# The Epistemology of Skills

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## 1. Introduction

Artemisia Gentileschi was an exceptionally skilled painter. She undoubtedly had a knack for it, which she inherited from her father Orazio Gentileschi. But her talent alone did not make her into one of the most skilled Baroque painters—it took several years of training first under her father's supervision, and then at the Tuscan Academy of the Arts of Drawing, where she was the first woman ever to enroll and where she learned from the best painters of her time. Consider her ability to paint at the culmination of her career, as is manifested in *Self-portrait as the Allegory of Painting* (1638-1639). In what sense does that ability count as a skill?

Skills such as that Gentileschi had are *learned* abilities that characteristically manifest in *controlled actions*. Skills are distinguished from bodily and cognitive instincts, from knacks, talents, as well as from general faculties in their being learned; their distinctive control distinguishes skills from reflexes, habits, as well as from virtues, and epistemic competences. Skills are also closely related to know-how, as it seems that one cannot be skilled at a task without knowing how to perform it; on the other hand, knowing how to perform a task might not suffice as a skill—after all, many unskilled painters might nonetheless know how to paint (just not as well as Artemisia Gentileschi).

If learning and control are central to paradigmatic cases of skills, then an epistemology of skills includes questions such as the following: what kind of learning does skill acquisition involve? What kind of knowledge, or know-how, if any, do skilled agents possess? How are we to think of this knowledge in such a way as to explain the control that is distinctive of skilled actions?

This chapter first motivates the demarcation of skills from other abilities on the basis of their robust learnability and control, and then discusses the epistemology of skills by looking at how different views of skills answer these questions.

## 2. *The Demarcation Question*

Ordinary use of 'skill' is very liberal, and applies indiscriminately to knacks, talents, instincts, know-how, general faculties, as well as to innate or acquired abilities. Professional philosophers' use of 'skill' is often equally liberal. Many epistemologists classify epistemic competences as kinds of skills and ordinarily compare perception to archery and piano playing (e.g., Sosa 2007, 2015, Sosa and Callahan 2020) or to fencing (Stanley and Williamson 2017); some go as far as to think of knowledge as a skill of sort (Heatherington 2020). Philosophers of mind and cognitive science talk of of perception (Noe 2004, Siegel 2020), of attention (Wu 2011, 2020), of memory (Goldwasser 2022), of imagination (Kind 2020), and of reasoning (Wu 2023) as of skills, and equate them to crafts such as carpentry or tool use.

These disparate uses of 'skill' are no doubt motivated by the relevant theoretical goals. But they have the pitfall of classifying different kinds of practical abilities under

the same heading; by doing so, they risk obliterating significant differences. Some of these differences have epistemological import. My goal in this section is to highlight some important differences among different kinds of abilities and to single out a narrower, and technical, notion of skill that (i) has a long historical pedigree, (ii) happens to pick out a natural (i.e., psychological) kind, and (iii) it is also of special interest to epistemologists, as it is constitutively connected to learning and knowledge. As it turns out, skills stand out from general faculties such as perception, memory, reasoning, and attention as well as from instincts, virtues, powers, and habits in their characteristic manifestations and in the sort of control that their manifestations exhibit. They are also distinctive in their cultural dimensions and in the manner of their acquisition.

Some initial distinctions are uncontroversial. Paradigmatic skills such as archery, chess, or playing a musical instrument differ from bodily abilities, such as the ability to digest or to breathe; skills also differ from a variety of cognitive but subagential abilities, such as the ability to process relevant complex acoustic and/or visual inputs or the ability to store information in working memory. Skills differ from these abilities in that they characteristically manifest in *actions*—something agents do (cf., e.g., Ryle 1949, Setiya 2012, Pavese 2013, 2016, Stanley and Krakauer 2013). This is true of both motor skills (e.g., archery, basketball, gymnastics) and of more cognitive skills (e.g, chess): the former characteristically manifest in physical actions—which we might assume to be *bodily movements* (Davidson 1971); the latter characteristically manifest in *mental actions*, such as deciding what move to make (cf. Schmidt and Wrisberg 2008). By contrast, the characteristic manifestations of the ability to digest (i.e., digestion) and of the ability to

breathe (i.e., breathing) are not purposeful and goal-directed, nor are they (nor do they need to be) under the full control of the agent. Saying that skills characteristically manifest in actions does not preclude them from manifesting *non-characteristically* in involuntary movements and in reflexes too.[1] For example, a skilled basketball player might instinctively catch the ball even when doing so will thwart their aims. The catching still manifests their skill—it is definitely evidence that the skill is there—albeit not characteristically (cf. Pavese and Beddor 2022).

