

Know-how and concept possession

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Abstract We begin with a puzzle: why do some know-how attributions entail ability attributions while others do not? After rejecting the tempting response that know-how attributions are ambiguous, we argue that a satisfactory answer to the puzzle must acknowledge the connection between know-how and concept possession (specifically, reasonable conceptual mastery, or understanding). This connection appears at first to be grounded solely in the cognitive nature of certain activities. However, we show that, *contra* anti-intellectualists, the connection between know-how and concept possession can be generalized via reflection on the cognitive nature of intentional action and the potential of certain misunderstandings to undermine know-how even when the corresponding abilities and associated propositional knowledge are in place. Such considerations make explicit the intimate relation between know-how and understanding, motivating a general intellectualist analysis of the former in terms of the latter.

Keywords Know-how · Concept possession · Ability · Propositional knowledge · Understanding · Intellectualism

Recent philosophical discussion of the nature of know-how has focused on the relation between know-how and ability. This relation seems rather puzzling. On the one hand, many philosophers have noted that know-how attributions do not in

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general entail possession of the corresponding abilities (Brown 1970; Ginet 1975, 8; Craig 1990, 158; Hyman 1999; Stanley and Williamson 2001; Snowdon 2004).¹ For instance, a figure skater might know how to perform an extremely difficult jump, such as a quintuple salchow, though she cannot actually do the jump herself.² In such a case, (1a) does not entail (1b), as indicated by the acceptability of (1c):

- (1) a. Irina knows how to do a quintuple salchow.
- b. Irina is able to do a quintuple salchow.
- c. Irina knows how to do a quintuple salchow, but she is unable to do one.

On the other hand, some know-how attributions *do* appear to entail possession of the corresponding abilities. Consider, for instance, a situation in which one is asked to perform some simple mathematical operation, such as elementary addition. It seems that one could not know how to add and yet lack the ability to add. Such a person might be unable to add extremely large sums; but if one knows how to perform elementary addition, then it seems that one must be able to do so in at least some instances.³ If this is correct, then (2a) entails (2b), as indicated by the unacceptability of (2c):

- (2) a. Irina knows how to add.
- b. Irina is able to add.
- c. * Irina knows how to add, but she is unable to do so.

This difference in behavior is rather puzzling. On the face of it, (1a) and (2a) possess the same logical form and, a posteriori necessities aside, one would expect sentences that possess the same logical form to act uniformly with respect to their entailments. What, then, accounts for the difference between (1a), which does not entail possession of the corresponding ability, and (2a), which does?

¹ We will understand know-how attributions to be instances of the schema $\lceil x \text{ knows how to } \psi \rceil$, which should be distinguished from instances of the schemas $\lceil x \text{ knows how one } \psi \text{—}s \rceil$, $\lceil x \text{ knows how people } \psi \rceil$, $\lceil x \text{ knows how } y \text{ } \psi \text{—}s \rceil$, and so on (see Stanley and Williamson 2001, Snowdon 2004, Noë 2005, Bengson, J., & Moffett, M. A., Radical intellectualism, Unpublished Manuscript). By ‘know-how’, then, we mean knowledge *how to* perform a given activity, rather than mere knowledge *how one* performs or *people* perform or *a particular person* performs that activity. Our preferred account of these distinctions is sketched in note 34 below.

² The salchow (pronounced *sal-kow*), named after the Swedish skater Ulrich Salchow, is a figure skating jump with a takeoff from a back inside edge and landing on the back outside edge of the opposite foot after one or more rotations in the air. The quintuple salchow would then require five complete rotations in the air. To our knowledge, no skater has ever landed a quintuple salchow. Of course, nothing substantial turns on our choice of this particular complex activity. One might know how to dunk a basketball yet be unable to do so oneself. Another example, due to Stanley and Williamson (2001, 416), who in turn credit Jeff King, involves a ski instructor who knows how to do complex ski stunts which she cannot do herself.

³ Of course, nothing substantial turns on our choice of this particular activity. Knowing how to do conjunction elimination or take the successor likewise appear to require possession of the corresponding abilities.

It is initially tempting to locate the source of the difference solely in the nature of know-how. However, in what follows we argue that the difference between know-how attributions such as (1a) and (2a) does not lie solely in the nature of know-how itself, but is due in part to differences in the attributed contents. Specifically, know-how attributions that entail ability attributions occur in cases involving what we will call *ability-based concepts*. As with any concept, the mere possession conditions for ability-based concepts are relatively cheap. However, the sort of reasonable mastery of these concepts presupposed by know-how attributions requires that the subject possess the corresponding abilities. On our view, then, the entailment from (2a) to (2b) is due to the combination of two factors: (i) the occurrence of an ability-based concept in the attributed content and (ii) a demand for reasonable conceptual mastery arising from the know-how attribution.

If our treatment of the puzzle is correct, then know-how depends on reasonable conceptual mastery, and thus a certain sort of understanding, in an important range of cases. In the end, we will argue that reflection on the cognitive nature of intentional action and the fact that certain misunderstandings undermine know-how even when the corresponding abilities are in place show that this connection can be generalized, thereby allowing a general intellectualist analysis of know-how in terms of understanding. In short, the key to an adequate philosophical theory of know-how is not the relation between know-how and ability, but rather the connection between know-how and concept possession. The upshot, we believe, is that the discussion of know-how is of broader philosophical importance than is often assumed.

We begin, in Sect. 1, by arguing that the above puzzle is genuine: know-how attributions sometimes but not always entail the corresponding ability attributions. In Sect. 2, we provide reasons to reject the temptation to respond to the puzzle by positing an ambiguity in know-how attributions. While rejecting this ambiguity proposal makes solving the puzzle more difficult, it also paves the way for a more subtle—and, we believe, more compelling—answer. This answer, which appeals to certain facts about the relation between know-how and concept possession, is introduced and defended in detail in Sect. 3. In Sect. 4, we argue that once one sees how know-how and understanding interact in the puzzle cases, it is possible to exploit this relation in order to motivate a general intellectualist theory of know-how.

1 Is the puzzle genuine?

On the anti-intellectualist view, knowing how to ψ requires the corresponding ability to ψ (Ryle 1946, 1949 ch. 2; Bechtel and Abrahamsen 1991, 152; Brandom 1994, 23; Braddon-Mitchell and Jackson 1996, 131; Haugeland 1998, 322; Hawley 2003; Noë 2005).⁴ Anti-intellectualists do not require that, in order to know how to

⁴ It is important that anti-intellectualism requires the *corresponding* ability; one need not be an anti-intellectualist in order to allow that *some* ability (e.g., the ability to breathe or think or apply concepts) might be required for know-how. One implication is that Noë's (2005, 285–286) modified regress argument poses no threat to intellectualism.

ψ , one be able to ψ *right now*; still, they do require that one possess the ability to ψ .⁵ Consequently, anti-intellectualists would reject our puzzle on the grounds that know-how attributions *always* entail the corresponding ability attributions. However, as noted above, many philosophers have denied that knowing how to ψ generally entails the corresponding ability to ψ . We believe that there are at least four reasons to consider this denial well-motivated.

First, there is a natural explanation for the failure of the entailment from know-how to the corresponding ability. Intuitively, if x understands how to ψ , then x knows how to ψ . But one generally need not be able to ψ in order to understand how to ψ . Consequently, being able to ψ is not generally a necessary condition for knowing how to ψ .

Second, the anti-intellectualist view conflicts with our judgments concerning particular cases. We are often willing to ascribe knowledge how to do certain complex actions to subjects who cannot do them. For instance, we take it that basically all world class figure skaters know how to do a quintuple salchow, but owing to the athletic difficulty of the jump only a few (if any) of them can actually do one. This intuition is supported by reflection on the epistemic status of our beliefs about such skaters. Consider, for instance, the Olympic figure skater Irina Slutskaya. We are quite confident that Irina knows how to perform a quintuple salchow. Yet, we are equally confident that she is unable to perform it. Since there is no apparent epistemic tension in this pair of beliefs, there is good reason to think that knowing how to do a quintuple salchow does not entail the ability to do one.

