

Epistemic Trespassing

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Epistemic trespassers judge matters outside their field of expertise. Trespassing is ubiquitous in this age of interdisciplinary research and recognizing this will require us to be more intellectually modest.

1. Introduction

Epistemic trespassers are thinkers who have competence or expertise to make good judgments in one field, but move to another field where they lack competence—and pass judgment nevertheless. We should doubt that trespassers are reliable judges in fields where they are outsiders.

A few examples will guide our discussion. Linus Pauling, the brilliant chemist and energetic proponent of peace, won two Nobel Prizes—one for his work in chemistry, and another for his activism against atomic weapons. Later, Pauling asserted that mega-doses of vitamin C could effectively treat diseases such as cancer and cure ailments like the common cold. Pauling was roundly dismissed as a crackpot by the medical establishment after researchers ran studies and concluded that high-dose vitamin C therapies did not have the touted health effects. Pauling accused the establishment of fraud and careless science. This trespasser did not want to be moved aside by the real experts.

Scientists sometimes encroach on one another's fields. But philosophers are especially wary of intruders on their turf. The evolutionary biologist Richard Dawkins has written and lectured on religion. Experts in the philosophy of religion—atheists, agnostics, and theists alike—charge that Dawkins fails to engage with the genuine issues and sets up strawmen as his dialectical opponents. Dawkins appears to overstep his competence as a biologist. Neil deGrasse Tyson, an astrophysicist, supplies a similar example in his remarks on philosophy. Tyson has said, for instance, that philosophy is 'useless' and majoring

in philosophy ‘can really mess you up’. But if we look closely at what Tyson apparently thinks philosophy is, we will see the astrophysicist would benefit from taking a philosophy course or two. Tyson and Dawkins are both intelligent scientists, but we may think they should stick to topics about which they can rightfully claim to know something.

Trespassers occasionally annoy philosophers, but that doesn’t mean philosophers always stay inside their own intellectual boundaries. For instance, reviewers panned Colin McGinn’s book *The Meaning of Disgust* (2011), asserting that McGinn had written a ‘tragically flawed’ book (Kelly 2012) and completely bypassed ‘the received wisdom amongst empirically-minded scholars of disgust’ (Strohming 2014). According to critics, McGinn had theorized about disgust while in a state of ignorance concerning past research on the topic. Of course, the question of whether or not someone has trespassed is often up for grabs, and indicted trespassers may plead not guilty, offering justifications for their cross-field judgments.¹

Trespassing is a significant problem in an age of expertise and punditry, but it’s not new. In Plato’s *Apology*, Socrates tells us he tracked down citizens in Athens who had reputations for being skilled. He met politicians, poets, and craftsmen and tested their mettle. As Socrates says, he ‘found those who had the highest reputation were nearly the most deficient’ (22a). Socrates diagnosed the problem: because these men had been so successful in their particular crafts, each one ‘thought himself very wise in most important pursuits, and this error of theirs overshadowed the wisdom they had’ (22e). Puffed up by their achievements in one domain, the successful Athenians trespassed on matters about which they were ignorant.²

¹ In a response to critics, McGinn (2015) claimed that ignoring the empirical literature on disgust was appropriate because he ‘wanted to elucidate [disgust’s] broad psychological significance to us as reflective beings’. According to him, his book’s main question is the exclusive domain of philosophy.

² I use Grube’s translation in Cooper and Hutchinson, eds. (1997). Did Socrates have to trespass in order to judge that the elite Athenians were overreaching? Not necessarily. One of Socrates’ dialectical techniques was to tease out contradictions in his interlocutors’ thinking. Recognizing that someone is committed to an inconsistent set of statements may not require any trespassing. For more on Socrates and expertise, see LaBarge (1997).

Epistemic trespassing is a topic that cries out for investigation.³ In this essay, I will focus on four questions:

- (1) What is epistemic trespassing?
- (2) How commonplace is trespassing?
- (3) In cases where trespassing is epistemically problematic, what makes it problematic?
- (4) What makes trespassing permissible?

After I say more about what trespassing is and articulate why it is an epistemological problem, I'll defend two theses. First, trespassing is a widespread problem that crops up especially in the practice of interdisciplinary research, as opposed to what we might call 'single-discipline' research. Second, reflecting on trespassing should lead us to have greater intellectual modesty, in the sense that we will have good reason to be far less confident we have the right answers to many important questions.

2. What is epistemic trespassing?

Epistemic trespassing of the sort I've noted is easy to recognize. Experts drift over a highly-visible boundary line and into a domain where they lack either the relevant evidence or the skills to interpret the evidence well. But they keep talking nonetheless. Experts on a public stage are cast in the role of the 'public intellectual' or 'celebrity academic'. They may find trespassing all but impossible to resist. Microphones are switched on, TV cameras zoom in, and 'sound bites' come forth, coaxed out of the commentators by journalists. So what do you have to say about philosophy, Neil deGrasse Tyson? And what about arguments for the existence of God, Professor Dawkins? I don't think trespassing is exclusively a problem for scholars in the limelight, however, and one of my goals here is to explain why ordinary researchers often risk trespassing, too.

³ I should add that scholars in science studies and the history of science have often examined how boundaries between fields are created and crossed. (See, for example, Gieryn 1999.) Patricia Kitcher (1992, chapters 6 and 7) describes how Sigmund Freud's attempt to build an interdisciplinary science of the mind fizzled out when psychoanalytic theory 'lost contact with the rest of science'. Freud committed himself to a policy of trespassing when new scientific findings did not fit with his initial expectations. (Thanks to Hilary Kornblith for pointing out Kitcher's book.) In a book on expertise, Tom Nichols (2017, chapter 6) discusses 'cross-expertise poaching', which is what I call trespassing, and uses Linus Pauling as an example of a poacher. (Thanks to Lucy Randall and Coran Stewart for telling me about Nichols's book.)

