

# Know-How and Expertise

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This paper offers a novel account of how know-how improves to expertise in a way that is *structurally analogous* to how propositional knowledge improves to understanding. A payoff of developing this analogy is a better grip not only of how know-how and expertise differ, but also of why it is that this difference is important.

1. Aristotle thought that the kind of ‘cognitive gain’ one makes when one transitions from knowledge to understanding is a gain of ‘more of the same’—understanding is just more knowledge, albeit, knowledge of causes.<sup>1</sup> Contemporary epistemologists and philosophers of science are deeply divided over whether he was right<sup>2</sup>, while in broad agreement that the move from knowledge to understanding marks an important kind of intellectual *improvement*.<sup>3</sup>

If understanding marks an improvement from knowledge-that, what marks an improvement from knowledge-how? Put another way: how should we complete the following analogy:

*Propositional knowledge is to understanding as knowledge-how is to*

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<sup>1</sup>For a helpful overview of this position, see Grimm (2014).

<sup>2</sup>For some defences of this view, see for example Lipton (2003), Sliwa (2015), Woodward (2005), Kelp (2016). For criticism, see Pritchard (2009) and Hills (2009).

<sup>3</sup>For some influential discussions of this transition as one of intellectual improvement, see for example Kvanvig (2003a) and Haddock, Millar, and Pritchard (2010). Note that while orthodox thinking about the value of knowledge and understanding maintains that understanding is in some sense factive, even views that deny a factivity constraint on understanding (e.g., Elgin 2017) agree that understanding is valuable intellectually in a way that knowledge is not.

One very natural answer—and one that we will take as our starting point—is *expertise*, which is (i) what those with know-how often aspire through practice to attain, and (ii) which is, moreover, predicated upon already acquired know-how in a way that analogically parallels how understanding is both (i) a fitting aspiration of knowers and (ii) an achievement predicated upon knowledge already acquired.

But even if this is right, a lingering question remains, one that will guide the remainder of our discussion:

*Question:* what is the *nature* of the kind of expertise that know-how improves toward as propositional knowledge improves toward understanding?

This is much harder to get right than the analogy itself. We can envision four broad kinds of answers along two axes of division. One such division is between *propositionalist* answers and *dispositionalist* answers. The former line up with the intellectualist thesis that knowledge-how is a species of knowledge-that<sup>4</sup>, and the latter with the anti-intellectualist thesis that denies this while maintaining that know-how is fundamentally a matter of ability possession. Propositionalist answers accordingly maintain that know-how improves toward a propositional epistemic state (e.g., a kind of propositional knowledge), while dispositional answers deny this and maintain that know-how improves toward something else (e.g., a kind of ability).

One potential line available to both propositionalists and dispositionalists is that the kind of expertise that stands to know-how as understanding to knowledge-that involves ‘more knowledge how’. This is a kind of Aristotelian answer in the sense that it takes the kind of improvement from know-how that is analogous to the improvement from propositional knowledge to understanding to be an improvement that involves ‘more of the same type of thing’. Call answers to the analogy ‘non-Aristotelian’ if they deny this. The distinction between Aristotelian and non-Aristotelian answers marks a second axis of division, which makes room for four possible ways to characterise the kind of expertise that would complete the analogy:

<sup>4</sup>The idea that know-how is a species of knowledge-that is spelled out by intellectualists (e.g., Stanley and Williamson 2001) as follows: A subject S knows how to  $\phi$  if and only if there is some contextually relevant way  $w$  such that S stands in the knowledge-that relation to the proposition that  $w$  is a way for S to  $\phi$ .

Answer-type	Aristotelian	Non-Aristotelian
Propositionalism	Aristotelian propositionalism	Non-Aristotelian propositionalism
Dispositionalism	Aristotelian dispositionalism	Non-Aristotelian dispositionalism

Here is the plan. In §§2-3, we show how these four possible answer-types to our analogy interface with a key distinction between two types of expertise: *epistemic* and *performative* expertise. §4 clarifies how we will be narrowing down our option space without reasoning through certain contentious premises, viz., premises that take a stand on whether understanding or know-how is (or is not) a species of propositional knowledge. §5 argues, in light of this constraint, that propositional knowledge improves toward understanding as know-how to a state that (like understanding, but unlike *mere* propositional knowledge) essentially manifests what we call a *performance perspective*. §6 builds upon this idea and shows that know-how plausibly (i) doesn't essentially involve a performance perspective while nonetheless (ii) improving to a kind of expertise—one that *makes a difference* over mere know-how—and which does. The remaining sections show, with reference an illustrative example involving safety engineering, how the combined results from §§5-6 can help us eliminate all but the *non-Aristotelian dispositionalist* answer to our guiding question. We conclude by defending our results against some potential objections and replies.

2. One fundamental distinction in the literature on expertise is the distinction between what is called *epistemic expertise* and *performative expertise* (Weinstein 1993). The former involves a capacity to provide 'strong justifications for a range of propositions in a domain' and the latter to perform a skill well in accordance with the rules and virtues of a practice (1993, 57).<sup>5</sup>

Epistemic expertise and performative expertise can overlap. For example, Russian chess grandmaster Peter Svidler's 2700+ chess rating makes him one of the top 15 performative experts in world chess; he is also considered among the greatest chess analysts, writers and commentators, not

<sup>5</sup>See also, for discussions of this distinction, Weinstein (1994), Steinkamp, Gordijn, and Ten Have (2008), Cholbi (2007), Scholz (2018). Cf., Goldman (1999, 91), who draws an analogous distinction between what he calls cognitive and skill expertise.

due to his playing ability at all, but due to his deep knowledge and understanding of strategy—viz., his epistemic expertise. Epistemic expertise and performative expertise can, however, come apart in both directions—corresponding with two kinds of cases familiar in the know-how literature, due to Bengson and Moffett (2011b).

**SKI INSTRUCTOR:** Pat has been a ski instructor for twenty years, teaching people how to do complex ski stunts. He is in high demand as an instructor, since he is considered to be the best at what he does. Although an accomplished skier, he has never been able to do the stunts himself. Nonetheless, over the years he has taught many people how to do them well. In fact, a number of his students have won medals in international competitions and competed in the Olympic games.