Third, it is difficult to understand how one could deliberately go about learning to perform certain complex physical actions like the salchow if know-how could not precede ability, as anti-intellectualists maintain. After all, if Irina was unable to do a salchow and wanted to learn how, then she would practice doing the salchow. But if she did not know *how* to do it, then what exactly would she practice?⁶ (Notice, for instance, that it is more than a little odd to say that Irina doesn't know how to do a salchow, but she's going to practice it anyway.) Presumably, it is not enough that Irina merely knows how *one* does a salchow, since this is consistent with her harboring significant confusions about what it takes to do a salchow, confusions which would render her incapable of genuinely practicing *a salchow*. In such a case, Irina might *think* she is practicing a salchow; but to genuinely practice it, Irina must, in addition, know how to do it.

⁵ The absence of a baseball bat in your present immediate environment, for instance, does not undermine your ability to hit a baseball, though it does undermine your ability to hit a baseball *right now*. That the inability to ψ right now is consistent with the ability to ψ is a consequence of the fact that abilities are *stable*, in the sense that one typically retains them even in inauspicious conditions—as when, e.g., one is asleep, nervous, inebriated, temporarily injured, in an unsympathetic environment, and so on (Ryle 1946, 1949; Hawley 2003; Noë 2005; see also Stanley and Williamson 2001). Of course, while some impediments to action do not undermine ability, others—e.g., chronic paralysis, amnesia, or death—do. The moderate sensitivity of ability attributions to impediments to action might be best handled by a dispositional or conditional account of ability (Sosa 1993). An alternative strategy is to invoke descriptive predication (Bealer 1993; Moffett 2003) to analyze ability attributions as, say, a kind of generic attribution. Either way, one implication of the stability of abilities for the present discussion is that the plethora of cases in which one knows how to ψ but for one reason or another is merely unable to ψ right now are not successful counterexamples to anti-intellectualism.

⁶ The problem here is reminiscent of Meno's paradox.

Fourth, the anti-intellectualist view conflicts with our semantic intuitions. To determine whether know-how attributions entail ability attributions, we can check for the presence of such characteristics as cancellability or reinforceability, which serve as the standard tests for entailment. Consider, for instance, the know-how attribution (1a). The ability attribution (1b) is both cancellable (1c) and reinforceable (1d):

- (1) a. Irina knows how to do a quintuple salchow.
- b. Irina is able to do a quintuple salchow.
- c. Irina knows how to do a quintuple salchow, but she is unable to do one.
- d. Not only does Irina know how to do a quintuple salchow, she can actually do one.

If knowing how to do a quintuple salchow (1a) entailed being able to do one (1b), then (1c) would be internally inconsistent and (1d) would be redundant. We, however, find (1c) and (1d) unproblematic.

These considerations indicate that an anti-intellectualist response to the puzzle is mistaken. What is more, it is possible to account for intuitions which have been thought to sustain the anti-intellectualist view that know-how requires the corresponding ability. Since in paradigmatic cases of knowing how to ψ the individual is also able to ψ , know-how attributions, such as (1a), would presumably stereotypically implicate the corresponding ability attributions, such as (1b).⁷ The presence of such an implicature might explain Noë's (2005) reaction to the judgment of Stanley and Williamson (2001) that a ski instructor could know how to perform complex ski stunts, yet be unable to perform them herself. Noë (2005, 283) writes, "Is it Stanley and Williamson's view that, if polled, most English speakers would share their intuition that the instructor is unable to do the jumps even though she knows how to do the jumps? I would predict that this is not true..." Suppose for the sake of argument that, as Noë suggests, most English speakers would follow anti-intellectualists in responding that the ski instructor who knows how to do the jumps is able to do the jumps. Such a response need not be explained by the hypothesis that know-how requires the corresponding ability. For it would be equally well explained by the simple observation that ordinary speakers frequently treat generalized conversational implicatures as entailments.⁸ Fortunately, the

⁷ Roughly, stereotypical implicatures rely on the heuristic that what is simply described is stereotypically exemplified (Levinson 2001). Our arguments above that ability is not necessary for know-how and our arguments in Sect. 4 that ability is not sufficient for know-how do not affect the present point, since cases in which ability and know-how come apart appear to be atypical.

⁸ As Soames (2002, 68) observes in a somewhat different context, "When ordinary speakers are asked what sentences mean, often they do not address themselves to the question of [semantic meaning]. Instead, they focus on what they would typically use the sentences to convey, or what information they would typically gather from assertive utterances of them." This and related phenomena are important confounding variables which arise when polling ordinary speakers. Still, we believe that carefully constructed surveys could be used to test Noë's prediction. Elsewhere (Bengson, J., Moffett, M. A., & Wright, J. The folk on knowing how, Unpublished Manuscript) we report the results of empirical studies showing that, contrary to Noë's prediction, most English speakers do in fact judge both that the ski instructor is unable to do the jumps and that she knows how to do them. Only a small minority, perhaps influenced by the stereotypical implicature described in the text, make judgments consistent with anti-intellectualism.

cancellability and reinforceability tests employed above enable us to decide between these proposals in a principled manner. Since these tests go heavily in favor of the implicature view, it is to be preferred.

On the opposite end of the spectrum from anti-intellectualists are a specific breed of intellectualists, namely those philosophers who would reject our puzzle on the grounds that know-how attributions *never* entail the corresponding ability attributions. Because it asserts the relative purity, so to speak, of know-how attributions, we will call this special sort of intellectualism *Puritanism*. We believe that there are at least two reasons to be skeptical of a Puritan response to the puzzle.

First, Puritanism conflicts with our judgments concerning particular cases. We are generally unwilling to ascribe knowledge how to do elementary arithmetic to subjects who cannot do elementary arithmetic. Presumably, this is because it does not seem possible for one to know how to do elementary arithmetic and yet lack the ability to do so. For instance, if Irina knows how to add, then she must be able to do so in at least some instances. Or suppose that Irina is asked to perform a simple logical inference, such as conjunction elimination (i.e., simplification). It would appear that if she knows how to do conjunction elimination, then she must be able to do so. In cases like these, there is no gap between the knowledge and the ability, so one does not know how if one is unable.

Second, Puritanism conflicts with our semantic intuitions. Consider, for instance, the know-how attribution (2a). The ability attribution (2b) is neither cancellable (2c) nor reinforceable (2d):

- (2) a. Irina knows how to add.
 b. Irina is able to add.
 c. * Irina knows how to add, but she is unable to do so.
 d. * Not only does Irina know how to add, she can actually do so.

If knowing how to add did not entail being able to add, then (2c) would be internally consistent and (2d) would not be redundant. We, however, find (2c) and (2d) problematic. Apparently, the evidence is no friend to Puritanism.

One might object that this evidence is somewhat misleading, for there is in fact a gap, albeit one that is extremely small, between know-how and ability in the case of adding.⁹ For instance, Irina might know how to add, but be unable to do so because she presently lacks pen and paper, the use of her fingers, an abacus, etc. (which, owing to a poor short-term memory, she needs to successfully perform even the simplest mathematical calculations). On the face of it, this seems to be a case of knowing how to add absent the corresponding ability. But in fact it is not. For in such a case, Irina is able to add; she is just unable to do so *right now* (see note 5).