Control is a fundamental feature of skills' characteristic manifestations. A skilled painter or a skilled pianist is in control of their execution when they exercise their skills. Their control is manifested in their ability to adjust the execution of the action as the performance unfolds. Agentive control—the sort of control characteristic of skilled behavior—has been theorized by cognitive scientists as well as philosophers of psychology. So, for example, Miller (2000, 59) claims that 'cognitive control is essential for what we recognize as intelligent behavior' and that 'agents have evolved mechanisms that can override or augment reflexive and habitual reactions in order to orchestrate behavior in accord with our intentions, which exert cognitive control over lower-level sensory, memory, and/or motor operations.' Dreyfus (2002) thinks that control is distinctive of expert performance and tells us that an expert is in control of their movements in the sense that they can stop doing what they are doing if they so want. Christensen et al. (2016) argue that cognitive control is present in every expert skillful performance. Wu (2016, p. 101) focuses on agentive control, which he thinks 'yields

[1] Dreyfus (2005, 2007, 2014) makes it clear that he thinks that reflexes can be skillful, though he seems to think of them as manifesting a basic sort of intentionality. See Gehrman & Schwenkler (2020) for discussion.

phenomena of central philosophical interest: moral, rational, reason-based, skilled, conscious, epistemic and free agency' (see also Fridland 2014, Shepherd 2021, Pavese 2021). Though these scholars all mean slightly different things by 'control,' the minimum core they all agree on is captured by Frankfurt's (1978)'s notion of *guidance*: one guides the action just in case one can refrain from performing it, can stop performing it, and can adjust its performance depending how the action develops. Some think that this sense of control even sets apart skills from *habits*—i.e., that the ability to adjust one's performance depending on how an action develops is only distinctive of skilled, versus habitual, actions (Christiansen et al. 2016).[2]

Besides control, the other characteristic feature of skills such as archery, playing the piano, gymnastics, carpentry is that they are supposed to be *learnable* (Ryle 1945, 1949; Singleton, 1978; Adams, 1987; Dreyfus, S. 2004; Yarrow, Brown, & Krakauer, 2009). Indeed, some cognitive scientists even define skills as necessarily involving learning (cf. Willingham 1998 and Rosenbaum, Carlson, & Gilmore 2001). Their learnability puts them in opposition to *instincts*. Instincts are inherited and unlearned abilities for even fairly complex and stereotyped activities which are common to members of a species (Lorenz 1957; Blumberg 2017). There is, however, considerable controversy over what the alleged *learnability* that is characteristic of skills amounts to. For though instincts are innate from birth, they *develop*. How does a skill's learnability differ from the development of paradigmatic instincts, such as a baby's instinct to cry when hungry?

[2] For a different, but more controversial, understanding of habits, see Hutto and Robertson (2020).

Philosophers of biology distinguish an instinct's development from a skill's learnability in terms of whether it develops *across a variety of different environments*. A skill exhibits a modal dependence on environments: *had the environments been different, the skill would have been different too* (cf. Stich 1975, Fodor 1981, Sober 1998). The general idea is that, while an instinct tends to develop in pretty much every healthy member of the species that grows in a normal environment, skills are only acquired by individuals who find themselves in appropriate social and learning environments. The acquisition of skills might depend on the resources made available by the environment—e.g., sailing skills develop in populations in proximity to water, whereas mountaineering skills develop in populations living in mountainous regions. The differing availability of materials makes for widely different tool-use skills—e.g., Incas' tool skills were shaped by the availability of stone, copper, and bronze, but not of iron (Romney 2021). Relatedly, skills are not fully learnable in socially isolated animals, the idea being that their acquisition requires exposure to the same activity in other practitioners of the skill. The modes by which we acquire craft skills exhibit both a vertical dimension (parent/children), as well as a master/apprentice dimension, and a horizontal (among peers) dimension (Hosfield 2009). Thus social learning plays a central role in the acquisition and transmissibility of skills. By contrast, instincts are generally thought to be capable of developing in socially deprived environments—i.e., even in socially isolated animals (Tinbergen 1942; Lorenz 1957). Indeed, Fodor (1981) distinguishes innate abilities from learned abilities on the basis of whether they developed merely thanks to

causal triggers (*instincts* = innate), or through rational processes of evidence gathering, hypothesis testing, and rational revisions (*skills* = acquired).

One upshot of this discussion is that paradigmatic examples of skills such as archery, chess, basketball, playing a musical instrument, carpentry or tool use also differ in some crucial epistemological respects from *general faculties*, such as memory, perception, attention, reasoning, or imagination. Although the general faculties can sensibly improve too by practice and training (Kind 2020), general faculties are mental abilities that we *cannot but* develop—as humans we cannot fail to eventually develop imagination, reasoning, attention, perception, to at least some degree. This very much differs from paradigmatic skills: not every skill is one that every human *has* to acquire. That is, skills are *learnable* in a robust sense.