**SALCHOW:** Irina, who is a figure skater, decides to try a complex jump called the salchow. When one performs a salchow, one takes off from the back inside edge of one skate and lands on the back outside edge of the opposite skate after one or more rotations in the air. Irina, however, is seriously mistaken about how to perform a salchow. She believes incorrectly that the way to perform a salchow is to take off from the front outside edge of one skate, jump in the air, spin and land on the front inside edge of the other skate. However, Irina has a severe neurological abnormality that makes her act in ways that differ dramatically from how she actually thinks she is acting. So despite the fact that she is seriously mistaken about how to perform a salchow, whenever she actually attempts to do a salchow (in accordance with her misconceptions), the abnormality causes Irina to unknowingly perform the correct sequence of moves, and so she ends up successfully performing a salchow. Although what she is doing and what she thinks she is doing come apart, she fails to notice the mismatch.

Pat in **SKI INSTRUCTOR** is (according to Bengson and Moffett) meant to be an example of someone who knows how to do the tricky jumps despite

lacking the ability to do them<sup>6</sup>; the case, they claim, counts against anti-intellectualism about know-how, which is committed to the thesis that S knows how to  $\phi$  only if S has the ability to  $\phi$ .

Whether or not this case decisively shows how know-how and ability possession can come apart isn't something we need to take a stand on here.<sup>7</sup> For our purposes, what's relevant is that the case nicely illustrates epistemic expertise in the absence of performative expertise. Pat is an epistemic expert in virtue of what he knows and what he can explain about jumps, while he lacks performative expertise in virtue of what he can't do if he put on skis.

SALCHOW offers a total inversion of this situation.<sup>8</sup> It is on account of what Irina doesn't know that she's not an epistemic expert (e.g., Irina cannot give a justified account of what sequence of moves to make to perform the jump—on this point, she is badly confused), and a matter of what she can do very reliably (i.e., the salchow jump) that she has performative expertise.

3. With the distinction between epistemic and performative expertise in mind (we'll return to it shortly), let's now look more carefully at our four possible combinations of views along the Aristotelian vs. non-Aristotelian and propositional vs. dispositional axes.

Firstly, *Aristotelian propositionalism* (AP) holds that propositional knowledge is to understanding as know-how is to 'more know-how' (compare: understanding on the Aristotelian line is more knowledge of a certain sort, knowledge of causes) where that additional know-how is itself—and this is the propositional component—understood as a propositional good, such as propositional knowledge. For example, according to (AP), this might involve a wealth of knowledge of facts about ways for one to do a relevant performance-type.<sup>9</sup>

<sup>6</sup>This is structurally a variation on Paul Snowdon's (2004) case of the chef who has lost his hands in an accident but, claims Snowdon, still knows how to make his specialty dish. For critical discussion of this case, see [Redacted] and [Redacted]. See also Pavese (2015a) for related discussion of this more general argument strategy.

<sup>7</sup>See, however, [Redacted] for some criticisms of this argument.

<sup>8</sup>See [Redacted] for a detailed discussion of this case. Cf., Bengson, Moffett, and Wright (2009).

<sup>9</sup>An optional feature of such a proposal, one that would likely be taken on board by intellectualists about know-how, will be to make use of what Stanley and Williamson

*Non-Aristotelian propositionalism* (NAP) denies that propositional knowledge is to understanding as know-how is to ‘more know-how’ of any sort, and this is so regardless of whether know-how is unpacked dispositionally or propositionally. However, the view nonetheless remains an idiosyncratic form of ‘intellectualism’ in the sense that it holds that know-how improves to an epistemic state characterised by propositional attitudes.

*Aristotelian dispositionalism* (AD), like (AP), holds that propositional knowledge is to understanding as know-how is to more know-how (viz., the Aristotelian component); however, unlike (AP), the view denies (via its dispositionalist component) that the additional know-how is itself understood in terms of propositional goods. The additional know-how is, rather than knowledge of facts about ways for one to do certain things, secured on account of one’s *dispositions* to do those things.

Finally, *Non-Aristotelian dispositionalism* (NAD), like (NAP) and unlike (AP) and (AD), denies (via its non-Aristotelian component) that propositional knowledge is to understanding as know-how is to ‘more know-how’. Though, like (AD) and unlike (AP) and (NAP), the view holds that which know-how improves towards to be dispositional rather than propositional. In this way, the view is an idiosyncratic kind of anti-intellectualism.

4. With these four views on the table, we’re now in a position to connect them to the distinction between epistemic and performative expertise. In particular, if either AP or NAP are correct, then propositional knowledge is to understanding as knowledge-how is to *epistemic expertise*. If either AD or NAD are correct, then propositional knowledge is to understanding as know-how is to *performative expertise*.

Which of the four views is best? Two strategies look initially most promising, both of which involve cutting the possible options in half. The first is to try to eliminate *either* (i) the answers that line up with performative expertise (i.e., the dispositionalist options (AD) and (NAD)) or with epistemic expertise (i.e., the propositionalist options (AP) and (NAP)), by first

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(2001) call ‘practical modes of presentation’. The idea, roughly, is that know-how involves knowing facts under a practical mode, which is (like *de se* thought) a way of thinking, namely, by thinking of a way of doing something as a way for *you* to do that thing. For discussion of practical modes, see for example, Stanley (2011), Pavese (2015b), and Glick (2013).

settling the matter of whether intellectualism or anti-intellectualism about know-how is correct.

For example:

*Anti-dispositionalist argument* (Eliminates AD and NAD)

(KH-1) Intellectualism about know-how is true.

(KH-2) If intellectualism about know-how is true, then AD and NAD are false.

(KH-3) AD and NAD are false.

or

*Anti-propositionalist argument* (Eliminates AP and NAP)

(KH-4) Anti-intellectualism about know-how is true.

(KH-5) If anti-intellectualism about know-how is true, then AP and NAP are false.

(KH-6) AP and NAP are false.

A second strategy requires eliminating either the Aristotelian answers (AP and AD) or non-Aristotelian answers (NAP and NAD), by first settling the matter of whether understanding is a species of knowledge. Such an argument would go either of the following ways:

*Anti-Aristotelian argument* (Eliminates AP and AD)

(U-1) Anti-Aristotelianism about understanding is true.

(U-2) If Anti-Aristotelianism about know-how is true, then AP and AD are false.