Its deeper causes aside, trespassing brings many kinds of epistemic costs, both personal and social. Trespassers pay some costs themselves when they hold beliefs or make assertions that do not satisfy the standards for rational belief or knowledge. If trespassers do happen to arrive at the truth, that's thanks to a stroke of good luck, and not because they have reliably or responsibly responded to the available evidence. I'll say more below about the epistemic status of the opinions held by reflective trespassers, but for now notice two points. First, the intellectual characters of trespassers often look unsavoury. Out of their league but highly confident nonetheless, trespassers appear to be immodest, dogmatic, or arrogant. Trespassers easily fail to manifest the trait of intellectual humility and demonstrate one or another epistemic vice (Whitcomb et al. 2017, Cassam 2016). Second, it's useful to distinguish between trespassers *holding confident opinions* and *investigating questions in another field*. I assume it can be epistemically appropriate for people to look into questions beyond their competence, even when it would be inappropriate for them to hold confident opinions. I want to examine cases where people do hold confident views about topics beyond their intellectual grasp. One lesson will be that it's often preferable, from an epistemic point of view, to investigate questions in another field than to adopt opinions about those questions.

Trespassing can also harm other people. Bystanders may be led into error when they trust the word of trespassers. The genuine experts may expend precious resources refuting the trespassers' mistakes or managing PR campaigns to correct dangerous misinformation. Recall Linus Pauling's advocacy of mega-vitamin therapies. Pauling threw his reputation as a double Nobel laureate behind a bogus medical cause. From an epistemological perspective, it is unclear how the world could be better off because of Pauling's trespassing. Even so, manufacturers of vitamin C tablets were pleased. They bankrolled Pauling in his public war against conventional medicine and amassed fortunes in the sale of vitamin supplements.

Let us now sharpen our focus on the idea of epistemic trespassing. I will invoke two terms of art: *fields* and *experts*. Let us say that a field is fixed by a set of questions or topics. For instance, the questions of biochemistry (the study of chemical substances and processes inside living things) make up a field. That is not to say there are always sharp cut-offs between biochemistry and other fields. The line between biochemistry and molecular biology (the study of the molecular basis for activities inside a living cell) is blurry. Biochemists and molecular

biologists examine some of the same questions, though they bring different perspectives and resources to inquiry. We can keep that point about blurry divisions between fields and shared questions in mind for later. A field, in my sense, can be fixed by an extremely narrow set of questions, so what I call a field may not be coextensive with the ordinary boundaries of any academic or scientific discipline.

Expertise is a status of thinkers and it is relative to a field at a particular time. Let us say thinkers count as experts in a field only if they possess two things at one time: first, enough relevant evidence to answer reliably or responsibly their field's questions; and, second, enough relevant skills to evaluate or interpret the field's evidence well. While novices or laypersons can sometimes reliably or responsibly accept answers to a field's questions by trusting expert testimony, the experts themselves answer on the basis of their evidence and skills.

Whatever else it is, expertise is built out of evidence and skills. Notice that expertise does not entail that one can give firm answers to all of a field's questions; there can be 'open questions' in a field. Experts are well-positioned to survey their fields and recognize what is known and unknown. Furthermore, expertise does not eliminate differences between thinkers who have enough evidence and skills to evaluate the evidence well. Some experts may have a 'deeper' understanding of the evidence, or better skills for evaluating it, than other experts do. Two experts in a field may also reach different conclusions. But they both must meet some threshold for having enough evidence and skills.

I am concerned with epistemic or intellectual expertise. Other types of expertise are fixed by the credentials and social markers needed for someone to pronounce authoritatively on a field and its questions. Epistemic expertise is more closely tied to the ability to acquire rational beliefs, true beliefs, or knowledge (Coady 2012, chapter 2, Goldberg 2009, Goldman 2001 and forthcoming, Pigliucci 2010, chapter 12, and Scholz 2009). Normally, when we call people 'experts' concerning vast professional or academic disciplines, we use the term to ascribe a social standing, not genuine epistemic expertise. Expertise in my sense is an intellectual competence that is consistent with fallibility. Someone can be an expert about a field where the relevant evidence is incomplete or misleading, or where the tools for evaluating the evidence are unreliable, so that even a flawless expert performance will not track the truth. Isaac Newton is one example. Even though many of his views were mistaken, he was an epistemic expert about the physics of his day, because he had enough evidence and skills to evaluate the relevant evidence well.

3. How commonplace is trespassing?

I began with cases where Pauling, Dawkins, Tyson, and McGinn apparently stepped over an epistemological line. Trespassing happens. But does it happen often? Pauling and company are easy-to-recognize, public examples of trespassing. But subtle, harder-to-detect sorts of trespassing could be commonplace, and sometimes more dangerous because they are unobvious.

To recognize more subtle forms of trespassing, we need to find interdisciplinary connections forged between different fields. We need to see how these connections cause experts unwittingly to overstep their limits. This easily happens when experts investigate what I will call *hybridized questions*—ones addressed and answered by combining evidence and techniques from two or more fields.

Fields are fixed by a set of questions and expertise is fixed by bodies of evidence and skills needed to answer a field's questions. But note that sometimes fields overlap or converge and come to share a question. This may happen in one of three ways: (a) the evidence required to answer a question reliably or responsibly comes from two or more fields; (b) the skills required to evaluate the evidence well come from two or more fields; or (c) both the relevant evidence and the relevant skills required to answer a question reliably or responsibly come from two or more fields. In such situations, the experts in one field will not all satisfy the same evidence or skill conditions as the experts in another field. Since the experts are in different fields, the evidence and skills that constitute their expertise differ. A hybridized question, then, is one that experts in distinct fields could try to answer using their own resources. Take the question, 'What caused the Cretaceous-Paleogene extinction event?' It is addressed by experts in palaeontology, geology, climatology, and oceanography, among other fields. The question is thoroughly hybridized and answering it calls for a host of evidence and skills. A question can be hybridized even if it is experts from one field only who address the question. But once investigators recognize that a question is hybridized, they should think that answering it reliably and responsibly calls for cross-field resources.

These days, hybridized questions abound. I will consider one case in detail before noting others more briefly. From the 1950s through to the 1980s, philosophers approached questions about human freedom using the tools of analysis and counterexample. Principles meant to articulate the nature of freedom were tested using 'thought experiments'. Questions about free will were treated as metaphysical or

conceptual questions. Recent decades have seen an explosion of interest in free will from beyond metaphysics. Normative ethicists, for instance, investigate the nature of moral responsibility and blame, connected with the conditions for freedom. Neuroscientists and experimental psychologists have also joined the conversation. Scientists who study conscious will and intention have alleged there are ‘unconscious precursors’ for what appear to be our free choices. Experimental philosophers have examined ‘free will’ thought experiments, seeking to discover what influences philosophical judgment. The evidence that bears on the question ‘Are we free?’ is presently much more diverse than it was in earlier decades. The question has been hybridized.