This 'narrow', and technical, notion of skills that I have attempted to isolate comes with a long pedigree. Indeed, it arguably traces back to Aristotle's conception of *technē.* Aristotle did not count general faculties such as perception, memory, reasoning or imagination among the *technai*. Paradigmatic examples of Aristotelian *technai* include, crafts, such as the art of building (cf. *Met.* E.2 1026b6-10; *EN* I.1 1094a5ff, *inter alia*), carpentry, knitting, or tool use, but also medicine and the art of war (*Post. An.* II.11 94a36-94b8), intellectual skills such as rhetoric, as well as sport skills, such as gymnastics and sailing. One of key texts for Aristotle's discussion of *technē* is *Met.* Θ.2. The passage distinguishes between powers in accordance with *logos* (*meta logou dunameis*) and powers without *logos* (*alogoi dunameis*).[3] *Technai* are powers in

[3] At *Met.* 1046b1, '*logos'* refers to the faculty of reason. From then onwards in the text, Aristotle uses '*logos*' to refer to an account or definition. So *logoi* are rational accounts, namely accounts of things that one possesses in

accordance with *logos*. He also tells us that *technai* are productive forms of knowledge (*poiētikai epistēmai*), the manifestation of which are *products*—the effects of particular kinds of actions, or productions. Aristotle makes it clear that an artisan is able to teach their *technē* (*EE* I.8 1218b16-22; *Met*. E.2 1027a20-23, *Top*. VI.4 141a29-30), since *technai* involve causal explanatory accounts (*logoi*) that can be taught and so can be transmitted to others.[4] Aristotle also tells us that *technai* are two-way powers, or *powers for contraries*. In this way, Aristotle distinguishes *technai* from other rational powers—such as virtues, which are one-way powers. The contrast between *technē* and *virtue* is at the core of Aristotle's discussion in the *Ethics*, where he tells us that "… in a craft, someone who makes errors voluntarily is more choiceworthy; but with prudence, as with the virtues, the reverse is true." (NE VI. 5 1140b20-25). The crucial distinction seems to be one in *control*. One way of making an error voluntarily is *to refrain from exercising the power while still having it*. For instance, the housebuilder can be skilled at their job while refraining in some cases to exercise their art: their refusing a commision does not undermine their status as skilled housebuilder. Moreover, there is no difficulty, for a skilled agent, in knowingly disregarding what it is right to do in light of the norms of a certain skill-domain. For instance, while playing chess, one might recognize that castling is the best way to avoid being checkmated but might choose to make some other move instead if they desire to lose. This choice doesn't automatically call into question

virtue of having the faculty of reason. See Moss (2014a) for a helpful reconstruction of these senses of *logos* in Aristotle.

[4] While the claim that *technai* can be passed on through teaching and verbal transmission is important for skills, as we have seen, the claim that it is the possessor of *technē* themselves that also can teach it finds strong opposition in the recent debate on the nature of skills, starting from Fodor (1968).

one's skill as a chess player. Virtues, by contrast, are one-way powers, since a person cannot refrain from acting generously when required while still counting as generous. When it comes to virtue, *ceteris paribus*, someone's failure to act kindly in relevant situations immediately calls into question whether she is rightly credited with possessing the virtue of kindness. This idea that skills differ from virtues in that skilled agents retain a control over whether or not to exercise or refrain from exercising a given skill is rather standard among contemporary philosophical literature on the virtues (McDowell 1979).[5]

So much for the relation between skills and virtues. Now consider the relation between skills and epistemic competences. It is an interesting, and open, question in which respect (if any) epistemic competences—the sort of competences by which we form justified beliefs or knowledge—are skill-like. Our discussion has highlighted one crucial dimension of difference: like general faculties, epistemic competences are not learnable in the same robust sense in which skills are learnable. It is a vexed and widely discussed question whether the characteristic manifestations of epistemic competences (beliefs, or knowledge) are action-like. Some sharply distinguish between beliefs and knowledge (states) on the one hand, and actions on the other (Engel 2013), though this distinction is challenged by examples such as marriage and friendship—i.e., states which require activity for maintenance. So perhaps beliefs too can be conceived of on the model of activities (Rohrbaugh 2015, Sosa 2015).[6] Indeed, perhaps the sort of modal robustness that many epistemologies require of beliefs to count as knowledge is just a special

[5] This is not to deny that virtues are like skills in many other respects—see Annas 1995, and Stichter 2018.
[6] Sosa and Callahan (2020) argue that it is sufficient for a state of knowledge to count as an action that it aims at a goal.

instance of the sort of modal robustness that is required of skilled action (Beddor and Pavese 2020).