(U-3) AP and AD are false.

or

*Anti Anti-Aristotelian argument* (Eliminates NAP and NAD)

(U-4) Aristotelianism about understanding is true.

(U-5) If Aristotelianism about know-how is true, then NAP and NAD are false.

(U-6) NAP and NAD are false.

While it would be nice to, as it were, cut our search space in half right out of the gate in any of these four ways, we think these strategies should be avoided if possible. The problem is that premises (KH-1), (KH-4), (U-1) and (U-4) all involve making substantive commitments in what are already highly contentious debates. *Ceteris paribus*, if we can make good on our guiding analogy while remaining neutral with respect to both of these contentious debates, that will be best. Fortunately, we think we can.

5. Here is an idea that is, in principle, neutral with respect to both sides of the debate about whether understanding is a species of knowledge. Understanding—in a sense we’ll shortly explain—manifests what we’ll call an epistemic *performance perspective* in a way that propositional knowledge does not, and regardless of whether understanding is a matter of knowing propositions. We’ll use this term ‘performance perspective’ in a very specific way, which will take a bit of unpacking.

Let’s say that for any state (epistemic or otherwise)  $\alpha$  of an agent, S, and any domain of endeavour, D,  $\alpha$  manifests a performance perspective in D if and only if S’s being in  $\alpha$ , involves an assessment on the part of S of both

- (i) S’s first-order (relevant) D-performance; and
- (ii) S’s first-order D-relevant *competences*, where competences are dispositions to perform well reliably (in circumstances that are relevant to good performance in D.)

Finally, stipulate that the manifestation of a performance perspective is *competent* if and only if the assessment of (i) and (ii) is suitably reliable in normal conditions. Because manifestations of a performance perspective that are *incompetent* will be of no interest in what follows, we will—for ease

of exposition—use ‘performance perspective’ (unqualified) to imply not just any kind of assessment of (i) and (ii), but a competent assessment.

To make the notion of a performance perspective more concrete, consider a non-epistemic case, where the domain of endeavour is baseball. Suppose we have four batters: Knacky, Opie, Opie\* and Percy. Let’s stipulate that all four players are reliable hitters, but each attains their level of reliability differently. Knacky simply has a knack for hitting baseballs. He can’t tell you how he does it, what he’s doing when he hits it, or for that matter what he thinks is working and what’s not. But what he’s doing works.

Opie is different. Opie is not oblivious to what he’s doing when he swings (e.g., how he’s moving his arms, gripping the bat, etc). He could, as it were, do *that* on command. But he lacks any conception of what’s *working* for him when he hits it as opposed to misses; put another way, he lacks any view of his own competence. Opie\* is in the reverse situation. Opie\* appreciates *that* he’s a good hitter (suppose he has lots of testimony from statisticians who confirm his reliability levels, including the fine-grained situations under which he’s reliable versus unreliable) but has no better idea of what he’s doing when he swings than Knacky does. Finally, Percy has the best traits of the other three hitters: like Knacky and the rest, he’s reliable. Like Opie, he has a perspective on what he’s doing when he swings and can do it on command, and like Opie\* he has a grip on his strengths and weaknesses as a hitter—viz., he has a view of his own competence.

Because Percy’s baseball hitting performance manifests a perspective he has on both (i) his own baseball-relevant performance (e.g., what he’s doing when he’s attempting to hit it) *as well as his* first-order baseball competence (e.g., what his strengths and weaknesses are as a hitter—viz., in his capacity as as one who is trying to hit the ball reliably), his hitting the ball successfully manifests a performance perspective in the domain of endeavour that is hitting baseballs. Knacky’s, Opie’s and Opie’s\* swings of the bat, even when they result in successful hits, do not manifest any such perspective.

Let’s now transpose things to the epistemic arena: just as a baseball-hitting performance (e.g., a swing) is successful when one hits the ball, a belief is successful when it’s true.<sup>10</sup> Now suppose that Knacky<sub>E</sub>, Opie<sub>E</sub>,

<sup>10</sup>The claim here is that truth is the standard of correctness for belief. A stronger claim in the neighbourhood, but which isn’t implied by this claim, is that truth is the

Opie\*<sub>E</sub>, and Percy<sub>E</sub> are not baseball players but inquirers, forming beliefs about why something happened. To simplify things: suppose what needs explained is why a house burnt down. Stipulate further that the answer is faulty wiring,<sup>11</sup> and that all four inquirers reach this conclusion correctly *and* reliably, though in different ways.

Knacky<sub>E</sub>, let's suppose, is akin to Lehrer's (1990) famous 'Mr. TrueTemp' in that Knacky<sub>E</sub> has no conception of how he's forming beliefs or for that matter of the source of his reliability. He simply—in a way that aligns with metaincoherence cases in epistemology<sup>12</sup>—forms the belief 'The house burnt down because of faulty wiring' in such a way that he has no clue as to why he believes it. Opie<sub>E</sub> (unlike Knacky<sub>E</sub>) he appreciates that he is using visual perception (e.g., sees a burning wire) and abduction (reasons to the best explanation). But Opie<sub>E</sub> lacks any conception of what his perceptual and abductive strengths and weaknesses are in causal reasoning. Put another way, he lacks any view of his own competence to reason about such things reliably. Opie\*<sub>E</sub> is the opposite. He appreciates that his causal reasoning is as reliable as he knows it to be via testimony, but when it comes to the matter of *how* he's forming the beliefs he does, he's in the same situation as Knacky<sub>E</sub> and Mr. TrueTemp. Percy<sub>E</sub>, to continue the analogy, has the best traits of the other three inquirers. Like Opie<sub>E</sub> and unlike Knacky<sub>E</sub>, he has a perspective on what he's doing when using visual perception and induction in causal reasoning, and like Opie\* (and unlike Opie<sub>E</sub> and Knacky<sub>E</sub>) he has a grip on his own strengths and weaknesses in causal reasoning—viz., his own competence to reason reliably, e.g., the cause of a fire.

Because Percy<sub>E</sub>'s causal-explanatory reasoning manifests a perspective he has on both (i) his own performance in causal reasoning (e.g., what he's doing when he's combining visual perception and abduction in reaching

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constitutive aim of belief. On this stronger proposal, part of what it is for an attitude to be a belief is for it to be such that it is correct if and only if true. For some proponents of this latter view, see Shah and Velleman (2005), Shah (2003), and Wedgwood (2002). Cf., Williamson (2017).

