part. Instead, he would choose to research the particular organization, then decide if their cause was worthwhile.

The appeal to ignorance is used often by those who claim to have magical powers, ESP, belief in Big Foot (or Sasquatch) and the Loch Ness monster, and many other paranormal beliefs or abilities.[2] The basics of this fallacious argument are that if it is not proven that these things cannot exist, they therefore must exist. This particular fallacy can also be applied in reverse- the lack of evidence for a particular phenomenon does not prove that that phenomenon cannot exist, either. The important point to remember when trying to sort out the particular cases of this fallacy is that the burden of proof "surely rests on the shoulders of those who advance such claims." (Sagan 1997, p. 223)

The last two fallacies, the ad hominem, argument against the person, and ad baculum, appeal to force, have a characteristic in common. Neither on them really tries to apply itself directly to an argument. The appeal to force uses "direct or insinuated threats in order to bring about the acceptance of some conclusion." (Copi, p. 177) One of the most often used examples of this is during hostage situations on television. The hostage taker uses the threat of violence against his hostages to get what he wants out of the police. Both of the versions of the argument against the person focus on particular attributes of the person defending a particular position instead of on the validity of the argument. The abusive form of the ad hominem attack taints the character of the person being attacked. The circumstantial attack uses a particular circumstance of the person being attacked as a reason to reject the entire argument.

[2] For a more extensive list, see Sagan, The Demon Haunted World, page 221-222

The next set of tools that is missing from our toolkit is the fallacies of presumption. The fallacy of false cause is a very tricky tool to use. Blatant examples are easy to detect, but “even the best of scientists and statesmen are occasionally misled” by this fallacy. (Copi, p. 159) We are often lead to believe that because two events are temporally sequential, the first caused the second. This is not always the case. One of the examples that Sagan uses in his book to explain this is “Before women got the vote, there were no nuclear weapons.” (Sagan 1997, p. 215) There is no clear correlation between these two temporally sequential events. The other fallacy in this category is that of begging the question, also called assuming the conclusion. This is more difficult to do in some cases, but someone gifted in rhetoric, like a lawyer, can use it very effectively. Lawyers use this exact fallacious argument to make it seem to the jurors that they have trapped a witness into saying something that was not supposed to be said. Another good example of this is those who are in favor of the death penalty. They will say that it is necessary to institute the death penalty to discourage violent crime. However, they will never try to prove that the death penalty does, in fact, reduce the incidence of violent crimes.

The third set of lost tools is the set of scientific tools, namely quantification, multiplicity of hypotheses, falsification, and Occam’s Razor. Quantification simply asks for numerical proof to back up any claim. This is important in science, and the same request for proof can be easily transferred to other domains by the skeptic. In the case of a new drug coming onto the market, research is done first, to make sure that it does, in fact, do what it purports to do. Patients participate in a double-blind study where

they are given either a sugar-pill or the new medication. Those on the placebo are the control group. If the medication works, the cure rate in the medicated group should be larger than that of the control group. If not, then the medication is deemed useless. Many people forget to ask for proof like this.

The demand for multiple hypotheses is a necessary one in science. If every phenomenon were to be explained by one hypothesis only, chances are that human beings would, like Ducky-Lucky in the Mother Goose tale, think the sky was falling if ever something were to hit them on the head. This works outside of the realm of sciences as well. Imagine yourself in the following situation: You're waiting for a friend who is always punctual. They are now 30 minutes late. You hypothesize that they must have been run over by a car, otherwise they would never be late. Chances are, you will reject that hypothesis, or at least try to generate other ones, since there are many other possible reasons for your friend's tardiness.

Falsifiability is an extremely important tool to remember. If it is not possible to prove a hypothesis wrong by some sort of test, the hypothesis is close to worthless. As Carl Sagan says, "you must be able to check assertions out. Inveterate skeptics must be given the chance to follow your reasoning, to duplicate your experiments and see if they get the same result." (Sagan 1997, p. 211)

The last tool that has fallen out of the baloney detection toolkit is Occam's razor. This is a simple principle that states that, if there are two hypotheses that explain the phenomena equally well, the simpler of the two is the best. As an example, take a look at Sagan's novel, Contact. When the message arrives from Vega, the scientists do get

excited about the possibility that this is a message from an alien civilization, but they make sure that that hypothesis is the simplest one. They eliminate all sorts of different hypotheses, from a malfunction in the radio telescope array, to a low-flying plane, an orbiting satellite, to making sure the signal moves with the stars. Finally, when all of the simpler possibilities have been rejected, they compile the data of the movement and intensity of the signal, as well as the other data, and find that “by every criterion we can lay our hands on, this looks like the real thing.” (Sagan 1985, p. 69) Even so, they remain cautious, knowing that it is likely that a simpler solution will make itself known.

The reason that the loss of these tools is so problematic is not primarily for the sciences, but for human life as a whole. Many of these fallacies surround us every day of our lives. The tools that are missing are the ones that we use to protect ourselves from con artists and other scam operations, from the lies and deceits around us, and especially from falling into the inconsistencies of our times.

So, how do we get them back?

The project of education

To regain the tools to fill up the toolkit, society must slowly be re-educated to have “a passionate, ‘erotic,’ thirst for truth.” (Pangle, p. 184) We need to reach for knowledge that is superior to the scientific knowledge we already have. Pangle calls this kind of education dialectical education. It “always includes some skepticism ... because it always includes an acute awareness of the limits of our knowledge as well as firsthand experience of the power of the arguments that can be mustered against our

beliefs." (Pangle, p. 195) How does this awareness and experience come about? It comes from the debate that is continuing even today in the Great Books.