A second, much less discussed, question concerning epistemic competences is whether they are more akin to either skills or virtues when it comes to their *control profile*. Exercising one's epistemic competence is typically a matter of forming beliefs in response to considerations that bear on what it is correct to believe in light of the relevant epistemic norm. In this respect, epistemic competences appear similar to virtues (Horst 2021).[7] On the other hand, it seems that a father that chooses to believe that their son is not guilty, while recognizing that all the available evidence should convict him, seems to be perfectly exercising his epistemic competence (when choosing what to believe), even though the resulting belief is not in good standing epistemically. Similar examples might actually highlight the similarities in the sort of control over one's performance that both the skilled agent and the epistemically competent believer have.

Finally, consider the relation between skills and know-how. There is no doubt that they are closely related: Artemisia Gentileschi could not be as skilled at painting without knowing how to paint. On the other hand, many believe that know-how might not suffice for skill possession. Stanley and Williamson (2001) have argued that know-how does not even entail ability (though this claim might rely on a conflation between general and circumstantial ability, cf. Hawley 2003, Pavese 2016). On the other hand, it is undeniable that many mediocre painters knew how to paint but not sufficiently well to count as skilled (cf. Pavese 2016, Cath 2020). On the other hand, while knowing how to paint

[7] Drawing a similar analogy between epistemic competences and virtue does not necessarily commit one to Zagzebski (1996)'s form of responsibilism. See Horst (2021).

does not entail skill, knowing how to paint sufficiently well might. Finally, one might think some know-how might be innate, so it might not involve robust learning in the same way as the notion of skill that we have discussed. It is certainly true that while early philosophical literature has focused on know-how at the expense of skills, more recently the literature has evolved to draw a clearer distinction between the topics of know-how and skills and to explore skills in their own right in further detail (see Pavese 2016, 2021 on the relation between know-how and skill).

## 2. *Some Epistemological Questions*

If skills are learned abilities (in the robust sense) that characteristically manifest in controlled actions, the epistemological questions arise as to (a) what (sort of) knowledge, if any, is required for such learning and (b) how we are to think of them in such a way as to guarantee that they manifest in controlled actions. Different views of skills answer these epistemological questions differently. In this section, I survey some of the main extant theories of skill.

### 2.1 *Dispositionalism*

Ryle (1946, 1949) oscillates between a broader conception of skills that includes general faculties and competences and a narrow conception of skills conceived of as *technai*. For example, Ryle (1946: 7) talks of reasoning—a general faculty—as a skill. According to Kremer (2020), Ryle would also include perceptual abilities and epistemic competences among skills. Indeed, insofar as knowledge is formed through perception and other

epistemic competences, Ryle thought that propositional knowledge was an activity that too required skill. Yet, Ryle also embraces the claim that a skill's characteristic manifestations are necessarily controlled, as when he (1949: 5) compares the skilled clown—who tumbles on purpose — to the klutz, who only does so unintentionally. Ryle talks of skills as a distinctive form of knowledge, inculcated through a distinctive form of teaching or 'training' (Ryle 1967, 1972, 1976). And he does seem to think of training in terms of what we have characterized as robust learning (Fodor 1971). Indeed, Ryle (1949: 42-3) distinguishes habits from skills in that, although both are *acquired dispositions*—the former are acquired through 'drill,' 'conditioning,' or 'mindless repetition,' whereas the latter are acquired through *training*, which involves 'the stipulation by criticism and by example of a pupil's own judgment,' in which the pupil 'learns how to do things thinking what he is doing'. Finally, for Ryle, skills are know-how, which he thought of as a particular kind of intelligent disposition—a 'multi-track' disposition. One distinctive feature of knowing how to *F* is that this knowledge does not need to be exercised in acts of *F*-ing. For example, Ryle thought that a chess player might manifest their know-how and skill simply by recognizing what the right move is, even if they refrain from making it.

Ryle's chief argument for thinking that skills can neither be nor involve propositional knowledge is the well-known *regress argument*. In the original formulation (Ryle 1949, 19-20), assume that skillful behavior involves contemplating knowledge—as 'intellectualist legend' has it. Contemplating knowledge is itself behavior that can be skillful or unskillful. If this particular skill also requires some further act of

contemplation, a regress emerges. While this regress assumes the objectionable assumption that using knowledge requires contemplating or consciously entertaining some proposition, the same regress can be reformulated on the weaker assumption that skillful behavior requires *using* knowledge. This version of the regress is what Cath (2013) calls the 'exploiting regress.'