Another putative counterexample to the claim that (2a) entails (2b) has us supposing that Irina knows what it takes to do addition: for instance, she knows that to add m and n , for some numbers m and n , one simply applies the plus function to $\langle m, n \rangle$. However, Irina consistently fails to answer addition problems correctly. She

⁹ Thanks to Derek Ball, Josh Brown, Andy Egan, Shieva Kleinschmidt, Elia Zardini, and Aaron Zimmerman for pressing this objection with cases like the ones that follow.

has a rare but permanent neurological disorder such that whenever she attempts to add she arrives at the result of the corresponding subtraction. For instance, when asked to add seven and five, she arrives at the answer two, rather than twelve. Although Irina tries her best to apply the plus function correctly, she cannot help but arrive at such answers when attempting to add.

This case supports Puritanism only if it is true that Irina knows how to add but is unable to do so. But it is not clear to us that this is so. For when the case is described so that Irina clearly knows how to add, it becomes unclear that she is not able; but when the case is described in such a way as to clearly undermine her ability, it becomes unclear that she knows how.

To see this, consider that either Irina at least sometimes correctly (non-accidentally) performs the calculation or she does not. That is, either she sometimes correctly applies the plus function to $\langle m, n \rangle$ or she does not. If Irina at least sometimes does the calculation correctly, then she is able to add, appearances notwithstanding. For in such a case, the problem is not located in her application of the plus function, but rather in the move from the application of the plus function to an incorrect belief (or belief report) regarding the actual result of that application. But if the problem is located there, then there is no threat to her ability to add. So, on the assumption that she correctly performs the calculation, Irina both knows how and is able. On the other hand, if Irina never gets the calculation right, then she is not able to add. But it is then unclear that she knows how. For in such a case, the problem is located not in the move from the application of the plus function to an incorrect belief (or belief report) regarding the result of that application, but rather in the failure to *ever* correctly apply the plus function to begin with. This means that, her knowledge of what it takes to do addition (which is, of course, not alone sufficient for know-how) notwithstanding, she does not really have a solid grip on addition. Irina's basic error is, in effect, a manifestation of her feeble epistemic position with respect to addition. Consequently, in this case we believe that she cannot be said to know how to add.¹⁰

There is therefore no gap, however small, between know-how and ability in the case of adding. Those who remain skeptical of this anti-Puritan claim are encouraged to consider other basic mathematical and logical activities, such as performing conjunction elimination, which appear to be such that knowing how to do them entails being able to do them. To establish Puritanism, one would need to show that there are in fact no such activities, that all activities admit of a gap between know-how and ability. For the fact that *some* instances of the schema $\lceil x \text{ knows how to } \psi \rceil$ fail to entail that x is able to ψ cannot alone establish that *all* instances of the schema $\lceil x \text{ knows how to } \psi \rceil$ fail to entail that x is able to ψ . Indeed, we propose that to the extent that Puritanism is appealing, it is because it has not

¹⁰ We believe that the initial feasibility of the counterexample turns in part on what we take to be a mistaken underlying assumption, namely, that performance errors in cognitive tasks which arise from non-cognitive neurological processes do not affect conceptual mastery. In Sect. 3, we observe that an adequate grasp of the concept *addition* (*plus*) is required for knowing how to add. But someone who *always* applies the subtraction function when attempting to add has at least as tenuous a grasp of the concept *plus* as Burge's (1979) patient has of the concept *arthritis*. That the conceptual error arises from an underlying neurological disorder, rather than a mistaken empirical belief, does not affect this point.

been appreciated that the schema need not have the entailment in order for specific instances of the schema to have the entailment. Such neglect carries the potential to spark a wild goose chase for a scenario in which, for instance, one knows how to take the successor while lacking the ability to do so.

In what follows, we forgo such a chase and instead attempt to solve the puzzle. Although know-how attributions do not always entail ability attributions, there are at least some that do. Why is this?

2 Are know-how attributions ambiguous?

A natural first response is to posit an ambiguity in know-how attributions. This is, in effect, Carr's (1981) reaction. He claims that the best explanation for the peculiar behavior of know-how attributions is that in cases such as (2a), but not (1a), the expression 'knows how to' has the same sense as 'is able to'.¹¹ Carr (1981, 54) writes,

...although we may say of someone that he 'knows how' to do multiplication, there is no clear difference between expressing that state of affairs in terms of knowing how or in terms of (mental) ability. In short, mental knowing how and mental ability are not two different things.

The context in which this passage occurs makes it clear that Carr believes that in certain cases, but only in certain cases, know-how attributions and ability attributions are synonymous (there is no difference in what they express) and therefore identical (they are not two different things).

If Carr is right that know-how attributions and ability attributions are synonymous in cases involving multiplication and other mathematical calculations, then not only does (2a) entail (2b), but in addition (2b) entails (2a); for a minimal requirement on synonymy is necessary equivalence. It is not obvious, however, that this is correct. But even if it is, an appeal to synonymy is not obligatory. Our own positive account, articulated in Sect. 3, is another possible explanation.¹²

Of course, one need not accept that know-how attributions and ability attributions are sometimes synonymous in order to hold that the best response to our puzzle involves positing an ambiguity in the expression 'knows how to'. But while the claim that know-how attributions are ambiguous has attracted a variety of philosophers,¹³ it nevertheless faces substantial difficulties. If one accepts Grice's

¹¹ Carr does not consider our puzzle as such, though he is aware of the need for an account of the peculiar behavior of know-how attributions we identified at the outset. His account, which we will argue is unsatisfactory, posits a distinction between "strong" and "weak" senses of know-how attributions, only the former of which are synonymous with ability attributions.

¹² It is worth emphasizing that even if in these cases know-how attributions are necessarily equivalent to ability attributions, that is not sufficient to show that in these cases knowing how is identical with being able, since logical equivalence does not entail identity. For example, Bealer (1982) has argued (in our view, convincingly) that intensional entities (e.g., propositions) can be logically equivalent without being identical.

¹³ See, e.g., Mackie (1974), Hintikka (1975), Carr (1979, 1981), Katzoff (1984), Rumfitt (2003), Rosefeldt (2004), Hetherington (2006), and Brogaard (Forthcoming). For dissent, see Stanley (2005).

claim that we should not posit senses beyond necessity (Grice 1975; see also Kripke 1977 and Bontly 2005), there is a *prima facie* methodological reason for being suspicious of the ambiguity thesis. Such suspicions are confirmed by the linguistic evidence, for the expression ‘knows how to’ consistently fails semantic tests for ambiguity and related phenomena. We will consider four such tests.

The first involves conjunction reduction (Zwicky and Sadock 1975, 17–18), as in:

- (3) * Irina drove her trainer crazy and her mother to the airport.

Clearly (3) is zeugmatic, indicating that the verb in question (‘drove’) standardly expresses multiple non-equivalent concepts. On the other hand, the following sentence is non-zeugmatic:

- (4) Irina knows how to do a quintuple salchow and elementary addition.

Another well-established test involves VP deletion (Zwicky and Sadock 1975, 19), as in:

- (5) I didn’t see her duck, but Irina did.

This sentence has a grammatically anomalous reading on which the deleted VP is not anaphoric on the antecedent VP; the availability of this reading is due to the fact that (5) contains an ambiguous expression (‘duck’). Now, contrast (5) with the following sentence, which does not admit of a grammatically anomalous reading:

- (6) I don’t know how to do a quintuple salchow, but Irina does.

A third test for ambiguity involves eliciting potential contradictions (Zwicky and Sadock 1975, 7–8). Consider:

- (7) Irina deposited her check in the bank, but she didn’t deposit her check in the bank.

Clearly (7) has a reading on which it is not contradictory, indicating that one of the terms occurring in the sentence (in this case, ‘bank’) standardly expresses multiple non-equivalent concepts. On the other hand, there is no reading of the following sentence on which it is not contradictory:

- (8) * Irina knows how to do a quintuple salchow, but she doesn’t know how to do a quintuple salchow.