<sup>11</sup>We borrow this example, which has become a common reference point (e.g., Hills 2009; Sliwa 2015) from Duncan Pritchard (e.g., 2009).

<sup>12</sup>See Sosa (1991). Such cases include, along with Lehrer's (1990) 'TrueTemp' and Plantinga's (1993) brain lesion case, also Bonjour's (1985) case of Norman the clairvoyant. In each of these cases, one has a reliable method but no conception whatsoever of the source of this reliability.

a causal conclusion) *as well as his* first-order causal-reasoning competence (e.g., what his strengths and weaknesses are as a causal reasoner—viz., in his capacity as one who is trying to reach a correct causal conclusion via perception and abduction), his getting the explanation manifests a performance perspective, and competently so. Knacky<sub>E</sub>'s, Opie<sub>E</sub>'s and Opie\*<sub>E</sub>'s' causal reasoning, even when they result in a correct causal explanation, do not manifest any such perspective (competently or otherwise).

That said, it's not at all obvious that Percy<sub>E</sub> is the only thinker of the four who *knows* that the house burnt down due to faulty wiring. Plausibly, Knacky<sub>E</sub> lacks knowledge, despite being reliable, for reasons that are much discussed in the classic reliabilist literature.<sup>13</sup> Opie<sub>E</sub>'s and Opie\*<sub>E</sub>'s situations do not obviously exclude them from having propositional knowledge, unless we assume a strong kind of epistemic internalism (and even then, it's not clear they would be excluded from knowing the causal conclusion).

However—and this gets at the crux of things—there *is* good reason to think that Percy is unique here in that he not only knows *that* faulty wiring caused the house to burn down, but also that he *understands why* it does. By manifesting the performance perspective he does, he grasps not only how the cause and effect are related—a necessary but not sufficient condition on understanding—but (and this is what Opie<sub>E</sub>'s and Opie\*<sub>E</sub> are missing, respectively)—he also is plausibly situated to *use* the information he has to make more robust predictions—a distinctive mark of understanding<sup>14</sup>—in a way that neither of the other three can. For example, Percy<sub>E</sub> but not the others is better equipped to extrapolate from his command of this causal relationship to others (e.g., to spot new cases where faulty wiring has caused fires). And moreover, he is less likely to extrapolate improperly from his command of this causal relationship to others (e.g., to project false positives). And this is due not just to the grasp he has in this case of cause and effect, but to the perspective he has on his use of causal reasoning, its strengths and weaknesses.

In summary, here is how our four characters stand with respect to the claim that faulty wiring caused the house fire:

<sup>13</sup>For an early and influential discussion of these cases, see Sosa (1991).

<sup>14</sup>See Elgin (2017) and Grimm (2014) for discussion of the importance of making predictions to understanding.

	Propositional Knowledge	Understanding
Knacky <sub>E</sub>	No	No
Opie <sub>E</sub>	Yes*	No
Opie* <sub>E</sub>	Yes*	No
Percy	Yes	Yes

The ‘take-home’ message from this diagnosis of the four cases is that while propositional knowledge does not essentially involve the manifestation of a performance perspective,<sup>15</sup> understanding does. This marks an important difference between the two<sup>16</sup>, one the recognition of which doesn’t presuppose an Aristotelian or non-Aristotelian answer to the question of whether understanding is a species of knowledge. At the same time, though, this distinction between the two identifies a feature in virtue of which possessing the former constitutes a kind of intellectual improvement over the latter. Taken together, these insights help us take on our guiding question on a new footing. In short, we now have a *partial* answer to what we were looking for:

<sup>15</sup>This is the case even though propositional knowledge can rise to a perspectival level. See, for example, Sosa (1997, 2007, 2015) for discussion. Propositional knowledge that rises to the perspectival level, for Sosa, is called ‘reflective knowledge’. For criticism of Sosa’s two-tiered picture of propositional knowledge, see Kornblith (2004, 2009). For replies to Kornblith’s criticisms, see Perrine (2014) and [Redacted].

<sup>16</sup>Note that the claim that understanding essentially involves the manifestation of a performance perspective should not be confused with the claim that manifesting a performance perspective in one’s causal reasoning is *sufficient* for understanding. This is for two reasons. First, understanding why something is the case is *factive* in the sense one doesn’t understand why the house burnt down due to faulty wiring unless the house really did burn down due to faulty wiring. (For discussion on the factivity of understanding, see Gordon (2017) and Pritchard (2009).) But even more—and this is the second point—one can manifest a performance perspective on first-order dispositions that fall short of competence. (Just consider, by analogy, a batter keenly attuned to their strengths and weaknesses as a hitter, but who—in addition—has more weaknesses than strengths).

*Question:* What is the *nature* of the kind of expertise that know-how improves toward as propositional knowledge improves toward understanding?

*(Partial) Answer:* Propositional knowledge improves toward understanding as know-how to a state that (like understanding, but unlike mere propositional knowledge) essentially manifests a performance perspective.

We say ‘partial’ because it’s not yet clear what a performance perspective would contribute to know-how, specifically. And it’s also not yet clear why know-how itself would *not* essentially involve such a perspective.

6. Our aim in this section will be to—through a practical example case—build upon the idea established in §5, namely, the idea that know-how improves to a state that, unlike *mere* know-how, essentially involves a performance perspective. In particular, we show how the idea, once fleshed out, can successfully explain why improving from know-how to expertise makes a valuable *difference*. The upshot will be a fresh vantage point from which to revisit our four candidate answers and see how some fare better than others.

With these aims in mind, suppose an experienced safety engineer—‘Pro’—is in charge of deciding when to replace a particular wing component, *W*. Pro has a long history of successfully recognising when a *W*-component needs changed, and of then changing it when it does. Moreover, a *W*-component has never failed on any vehicle Pro had responsibility for and let us take for granted for the moment that it never will. Pro’s work is reliably enough<sup>17</sup> *safe*. Now, suppose that a trainee—‘Tyro’—begins working for Pro’s organisation, and is responsible for the very same wing component—*W*—on other vehicles. Suppose further that Tyro is unsure whether the *W*-component needs to be changed on any given occasion, and he opts to replace the *W*-component every time. Not only is Tyro’s work safe in the actual cases, we know that it, just like Pro’s, always will be given this strategy.