Questions in philosophy may become hybridized when bodies of empirical fact, experimental evidence, and empirically-driven theories are recognized to be relevant to answering those questions. As a matter of fact, the era of narrowly analysis-driven philosophy represents an anomaly within the history of philosophy. In many periods, philosophers have sought to blend together ideas from different quarters of their intellectual worlds and engage with broad social and cultural debates. Certainly, compared to the golden era of analysis, a more interdisciplinary approach toward many philosophical questions can be witnessed in the present. Here are some examples. The question ‘Are we rational?’ now invites contributions from psychology and the cognitive sciences (Stein 1996, Samuels and Stich 2004, and Mercier and Sperber 2011). The question ‘What is knowledge?’ has been opened to intrusions from empirical fields (Craig 1990 and Kornblith 2002). A range of scientific ideas have hybridized the question ‘Is there a God?’, from the ‘fine-tuning’ of the universe (Davies 2007) to scientific models purporting to explain theistic beliefs (Wilson 2003 and Atran 2004). Furthermore, many questions from philosophical ethics have been linked to empirical fields. Philosophers have used ideas from evolutionary biology to challenge moral realism (Street 2006 and Joyce 2006). Moral psychologists claim that evidence from neuroscience challenges Kantian deontological theories and supports consequentialism (Greene 2008). Philosophers have argued that the situationist paradigm in social psychology undermines, or calls for reinterpretation of, traditional virtue theories (Harman 1999, Doris 2002, and Miller 2014).

Traditional philosophical questions are now front and centre in many interdisciplinary debates. Here are two issues. First, what does hybridization have to do with trespassing? The answer is that

investigators who address hybridized questions will often lack expertise in one or more of the relevant fields. Second, how common is trespassing? My answer is ‘Quite common’. Growing numbers of philosophers have become aware of research from empirical disciplines—either because that research grew more prominent in general, or because intellectual entrepreneurs carried insights from the sciences into areas traditionally studied by philosophers. Let me also hypothesize that academic deans and grant agencies incentivize trespassing by funding interdisciplinary research. From the perspective of academic philosophy in the English-speaking world, if the middle to late decades of the twentieth century were a period of fracturing and splintering of philosophical subfields into increasingly smaller bits and pieces, we are beginning to feel forces pulling together many kinds of researchers into shared conversations about philosophical matters. But when experts in one field try to answer hybridized questions, they need evidence and skills located outside their home field. They appear to be treading on someone else’s turf.⁴

4. What makes trespassing epistemically problematic?

In the opening examples starring Pauling and company, we find experts who issue judgments on questions beyond their training and competence. But consider experts who knowingly take a stand on hybridized questions—specifically, questions that call for more than their field-specific expertise alone. How should these experts react to learning there is more relevant evidence and skills than what they have brought to the table?

One response is to obtain further expertise. If you know you have trespassed, then decide to stop and figure out what you’re missing. That is what philosopher of action Al Mele did when he heard

⁴ Here are two notes about the scope of my discussion. First, I focus on trespassing scholars and researchers, but the problem of trespassing arises in everyday life. People who have no special expertise in any technical field hold views about scientific, social, and political questions that can be addressed using specialized evidence and skills. People lacking the relevant competence oftentimes knowingly reject experts’ positions. For now, I set to the side questions about the normative evaluation of such trespassers, a topic I consider elsewhere. Second, I also mean to restrict my focus to questions where the answers are not rationally believed in a ‘properly basic’ way on the basis of widely shared experiences or intuitions due to nature or nurture. One upshot is that people who hold ordinary perceptual or memory beliefs don’t count as trespassing on radically skeptical philosophers, who reject such beliefs on the basis of specialized evidence and skills. (I am grateful to Michael Bergmann and Tomás Bogardus for discussion here.)

tantalizing claims defended by neuroscientists, physiologists, and psychologists. Scientists had claimed to have discovered that free will is an illusion. Mele learned enough of the science to understand its bearing on debates about free will (Mele 2008 and 2009). His response is far from ordinary, however. Most scientists studying human freedom have apparently not followed in Mele's footsteps by developing cross-field expertise themselves; most philosophers interested in free will have not either.⁵

Here is a different response. Experts can retreat to the relative safety and security of their disciplinary trenches. The idea is that experts will refrain from confidently accepting answers to hybridized questions once they recognize they are not cross-field experts. Instead, these modest thinkers might only confidently accept answers to 'narrower', non-hybridized sub-questions. For example, metaphysicians who think about human freedom could quit confidently judging whether humans are free, and instead only judge the narrower matter of whether freedom is compatible with causal determinism. Metaphysicians could insist that the compatibility of freedom and determinism is neither neuroscience nor psychology. It is metaphysics—straight, no chaser.

Does the fall-back manoeuvre work? That depends on whether metaphysicians reasonably think some hybridized question 'decomposes' into non-hybridized questions, or at least ones that are properly investigated only by the field or fields in which they have expertise. In the case at hand, notice that the question about the compatibility of freedom and determinism is connected to evidence uncovered by experimental philosophers who investigate intuitions prompted by 'free will' thought experiments. Furthermore, compatibilism raises questions from the philosophy of science about the laws of nature. These points suggest that even the sub-question about compatibilism has become hybridized by the mixing and mingling of philosophical subfields.⁶

Thus far, I have noted two reactions to learning we are trespassers: become cross-field experts or confidently answer only non-hybridized questions. But hard work and modesty are both uncomfortable. What

⁵ Increasingly, in a number of philosophical subfields, graduate education aims to equip students with cross-disciplinary competence. For example, doctoral students in the philosophy of physics must complete a standard sequence of graduate courses in physics.

