

Running Header: SKEPTICAL CHALLENGE

Knowledge and Truth: A Skeptical Challenge

Abstract

It is widely accepted in epistemology that knowledge is *factive*, meaning that only truths can be known. We argue that this theory creates a skeptical challenge: because many of our beliefs are only approximately true, and therefore false, they do not count as knowledge. We consider several responses to this challenge and propose a new one. We propose easing the truth requirement on knowledge to allow approximately true, practically adequate representations to count as knowledge. In addition to addressing the skeptical challenge, this view also coheres with several previous theoretical proposals in epistemology.

Keywords: truth; factivity; knowledge; skepticism; approximation; practical interests

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The human organism is, from the point of view of physics, a certain kind of measuring apparatus. As such it has certain inherent limitations. – Bas C. Van Fraassen

Human beings are limited creatures. Despite our best efforts, there are many things that we will never fully observe, represent, calculate, or measure. For example, scientists will probably never directly observe quarks or measure the precise size or age of the universe. In these and other matters, often the best they can do is rely on approximation. For example, scientists at NASA's Jet Propulsion Laboratory use the fifteen-digit number "3.141592653589793" as an approximate value of pi, even though it is, strictly speaking, not the actual value of pi. They also estimate the age of the universe as approximately 13.8 billion years, give or take a few million years. Such limitations have long been discussed by philosophers of science, who acknowledge that "measurement is nothing more or less than controlled or regulated estimation" (Trout 2003: 45-46) and that "science does not aim at establishing immutable truths and eternal dogmas: its aim is to approach the truth by successive approximations, without claiming that at any stage final and complete accuracy has been achieved" (Russell 1925 [1958]: 100).

Approximation is also ubiquitous in everyday life, though it is considerably less accurate outside of NASA. When representing, observing, and measuring things, we frequently approximate distances, spatial orientations, trajectories, speeds, sizes, colors, temperatures, dates, and times. For example, the representation that a mile equals 1.6 kilometers, that my mailbox is 2 feet from the curb, that 16 ounces of water was added to

the recipe, that 2 blue shirts are the same shade, that the current temperature is 75 degrees Fahrenheit outside, or that the current time is 9:03 are all common approximations. These representations closely approximate the truth, but they are not strictly true. For example, my mailbox is actually not 2 feet from the curb (it's 1.95 feet), I didn't add 16 ounces of water to the mixture (I added 15.90), and it is not 9:03 (it's 9:02:58). And while the use of everyday measurement tools, such as clocks, rulers, or kitchen scales may sometimes allow the more litigious, punctual, or epicurean among us to make very accurate representations of these things, in practice, measurement error all but guarantees that such representations will always be only approximate.

Given these limitations, the question arises: do the same limitations extend to what humans know? According to a leading theory of knowledge, knowledge is *factive*, meaning that only truths can be known (e.g. Audi 1998; BonJour 2002; Chisholm 1989; Davidson 1988; Feldman 2003; Fumerton 2006; Greco 2010; Pritchard 2006; Sartwell 1992; Sosa 1991; Williamson 2000; Zagzebski 2009). However, if knowledge requires strict truth, and approximations are not strictly true, then it is not possible to know approximations. Let this be the skeptical challenge for factive knowledge:

1. A representation is known only if it is strictly true. (premise)
2. Approximations are not strictly true. (premise)
3. Therefore approximations are not known. (from 1 and 2)
4. Many of our representations are mere approximations. (premise)
5. Therefore many of our representations are not known. (from 3 and 4)

Epistemologists may be willing to grant that some, perhaps even many, of our representations are ordinarily not known. But given the ubiquity of approximation in

personal, professional and public life, the extent of ignorance implied by this argument is noteworthy. To begin appreciating the skeptical challenge it poses, consider the sheer number of things we represent approximately and thus, according to this argument, would no longer know. For instance, I do not know that my mailbox is the distance from the curb I thought it was, that I added the amount of water to the recipe I thought I did, or that the current temperature or the current time is what I thought it was. In light of the fact that usually the best we do is merely approximate the truth, the requirement of strict truth could undermine much of what we ordinarily take ourselves to know.