Finally, if ‘knows how to’ was ambiguous and thus standardly expressed, say, two non-equivalent concepts, then

- (9) Irina knows how to do a quintuple salchow, and she knows how to add.

would have four distinct readings arising from various combinations of the two non-equivalent concepts allegedly expressed by ‘knows how to’. Theoretical prejudices aside, (9) does not have four distinct readings.¹⁴

The foregoing tests reveal that ‘knows how to’ does not standardly express multiple non-equivalent concepts, and thus is not ambiguous. We conclude that one cannot account for the peculiar behavior of know-how attributions by positing an ambiguity. So the puzzle remains: why do some know-how attributions entail ability attributions while others do not?

3 Know-how, understanding, and concept possession

The arguments of Subsect. 1–2 indicate that we cannot account for the peculiar behavior of know-how attributions solely by appeal to some general feature of know-how. Given this, it is natural to look to the activity in the complement of the attitude, rather than simply the attitude itself, to explain what determines the behavior of a given know-how attribution. Yet, what could explain why ordinary talk of knowing how to ψ has quite different entailments when ψ is one sort of activity from its entailments when ψ is another sort of activity?

Before attempting to answer this question directly, we should first note that know-how attributions entail ability attributions when the activity in the complement of the attitude is addition, subtraction, multiplication, conjunction elimination, disjunction introduction, modus ponens, or any other simple logical or mathematical operation.¹⁵ On the other hand, know-how attributions do not entail ability attributions when the activity in the complement of the attitude is doing a quintuple salchow, dunking a basketball, performing complex ski stunts, or dancing.

It is tempting to conclude from this observation that know-how attributions entail possession of the corresponding abilities in cases of “mental”, as opposed to

¹⁴ It is possible that stressing one of the occurrences of ‘knows how to’ would result in multiple readings. But this could be explained by the well-known fact that focal stress regularly affects meaning. In this regard, it is worth bearing in mind that multiple readings are not sufficient, though they are necessary, for ambiguity (Zwicky and Sadock 1975, 4–5). Incidentally, the preceding tests would remain appropriate even if a single reading of ‘knows how to’ was keyed by the type of activity invoked in the complement clause, for in such a case the inappropriate reading(s) would nevertheless still be available.

¹⁵ Certain comments by Koethe (2002, 327) and Rumfitt (2003) might be taken to suggest that knowing how to wiggle one’s ears entails the ability to do so. It is tempting to say the same about basic activities (in Goldman’s sense), such as walking, in which case know-how attributions entail ability attributions when such activities are found in the complement of the attitude. But we believe that this is not so. Consider, for instance, an expert in the anatomical underpinnings of facial appendage-wiggling who knows, for any facial appendage, precisely which muscles he must flex in order to wiggle that appendage. Over the course of many years, he has used this knowledge to teach himself to wiggle his nose, which he now does with ease. An aspiring ear-wiggler, he practices wiggling his ears daily, though to his frustration he has never succeeded. Of course, he knows how to wiggle his ears: this is, in part, why his failure is so frustrating. We believe that to the extent that it is possible to know how to perform basic activities, they can be given a similar treatment. For discussion of the felicity of know-how attributions concerning basic activities, see Katzoff (1984), Stanley and Williamson (2001), 440 n. 46, and Snowdon (2004, 12–13). For further discussion of ear-wiggling cases, see Sect. 4.

“physical”, activities.¹⁶ But simply calling the relevant activities “mental” does not explain what it is that makes know-how attributions concerning those activities entail attributions of the corresponding abilities. Moreover, many mental activities, such as solving extremely complex multiplication problems or proving Gödel’s Incompleteness Theorem, are not such that knowing how to do them entails being able to do them. Similarly, one may know how to find the n th numeral in the decimal expansion of π (e.g., one may know the algorithm), but because of principled cognitive limitations may not be able to actually find it. So, we must look elsewhere than a simple mental/physical distinction to solve the puzzle.

Despite the aforementioned shortcomings with his treatment of the puzzle, Carr makes an observation which we find instructive. After noting that multiplication is an activity such that knowing how to do it entails being able to do it, he writes, “to understand the rules of multiplication is ipso facto to be able to multiply and hence there is an air of paradox about the statement—‘he understands multiplication but cannot multiply’” (1981, 54). We believe that this “air of paradox” indicates that the solution to our puzzle is to be found in what it takes to *understand* certain activities. We will argue that know-how attributions with respect to certain activities entail ability attributions because in such cases knowing how to ψ requires an understanding of ψ -ing, which in turn requires reasonable mastery of certain concepts.¹⁷ Furthermore, reasonable mastery of those concepts entails possession of the corresponding abilities. The solution to our puzzle, then, lies in the connections between know-how, understanding, and concept possession. Our argument proceeds in three steps.

The first step concerns the connection between know-how and understanding. Consider those activities, a few of which are mentioned above, of which it is true that knowing how to do them entails being able to do them. For ease of exposition, we will refer to these as *select activities*. Intuitively, knowing how to perform select activities entails a minimal understanding of them. That is, when ψ is a select activity, x knows how to ψ only if x minimally understands ψ -ing. For instance, if Irina knows how to add, then she must at least minimally understand addition (adding). To be sure, Irina need not grasp mathematical theory, nor even be able to articulate the procedure she follows when making the calculation. Rather, she must simply possess a minimal understanding (hereafter, simply ‘understanding’) of addition.

To see this, suppose for a moment that Irina lacks an understanding of (the activity of) addition, and that she merely follows directions or imitates others to arrive at a correct answer to, say, the question “What is one and one?”. Irina would then be like a child who manages to memorize, and thereby comes to believe, a few mathematical facts, such as that one and one equals two. Surely the child does not thereby know how to add. Likewise, because she is merely following directions or imitating others, Irina cannot be said to know how to add. That merely following

¹⁶ This might be one way to read the quote from Carr in Sect. 2. See also Hetherington (2006, 91).

¹⁷ In Sect. 1 we noted that understanding how to ψ implies knowing how to ψ . The present claim, which concerns understanding (not understanding *how*), is a more substantive one which ultimately ties certain cases of know-how to the grasp of concepts. In Sect. 4 we discuss the connections between know-how, understanding, and concept possession more generally.

directions, imitating others, or forming beliefs via rote memorization is not sufficient for know-how in these cases is only to be expected if such know-how requires understanding.

We now turn to the second step in the argument, which involves a simple observation about the sort of understanding in question: namely, when ψ is a select activity, x understands ψ if and only if x has reasonable mastery of certain concepts. For instance, Irina understands (the activity of) addition just in case she has reasonable mastery of the concept of *addition*, or *plus*. If she does not have a sufficiently solid grasp of the concept *plus*, then she cannot be said to understand addition, and *vice versa*: understanding addition is equivalent to having a solid grasp of the concept *plus*.

Reasonable mastery of a concept is of course more demanding than mere possession of it. The child who merely memorizes that one and one equals two possesses the concept *plus*, but does not have reasonable mastery of it.¹⁸ This is basically the well-established point that mere possession of a given concept is relatively cheap (see, in particular, Burge 1979, 1986, 1990). On the other hand, reasonable mastery requires a substantive, though not necessarily full, grasp of the concept. It thus occupies the middle ground between *mere possession* and *full mastery*. For example, most nine year olds lack full mastery of the concept *multiplication*, yet one who has received a standard education typically has by that time had sufficient exposure to multiplication tables, for instance, to be said to grasp the concept in a way that a five year old who merely possesses the concept because she believes, on the basis of testimony, that three times three equals nine does not.¹⁹

This explains why understanding is equivalent to reasonable conceptual mastery. Understanding a select activity clearly does not require full mastery of the relevant concepts;²⁰ understanding addition, for instance, is consistent with fairly substantial misunderstanding or ignorance with regard to complex applications of those concepts. At the same time, such understanding requires more than mere possession of the relevant concepts; understanding addition, for instance, is not consistent with

¹⁸ Similarly, we merely possess the concept *extremal black hole*, whereas Cumrun Vafa and Andrew Strominger, the theoretical physicists who used so-called “string theory” to account for certain features of a particular class of black holes (Greene 1999, 338 ff.), have reasonable mastery of it. Arguably, since one cannot have a given propositional attitude unless one possesses the concepts involved in its content, simply having an attitude with the content that a is F is sufficient for having some grasp, however tenuous, of a concept of F s (Siebel 2004). Obviously, reasonable mastery requires more than this (see note 36).