Why think that the regress is vicious (Fantl 2011)? The regress seems to require, for anybody to act intelligently, that one ought to perform an infinite number of acts *of using knowledge*. And one might worry that this is temporally and psychologically impossible—because any such act will require some time to perform, thereby making it impossible to perform any intelligent action. And yet, this cannot be what makes the regress vicious. After all, a temporal construal of the regress makes it analogous to Zeno's paradox, of which there are well-known solutions (e.g., Yablo 2000). Nevertheless, the regress argument might commit us to something false, regardless of whether or not the regress commits us to something paradoxical. As stated, the regress commits us to the claim that the intelligence of an act depends not only on whether that act uses knowledge, but also on whether an infinite number of acts use knowledge, thereby making the question of whether any act is intelligent entirely extrinsic to that action. One might be forgiven for wanting a theory of skillfulness that does not require this unexpected commitment.

So much for the regress argument. What view did Ryle embrace as an alternative to the intellectualist legend? The claim that skills are dispositions (or abilities) of a sort can be understood in a *substantial sense*—i.e., skills are *merely* dispositions, not further

grounded in the cognitive states of subjects. In this substantial sense, skills neither require nor involve propositional knowledge. There is also a *minimal sense* in which skills are dispositions—skills are dispositions which are further explained in terms of the representations and cognitive states of subjects. In the latter minimal sense, talk of skills as dispositions (or abilities) should not be taken to prejudge whether or not skill possession requires representations and cognitive states since dispositions might be further grounded in cognitive states and representations.

Though this is sometimes debated, Ryle must have thought that skills and know-how are dispositions *in the substantial sense*—in that they don't require any propositional knowledge at all. Skills cannot require propositional knowledge or even representations for Ryle, since this claim, together with another that he seems to have endorsed, would quickly lead his view to another kind of regress. The other relevant claim is that propositional knowledge requires skills. As we have seen, Ryle seemed to have believed this, since he thought of knowing as involving the activity of grasping a proposition, which requires the exercise of epistemic skills if it has to yield knowledge. However, if skills require propositional knowledge and propositional knowledge does require skills, Ryle's dispositionalism would also quickly lead to a vicious regress—according to which, in order to know how to perform *any task at all*, one would need to perform an infinite number of graspings. Hence, Ryle had better not have thought *both* that skills constitutively involve propositional knowledge *and* that knowledge requires skilled grasping. Indeed, it is worth emphasizing—since this point is often neglected in the recent literature on the topic—that any view that takes skills to

constitutively involve propositional knowledge, while falling short of identifying skill with knowledge, *already* counts as intellectualist by Ryle's own lights, since any such a view is already exposed to a version of Ryle's original regress argument.

*2.2 Intellectualism à la Stanley and Williamson 2001*

In their defense of the Intellectualist legend, Stanley and Williamson (2001) focused on know-how, rather than on skills. Indeed, later, they embraced a different view of skills (cf. Stanley and Williamson 2016), which divorces know-how from skills (see section 2.3). According to Stanley and Williamson (2001), knowing how to *F* is a matter of knowing a proposition, but this knowledge does not need to endow one with an ability—not even with a general ability, or skill. So, for them, knowing how is just a kind of knowledge-wh (see also Stanley 2011). Their primary argument for this view of knowing how relies on the semantics of the ascriptions of knowledge-how and the analogy with other sorts of ascriptions of propositional knowledge. This argument faces the objection that it narrowly focuses on English ascriptions, since in other languages the analogy between ascriptions of knowledge-how and propositional knowledge is much looser (Noe 2005, Setiya 2012, Brown 2013, Ditter 2016).

Besides providing a linguistic argument for intellectualism, Stanley and Williamson (2001) developed a response to Ryle's regress argument that Ginet (1975) had sketched. Ginet (1975) questioned the assumption that at every point in the chain of the regress, using knowledge can be assessed for skillfulness (Ginet 1975; Stanley and Williamson 2001; Stanley 2011; Cath 2013), since he objected that only intentional

actions are the sort of things that can be skillful or unskillful. Non-intentional behavior, such as digesting one's food, is not the sort of thing that can be skillful or unskillful (cf. Stanley and Williamson 2001; Cath 2013). The idea behind this response is that in order to stop the regress chain, there will be operations that amount to using knowledge which cannot themselves be assessed for skillfulness because they are not intentional (cf. Fodor 1968 for a similar response).