There are several potential responses to this skeptical argument. A first response rejects the premise that many of our representations about the world are merely approximations of what the world is like (i.e. line 4). This response appears to be a non-starter for several reasons. First, limitations of measurement are well known. Even the most astute or careful measurements are bound to merely approximate values that a more discerning instrument might later detect. Second, ordinary discourse and measurement are far less discerning than professional scientific measurement. We frequently “round off” such details in the course of daily life.

A second response denies the premise that approximations are not strictly true (i.e. line 2). One way to deny this is to adopt relativism about truth. For example, “pi equals 3.14” could be strictly true in the grade-school classroom but false in the laboratory. This view can seem versatile and appealing. Moreover, relativism could be on strong footing in some domains, such as morality (Harman 1975) or justification (Wright 2008). But the relativist response to skepticism must go beyond those domains to encompass all of the domains where we ordinarily take ourselves to know many things,

such as arithmetical calculations or the size of household objects, as well as the domains of scientific inquiry. This option is unavailable to philosophers who, like us, reject truth relativism. It could be a failing of ours, but no matter how hard we try, we simply cannot bring ourselves to believe, or even find it plausible, that in some contexts it is strictly true that pi is 3.14, or that it could be strictly true that we added 16 ounces to the mix (when in fact only 15.90 ounces was added). Later we will propose an alternative that avoids these consequences while matching truth relativism's appealing versatility.

Another way to deny that approximations are not strictly true is to deny that the representations in question are ever precise enough to count as false. When it comes to historical dates, for example, it is strictly true that the American Civil War ended in 1865. So long as the content is *imprecise* enough to encompass the margin of error, strict truth can be preserved. Thus, there is nothing in the factive account that rules out the possibility of knowing that Civil War ended in 1865, or even in April of 1865, even if I don't know that it ended on April 9, 1865. Similarly, our visual representations of where the mailbox is located might not be 2 feet, but rather the distance between my two outstretched hands, wiggling them a bit, which is about 2 feet from the curb. If representations are coarse-grained enough in these or other ways, the response goes, then they are coarse enough to count as strictly true.

This strategy is promising but also can be questioned. It is an empirical question what the precise granularity of our representations is. As far as we're aware, this has not been established, even approximately, by researchers in the cognitive sciences. Thus, a coarse-grained account of representation is no better empirically supported than a fine-grained account, and it is an open question whether the present strategy succeeds. It is

hostage to how the science turns out. In principle, there is nothing wrong with the issue ultimately hinging on how the science turns out, but, as discussed more below, we think that progress can be made independently of that.

A third response to the skeptical challenge accepts the conclusion but denies its force. Ordinary claims about everyday knowledge are false, but versions of them could be constructed that are true by including hedges and elliptical approximation clauses. For example, when it comes to knowledge of distance or time, we know only the approximate distance or the approximate time, such as “the age of the universe, give or take millions of years.” Similarly, when we say false things like “Smith knows that his mailbox is 2 feet from the street,” perhaps what we really mean to say is that Smith knows the approximate proposition “that his mailbox is *about* 2 feet from the street.” Restructuring our speech in these ways might even make knowing how old the universe is or where my mailbox is possible in virtue of knowing only the approximate proposition.

Such qualifications might also explain epistemic practices in some special domains such as scientific inquiry. Scientific inquiry might aim to uncover truth, but it typically does no better than uncover approximate rather than exact truths. When speculating about what scientists believe, Alvin Goldman, for instance, writes that “the sort of proposition they typically believe is not one expressed by a formula ‘F,’ but one with the content ‘F, to some approximation’” (Goldman 1999: 246). If this is true, then knowledge of (specific, unqualified) truths about the world is ruled out, while approximate propositions remain candidates for scientific knowledge. A related but distinct research program in philosophy of science emphasizes the use of laws, idealized models, “felicitous falsehoods,” and “cognitively useful fictions” in scientific inquiry.