¹⁹ While it is widely acknowledged that concept possession comes in degrees, the distinctions between mere possession, reasonable mastery, and full mastery come in many (subtly different) flavors. For instance, Bealer (1998, 2004a) distinguishes between *nominal* and *determinate* possession of a concept; Burge (1990), explicating Frege, between merely *grasping* a concept and *having a sharp (full, clear, thorough) grasp* of it; Crimmins (1989), between merely *having any idea whatsoever* and *having a normal idea*; Higginbotham (1998), between merely *possessing* a concept and *having an adequate conception* of it. There is also the distinction between *partial* or *incomplete understanding* versus *misunderstanding* of a concept (Burge 1979; Bealer 1998, 2004a). Needless to say, we will remain neutral with regard to the details of each of these proposals.

²⁰ By ‘relevant concepts’, we simply mean the concepts reasonable mastery of which is necessary and sufficient for understanding the select activity in question.

certain categorial misunderstandings or ignorance with regard to the simplest applications of those concepts. However one ultimately spells out the details, it is clear that the cognitive state in question falls between full conceptual mastery and mere concept possession—that is, in the region covered by the notion of reasonable conceptual mastery.

Before considering the third step in the argument, let us briefly take stock of where the first two steps leave us. It follows from steps one and two that know-how attributions concerning select activities presuppose attributions of reasonable mastery of certain concepts. For those know-how attributions presuppose attributions of understanding of the select activities, which in turn are equivalent to attributions concerning reasonable mastery of the relevant concepts.

The third step in the argument involves an appeal to intuitions about the possession conditions for these concepts. The purpose of this appeal is to make explicit the connection between reasonable mastery of these concepts and the possession of certain abilities. Intuitively, *x* has reasonable mastery of the relevant concepts only if *x* has the ability to correctly employ those concepts in simple ways. Roughly, to employ a concept in simple ways is to perform certain simple operations with that concept—e.g., performing the task of adding one and one. (This might consist in following a rule specified by the application conditions for that concept (Peacocke 1998), though we need not take a stand on this issue here.) For instance, if Irina has reasonable mastery of the concept *plus*, then she must be able to solve (and not merely recite) some addition problems, such as adding one and one. Irina need not be able to solve any and every addition problem, but she must possess the ability to perform some simple calculations involving the concept *plus*.

To see this, suppose for a moment that Irina lacks the ability to perform such calculations. For instance, when asked to add one and one in cognitively normal conditions (e.g., she is not asleep, nervous, injured, inebriated, etc.), Irina responds by (sincerely) attempting a series of calculations which she writes on the blackboard as follows:

$$\begin{array}{r}
 1 \\
 + 1 \\
 \hline
 1
 \end{array}
 \qquad
 \begin{array}{r}
 1 \\
 + 1 \\
 \hline
 0
 \end{array}
 \qquad
 \begin{array}{r}
 1 \\
 + 1 \\
 \hline
 11
 \end{array}$$

Suppose that Irina proceeds in this manner for some time, and that nothing changes when she is asked to add other numbers. Clearly Irina does not have reasonable mastery of the concept *plus*.²¹ If she did, she would not make such errors. That those apprised of the relevant facts would not be willing to say that Irina has reasonable mastery of the concept *plus* in such a case is only to be expected if reasonable mastery of *plus* requires the ability to employ *plus* in simple ways.

²¹ The only plausible alternative explanation seems to be that Irina does not have reasonable mastery of certain other concepts, such as *one*, *two*, or *equals*. But for the purpose of the example we can suppose that she does.

Call any concept reasonable mastery of which requires the possession of such an ability an *ability-based concept*. Roughly, a concept C is an ability-based concept if and only if reasonable mastery of C entails possession of the ability to correctly employ C in simple ways (cf. Peacocke 1992). Given that there is nothing idiosyncratic about the concept *plus*, we believe that the above considerations warrant us in holding the general thesis that any concept reasonable mastery of which is necessary for understanding a given select activity is an ability-based concept. Although we have not considered all such activities and concepts, the foregoing discussion suffices to make clear how the reasoning would proceed in each case. To illustrate the relative straightforwardness of this task, which for the sake of brevity we will not undertake here, a few select activities are paired with the corresponding ability-based concept, as well as the sort of ability required for reasonable mastery of that concept, in the table below:

Activity	Concept	Ability
addition	<i>addition (plus)</i>	adding m and n
subtraction	<i>subtraction (minus)</i>	subtracting m from n
multiplication	<i>multiplication (times)</i>	multiplying m and n
conjunction elimination	<i>and</i>	inferring p from p and q
disjunction introduction	<i>or</i>	inferring p or q from p
modus ponens	<i>if...then</i>	inferring q from: p , and if p then q

Steps one and two of the argument left us with the conclusion that know-how attributions concerning select activities presuppose attributions of reasonable mastery of certain concepts. We have just seen, in step three, that these concepts are ability-based, which means that reasonable mastery of them entails possession of the corresponding abilities. It follows that know-how attributions concerning select activities entail possession of the corresponding abilities.

This provides a subtle but compelling solution to our puzzle. Recall that what needs to be explained is why some know-how attributions entail ability attributions while others do not. Our answer is that some but not all know-how attributions presuppose attributions of reasonable mastery of the corresponding ability-based concepts, which means that some but not all know-how attributions entail attributions of the corresponding abilities. Because saying that one knows how to add, subtract, multiply, do conjunction elimination (etc.) presupposes an attribution of reasonable mastery of the corresponding ability-based concept, each of these know-how attributions entails an attribution of the corresponding ability. On the other hand, saying that one knows how to do a quintuple salchow, dunk a basketball, perform complex ski stunts, find the n th numeral in the decimal expansion of π (etc.) does not presuppose an attribution of reasonable mastery of a corresponding ability-

based concept.²² Consequently, each of these know-how attributions fails to entail an attribution of the corresponding ability.

4 Know-how and concept possession: Toward a general theory

To this point we have argued that there is a deep and philosophically important relation between some know-how attributions and understanding (reasonable conceptual mastery). (We have also argued that this understanding sometimes entails possession of the corresponding abilities.) Prima facie, one would think that the relation between know-how and understanding is limited to specifically cognitive activities such as those discussed in Sect. 3. But a bit of reflection exposes the naïveté of this judgment. For know-how becomes a possibility only in cases of intentional, though possibly rote, action. For instance, one can know how to shift gears on a car, but one cannot know how to jerk one's knee reflexively (cf. Carr 1979; Stanley and Williamson 2001; Schiffer 2002; Noë 2005). Plausibly, what is characteristic of intentional actions is, at least in part, that they require (minimal) understanding. These two observations—that know-how concerns intentional action and intentional action generally requires understanding—together suggest that the connection between know-how and understanding revealed in Sect. 3 generalizes beyond select activities to all intentional actions.²³

In this section we sketch a general intellectualist theory of know-how which respects the connections between know-how, intentional action, and understanding.²⁴ We proceed as follows. First, we argue that mere (reliable) abilities are not sufficient for know-how.²⁵ We then provide reasons to think that certain sorts of

²² We leave it open that some such attributions entail reasonable mastery of ability-based concepts. Even so, they will not entail reasonable mastery of the *corresponding* ability-based concepts (i.e., a concept reasonable mastery of which entails the ability to perform the very activity in question). For instance, knowing how to prove Gödel's Incompleteness Theorem plausibly requires reasonable mastery of the concept *proof* and reasonable mastery of this concept might entail the ability to do simple proofs (e.g., certain proofs by *modus ponens*). But it does not entail being able to do the Incompleteness proof itself.