Though this response has been the main defensive strategy adopted by intellectualists so far, it is not entirely unproblematic. There seems to be a variety of behavior that can be assessed for skillfulness even though it is not intentional (Weatherson 2017). Consider remembering to check the rearview mirror when driving. This behavior need not be intentional. And yet, if one's aim is to reach one's destination safely, remembering to check the rearview mirror can be intelligent, albeit not intentional. Or consider Paul McCartney developing the melody for "Yesterday" in his dreams: this behavior is skillful, even though it is neither intended nor intentional.

One might insist on denying that behavior can be skillful, if not intentional. This move might seem appealing at first. For example, consider unintentionally offending one's boss. Though the offense might not be intentional, it plausibly consists in one intentionally performing some actions—such as saying or insinuating certain things in front of one's boss. In general, non-intentional actions are intentional under some description (Davidson 1971). So one might contend that it is the intentional action of, e.g., saying certain things—not the offense—that is assessed for intelligence in this case. Or consider remembering to check one's rearview mirror or remembering to turn the gas

off. One might contend that it is not so much that we assess the act of remembering for intelligence *per se*; rather we assess the intelligence of the actions that this remembering gives rise to—such as the checking of the rearview mirror, or the turning off of the gas.

The problem with this line of response is that it does not cleanly cover all possible counterexamples. Consider *forgetting* to check the rearview mirror. This is not skillful. And yet there is no set of intentional actions to which forgetting to check the rearview mirror corresponds.

Another way of blocking the regress argument is to offer reason for thinking that the culprit of the regress ought to be relocated (Pavese 2023). The reason is that the regress arises even *without* assuming intellectualism. One gets the regress up and running already on the assumption that skillful behavior uses one's skill or knowledge-how. For using knowledge-how is behavior that can itself be assessed for skillfulness (i.e., that can be skillful or unskillful). Just as before, this behavior will be skillful only if it itself uses knowledge-how; this use of knowledge-how in turn, if skillful, will use knowledge-how, and so on. If the regress arises without assuming that there is a constitutive connection between skillfulness and knowledge, then the culprit of the regress cannot be this assumption. So, which is the culprit?

What is common to both versions of the regress is the fact that skillful behavior uses knowledge or knowledge-how. "Using" suggests an agential relation between the agent and their mental states, one that can at each turn be assessed for skillfulness. A way of overcoming the regress is to think of the relation between an agent's performance and the mental states that enter in a psychological explanation of that performance *not*

*agentively*. For example, we can think of this relation in terms of *manifesting*— the sort of relation that holds between dispositions and their manifestations. This is not an agential relation and so the question of whether it is skillful or not skillful does not arise. This way of overcoming the regress on behalf of intellectualism locates the source of the regress in the folk psychological concepts of *use, or action guidance*, rather than in the constitutive connection between skillful action and knowledge.

Whether knowledge-how could be knowledge-that has been attacked from the epistemological point of view. Cath (2011, 2015) and others argue that knowledge-how resists Gettierization (see also Poston 2009, Carter and Pritchard 2015a, b). Their arguments rely on intuitions concerning knowledge-how ascriptions in Gettier cases. Recent evidence from experimental philosophy shows that these conclusions might be too quick. Carter, Shepherd and Pritchard (2019) find that in environmental luck cases, people are as inclined to ascribe knowledge-that as they are to ascribe knowledge-how. Pavese, Henne and Beddor (2022) have gathered evidence that in classic Gettier cases, people actually refrain from ascribing knowledge-how as much as they refrain from ascribing knowledge-that. Finally, this entire debate on whether knowledge-how can be Gettiered might rely on faulty simplifications about the nature of knowledge-how. If knowledge-how and skill are learned through *social learning*—imitation, deliberative practice, in addition to verbal feedback—then cases in which skill and knowledge-how is Gettierized are at best marginal, since imitation and practice provide the subject with sources of evidence that might counterbalance the negative epistemic effect of Gettierization.

## 2.3 Epistemic Dispositionalism

According to epistemic dispositionalism, skills are dispositions to know. In particular, one is skilled at *φ*-ing if and only if *S* is disposed to have knowledge that is appropriate for guiding tokens of *φ*-ing. Dickie (2012), Löwenstein (2017), and Habgood-Coote (2019), Brandt (2021) embrace accounts of know-how in a similar vein. Stanley & Williamson (2017) defend epistemic dispositionalism for skills.

One first issue for epistemic dispositionalism is that it obliterates the epistemological differences between various epistemic competences such as perception and skills, such as archery, chess, and playing the piano. After all, perception is arguably a competence to know (Millar 2010, Stanley and Williamson 2017 seem to agree). So the view cannot account for the robust learnability that we have seen is distinctive of skills as opposed to epistemic competences. By embracing epistemic dispositionalism for skills but intellectualism for know-how, Stanley and Williamson (2017) divorce skills from know-how. So they cannot accept the Rylean claim that skills are always a matter of acquiring know-how, if they conceive of the latter as standing propositional states. And yet one would have thought that, if a subject is skilled at a task, then they know how to perform it.