Entering the Great Books debate is not as difficult as it sounds, says Pangle. "it is possible...to begin one's liberation by simply picking up and starting to read with questioning alertness and care any one of a number of the Great Books: ... there are as many entry-points as truly great books." (Pangle, p. 197) The problem is knowing which books are great books. The way to find them is to "seek critics who challenge us to the core, compelling us to rethink our own foundations." (Pangle, p. 196) This is easiest found in the study of two different types of books: those that are the sources of our own thought, and those that have a rich and well-articulated opposition to our thought. This harks back to the multiplicity of hypotheses that is wanted. The more hypotheses there are, the greater the chance of being correct. Often, the newer thought is found to have references to different, older thought. Pangle points out that, for Americans, the writers of the Federalist Papers, Montesquieu, Bacon, Descartes, Spinoza, Locke, Defoe, and Fielding are the originators of the new thought, and their thought is a criticism of the likes of Plutarch, Thuycydides, Xenophon, Aristotle, the Bible, Maimonides, Aquinas, and Ibn Tufayl. (Pangle, p. 196-7) And these are just the beginning. Each set of great books will reintroduce one of the tools to our toolkit. Once they are reassembled, we can continue on, increasing our knowledge of how to use these tools.

Conclusion

We have, at present, lost all of the contents of our toolkit. Without those tools, we are but gullible victims of the next con artist who passes our way. But, with determination, and a little help from the authors of the past, we can pick back up the tools we have lost, and become knowledgeable, skeptical people, les prone to the errors. Can we really do it? I certainly hope so, because "if we don't want to get taken, we need to do this job for ourselves." (Sagan 1997, p. 241)

Works Cited

1. Copi,Irving and Cohen,Carl. Introduction to Logic. Pearson Education, Inc. Upper Saddle River, NJ: 2002.
2. Pangle, Thomas. The Ennobling of Democracy: The Challenge of the Postmodern Age. Johns Hopkins University Press, Baltimore: 1992.
3. Sagan, Carl. Contact. Pocket Books, New York: 1985.
4. Sagan, Carl. The Demon-Haunted World: Science as a Candle in the Dark. Ballantine Books, New York: 1997.

[i] THE BALONEY DETECTION TOOLKIT: From page 210-216 of The Demon-Haunted World:

"Among the tools:

- Wherever possible, there must be independent confirmation of the "facts"
- Encourage substantive debate on the evidence by knowledgeable proponents of all points of view.
- Arguments from authority carry little weight- "authorities" have made mistakes in the past. They will do so again in the future. Perhaps a better way to say it is that in science there are no authorities; at most, there are experts.
- Spin more than one hypothesis. If there's something to be explained, think of all the different ways in which it could be explained. Then think of tests by which you might systematically disprove each of the alternatives. What survives, the hypothesis that resists disproof in this Darwinian selection among "multiple working hypotheses," has a much better chance of being the right answer than if you had simply run with the first idea that caught your fancy.

- Try not to get overly attached to a hypothesis just because it's yours. It's only a way station in the pursuit of knowledge. Ask yourself why you like the idea. Compare it fairly with the alternatives. See if you can find reasons for rejecting it. If you don't, others will.
- Quantify. If whatever it is you're explaining has some measure, some numerical quantity attached to it. You'll be much better able to discriminate among competing hypotheses. What is vague and qualitative is open to many explanations. Of course there are truths to be sought in the many qualitative issues we are obliged to confront, but finding *them* is more challenging.
- If there's a chain of argument, *every* link in the chain must work (including the premise)- not just most of them.
- Occam's razor. This convenient rule-of-thumb urges us when faced with two hypotheses that explain the data *equally well* to choose the simpler.
- Always ask whether the hypothesis can be, at least in principle, falsified. Propositions that are untestable, unfalsifiable are not worth much. Consider the grand idea that our universe and everything in it is just an elementary particle- an electron, say- in a much bigger Cosmos. But if we can never acquire information from outside our universe, is not the idea incapable of disproof? You must be able to check assertions out. Inveterate sceptics must be given the chance to follow your reasoning, to duplicate your experiments and see if they get the same result. ...

In addition to teaching us what to do when evaluating a claim to knowledge, any good baloney kit must also teach us what *not* to do ... :

- ad hominem- Latin for "to the man," attacking the arguer and not the argument...
- argument from authority...
- argument from adverse consequences...
- appeal to ignorance- the claim that whatever has not been proved false must be true, and vice versa...
- special pleading, often to rescue a proposition deep in rhetorical trouble...
- begging the question, also called assuming the answer...
- observational selection, also called the enumeration of favourable circumstances, or as the philosopher Francis Bacon described it, counting the hits and forgetting the misses...
- statistics of small numbers- a close relative of observational selection...
- misunderstanding the nature of statistics
- inconsistency
- non sequitur- Latin for "it doesn't follow"... Often those falling into the non sequitur fallacy have simply failed to recognise alternative possibilities
- post hoc, ergo propter hoc- Latin for "it happened after, so it was caused by"...
- meaningless question...
- excluded middle, or false dichotomy- considering only the two extremes in a continuum of intermediate possibilities...
- short-term vs. long-term – a subset of the excluded middle, but so important I've pulled it out for special attention...
- slippery slope, related to excluded middle...
- confusion of correlation and causation...
- straw man- caricaturing a position to make it easier to attack...
- suppressed evidence, or half-truths...
- weasel words(e.g. ... euphemisms for war are one of a broad class of reinventions of language for political purposes. Talleyrand said, "An important are of politicians is to find new names for institutions which under old names have become odious to the public")

Knowing the existence of such logical and rhetorical fallacies rounds out our toolkit. Like all tools, the baloney detection can be misused, applied out of context, or even employed as a rote alternative to thinking. But applied judiciously, it can make all the difference in the world- not least in evaluating our own arguments before we present them to others.