⁶ Trespassing experts may 'conditionalize' their assertions by arguing in this way: if some other field shows that p is true, then q follows. Experts wary of trespassing could hedge like that while denying they have knowledge or rational belief that the antecedent is true. For present purposes, I'll treat conditionalized claims as being properly part of an expert's own field. Conditionalizing allows experts to stick to answering non-hybridized questions.

other options do we have? I will argue that, a great deal of the time, the other alternatives are unattractive. For many cases of trespassing on hybridized questions, the most reasonable option will be one of the two just surveyed: either stop trespassing by gaining cross-field expertise or stop holding confident answers to hybridized questions. For many cases, there is no reasonable middle ground. My strategy will be to scrutinize some *defences of trespassing*. Defences explain how trespassing thinkers can have rational confidence in their answers to hybridized questions. I will contend that each attempt to justify trespassing will not help trespassers a great part of the time.

But first we must understand what the epistemological problem with trespassing is. There is not only one problem. Consider three types of problematic trespassing cases, where two different fields share a particular question:

- (a) Experts in one field lack another field's evidence and skills;
- (b) Experts in one field lack evidence from another field but have its skills;
- (c) Experts in one field have evidence from another field but lack its skills.

One kind of epistemic trouble with trespassing stems from recognizing we are in one of these cases. Passing a judgment about a question we know is hybridized looks dubious. Why do we confidently hold a view when we lack relevant evidence, skills, or both? Learning we're in one of the three situations should trigger a sort of intellectual perimeter alarm in our thinking. Here we are trespassing on somebody else's property, after climbing over a barbed wire fence. Let's split before any guard dogs show up.

That is an impressionistic look at why trespassing is problematic, but I will say more. If we recognize we are trespassing, we may thereby discover a reason to reduce our confidence. The reason to reduce confidence is the fact that we have trespassed. Taking stock of that fact will show us we have violated an epistemic norm and that our judgment is properly subject to criticism.

Trespassing cases come in three varieties—we are experts in one field, but we lack evidence from another field, or its skills, or both. The reflective trespasser, learning she is in such a case, could reason as follows:

I judge that proposition p is the correct answer to a question hybridized by two different fields. I know the other field where I lack expertise contains

relevant evidence or skills, but I reasonably believe I do not satisfy the evidence or skill threshold for expertise there. At best, I am a novice with respect to the other field's evidence or skills. Thus, I have formed a judgment without some relevant evidence or skills. But that is not a reliable or responsible way to form a judgment about the question. To arrive at a reliably-formed or responsible judgment about p , I would need to satisfy the evidence and skill threshold for expertise in both fields. Thus, I seem to have violated an epistemic norm in reaching my judgment and so I have reason to reduce confidence in my judgment.

This soliloquy illuminates why our judgments are epistemically dubious when we knowingly trespass on another field. Recognizing we have trespassed is a kind of 'higher-order' evidence. The evidence tells us about the manner in which we have reached our belief in p . It is not evidence bearing directly on p 's truth value, but it tells us about the rationality or reasonableness of holding particular attitudes toward p .⁷

Let me set to the side a tempting, but incorrect, alternative account of what the reflective trespasser could be thinking.⁸ We might assume the reflective trespasser takes her own field's resources to be sufficient for reliable or responsible belief-formation. Assuming she does not know what the other field's resources are, when she realizes she has not accounted for them in forming her view, she apparently gains reason to think she has made a mistake. In particular, she recognizes she has neglected evidence and skills from another field that might lead her away from her belief. But that need not bother her in the least. If the trespasser reasonably thinks her own resources are sufficient for reliable belief-formation, then consciously neglecting another field's resources may be appropriate for her, and her belief may be rationally in the clear.

Take an analogy to suggest why. You are a mechanic and you know of two reliable tests for diagnosing a particular engine problem. One test takes five minutes and the other requires several hours work. Each test is fairly reliable but not perfect. If you run the quick test and it indicates the engine doesn't have the problem, then you can sensibly ignore the other test. You can reasonably judge the engine doesn't have the problem while being fully cognizant of the fact that you

⁷ For discussion of higher-order evidence, see Feldman (2005), Bergmann (2005), Kelly (2010), Christensen (2010), Sliwa and Horowitz (2015), Talbott (2016), and Kappel (forthcoming).

⁸ I am grateful to David Christensen for discussion here.

don't know what the other test would indicate. After all, you know the test you used is reliable.⁹

The analogy suggests a lesson for the reflective trespasser. If she reasonably thinks her field's resources are sufficient for reliable or responsible belief-formation, her answer to the hybridized question need not display any epistemic defect. But the alternative account of the reflective trespasser's reasoning is not accurate. The trespasser does not believe her field's evidence and skills are sufficient to properly answer the hybridized question. The trespasser knows the question she answers has been hybridized; she thereby has reason to doubt the sufficiency of her single-field resources to answer the question properly.

Trespassers are a crafty bunch, of course, and they may resist reasoning in the way I've described. They may grant they are in one of the three reflective cases but insist they have not thereby flouted any epistemic norm. How could that work? For any particular trespassing case, the presumption that there is some epistemic trouble can be defeated by good reason to think there's no epistemic trouble in the case. I call reasons that defeat the presumption of epistemic trouble *defences*. Defences are reasons indicating no epistemic norm has been violated.

Let me illustrate the basic idea. Suppose you are an expert on the metaphysics of free will, but you lack evidence and skills from neuroscience and psychology that are relevant to 'free will' debates. Realizing that, you reason as follows:

I answer the hybridized question 'Are we free?' by judging we lack free will. I know scientists have evidence and skills that are relevant to the question I have answered. I lack the scientific evidence and skills. At best, I am a novice with respect to the science of free will. But I have reason to think that the evidence contributed by science could only *support* my judgment. In other words, the scientific evidence could only pose a challenge to thinkers who reject my judgment. So, if scientists make an evidential contribution to the question, it will be consistent with my judgment. Thus, I have trespassed without violating any epistemic norm.

The defence is the trespasser's reasonable belief that the cross-field evidence would only support the trespasser's judgment. I will say more about defences shortly.

⁹ Sometimes practical circumstances may require you to run the other test before judging that the engine doesn't have the problem at issue. I will assume that is due to practical, not epistemic, norms.

To sum up, recognizing we are trespassing gives us reason to reduce our confidence in our judgment, unless we have reason to think we have not violated an epistemic norm—that is, unless we have reason to accept what I've called a 'defence'. We can capture these key ideas with a principle, which supplies a schema for reasoning about cases of trespassing:

If we are experts in one field and accept p and we recognize that (a) we lack another field's evidence concerning p or (b) we lack another field's skills to evaluate the p -relevant evidence, then we have reason to reduce our confidence that p is true, unless we have reason to accept some defence (that is, we have reason to accept there are facts indicating we do not violate any epistemic norm by accepting p).