²³ Interestingly, even Ryle (1949, 41 ff.) observed this connection between know-how and understanding, writing that "Understanding is a part of knowing how" (54). In defense of his claim that know-how is not mere "blind habit" but requires "intelligence" (understanding), Ryle pointed out that "[a] boy is not said to know how to play [chess], if all that he can do is to recite the rules accurately...Similarly, a foreign scholar might not know how to speak grammatical English...for all that he had mastered the theory of English grammar." Ryle goes on to note the significant difference between merely being able "to give by rote the correct solutions of multiplication problems" and knowing how to multiply (42). Of course, we need not accept Ryle's view that understanding is competent performance to acknowledge his important insight that there is a general connection between know-how and understanding.

²⁴ A full exposition and defense of the theory, which might properly be labelled *radical intellectualism*, is beyond the scope of this paper. For detailed discussion, see Bengson and Moffett (Unpublished Manuscript). See also Bengson et al. (Unpublished Manuscript).

²⁵ If this is correct, then *neo-Ryleanism*, according to which know-how is equivalent to ability, is doubly wrong: not only is being able to ψ not generally necessary for knowing how to ψ , but *contra* Ryle (1946, 1949 ch. 2), Brandom (1994, 23), Braddon-Mitchell and Jackson (1996, 131), Haugeland (1998, 322), and Noë (2005), it is not sufficient either.

misunderstandings undermine know-how; moreover, they do so even when the corresponding abilities are accompanied by the sort of propositional knowledge typically invoked by intellectualist accounts. Such considerations will make explicit the intimate connection between know-how and understanding, motivating a general analysis of the former in terms of the latter.

Suppose that Irina 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 her skate, jump in the air, spin, and land on the front inside edge of her skate. (The correct sequence is to take off from the *back inside edge* and land on the *back outside edge* of the opposite foot after one or more rotations in the air.) However, Irina has a severe neurological abnormality that makes her act in ways that differ dramatically from how she actually thinks she is acting. Whenever she actually attempts to do a salchow (in accordance with her misconceptions) this abnormality causes her to reliably perform the correct sequence of moves. So, although 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 perform the correct sequence of moves, and so she ends up successfully performing a salchow. Despite the fact that what she is doing and what she thinks she is doing come apart, she fails to notice the mismatch. In this case, it is clear that Irina is (reliably) able to do a salchow. However, due to her mistaken belief about how to perform the move, she cannot be said to know how to do a salchow.

We take it that examples such as this one show that errors in understanding how to ψ are sufficient to undermine know-how attributions even when the corresponding abilities are in place. Abilities, it seems, are at most reliable dispositions to intentional behavior, whereas know-how involves some degree of understanding. We believe that this insight is the key to a general philosophical theory of know-how.

In the preceding case, Irina's failure to know how to do a salchow is a direct consequence of her mistaken belief that a certain sequence of movements constitutes a way of doing a salchow. This suggests that knowing how to ψ is intimately connected with knowing (being familiar with, being acquainted with) a way to ψ , where w is a way to ψ only if it is possible that there be an individual who successfully ψ -s in way w . Indeed, it is because she does not know a way of doing a salchow, due to her misunderstanding of what it takes to do one, that Irina fails to know how to do a salchow.

Might Irina at least *implicitly* know a way of doing a salchow, namely, by trying to perform a salchow using the wrong sequence of moves? While we believe that an adequate analysis of know-how must allow for possibly implicit knowledge, we do not find this particular suggestion plausible. Call ζ a *guiding conception* for an activity ψ for an individual x if ζ is for x a conception of a way of ψ -ing and, in attempting to ψ , x tries to at least implicitly make x 's behavior conform to ζ . Given this, we submit that the following pair of claims are independently plausible:

- (a) For any particular attempt α to ψ and for any candidate conceptions ζ and ζ^* of ways of ψ -ing ($\zeta \neq \zeta^*$), if in the course of α , ζ is x 's guiding conception, then ζ^* is not.

- (b) x implicitly knows a way w of ψ -ing only if for some conception ζ of w , ζ is sometimes a (perhaps implicit) guiding conception for x in attempting to ψ .

Principle (a) is an exclusion principle for guiding conceptions. Principle (b) is an epistemic grounding principle for attributions of implicit objectual knowledge. Since in the case described, we may suppose that Irina has a mistaken explicit guiding conception on every attempt to do a salchow, it follows from principle (a) that she does not also have a further implicit one. But then, by principle (b), it follows that she does not have implicit knowledge of any alternative way of doing a salchow.

Now, although knowledge of some way of ψ -ing is necessary for knowing how to ψ , it is clearly not sufficient. Suppose, for example, that pushing this gray button is a way of turning on this computer. Obviously, it is possible for one to know a way of turning on the computer (*viz.*, pushing this gray button) without knowing *that* it is a way of turning on this computer. But if one does not know that it is a way of turning on the computer, then one cannot be said to know how to turn on the computer. For instance, one might not know what a computer is, and mistakenly think that this way (pushing the button) is actually a way of summoning evil spirits. Thus, one may know some way, w , which is in fact a way of turning on the computer (pushing the button), without knowing how to turn on the computer. The fact that one does not know how to perform the action, ψ , because one does not know that w is a way of ψ -ing indicates that knowing that w is a way of ψ -ing is necessary for knowing how to ψ .²⁶

These considerations take us naturally to something like Stanley and Williamson's (2001) analysis of know how (cf. Brogaard Forthcoming):

- (†) x knows how to ψ if and only if for some way w of ψ -ing
- i. x knows w , and
 - ii. x knows that w is a way of ψ -ing.^{27,28}

²⁶ Mark Sainsbury has suggested to us that a repairman might know how to fix your dishwasher even though he does not know that some way w is a way to fix your dishwasher (because he is on holiday and so does not know that your dishwasher is broken). Of course, such a repairman knows that w is a way to fix a dishwasher which has the problem that your dishwasher actually has. This appears to be sufficient for knowing that w is a way to fix your dishwasher (on the reading of 'your' operative in, e.g., 'Irina has your kind nature'), in which case the example is consistent with the necessity claim. Alternatively, he does not have this last bit of knowledge; but then he merely knows how to fix a dishwasher which has the problem your dishwasher actually has, and thus does not know how to fix *your* dishwasher (on the reading of 'your' operative in, e.g., 'No one else can have *your* kind nature')—in which case the example is again consistent with the necessity claim.

²⁷ If propositional knowledge—either *de dicto* or *de re* (Brown 1970)—implies the corresponding bit of objectual knowledge, then clause (i) can be dispensed with in favor of clause (ii) alone. We will remain neutral on this issue, as well as on whether w must be a contextually relevant way of ψ -ing, as Stanley and Williamson (2001) and Brogaard (Forthcoming) claim.

²⁸ We momentarily put to one side Stanley and Williamson's appeal to a certain mode of presentation under which the relevant proposition is known. Incidentally, although we believe that Stanley and Williamson's analysis is correct in the fundamentals, because we hold a radically different conception of linguistic analysis, we do not find their reasoning for the conclusion that the biconditional they offer captures the logical form of know-how attributions persuasive (see Moffett 2005). In our view, their biconditional should, like (†) (and (‡) below), be interpreted as a standard, garden variety philosophical analysis and not as a linguistic claim, or a thesis about the logical form of know-how attributions.

We believe that this proposal comes very close to being correct. Nevertheless, it is not fully adequate, since it ignores the connection between know-how and understanding (reasonable conceptual mastery).