Epistemic Dispositionalism is in trouble when it comes to underwriting the connection between skillful action and controlled action (Pavese and Beddor 2022). This is the case because dispositions to know characteristically manifest in knowledge states, not actions, so not the sort of things that can be controlled. Perhaps, then, a better

proposal on behalf of epistemic dispositionalism is that the only *secondary* manifestations of skills qualify as skillful. Now, Stanley and Williamson do argue that skills secondarily manifest in actions guided by knowledge states (2017: 717). While this avoids obvious counterexamples, there is a worry that the definition of secondary manifestation here is arbitrary. After all, we would like our definition of secondary manifestation to follow from a *more general* theory of disposition manifestation—one that is not itself tailored to skillful action. A natural generalization would be that any disposition *D* secondarily manifests in whatever states or actions are explained by the primary manifestation of *D*. Note, however, that this generalized definition of secondary manifestation doesn't predict that only skillful actions are intentional. For example, if an athlete's prowess induces envy in an onlooker, the envy is explained by the primary manifestation of their athletic dispositions. But the envy is neither intentional nor skillful. So, regardless of whether or not we focus on primary or secondary manifestations, epistemic dispositionalists fail to predict that only controlled actions are skillful. Thus, epistemic dispositionalism fails to capture what is distinctive of skills: robust learnability and control. As such, epistemic dispositionalism might turn out to be a better view of epistemic competences than of skills proper.[8]

*2.4. Neo-Intellectualism: From Control and Learnability to Standing Knowledge in skills.*

The main case for Stanley and Williamson (2001)'s intellectualism has focused on know-how rather than on skills and has hinged on linguistic data suggesting a close

[8] See Miracchi (2015), Kelp (2017, 2018) who embrace epistemic dispositionalism for epistemic competences.

connection between “know-how” and “know that” constructions—linguistic data that do not obviously extend to skill ascriptions. It is no wonder that recent defenses of intellectualism have stopped short of providing an intellectualist treatment of skills. But in doing so, they abandon the close connection between skills and know-how which serve as a central premise in Ryle’s critique of the “intellectualist legend.” This section considers a more radical form of intellectualism, that extends to skills.

One argument in favor of intellectualism can actually be traced back to Aristotle. In general terms, Aristotle’s argument for thinking that *technai* involves knowledge is premised on the assumption—which we have already discussed — that *technai* are two-way powers, or powers for contraries (section 2). Aristotle’s main argument for thinking that *technai* are powers for contraries  is that productive knowledge is of contraries (10464ff). This conclusion follows only if *technai* are productive forms of knowledge—cf. Coope (2021: fn1). Later in *Met.* Θ.2., Aristotle says that productive knowledge is an account (*logos*). And it is clear from his examples and other passages that the account in question is an account of the product of the relevant *technē*. In *Met*. Z.7, Aristotle further confirms that a technical *logos* is an account of what the product is, namely its essence (*to ti ēn einai*, 1032b1-2; cf. *Phys*. II.1 193a30-36). To have a *technē* is to have a form of the product in the soul, where the form is what something is. That is, artisans in some sense grasp the essence of the products they make. Thus, doctors know what health is, whereas builders know what a house is. This raises the question of what exactly the account of the product looks like. We know from other passages that for Aristotle such accounts concern *universals* and are explanatory. *Met*. A.1 contrasts people

with *technē* with people who merely have experience (*empeiria*, cf. *Met*. A.1 981a10-25). The merely experienced person can tell that a particular person will benefit from a given cure since *empeiria* is concerned with particulars (981a5-24, esp. 15-16). But the doctor can also tell, for instance, what kind of cure benefits a given class of people—say, that such and such cure benefits phlegmatic people with fevers (981a7-12). So, *technē* is associated with knowledge which consists of generalizations that exclusively belong to the level of universals. People with mere experience only know that something is the case—say, that giving a certain medicine cures fever. But people with *technē* can explain *why* a given medicine is the right cure for fever (*Met*. A.1 981a25) because they "know the cause" (981a30). Here to know the answer to 'Why X?' is tantamount to knowing the cause of X, where 'the cause' picks one of the four Aristotelian causes (cf. *Phys*. II.3 194b18-20, *inter alia*). So, one can equally say that technical accounts are *causal*, in that they individuate the cause(s) of their corresponding products.[9]