5. What makes trespassing permissible?

If some defences are readily available in trespassing situations, then my claim that trespassers should often be more intellectually modest will be undercut. Trespassers armed with defences need not dial down their confidence in their answers to hybridized questions. But what defences are there?

I will examine three strategies to justify acts of trespassing and thereby preserve rational confidence in trespassers' answers to hybridized questions. Again, we are assuming some trespassers are experts in one field but encroach on another field.

(D1) I am trespassing on another field, but that field does not feature any relevant evidence or skills that bear on my view about p ;

(D2) I am trespassing on another field, but my own field's evidence conclusively establishes that p is true;

(D3) I am trespassing on another field, but my own field's skills successfully 'transfer' to the other field.

These defences are designed to allow reflective trespassers to conclude that their views about p are reasonable. I will argue that trespassers are rarely positioned to reasonably accept any of the three defences. Typically, reflective trespassers should be doubtful whether any of the defences are available to them. I will discuss (D1) and (D2) briefly before looking at (D3) in greater detail.

(D1) says that the trespassed-upon field does not feature any relevant evidence or skills that bear on the trespasser's view. I already noted this

basic idea when illustrating a defence. If a metaphysician knows the scientific evidence in the ‘free will’ debate could only support her judgment, then learning she lacks that evidence is no epistemological problem for her; reasonably believing (D₁) justifies her trespassing. Similarly, if trespassers learn that investigation in another field is ruled by degenerate or pseudoscientific research programs, or that field assumes a known scientific law is false, they can reasonably accept (D₁). For example, trespassers may know that some cross-field researchers compete for resources and acclaim by defending the novel and the bizarre, refusing to live in the daylight of common sense. Problematic social conditions in the field have spoiled its evidence. Members of the field are merely perceived as experts. Such a field is littered with the squalor of intellectual bankruptcy. If trespassers are aware of a field’s shortcomings, they can be justified in holding their views while disregarding the other field’s resources. One example is provided by the field of astrology. I believe the substantive claims of astrologers are false—‘[O]ccultism is the metaphysic of the dopes’, as Theodor Adorno once noted. But I’ll admit that astrologers have evidence and skills I lack. My considered view, however, is that astrologers’ evidence and skills do not constitute a reliable method for establishing their claims, and so I am justified in dismissing those claims.

Here are three observations about (D₁). First, when experts begin in relative ignorance about another field’s resources, they need good reason to accept (D₁). To come to reasonably believe (D₁), a single-field expert may rely on testimony from cross-field experts, or she may need to gain cross-field expertise herself. In the latter event, reasonably accepting (D₁) will not excuse the trespasser—she will have stopped trespassing. Second, we could get (D₁) in hand by noticing that the cross-field resources could only bolster our view. But bodies of evidence in interdisciplinary discussions usually have a ‘mixed’ character, with different pieces supporting different hypotheses, so that sort of response will be uncommon. Finally, trespassers hoping to reasonably accept (D₁) will often need to explain why the other field’s resources would not help them reliably or responsibly hold a view. Researchers can be unduly dismissive about research programs they do not contribute to.¹⁰ It’s easy for us to opine that some field is degenerate, lacking helpful resources for addressing a question. It’s far harder for

¹⁰ If the reader will allow an autobiographical footnote, I have lost count of how many professional philosophers working far outside my own subfield, epistemology, have said in my presence that the Gettier Problem was ‘a complete waste of time’.

us to reliably recognize degeneracy. Suppose we think we know why some field's evidence or skills are a sham. Let's see what the apparent experts think. They may school us on the actual nature of their field's practices and reveal our ignorance. That outcome would not be so surprising given that we are non-experts. Plausibly, reasonably accepting (D₁) will typically require considerable effort.

A second potential defence is (D₂), the idea that a trespasser's own single-field evidence conclusively establishes the truth of his or her judgment. While there could be conclusive evidence to settle a hybridized question, it's hard to sustain the idea that such powerful evidence is often available concerning ongoing, often contentious hybridized debates. Why would interdisciplinary discussion continue apace if the questions were in fact known by someone to be settled? If you think you have reason to accept (D₂) but have not dropped your bombshell, you might wonder: is my evidence really as powerful as I believe? To accept (D₂) reasonably, you need an account for why the discussion grinds on—as it shouldn't, on the assumption that (D₂) is reasonable for the relevant disputants. Normally, our evidence for answering interesting, hybridized questions falls well short of conclusive, knockdown arguments, or at least it will be reasonable for us to think that it does. But then (D₂) will not often justify trespassing.¹¹

I expect something like (D₃) will be among the most common justifications given by trespassers. For example, Richard Dawkins (2006, p. 56) suggests that he does not see what expertise philosophers of religion could possibly have that scientists like him would lack; in his own eyes, his scientific competence apparently transfers to a new context where he can appropriately answer questions about arguments for and against God's existence. Neil deGrasse Tyson may believe that his scientific training has taught him critical thinking—the only skill needed to answer philosophical questions. In general, if the trespasser's expertise successfully transfers from one field to another, then the trespasser does not violate any norms related to lacking the other field's skills.

How does transfer work? If an expert's skills transfer to a different field, the expert will satisfy the relevant skill threshold for expertise in that field. In other words, although she is at best an evidential novice in the other field, she meets the skill conditions for expertise there. This reveals one of (D₃)'s limitations. Even if someone can reasonably accept that defence, there is still the matter of her lacking the other

¹¹ For discussion of knockdown arguments, see Ballantyne (2014).

field's evidence. For (D₃) to justify a trespasser, a reason to accept it must be joined by a reason to believe she satisfies the relevant evidence threshold for cross-field expertise.

(D₃) will help trespassers only if they can reasonably accept it. So the crucial question is: under what conditions do we have reason to think skills successfully transfer from an expert's field to another field? Answering from the comfort of the armchair is not feasible, as the mechanics of a successful transfer are not obvious to us by introspection or casual observation. What I will do instead is describe some psychological research that suggests general constraints on reasonably accepting (D₃). First, I'll consider research on what psychologists and cognitive scientists call 'knowledge transfer' and 'transfer of learning'. The upshot of this empirical work is that attempts to transfer skills between different fields will run into obstacles. Second, I'll describe research on metacognition that explains why many trespassers who fail to transfer skills will mistakenly believe they have successfully done so.