To see this, first note that from the point of view of concept possession, propositional knowledge is not particularly demanding. Assuming that non-Gettierized justified true belief is sufficient for knowledge, it is a simple exercise to describe cases where an individual knows some proposition while having only a highly attenuated grasp of the associated concepts. For instance, if one of your physicist friends tells you under normal conditions that extremal black holes are a special type of black hole posited by string theorists, then you can know this fact despite only having mere possession of the concepts *extremal black hole* and *string theory*. In fact, it is even consistent with your knowing that extremal black holes are a special type of black hole that you be significantly confused about the concept of a black hole.²⁹

Given this, consider the following case. Irina knows a way of doing a salchow, namely, by taking off from the back inside edge of her skate, jumping in the air, spinning, and landing on the back outside edge of her skate. Moreover, she knows that this is a way of doing a salchow (her coach told her). Suppose, however, that Irina is deeply confused about the concepts *back outside edge* and *back inside edge*. In particular, suppose that she *takes* her back outside edge to be her front inside edge and her back inside edge to be her front outside edge. (As per Burge, we take it that this degree of misunderstanding is consistent with attributing to Irina possession of the concepts *back outside edge* and *back inside edge* and associated propositional attitudes.³⁰) However, as in the case described above, Irina has a severe neurological abnormality that makes her act in ways that differ dramatically from how she actually takes herself to be acting. Whenever she actually attempts to do a salchow (in accordance with her misconception of a *correct* way of doing one) this abnormality causes her to reliably perform the correct sequence of moves. Despite the fact that what she is doing and what she takes herself to be doing come apart, she fails to notice the mismatch.

As in the case described above, Irina is able to do a salchow. And, as in that case, due to her confusion regarding a way of performing the move, she cannot be said to know how to do a salchow. (After all, in applying her knowledge—e.g., in teaching someone else how to do a salchow—Irina would consistently make substantive

²⁹ These observations follow from (but ultimately do not rest on) Burge's (1979) arguments concerning linguistic externalism and concept possession together with epistemic fallibilism.

³⁰ We can suppose, if need be, that Irina has mastery of the simple concepts *back*, *inside*, *outside*, and *edge*: she is confused only about the complex concepts *back inside edge* and *back outside edge*. Compare the familiar case of mistaking a right turn of the dial for a left turn of the dial. One might be competent with dials, turns, and the difference between right and left, and thus have mastery of the concepts *dial*, *turn*, and *right*, yet still be confused about whether a right turn of the dial involves movement of the top or the bottom of the dial to the right. As a result, one might *take* a right turn of the dial to be a left turn of the dial. As per Burge, we take it that such misunderstanding is consistent with attributing to such a person possession of the concept *right turn of the dial* and associated propositional attitudes. In particular, it is consistent with attributing knowledge that, for instance, a right turn of the dial will increase the volume. Thanks to David Christenson for suggesting this example and to Louis de Rossett for the question that prompted it.

errors, errors which would render an attribution of know-how unacceptable.) Yet, in this case she knows a way of doing a salchow and she knows that it is a way of doing one; as a result, she satisfies (\dagger). Consequently, this is a counterexample to that analysis.³¹

Since (\dagger) entails Stanley and Williamson's (2001) analysis, this case should be viewed as a counterexample to their proposal. Of course, (\dagger) does not mention so-called "practical modes of presentation", under which the proposition that w is a way to ψ can be known. Or so claim Stanley and Williamson, who appeal to such modes to handle certain problem cases. But given that Irina's failure to know how to do a salchow is due to a failure of (conceptual) understanding and not a result of failing to possess her knowledge under a certain mode, it is difficult to see how an appeal to practical modes of presentation could help here.³²

(For the same reason, it does little good to hold that the relevant propositional knowledge must be first-personal. That is, revising clause (ii) of (\dagger) in order to read that x must know that w is a way for x to ψ (see Stanley and Williamson 2001; Brogaard forthcoming), would not affect our conclusion. Indeed, allowing Irina to possess the first-personal knowledge that w is a way for *her* to do a salchow would not eliminate her confusions, and thus would not make it so that she knows how. What is more, we are skeptical that such first-personal knowledge is generally required for know-how. Consider, for instance, the ski instructor who knows how to perform complex ski stunts that she is unable to perform herself. It seems plausible to think that she might know that w is a way to do the stunts while failing to know that w is a way for *her* to do the stunts, since it might be the case that she does not, and would not, do them in way w . Perhaps if she were to do the stunts, then because of her body type she would have to do them in a slightly different way w^* . Similarly, I might know how to find the n th numeral in the decimal expansion of π in virtue of knowing that applying this algorithm is a way to do so, yet because I am beset by principled cognitive limitations, applying this algorithm is not in fact a way

³¹ In fact, as indicated by the considerations which follow, it is a counterexample to *any* account which denies that reasonable mastery of certain concepts is necessary for know-how. Accordingly, this case exposes the fundamental inadequacy of neo-Ryleanism (see note 25), as well as more sophisticated theories which hold that know-how is a state with a certain sort of nonconceptual content.

³² More generally, we are unhappy with Stanley and Williamson's appeal to practical modes of presentation, which is intended to solve the problem posed by certain cases of mere demonstrative knowledge, for three reasons. (1) We are skeptical of the viability of a hidden-indexical solution to fine-grained intensionality (see Bealer 2004b). Some of the problems with that proposal will carry over to Stanley and Williamson's proposal as well. Moreover, if hidden-indexicalism is not required for an adequate theory of fine-grained intensionality, then invoking such modes of presentation in the present case threatens to be unacceptably *ad hoc*. (2) Like Koethe (2002), Schiffer (2002), and Rosefeldt (2004), we find the appeal to practical modes of presentation unconvincing. In our case, this is largely due to the fact that we are unclear about what exactly such modes are supposed to be. (3) The problem posed by certain cases of mere demonstrative knowledge goes away once we observe that knowledge how to ψ requires understanding, as suggested by the preceding example. So, there is no need to invoke practical modes of presentation, since an independently motivated condition (understanding) for know-how provides an adequate solution. (Alternatively, it might be possible to construe the understanding requirement as a way of articulating the notion of knowledge under a practical mode of presentation, though there are good reasons to doubt that this is what Stanley and Williamson intended.)

for *me* to do so. If this is correct, then one need not have the first-personal knowledge that *w* is a way *for oneself* to ψ in order to know how to ψ .³³)

Of course, we have built the case in such a way that it is transparent that Irina's failure to know how to do a salchow is based on her conceptual misunderstandings. Although Irina possesses all of the relevant concepts (which is all that is required, from the perspective of concept possession, to satisfy clause (ii) of (†)), her grasp of those concepts rises only to the level of mere possession. We have already argued that in the case of select activities, mere possession of the relevant concepts is not sufficient for know-how; what is in fact required in those cases is reasonable mastery. Given the connections between know-how and intentional action, on the one hand, and intentional action and understanding (reasonable conceptual mastery), on the other, the same condition plausibly holds in the present case. And, indeed, it does: if Irina had reasonable mastery of the associated concepts (in particular, the concepts *back outside edge* and *back inside edge*), then she would know how to do a salchow. (In fact, she would then know how to do a salchow even if correcting her conceptual shortcomings made it so that she could no longer execute one!)

If this is correct, then the importance of understanding (reasonable conceptual mastery) for know-how promises to generalize beyond the category of select activities. Although a full exposition and defense of our understanding of the implications of these considerations lies beyond the scope of this paper, we believe that the most adequate way of incorporating them in an analysis of know-how is as follows:

- (†) x knows how to ψ if and only if for some way w of ψ -ing
- i. x knows w ,
 - ii. x knows that w is a way of ψ -ing, and
 - iii. x minimally understands w .³⁴

What is it to minimally understand a way of ψ -ing? Presumably, it is to understand a correct and complete conception of that way. More precisely, x minimally understands w if and only if x has a correct and complete (possibly implicit)

³³ We believe that this point, like our broader point concerning the importance of understanding to know-how, suggests the inadequacy of popular analyses of knows-*wh* constructions.