We now have the main ingredients necessary to understand Aristotle's argument for intellectualism. According to Aristotle, *technai* are (a) for contraries since productive knowledge is for contraries and (b) productive knowledge. In other words, possessing technical knowledge of a product X entails possessing technical knowledge of the contrary of X. More specifically, given that technical knowledge is causal-explanatory, one is in a position to grasp an explanation of the contrary X in virtue of grasping explanations of X. For if one grasps explanations of X, and knows that Y is the absence

[9] In *Met*. A.1, technical knowledge is described as knowledge "of the things that are done" (*tōn poioumenōn,* 981b1). This fits with his view that technical knowledge is knowledge of the product (*Met*. Z.7 1032b5-6). The expression '*tōn poioumenōn*' may refer either to the steps that an artisan has to follow to bring about a product,or to things that are produced by artisans in general (if so, one could translate it as 'the things that are made').

of X in a given type of entity, one is in a position to explain the absence of X as well. Thus, Aristotle's argument for intellectualism (for thinking that *technai* must be knowledge) is premised on the claim that *technai* are two-ways powers and hinges on the kind of productive knowledge that the possessor of *technê* must have in order to possess a two ways power.

Neo-intellectualism has the resources to develop an argument for thinking of skills as knowledge states that starts both from control and from robust learnability. This intellectualist view of skills can underwrite the intuitive connections between skills and know-how, and thus agrees with Ryle (1949) that know-how and skills are one and the same. And this version of intellectualism is primarily motivated by consideration of the interrelations between skillful action, intentional action, and knowledge, rather than by linguistic theory and semantics. This argument for Neo-intellectualism proceeds in three different steps. Step 1: It starts from understanding control of skilled action in terms of occurrent knowledge states. Step 2: it argues that such occurrent knowledge states that explain control require a standing state. Step 3: it argues that such a standing state ought to be a propositional knowledge state if social learning is possible.

Let us start with Step 1. According to a prominent tradition that traces back to Anscombe (1957), skilled action requires knowing what one is doing when doing it—knowing what one is doing captures the sort of control that is distinctive of skilled action. While there is some disagreement on how this practical knowledge is to be understood, many agree that knowing what one is doing is a matter of knowing which

means to take to which ends when acting skillfully (Davidson 1971; Setiya 2012; Pavese 2022).[10]

Suppose control requires practical knowledge. This by itself does not mean that it requires a standing propositional knowledge state, since practical knowledge is just an occurrent knowledge state (Audi 2017). In order to make a second step towards neo-intellectualism, consider Gentileschi skillfully painting her *Self-portrait as the aAllegory of Painting* (1638-1639). Her control requires her to know, when painting, which means to take to which ends. What guarantees that her practical knowledge guides her execution? It would be hard for anybody to know what one is doing when executing an action that one does not know how to execute. This observation suggests that practical knowledge requires knowledge-how. While practical knowledge is an occurrent state of knowledge that explains control in action, knowledge-how is a standing knowledge state. So, control of the sort that is exhibited in skilled action demands that one knows how to perform it ahead of performing it—it requires a standing knowledge-how state.

How are we to think of such a knowledge-how state? Here comes the third crucial step on behalf of neo-intellectualism. Recall that skills are learnable in the robust sense—they can be acquired through social learning, through imitation, practical, and verbal feedback. Social learning is central to the acquisition and transmissibility of pretty much any skill that deserves the name. Morgan *et al*. (2015) argue that the teaching of general concepts such as that of a platform edge contributes to the development and

[10] Pineros-Glasscock (2021) argues that a theory of intentional action in terms of practical knowledge is exposed to an argument similar to Williamson's (2001)'s anti-luminosity argument. Beddor and Pavese (2022) show that practical knowledge can be rescued by these luminosity concerns, provided that we reject the view that some actions are essentially intentional.

transmissibility of Oldowan stone knapping techniques. The impact of verbal feedback has been shown to significantly affect the acquisition of wide ranging kinds of skills, from basic motor skills (e.g., Sullivan *et al.* 2008), to more complex sport skills such as swimming and tennis (e.g., Zatoń & Szczepan 2014), yoga skills, manual therapy skills, as well as surgical skills (e.g., Flinn *et al.* 2016) and musical skills (Duke & Henninger 1998), etc. At least some of this learning can take the form of rational revision, evidence gathering, and hypothesis testing. But if skills are susceptible to be acquired in this fashion, then they ought to encompass a propositional standing state that is updated and revised through imitation, practice, and verbal feedback (Pavese 2021d, forthcoming). So, the robust learnability of skills provides the final ingredient in an argument for the view that skills constitutively involve propositional knowledge.

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