Transfer has been studied extensively in the cognitive and social sciences since the early twentieth century. The starting point is the observation that we often do not treat new problems as new problems. We leverage old knowledge to gain new knowledge. We 'find the old in the new'. The literature on transfer is vast, bridging many sub-disciplines. I will briefly describe one classic experiment first performed in 1908 and replicated in 1941 (Judd 1908 and Hendrickson and Schroeder 1941).

In the replication, boys at an elementary school in Cincinnati, Ohio had to complete a practical task: fire a BB gun and hit a small target submerged in water. The boys were randomly assigned to an experimental group and a control. The control group was instructed to try to hit the underwater target. By contrast, the experimental group was first given an explanation of how light refracts as it passes between one medium and another. This group learned about how objects in water are not located where they *appear to observers to be* located. Because of refraction, the light changes direction at the surface of the water and the light waves are bent. The apparent displacement of the target was fairly considerable from where the boys were positioned. The depth of the target and the degree of refraction made it virtually certain that shooters in both groups who aimed the BB gun at where the target appeared to them to be would miss. Then the experimenters changed the depth of the target for both groups. The goal was to determine how the groups adjusted to the new task of hitting the target at a different depth.

Leaving aside the happy fact that no schoolboy shot his eye out, here is what the two studies suggest. The boys who had been given the principle

of refraction were able effectively to adjust their shots in the new task. They took fewer shots to hit the underwater target at its new depth than boys in the control group. The boys who had knowledge of refraction transferred their knowledge to a new target-shooting situation.

Transfer has been studied in a plethora of contexts. I want to note some key ideas that have come out of this research. In an important article, Susan Barnett and Stephen Ceci (2002) offer a useful taxonomy for thinking about transfer. Barnett and Ceci identify two categories of factors that influence any transfer: content and context. For any instance of transfer or attempted transfer, there are three main questions: What is transferred? Where is it transferred? And when is it transferred? The content answers the ‘What?’ question. It is what gets transferred to the new situation—a principle, a heuristic, or a representation of a fact, such as one’s knowledge of the order of operations in multiplication and division. The context answers the ‘Where?’ and ‘When?’ questions. Context tells us about the type of subject matter involved, the physical situation, the temporal situation, the functional situation, and the like. Take some examples of each contextual element. The subject matter of a transfer could be astrophysics to philosophy, or the metaphysics of free will to the neuroscience of free will. The physical situation could be a classroom to a supermarket check-out line. The temporal situation could be within a one-hour period on one day, or a span of several years. The functional situation might be two academic exams, or an academic exam and supermarket check-out line.

One standard idea in the transfer literature is that transfers come in degrees. Some transfers are relatively ‘near’ whereas others are relatively ‘far’. Psychologists are thinking about the similarity between the context of ‘old learning’ and the context of ‘new learning’. *Near* transfer involves greater similarity along dimensions of context than *far* transfer. The studies involving shooting underwater targets involved relatively near transfer, for instance. A fairly short time had elapsed between contexts and the specific task had changed, but the physical, functional, and motivational contexts were identical. A transfer of skills between a context involving, say, questions about astrophysics and questions about philosophy of mind would be considerably further. This point is widely appreciated by instructors and trainers in many domains, from athletics to the military. They often try to mimic the target context as closely as possible, so that training occurs in a situation that is highly similar to where the skills will be used.

In the literature on transfer, researchers often express pessimism about the evidence for far transfer.¹² But there is some evidence of successful transfer. Here is one example. An educational psychologist, Samuel Wineburg, recruited high school seniors and professional historians to determine how they would explain historical events on the basis of some fragmentary and inconsistent source documents (1991). The participants had to explain some events in the first military conflict of the American Revolution, the Battle of Lexington. Some of the historians were not trained in American history while others were Americanists. Each historian approached the documents by scrutinizing the perspectives and intentions of the witnesses so as to assess the relative credibility of each source document. The high school students evaluated each document in light of their own experiences. But both the historians and the students used their prior knowledge in efforts to understand the new texts. As commentators on Wineburg's study observed: 'From the vantage of most schooling practices, the [high school] students demonstrated appropriate transfer. They tried to make sense of the facts in the texts by connecting them to prior knowledge' (Schwartz et al. 2012, p. 210). The historians and high school students all transferred knowledge, but, unsurprisingly, the historians proved more effective at the task, because their prior knowledge and practices were better suited to good historical judgment and reasoning.

Importantly, many researchers have suggested that when we know something, that item of knowledge is less helpful for learning new things the 'further away' we move from the context where it was acquired. For example, in Wineburg's study, the experts in American history performed better than historians trained in other fields, but the historians as a group outperformed the high school students. When a transfer involves moving into a rather dissimilar context—dissimilar along the various contextual dimensions noted above—we should be more doubtful that the transfer was successful than when the context is rather similar to the context of initial learning.

Consider some examples of transfer failure. One study of children in Brazil showed they could perform mathematical calculations while selling corn-on-the-cob and peanuts out in the street; but they could not solve similar problems using pencil and paper in a traditional school context (Carragher et al. 1985). The researchers noted that

¹² See Barnett and Ceci (2002) for more. Researchers do not all agree about the best way to properly conceptualize transfer. Lobato (2006) provides an introduction.

‘[i]n many cases attempts to follow school-prescribed routines seemed in fact to interfere with problem solving’ (1985, p. 28). Some research has focused on transfer of skills in solving brain-teasing problems. One experiment modified the subject matter of the brain-teaser—changing the problem, Duncker’s ‘radiation problem’, from being putatively about medicine to being about warfare instead. Participants who solved the one problem failed to solve the other. They didn’t see that the two problems had the same ‘deep’ structure (Gick and Holyoak 1980). Our skills in one context do not always follow us to new ones.