<sup>17</sup>We say ‘reliably enough’ because you don’t fail to know how to do something if you would fail, say, occasionally and rarely. If I fail to tie my shoes correctly 1 in every 1000 times, it’s not true that I thereby fail to know how to tie my shoes. For discussion, see Sosa (2010).

Here is an important respect in which Pro and Tyro are *similar*: they both meet the following condition.

**SAFE CHANGE:** If it were the case that a *W*-component needed to be replaced, it would be replaced.

Even more, it is plausible that whenever Pro and Tyro successfully change a *W*-component, they manifest *know-how*. That is, their performances (unlike that of someone who is unreliable, or who is just guessing) manifest their knowledge how to change a *W*-component. This is, to note, an assumption that could be explained equally on intellectualist or anti-intellectualist terms. In the latter case, we point out that both are disposed to perform reliably enough *when they try* to change a *W*-component. On the former, both know of a correct way to change the *W*-component, *that* it is a correct way for them to change it. So far, so good.

But there is an important sense in which Pro has something Tyro lacks, something not captured by SAFE CHANGE, and not demanded by mere know-how. For one thing, whilst passengers and the component's manufacturer might be happy with Tyro's work, the organisation would not be, and this is because Tyro is *extremely* inefficient. Where Pro's work as well as Tyro's both pass the SAFE CHANGE test, only Pro's passes the following:

**SAFE NO CHANGE:** If it were the case that the component did not need to be replaced, it would not be replaced.

In changing the component when it needs changing, Pro ensures safety. She ensures this *through* her know-how. Tyro ensures this as well, equally, through know-how. But by ensuring that she only changes it when it requires to be changed, Pro ensures *efficiency* at the same time, but not *merely* through the know-how she shares with Tyro, but through the performance perspective she has, viz., through the grip she has on her competence to change the *W*-component, and the bounds of the situations pertinent to manifesting it (bounds which—to emphasise—*exclude* many cases in which Tyro attempts, and successfully, changes the *W*-component). Tyro for his part is competent, no doubt, but lacking any competent perspective on this competence and the situations pertinent to manifesting it, he manifests no such perspective when he successfully changes the *W*-component. And this is so *even when* it is one of those cases where the *W*-component

really does need changed, and Tyro changes it successfully and safely. In such a case, *very easily* could Tyro (but not Pro) have changed it when it didn't need changing.

It is worth emphasising that if we were to focus only on the SAFE CHANGE condition when assessing expertise, it would look as though Tyro and Pro were *equally* expert in respect of the wing. Worse still, if we allow the more realistic assumption that Pro may err even very rarely in her career, but hold fixed Tyro's reliable and safe 'scorched earth' tactic, we may falsely conclude that Tyro has *more* expertise than Pro in respect of this wing component. On the other hand, were we only to focus on the second condition, we would not be able to tell apart the expert who judged that no replacement was required, from a negligent engineer who would not have changed it in any event. This demonstrates that when we are determining the expertise of some subject concerning some domain, we need to look not only at the conditions under which they *do* intervene, but also the conditions under which they *do not*.

Those familiar with difference making<sup>18</sup> approaches to causation may notice that the success under both a *do* condition, and a *do not* condition, mirrors the requirement that causes meet both a *presence* condition, and an *absence* condition with respect to their effect. Abstracting somewhat, difference-making conceptions of causation take it that *c* is a cause of *e* iff the following are both true:

PRESENCE: If *c* were present, *e* would be present.

ABSENCE If *c* were absent, *e* would be absent.<sup>19</sup>

The need for both conditions is clear in causal cases. Any two actual events will meet the PRESENCE condition, even if the *c* is in the past, or

<sup>18</sup>This is a family of views that takes it as the mark of causation that the cause *makes a difference* to the effect, though members of the family disagree on how to analyse difference making. Perhaps the canonical such view is that given by Lewis (1973), but others include the contrastivism of Schaffer (2005), the interventionism of Woodward (2003), and the hybrid view of List and Menzies (2009).

<sup>19</sup>For explicit versions of this see Lewis (1973), List and Menzies (2009, 482), and Zhong (2014, 353). Since the presence condition may be considered trivial (depending on your semantics), or obviously assumed when *c* and *e* are actual events, it is more often left implicit, but can nevertheless be imputed.

at the other end of the universe relative to *e*. If we only adopted the PRESENCE condition this would trivialise the causal connection, just as adopting only the *do* condition trivialised the notion of expertise in the case of Tyro.

Similarly, far too many pairs of non-occurring events would meet just the ABSENCE condition in isolation (how many depends on the exact semantics for counterfactuals at play).<sup>20</sup> This also trivialises the causal condition, and is analogous to the way in which adopting only the *don't* condition trivialises the notion of expertise in the case of the negligent engineer.

When both conditions are met, however, we have a condition under which the presence/absence of *c* makes a *difference* to the presence/absence of *e*. On the plausible assumption that experts should be competent difference makers, then it would make sense that our test for expertise would embed a *difference-making structure* that is a close analogue of that which we find in other domains.

7. Here is where we've got to. (i) Propositional knowledge does not essentially involve the manifestation of a performance perspective, understanding does. And this suggested a structural constraint on the kind of expertise that know-how plausibly improves to as (propositional) knowledge to understanding. Specifically, the analogy we began with should preserve that, secondly, (ii) propositional knowledge improves to understanding as know-how to a state that (like understanding, but unlike mere propositional knowledge) essentially manifests a performance perspective. And thirdly, we've just seen how know-how plausibly (i) doesn't essentially involve a performance perspective while nonetheless (ii) improving to a kind of expertise—one that *makes a difference* over mere know-how—and which does.

These points, taken together, suggest a new kind of *substance* that our original four views, (AP), (NAP), (AD), and (NAD) will each need to take, and with reference to which we will be better positioned to reflect on their merits without relying on any of the contentious premises KH-1, KH-4, U-1 and U-4.