Catherine Elgin, for instance, argues that strictly false propositions can often increase our scientific understanding of natural phenomena and thus explain the epistemic legitimacy of science in the face of the kind of skepticism implied by the argument above (Elgin 2004).¹

While perhaps allowing us to retain some everyday or scientific knowledge and offering a path to recovering some ersatz knowledge, this response still comes with a cost. While most everyday knowledge claims could be made true, they still are false. Even scientific inquiry, arguably one of the best ways to acquire knowledge of the physical world, is necessarily limited to knowledge of qualified approximate truths. In fairness, this is exactly how the proposal was billed: the skeptic is right but it needn't matter. Perhaps this is ultimately the best that can be done. However, we think that it is premature to settle for this without first considering at least one other strategy.

We propose a fourth response: knowledge does not require truth (i.e. reject line 1). Instead, false but approximately true propositions can be known. Call this *the approximation account* of knowledge. On this view, representations need not be true in order to count as knowledge. Instead, they need only *adequately represent* the truth. Though there are potentially many ways that approximations could be adequate, one way is for them to serve our purposes well enough to facilitate action and help us to achieve our goals in a particular circumstance. For example, 3.14 might be adequate, and hence

¹ We thank a reviewer for discussion on these points.

known, as the value of pi in the grade school classroom, but inadequate, and hence not known, as the value of pi in the lab engineering a global positioning system.

The approximation account avoids the questions associated with the other responses considered above. Unlike the first response, the approximation account does not rely on unrealistic assumptions about measuring devices or human cognition. Unlike the second response, the approximation account preserves the link between knowing, on the one hand, and commonsense norms and standards of communication and inquiry, on the other. Relatedly, the approximation account does not imply that most of our ordinary knowledge claims are false, nor that speaking truthfully about these matters requires ubiquitous hedging. Unlike the second response considered above, the approximation account does not endorse relativism about truth. On our proposal, truth is perfectly objective. Surely something has to give in response to the skeptical challenge. But instead of giving up on objective truth, we could give up on truth as a requirement of knowledge. We propose in its place a standard for judging approximations that relativizes to practical purposes. This entails that a representation might be adequate relative to one practical context, but inadequate relative to another. It is important to emphasize that, on our proposal, this is not because it is true in one context but false in the other. Instead, it is because, trivially, the demands of successful action depend on features of the practical context, which are not always the same. We submit that exploiting the unobjectionable relativity of practical adequacy is theoretically preferable to resorting to relativism about truth.

It is also important to emphasize that our proposal does not sever the conceptual connection between knowledge and truth. One virtue of all three proposals considered

earlier is that they preserve an intuitive link between knowledge and truth. The approximation account has this virtue too, in at least two ways. On the one hand, conceptually, truth sets the standard by which approximations are judged worthy or not. Truth anchors the tolerable margin for error. On the other hand, an ideal instance of knowledge will be strictly true. We can allow that as the constituent representation more closely approximates the strict truth, the better the knowledge becomes. Other things being equal, improving a representation's accuracy means that you know better. In the limit, as a representation's precision increases indefinitely while still remaining strictly true, it would be adequate for any practical purposes.

Aside from providing a direct response to the skeptical argument, another strength of our proposal is that it coheres well with prior theoretical developments in epistemology. For instance, the approximation account naturally coheres with the theory that knowledge is importantly connected to action and practical interests (Fantl and McGrath 2009; Hawthorne 2004; James 1879 (1948); Locke 1690 (1975); Turri and Buckwalter 2017; Turri, Buckwalter, and Rose 2016). According to such views, whether a proposition is known depends partially on whether it is appropriate to treat that proposition as a reason for action in a particular situation. If actionability is a component of knowledge, and reliance on approximate truths can often be appropriate or even practically necessary to facilitate action, then it is reasonable to integrate approximate truths into pragmatic accounts of knowledge.