A different kind of transfer failure involves what has been called ‘overzealous’ transfer: our skills from one context successfully move to a new context, but the skills are inappropriate (Schwartz et al. 2012). There is an old saying: if all you have is a hammer, everything looks like a nail. One example is the high school students in Wineburg’s study who interpreted the Battle of Lexington source documents in light of their personal experiences and were led into error. In one study, experimenters asked middle school students the following question, slipped in among ordinary mathematical problems: *There are 26 sheep and 10 goats on a ship. How old is the captain?* Roughly three quarters of the students gave a numerical answer. One fifth-grade student, when asked why he had given 36 as his answer, remarked, ‘Because that’s the kind of thing you do in problems like this. This was an easy one, I only had to add’ (Schwartz et al. 2012, p. 206). Overzealous transfer can occur when thinkers mistakenly assume a new context is just like a previous one.

Transfer failures are unsurprising in view of disheartening findings from contemporary educational research. The development of critical thinking skills is a central goal of modern education, but researchers say critical thinking does not easily generalize across domains. Psychologist Deanna Kuhn remarks that ‘the most pressing practical issue’ in teaching critical thinking is that the gains students make ‘most often do not generalize beyond the immediate instructional context’ (1999, p. 16). Linus Pauling and company are poster children for the perils of trespassing. They are cautionary tales for how exemplary critical thinking in one field does not generalize to others.

In view of research on transfer, I offer a modest proposal about transfer to help us evaluate (D3). Recall our question about (D3): under what conditions do we have reason to think that an expert’s skills successfully transfer to another field? Reasonably accepting this defence of trespassing means knowing when an expert’s skills are likely

to transfer from her home field to another. But research on transfer of knowledge strongly suggests that it's difficult to have reason to accept (D₃). Here are two reasons why.

First, (D₃) should be doubtful to trespassers because they lack a track record of good judgment in the other field. A track record in that field could suggest they have successfully transferred their skills in forming the judgment at issue. But, ordinarily, thinkers do not know whether they are performing well in some domain without checking their track record. Trespassers might assert their good track record in their home field indicates that they *would have* a similarly good record elsewhere. But that optimistic idea ignores the fact that, in experiments, slight changes between the contexts—different subject matter, or physical situations, or temporal situations, or functional situations—can derail transfer. The absence of a track record in the other field suggests trespassers should be unsure about (D₃). Here's an analogy. If a classically-trained pianist claims he can play bebop jazz piano in the style of Oscar Peterson without ever having studied jazz piano, we should think the pianist's claim needs to be backed up by a satisfactory jazz performance. Start playing—we're listening. Something similar goes for trespassers who defend themselves with (D₃).

Second, background knowledge is crucial for the successful application of skills in any domain (Barnett and Ceci 2002, p. 616), but trespassers often lack such knowledge. The kind of skills that trespassers hope to transfer include strategies for thinking about thinking, including metacognitive heuristics such as 'consider both sides of an issue' or 'generate alternative explanations for the evidence'. Deploying those sorts of metacognitive tools is a non-starter in contexts where we lack rich background evidence—we cannot easily consider both sides or generate alternative explanations without an expert's perspective. As psychologist Daniel Willingham notes, 'metacognitive strategies can only take you so far. Although they suggest what you ought to do, they don't provide the knowledge necessary to implement the strategy' (2007, p. 13).

These points strongly suggest that reasonably accepting (D₃) will be a stretch for trespassers already out of their element. Of course, skill transfer is possible. If experts know at the outset that the same 'deep' structure obtains in another field, then they can take this as a good omen for successful transfer. But if they have no reason to believe the fields share deep structure, modesty about (D₃) should prevail. For example, if the school boys in the BB gun task learn about refraction and know that a new shooting task involves water, they have reason to

think their skills will transfer. But if they know a new shooting task involves a liquid with different properties, all bets are off.

To sum up, I have examined three justifications for trespassing and have found them of limited value to trespassers. I argued that trespassers will rarely have reason to accept these defences. As a result, in many cases of judgment on hybridized questions, trespassers cannot avoid the reasoning I proposed earlier, unless they find defences that apply more widely than (D₁)–(D₃). My recommendation, therefore, is that trespassers should recognize they have violated some epistemic norm and reduce their confidence in their judgment on hybridized questions. There are further questions about how much reduction is required in any particular case but those must be side-lined for now. I think that, quite often, the upshot is that trespassers should either seek cross-field expertise or hold confident answers only to non-hybridized questions.

I am aware that many trespassers will be unconvinced. Before concluding I'll explain briefly why many trespassers will remain confident about their judgment on hybridized questions.

I claim that trespassers typically lack good, reliably-formed judgment once they cross a disciplinary boundary or answer a hybridized question. One hallmark of trespassing, however, is a lack of awareness of the failure to render good judgments. Trespassers are not timid or self-doubting. Pauling and company appeared not to know they were in over their heads. But that is precisely what a well-confirmed idea from psychology predicts.

The Dunning-Kruger effect says that thinkers who are ignorant in a domain tend to be ignorant of their ignorance (Kruger and Dunning 1999). This is a bias influencing meta-knowledge. People who lack first-order knowledge often lack second-order knowledge about their lack of knowledge. Psychologists have described this as a kind of intellectual 'double curse' (Dunning et al. 2003). As Justin Kruger and David Dunning note, 'the same knowledge that underlies the ability to produce correct judgment is also the knowledge that underlies the ability to recognize correct judgment. To lack the former is to be deficient in the latter' (1999, pp. 1121–1122). Trespassers' lack of competence leads their self-assessments to be systematically off-track and so I predict that many trespassers will be oblivious to their lack of good judgment. For trespassers, their incompetence is for them an 'unknown unknown', as former U.S. Secretary of Defence Donald Rumsfeld might put it. Self-ignorance about trespassing is dangerous. Sometimes trespassers will have enough knowledge to give them false

confidence that they are not trespassers but not enough knowledge to avoid trespassing.

6. Conclusion

My main proposal in this essay is that trespassing is ubiquitous in contemporary research on hybridized questions and that reflective trespassers violate norms of good judgment. I will consider briefly some implications and further issues.