Firstly, *Aristotelian propositionalism* (AP) holds that propositional knowledge is to understanding as know-how is to expertise consisting of 'more

<sup>20</sup>For example, 'if flying pigs were absent, dancing unicorns would be absent' is true—see the actual world—and yet the first does not cause the second.

know-how' where that additional know-how is itself just more propositional knowledge of the relevant sort—viz., propositional knowledge of ways for one to do the relevant thing. Now, this additional propositional knowledge will *make a difference* over *mere* know-how in our example case only if that propositional knowledge one has suffices not only for SAFE CHANGE but also for SAFE NO CHANGE. But here already we find a worry for Aristotelian propositionalism. When it comes to the task of changing a *W*-component, propositional knowledge about ways for one to *do that*, viz., to change a *W*-component—even when that knowledge is known to one under a practical mode of presentation<sup>21</sup> (Stanley and Williamson 2001)—at most increases one's propensity to satisfy SAFE CHANGE *even more robustly*. But increasing the robustness of satisfying SAFE CHANGE through additional knowledge of ways to successfully change a *W*-component does not gain one, at the same time, any purchase on NO SAFE CHANGE. And herein lies an important reason for thinking Aristotelian propositionalism isn't going to capture the kind of expertise know-how improves to as knowledge improves to understanding: additional knowledge—that one acquires, viz., of ways for one to successfully change a *W*-component, is *not* the kind of knowledge that 'makes a difference' between Tyro and Pro. After all, in changing the component when it needs changing, Tyro ensures safety, *through* the manifesting of his know-how, but not efficiency. One ensures efficiency as well (as Pro does) not by manifesting *mere* know-how, but through the grip she has on her competence to change the *W*-component, and the bounds of the situations pertinent to manifesting it (bounds which, to reiterate, will *exclude* many cases in which Tyro attempts, and successfully, changes the *W*-component).

Notice that the crux of the rationale for rejecting Aristotelian propositionalism extends, *mutatis mutandis*, to Aristotelian dispositionalism (AD) which holds that propositional knowledge is to understanding as know-how is to expertise consisting of 'more know-how' where that additional know-how is itself just more dispositional (i.e., Rylean) know-how of the relevant sort—viz., dispositions to (intentionally) do the relevant thing—in our example case, change a *W*-component when one tries.

And here we can simply run an analogous argument: this additional dispositional know-how will *make a difference* over *mere* know-how in our ex-

<sup>21</sup>For discussion of practical modes of presentation, see Glick (2013) and Pavese (2015b). See also [Redacted].

ample case only if it suffices not only for SAFE CHANGE but also for SAFE NO CHANGE. But now the same problem crops up as it did for Aristotelian propositionalism. When it comes to the task of changing a *W*-component, dispositional know-how about ways for one to *do that*, viz., to change a *W*-component at most increases one's propensity to satisfy SAFE CHANGE *even more robustly*—viz., to *even more* reliably change it successfully whenever it needs changed. But, as the argument goes, increasing the robustness of satisfying SAFE CHANGE through additional knowledge of ways to successfully change the *W*-component does not make a difference *vis-à-vis* satisfying NO SAFE CHANGE. And, correspondingly, the additional know-how one acquires, viz., of ways for one to successfully change a *W*-component, is not the sort of thing that 'makes a difference' between Tyro and Pro.

8. What is the *nature* of the kind of expertise that know-how improves toward as propositional knowledge improves toward understanding? We've now eliminated two answers:

Answer-type	Aristotelian	Non-Aristotelian
Propositionalism	<del>(AP)</del>	(NAP)
Dispositionalism	<del>(AD)</del>	(NAD)

What remains are the two Non-Aristotelian answers: (NAP), which is a species of epistemic expertise, and (NAD), which is a species of performative expertise.

Recall that (NAP) denies that propositional knowledge is to understanding as know-how is to 'more know-how' of any sort, and this is so regardless of whether know-how is unpacked dispositionally or propositionally; further, NAP maintains that know-how improves to an epistemic state characterised by propositional attitudes. (NAD), like (NAP) denies (via its non-Aristotelian component) that propositional knowledge is to understanding as know-how is to 'more know-how'. Though, (NAD)—unlike (NAP)—takes that which know-how improves towards to be dispositional rather than propositional. Neither (NAD) nor (NAP) is subject to the kind of argument just canvassed against (AP) and (AD). Even so, there is a different kind of argument available for highlighting a key advantage that one of these views has over the other.

With this in mind, it will be helpful for illustrative purposes to run a twist on a case that plays an important role in Ernest Sosa's (2015) *Judgment and Agency*. In the case at issue, Sosa imagines a huntress, Diana, who is competent at shooting arrows reliably at targets. Suppose that Diana is *also* very good at assessing risk, viz., at assessing—in light of the view she has of her own competence and its limits—when a given shot is worth taking (given how reliable she is) and when it's not. Diana spots a target, and she knows that, on this occasion, taking a shot at this target would be a shot worth taking. Suppose further that she *actually does* take the shot and hits the target, and in the process, manifests the competence she has to shoot targets reliably (in that kind of situation). The final piece of Sosa's story is this: that Diana actually decided to *take* the shot she did on the basis of a coin flip, and thus, that her competent risk assessment actually played no role whatsoever in explaining why she actually hit the target skilfully as opposed to *refrained* from shooting at all.

Sosa's own interest in the case was to show an important sense in which a performance can be apt (i.e., its success can manifest a competence), *and* can be aptly assessed for risk, and *even so*, it might not be *guided* to aptness by the competent risk assessment.<sup>22</sup> For our purposes, it will be helpful to imagine a variation on this kind of case structure, one that involves Pro, Tyro, and a third character, 'Chancy'. Suppose that Chancy is like Pro in all respects with one exception: in certain cases where the *W*-component did not need to be replaced, and Chancy *knows* that this is so (something Tyro doesn't ever know), he nonetheless—due to unwarranted diffidence—lacks the conviction to act on this knowledge, and so is not disposed to refrain from changing it. He accordingly makes the decision whether to change the *W*-component in these cases by simply flipping a coin: heads = 'change it', tails = 'don't change it'. Unbeknownst to Chancy, he has a trick coin which always lands tails. Thus, Chancy's actions line up exactly with Pro's and will continue to do so.