Pursuant to that thought, in a certain respect, the approximation account is the antithesis of the Cartesian view. At the end of Meditation One, in the context of justifying his method of hyperbolic doubt, Descartes considers an objection: even if our senses are

“in some respects doubtful,” isn’t it nevertheless more reasonable to trust rather than distrust them? Descartes responds, “It is impossible for me to indulge in too much distrust, since I am now concentrating only on knowledge, not on action” (Descartes 1641: 12). On Descartes’ approach, one can set action aside when theorizing about knowledge, at least in its ideal form. On our approach, far from being able to set action aside, one achieves ideal knowledge only when the constituent representation is precise and accurate enough to inform action in any practical context. Rather than being separable from action, ideal knowledge is partly defined by its connection to action across an indefinite range of situations.

This definition coheres with recent work on epistemic normativity and the epistemic conditions on practical reasoning. Michael Shaffer, for example, argues that it is epistemically rational to employ certain kinds of false propositions in practical reasoning so long as they are approximately true, and that “we can be efficient problem solvers and deliberators even though we do not reason in maximally accurate ways on the basis of exact truths” (Shaffer 2012: 250). We agree with this basic observation. But, in contrast, we suggest that one straightforward explanation for why this behavior can be rational is because some approximate truths can be known.

The approximation account could also cohere with some versions of contextualism. According to David Lewis, for example, “S knows that p iff S’s evidence eliminates every possibility in which not-p — Psst! — except for those possibilities that we are properly ignoring” (Lewis 1996: 554). The context of the attribution distinguishes epistemically relevant from irrelevant possibilities of error. When deciding what a subject knows, only the relevant possibilities need ruled out by a subject’s evidence in order for

an attributor to ascribe knowledge. For Lewis, the factivity of knowledge is guaranteed by the further “rule of actuality”, according to which, “the actual world is never properly ignored” (ibid.). One way to unpack this, we submit, is that the way things actually are is a fixed point from which a practically acceptable margin of error is established. We can properly ignore error possibilities that fall in the gap between strict truth and the outer limits of practically adequate approximation. Future research is necessary to explore whether the approximation account is best executed with mechanisms developed by contextualists, interest relative invariantists, or others. For present purposes, however, we think the prospect that it could be readily accommodated by several leading accounts of knowledge adds to its plausibility and further motivates the proposal.

Finally, we would be remiss if we failed to remark upon a curious and ironically useful consequence of our proposal. We propose abandoning the mainstream view that knowledge requires truth and replacing it with the view that knowledge requires merely an adequate approximation of the truth. Moreover, we argued for this in the context of a skeptical challenge that, as far as we’re aware, has received little if any attention in contemporary epistemology. Thus it could turn out that, with respect to the contexts in which the theory of knowledge is typically pursued, the view that *knowledge requires truth* is an adequate approximation of the true view that *knowledge requires not truth but merely adequate approximation*. In other words, by our own lights, it is possible that proponents of the false mainstream view *know* that it is true! We submit that this is an excellent explanation of the mainstream view’s appeal.

In summary, we considered a skeptical challenge that arises in light of a condition that is widely accepted as a necessary condition of knowledge: truth. If knowledge

requires truth, then the fact that many of our beliefs are false threatens skepticism. We view the main contribution of this paper to be isolating the skeptical challenge for factive knowledge, reviewing several responses to this challenge, and hopefully, inspiring more nuance in future theorizing on factivity constraints on knowledge in light of it. To that end, we also proposed a new response to the skeptical challenge and theory of our own: relinquishing the truth requirement on knowledge and allowing adequate approximations to be known. This response addresses the skeptical challenge, avoids questions facing other responses, retains a conceptual connection between knowledge and truth, coheres with several other developments in theoretical epistemology, and can explain the widespread appeal of the view that knowledge requires truth.

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