In 1944, the physicist Erwin Schrödinger published a book on biology.¹³ He opened the preface with these words: ‘A scientist is supposed to have a complete and thorough knowledge, at firsthand, of *some* subjects and, therefore, is usually expected not to write on any topic of which he is not a master. This is to be regarded as a matter of *noblesse oblige*’ (1967, p. 1). Schrödinger then tried to explain why he had deviated from the ordinary ground rules for good scientific practice by writing about biology. But exactly what did he mean by his ‘*noblesse oblige*’ remark? *Noblesse oblige* is the idea that privileged people should act kindly and generously towards others who are less privileged. Schrödinger seems to say that scientists are honour-bound to remain inside their field of expertise as a matter of kindness, presumably kindness towards novices as well as experts in other fields. Schrödinger had a good point, but he didn’t go far enough. Trespassing is not exclusively a problem for novices led astray by overreaching experts, or for miffed experts who are trespassed upon by overconfident intellectual outsiders. Trespassing is also a problem for the trespassing experts. Trespassers are unkind to themselves. Their confident views are epistemically problematic. Ordinarily, the most reasonable response to finding out we have overstepped our limits is, as I have argued, to gain cross-field expertise or hold confident opinions only on non-hybridized questions.

One general reaction to the problem of experts trespassing on other experts is to redesign our research communities. Perhaps we could minimize problematic trespassing by encouraging researchers in cognate fields to rub shoulders more than they ordinarily do. In the 1930s and ’40s, some members of the Vienna Circle, including Otto Neurath, promoted what was called the ‘unity of science’. This was an attempt to collect together and interpret the findings of disparate scientific fields, advanced through congresses held in Europe and the

¹³ I am grateful to Benjamin Wilson for telling me about Schrödinger’s book.

United States and an encyclopaedia project. Ultimately, proponents of the unity of science wanted to resist fragmentation and disconnection in scientific knowledge so that science could play a greater role in planning social and political life (Reisch 2005). Some historians of social science have described how pockets of interdisciplinary research flourished in the middle decades of the twentieth century in the United States, supported by Cold War-era grants and patronage, incubated in interdisciplinary institutional spaces created during the pre-war period (Isaac 2012). For example, in Harvard University's peculiar Department of Social Relations, which existed from 1946 to the early '70s, anthropologists, psychologists, and sociologists worked together on problems of theory and policy. These researchers wanted to devise a comprehensive theory of human behaviour, an unachievable task from inside one academic discipline.

I suspect we *must* trespass to answer most important questions. Perhaps this means we should never trespass alone. Instead, we must rely on the expertise of others. What we need, to extend the trespassing metaphor, is an 'easement' or 'right of way' for travel beyond our fields' boundaries. The right of safe passage could be secured by our collaboration with cross-field experts. Imagine your colleague is a representative source of evidence, skills, and potential criticism from another field. Even if you don't have direct knowledge of that field, if your colleague tests out your answer to a hybridized question and tells you it sounds right to her, then your view is apparently more reasonable than it would have been otherwise. Trespassers may gain reasonable beliefs by engaging in certain kinds of discussion with cross-field colleagues.¹⁴

Even if we can acquire an 'easement' or 'right of way' by collaboration, a question remains: how can we enter into productive cross-field partnerships? Here we could draw on insights from researchers who study interdisciplinary and multidisciplinary research (Bammer 2013, Hirsch Hadorn et al. 2008, National Academies 2005). The unorganized knowledge that's relevant to answering hybridized questions

¹⁴ The possibility of an 'easement' or 'right of way' for trespassing raises questions I won't address here. (Thanks to Shane Wilkins for the 'easement' label.) How can trespassers know their collaborators are a source of representative evidence, given that the trespassers do not have an expert-level understanding of the other field's evidence? How can trespassers deal with the possibility that their collaborators disagree with well-qualified experts? These questions bring up an old epistemological problem, going back to Plato, concerning non-expert perception of expertise. See LaBarge (1997), Goldman (2001), Scholz (2009), and Ballantyne (forthcoming) for discussion.

is sometimes like an unassembled jigsaw puzzle. Researchers from different fields pull their chairs up to the table and try to arrange the pieces into a coherent whole. But these people have different technical backgrounds and vocabularies, different goals for research practice, and different perceptions of the problem. Presumably, the group could benefit from some guidance, lest their collaboration devolve into grabbing pieces and bickering over whose perspective is best. The field of integration and implementation science (Bammer 2013) seeks to understand the challenges of synthesizing disciplinary knowledge, communicating across boundaries, and understanding the objectives of interdisciplinary research. Lessons from this field could help us develop effective collaboration practices as we tackle hybridized questions.

In this essay, I've defended the idea that recognizing the risks of trespassing should often encourage greater intellectual modesty. Researchers on interdisciplinary collaboration have also affirmed the importance of something like modesty. For example, some researchers note that the 'first step' for cross-field collaborators 'is to acknowledge, respect, and explore the diversity of perspectives' (Hirsch Hadorn, Pohl, and Bammer 2010, p. 437). When researchers tackle together so-called wicked problems—from epidemics to poverty to nuclear arms control—they should presume they don't have in hand what is required to hold confident answers to the questions, or even to know what those questions are. Their ignorance is what prompts the collaboration, and so they should begin the conversation knowing there are significant unknowns. My proposal is that many questions often not viewed as interdisciplinary call for a similarly modest response. We should be more sensitive to the inherent difficulties of confidently answering hybridized questions. At the same time, we may be encouraged by the possibility that cross-field efforts will enhance our understanding of important questions.

One issue I have left mostly unmentioned until now concerns limits on developing expertise. There is an idea captured by aphorisms and sayings from every human culture. Where I live, people sometimes say: 'Jack of all trades, master of none'. In the Czech Republic they say: 'Nine crafts, the tenth is misery'. In Mexico they say, 'You aim for everything, but you hit nothing'. We cannot become experts on each and every hybridized question about which we may want to hold confident beliefs. It is apparently easier for us to become more intellectually modest than to expand our expertise. The limits of gaining expertise make socialized responses to the problem of trespassing

indispensable. Trespassing is a problem for individual thinkers, but it points toward social solutions.¹⁵

We human beings are trespassers at heart. Don't we sometimes find inside ourselves the overreaching inclinations of Pauling, Dawkins, and their kin? If we hold trespassers in contempt, do we condemn ourselves as well? For my own part, whenever I consider the fabric of our intellectual practices—the clever, intriguing, and embarrassing things we do as we inquire and pass judgment—my feelings are decidedly mixed. Being so imperfect is no reason for joy. But I find some hope that careful reflection on our practices can make all of us a little wiser.¹⁶

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¹⁵ The difficulty of developing expertise is connected to 'the problem of unpossessed evidence' discussed in Ballantyne (2015).

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