What to make of Chancy? Firstly, there is a sense in which Chancy is *more* expert than Tyro. Even though all three—Tyro, Chancy, and Pro—are on a par *ex hypothesi* when it comes to SAFE CHANGE, the difference

<sup>22</sup>For Sosa, this case was of particular importance in explicating the concept of fully apt judgment (e.g., Sosa 2015, Ch. 3). By showing this specific way in which a performance's quality can fall short, Sosa was parting ways with his previous bi-level virtue epistemology (Sosa 2007), which lacked the power to explain why this kind of a case falls short.

in their respective expertise is exposed when it comes to NO CHANGE. Chancy is, clearly, in a better position than Tyro is *vis-à-vis* NO CHANGE. This is because Chancy, due to the perspective he has on his competence and the limits of the situations pertinent to exercising it, knows—in cases where the *W*-component doesn't need changed—that it doesn't. This is not something Tyro knows, which is why Tyro just replaces the *W*-component indiscriminately in such cases. Tyro knows only *how* to do it successfully whenever he tries—and he can tell only when it in fact needs changed and not when it doesn't. It is this in respect that Chancy has an important advantage over Tyro. However, this is also a crucial sense in which Chancy falls short of Pro, despite this advantage over Tyro. This is because, on any given occasion where a *W*-component *doesn't* need changed, and Pro and Chancy don't change it (while Tyro does), Pro's refraining from doing so manifests the competent perspective she has on her competence (and the limits of the situations pertinent to exercising it), whereas, Chancy's refraining from doing so does not manifest this competent perspective he shares equally with Pro. Indeed, Chancy's refraining from doing so in such cases is not down to any expertise of his whatsoever, but to a coin flip that (for all he knows) will go one way just as likely as the other.

This difference between Chancy and Pro is one that can be explained easily on a view like (NAD) but *not* on a view like (NAP). After all, Chancy actually has *ex hypothesi* the kind of beliefs about when *not* to fix the *W*-component that Pro has. Intellectually speaking, Chancy is like Pro *as well* as like Diana the huntress, whose assessment of her abilities and the relevant situation she finds herself in is impeccable. But, Chancy is also like Diana and *unlike* Pro in that Chancy is not disposed to actually perform (or refrain from performing) the relevant task *in light of* this competent assessment.

Accordingly, what Chancy lacks—and which makes the difference between him and Pro—is a certain kind of expertise-relevant disposition, one not obviously secured simply by (*a la* NAP) upping the propositional attitudes (e.g., beliefs) he has about the conditions under which he should manifest his *W*-component-changing know-how. It is, indeed, on account of a disposition to change the *W*-component in light of the competent assessment of the situation that distinguishes Pro from Chancy, and in virtue of which Pro is more expert than Chancy.

Whereas (NAP) can't make sense of this idea, (NAD) straightforwardly can. Even more, the (NAD)-style structure can explain why the improve-

ment from Tyro’s know-how to Pro’s expertise isn’t *merely* analogous to an improvement from knowledge-*that* to an epistemic standing *short* of what Percy<sub>E</sub> (from §5) has, and which lacks any disposition to draw the understanding-relevant inference in light of the grasp he has on his own causal reasoning.

The situation, then, is that one of our four possible answer-types to our guiding question lacks problems that face each of the other three answer-types:

Answer-type	Aristotelian	Non-Aristotelian
Propositionalism	<del>(AP)</del>	<del>(NAP)</del>
Dispositionalism	<del>(AD)</del>	(NAD)

So what is the *nature* of the kind of expertise that know-how improves toward as propositional knowledge improves toward understanding? We have proposed grounds for thinking the answer is as the *non-Aristotelian dispositionalist* would have it. In particular, we have reason to both (i) deny the broadly Aristotelian idea that propositional knowledge is to understanding as know-how is to ‘more know-how’ (no matter how this additional know-how is construed); and, further, (ii) we have reason to maintain that that which know-how improves towards is fundamentally dispositional in character rather than propositional (much as the anti-intellectualist about know-how holds that know-how is fundamentally dispositional rather than propositional). In this way, the view is an idiosyncratic kind of anti-intellectualism, though not one that implies any kind of anti-intellectualism about know-how itself *or* for that matter any view about whether understanding is a species of propositional knowledge.

We acknowledge that there are multiple *ways* in which one might pursue an Aristotelian dispositionalist strategy further. For example, one might opt to embrace further substantive theses *beyond* the bare template version of the view we’ve shown holds up better than alternatives. In fact, the literature on the value of understanding intimates that further work would be welcome in so far as it might offer new ways to account for the *value* of expertise, over and above the value of mere know-how that falls short of it.<sup>23</sup>

<sup>23</sup>For some notable discussions of how understanding has a kind of value that propo-

We leave this further work for another occasion—and we conclude instead by considering and replying to some objections to the conclusions already defended.

9.

(Objection 1). Even if we grant that the defence of (NAD) doesn't reason through any of the contentious premises (KH-1), (KH-4), (U-1) and (U-4) from §4, there is still a sense in which the argument is problematically theory-laden. Here is the problem: the notion of a 'performance perspective' introduced in can do the work it's meant to do in the understanding-expertise analogy defended only for one who commits themselves already to a kind of 'epistemic internalist' condition on *both* understanding and on the kind of expertise know-how improves to as propositional knowledge improves to understanding. But such an internalist commitment is itself highly contentious! For example, one who is an externalist about propositional knowledge and who regards understanding to be reducible to such knowledge<sup>24</sup>, will be inclined to reject the implicit internalism associated with a performance perspective.

*Reply:* It doesn't follow from the fact that a given state (e.g., understanding) manifests a performance perspective that the satisfaction conditions for being in that state must thereby be reflectively accessible to one, as epistemic internalists would have it. The central reference point in contemporary epistemology where such an assumption is explicitly rejected is found in Sosa's bi-level virtue epistemology. Sosa's virtue epistemology embraces a bi-level picture, which is thoroughly externalist at both the first- and second-orders.<sup>25</sup> In short, although recourse to a performance perspective as it's been defended here is certainly compatible with a further epistemic internalist requirement, it doesn't presuppose any such requirement.

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sitional knowledge lacks, see for example Kvanvig (2003b, 2009), Pritchard (2009, 2008, 2014), Haddock, Millar, and Pritchard (2010) and [Redacted].

<sup>24</sup>See, for example, Kelp (2015, 2016) for versions of such a view.

<sup>25</sup>This is a point that makes especially clear in his Sosa (1997), and later in his response (2009, Ch. 8) to Stroud (2004) who misconstrues this very point.

(Objection 2). Suppose we grant that. Even so, there is a substantive problem with Non-Aristotelian dispositionalism as a solution to the guiding problem. The problem is that—in the safety engineering example used for illustration—surely Pro’s expertise involves some propositional attitudes, and indeed, some propositional knowledge. But if that’s right, then it’s hard to see why there isn’t a further problem with Non-Aristotelian dispositionalism that hasn’t been addressed, one that remains even if we grant that Non-Aristotelian *propositionalism* has trouble with cases like that of Chancy.

*Reply:* The problem with this reasoning is that it misconstrues the core claim of a dispositionalist strategy. To appreciate why, it will be helpful to consider the kind of claim that the anti-intellectualist about *know-how* is making when embracing the simple Rylean (e.g., 1945) idea that being in a state of knowing-how to  $\phi$  is equivalent to possessing the disposition to (intentionally)  $\phi$  when one tries.<sup>26</sup> In short, the possession conditions for some dispositions imply certain propositional attitudes. The anti-intellectualist about know-how concedes this—and thus is not deterred when it is pointed out that the disposition to get from London to Edinburgh by train implies at least some knowledge-wh (e.g., knowing where the train station is, what to do at a ticket machine, etc.) What the anti-intellectualist about know-how submits is that it is *in virtue of* possessing such a disposition (sometimes glossed as an ‘ability’), rather than in virtue of any propositional knowledge such disposition implicates, that one knows how to do something<sup>27</sup>, and it is in this sense that know-how is taken to be fundamentally dispositional.<sup>28</sup> But notice that this same point applies, *mutatis mutandis*, for other states grounded in the possession of dispositions. To claim that a given state is dispositional is, in short, not to embrace the further and much stronger idea that the relevant disposition must not imply the possession of relevant propositional attitudes, or worse, must not accompany any such attitudes. To think otherwise would commit one to among other things a misguided interpretation of anti-intellectualism in the theory of know-how.

<sup>26</sup>Though, see Navarro (manuscript) for resistance to the common attribution of this positive thesis to Ryle.

<sup>27</sup>For simplicity’s sake, I’m describing a canonical form of anti-intellectualism here when describing its positive commitments. For a non-traditional variety of anti-intellectualism, see Bengson and Moffett (2011a).

<sup>28</sup>For discussion on this point, see Bengson and Moffett (2011b) and [Redacted]. Cf., Snowdon (2004).

(Objection 3) Is Aristotelian dispositionalism discarded too quickly? For example, might it be that the disposition Pro has and Chancy (and Tyro) lack is a kind of (dispositionally construed) *know-how*, where the know-how at issue is a know-how to *refrain* from changing the *W*-component in circumstances where it shouldn't be changed? Tyro of course lacks such know-how. But, debatably, so does Chancy. After all, the relevant stimulus condition (e.g., the absence of the *W*-component's needing to be changed) doesn't itself trigger Chancy to refrain from changing it.

*Reply:* Here it's important to remember the 'Aristotelian' element of Aristotelian dispositionalism. In particular, note that, on this view, the 'more know-how' *just is* more knowledge how *to change* the *W*-component, knowledge that would increase the safety though not the efficiency that's pertinent to expertise. This restriction marks the difference between Aristotelian and non-Aristotelian dispositionalism, where the latter isn't confined in this way.

(Objection 4) Luck is pervasive, and it seems, pre-theoretically at least, that even the expert can be lucky some of the time. (Think of expert athletes who, on occasion, achieve their feat in part by taking advantage of very favourable circumstances.<sup>29</sup>) But this observation seems at least initially at tension with the diagnosis of the difference between Chancy and Pro, a diagnosis that plays an important role in thinking that (NAD) outperforms (NAP).

*Reply:* We want to respond to this worry in two parts. Firstly, Non-Aristotelian dispositionalism rules out only very specific kinds of luck—for example, as when it is just a matter of luck that one satisfies the NO CHANGE condition (and, regardless of whether one's higher-order assessment of one's competence is on target.) But note that this is compatible with other ways in which one with (NAD)-style expertise might be lucky. This includes, unqualified compatibility with what Nagel (1993) calls 'circumstantial luck' (as, for instance, when an expert might find herself in favourable circumstances.) But, importantly, it is also compatible with another kind of luck that has special significance in epistemology: *environmental luck* (e.g., Pritchard 2005) of the sort at play in 'barn facade'

<sup>29</sup>See, for example, John Greco's (2010) case of a professional football player who scores an easy goal thanks to a highly-skilled pass.

cases.<sup>30</sup> Suppose, for example, that Pro could *very easily* possessed a disposition to mimic Tyro's 'scorched earth' method—viz., to always replace the *W*-component—due to the fact that she very easily could have had a risk-averse instructor at university, and we may suppose further that *all other* such instructors were highly-risk averse—that only one instructor, the one from whom Pro learned, was not. Such environmental luck would not on (NAD) downgrade Pro's expertise. And indeed, this is exactly the kind of result we should *expect* in so far as we are aiming to capture an improvement from know-how that is *analogous* to the improvement from propositional knowledge to understanding. After all, understanding is widely taken to be compatible with environmental epistemic luck<sup>31</sup>, even if such luck is incompatible with propositional knowledge. For these reasons, considerations to do with luck do not provide a good basis for rejecting Non-Aristotelian dispositionalism.

<sup>30</sup>See Ginet (1975) and Goldman (1976) for seminal discussions.

<sup>31</sup>See, for example, Pritchard's (Peels 2011) case of the fire-officer. Suppose one approaches a burning house, spots a group of individuals dressed like fire officers, picks out one of them and asks 'Why did the house burnt down?'. Now, suppose the particular individual who is asked is a *genuine* fire officer, and that they explain, accurately, that the house burnt down because of faulty wiring, an explanation that the inquirer easily grasps. Suppose further that had any of the officers in fancy dress been asked, they would have simply made something up. This case bears structural similarities to a fake barn case, in that the inquirer could very easily have asked an imposter, who would have given a false explanation, but just happened not to. Even so, as Pritchard argues, it is problematic to deny that the subject understands in this situation why the house burnt down. For experimental results that suggest that this intuition—viz., that understanding is compatible with environmental luck—is shared by those with self-reported philosophical expertise (though less so by those without), see [Redacted]. For some criticism, see Sliwa (2015) and Grimm (2014).

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