³⁴ Allowing that the understanding in question may be implicit. We believe that clauses (ii) and (iii) together entail clause (i), which we leave for the sake of perspicuity. We also believe that clause (iii) enables us to properly distinguish knowledge how to ψ from knowledge how one ψ -s and associated states: the former, but not the latter, requires a minimal understanding of w . Finally, as suggested by the discussion to follow, clause (iii) entails that x has reasonable mastery of the concepts in the proposition in clause (ii).

conception ζ of w and x has reasonable mastery of the concepts in ζ (and their mode of combination).^{35,36}

There are a number of reasons for analyzing understanding a way in terms of (possibly implicit) conceptions—a phenomenon which various philosophers and psychologists have independently argued is indispensable in psychological explanation (see, e.g., Peacocke 1998). One important reason is that it allows us to capture both differences and similarities in the cognitive states of individuals who know how to ψ in the same way. They are similar in that they know the same way of ψ -ing; they are different in that they have different conceptions of this way. Perhaps the most important reason, however, is that it provides a level of description which respects the conceptual sophistication of the subject. Both of these points can be illustrated by an example.

Suppose that there is only one way of wiggling one's ears, namely, by contracting one's auricular muscles. Clearly, both a neuroanatomist and a child can know how to wiggle their ears. But only in the case of the neuroanatomist would it be plausible to attribute reasonable mastery of the concepts *muscular contraction* and *the auricular muscles*. The child's conceptual situation is more likely proprioceptive and demonstrative: by doing *this* to *these* muscles (parts of my body).³⁷ According to our proposal, this is the child's conception of contracting (doing *this*) her auricular muscles (*these* muscles). Consequently, we need not demand that the child have reasonable mastery of such sophisticated concepts as *muscular contraction* and *the auricular muscles*.³⁸ In this way, an appeal to conceptions provides for a psychologically realistic theory of understanding.

It might be thought that allowing demonstrative concepts, such as *this*, to sometimes underwrite know-how attributions makes (\ddagger) too weak. For instance, it might be suggested that one result is that any couch potato can know how to throw a

³⁵ On certain views about the nature of analysis, it is possible to understand a correct and complete conception of w as an analysis of w . Then we could state this requirement equivalently as: x minimally understands w if and only if x has reasonable mastery of the concepts in an analysis of w (and their mode of combination). However, we believe that this approach is acceptable only if what is required is an *intensionally* correct conception. We are doubtful, however, that the requirement is this strong; extensional correctness appears to be adequate.

³⁶ Roughly, x has reasonable mastery of a concept C if and only if x is able to apply C correctly in core cases (under normal cognitive conditions). Of course, this ability is to be distinguished from the ability to correctly employ C in simple ways, which is a substantive performance ability (e.g., the ability to perform the task of adding one and one) and not merely an ability to apply the concept. (In the special case of ability-based concepts, however, the ability to apply the concept entails the performance ability, and *vice versa*.) Now, we have no general theory of what counts as a core case. In fact, we are doubtful that this can be settled other than on a case-by-case (or, perhaps, category-by-category) basis. Roughly, however, the core cases are those in which a general failure to correctly apply the concept implies that the subject at most *merely* possesses the concept. Consider Burge's (1979) contract example. Presumably, not knowing whether or not a contract may be verbal is not sufficient for denying that the person has reasonable mastery of the concept *contract*. By contrast, not knowing whether or not a contract has normative force (i.e., generates an obligation) would be.

³⁷ The importance of proprioception for concept formation is discussed in Lakoff (1987).

³⁸ Some readers will be comfortable with the claim that the child's concept of *doing this* constitutes her conception of the concept of *muscular contraction* and that this is adequate for reasonable mastery of the latter concept (for a discussion of conceptions of concepts, see Higginbotham 1998). Our position is not affected by this further debate.

perfect spiral simply because he knows, on the basis of watching television, that *that* is the way John Elway (who has a distinctive throwing style) throws a football. Put more generally, demonstrative concepts might seem somehow too simple to generally underwrite know-how attributions for complex activities. We believe, however, that any adequate philosophical theory of know-how must make room for demonstrative concepts (in order to handle, e.g., chicken-sexing cases). The problem, we suspect, is instead due to two factors: (i) the nature of the relation between demonstrative concepts and a correct and complete conception of a way of ψ -ing, and (ii) the requirements for reasonable mastery of the sort of demonstrative concepts that might constitute such a conception. Let us say a word about each of these factors.

First, in certain cases, a purely perceptual demonstrative concept or set of concepts may be incapable of constituting an adequate conception of a way of ψ -ing. Plausibly, a conception ζ of a way of ψ -ing is correct and complete only if it is possible for ζ to be some individual's guiding conception in successfully ψ -ing (see above for discussion of guiding conceptions). There are many reasons that a given conception may fail to satisfy this condition. For instance, a way of throwing a perfect spiral involves a significant number of kinesthetic properties, and thus it is reasonable to think that no purely perceptual demonstrative concept or set of concepts could alone constitute some individual's guiding conception in successfully throwing a perfect spiral, in which case no purely perceptual demonstrative concept or set of concepts could constitute a correct and complete conception of a way of doing so. Since the couch potato's demonstrative concept is purely perceptual, he may not, in fact, have an (implicit or explicit) correct and complete conception of a way of throwing a perfect spiral. (By contrast, in the chicken-sexing cases a purely perceptual demonstrative concept or set of concepts may very well constitute such a conception of that way.)

Second, in certain cases, a given perceptual modality may be insufficient to alone confer reasonable mastery of the sort of demonstrative concept or set of concepts that could constitute an adequate conception of a way of ψ -ing. For instance, it is doubtful that visual perception alone could confer reasonable mastery of, say, demonstrative concepts of the kinesthetic properties involved in throwing a perfect spiral, even *if* such concepts can constitute a correct and complete conception of a way of throwing a perfect spiral. Since visual perception would serve as the couch potato's sole source for the relevant demonstrative concepts, presumably he would not, in fact, have reasonable mastery of those concepts. (By contrast, in the chicken-sexing cases, visual perception alone may suffice for reasonable mastery of the relevant demonstrative concepts.) In fact, reasonable mastery of certain demonstrative concepts may be achieved most easily—and, in some cases, perhaps even only—via *action*. Consider: most of us are acquainted with the phenomenon of practicing a certain motor skill, such as swinging a golf club, until at some point we perform it correctly and suddenly “just get it”. In such a case, we come to see (understand) that it's done like *this*.³⁹

³⁹ This discussion suggests an answer to Noë's (2005, 285) challenge to the intellectualist to identify “what [it is] about the distinctive kind of propositional knowledge in which knowing how to do something consists that should make it the case that situation and embodiment play such an essential role”. Thanks to Josh Brown for suggesting the couch potato example, and to Ishani Maitra and Brian Weatherson for related discussion.

It should be clear that the requirement of understanding, or reasonable conceptual mastery, enables (‡) to accommodate the case in which Irina has a significant misconception of a correct way of doing a salchow. In that case, Irina lacked reasonable mastery of the concepts, demonstrative or otherwise, in an adequate conception of a way to do a salchow. Consequently, she did not minimally understand a way to do a salchow, and thus did not know how to do one. The Irina case thus poses no challenge to the sufficiency of (‡).

One might object that although (‡) is able to explain why Irina fails to know how to do a salchow, the analysis is insufficient on the grounds that it does not capture the practical import of know-how, that is, the role of know-how in the production and explanation of action.⁴⁰ We believe, however, that although (‡) drives a wedge between know-how and ability, and is therefore an intellectualist theory, it sits happily with the observation that know-how is one sort of “practical knowledge”. For, according to our analysis, the concept of knowing how to ψ is the concept of a non-ability entailing epistemic success state that could guide action. Indeed, one’s understanding of a way of ψ -ing would appear to be a quite promising candidate for a state that underlies and explains one’s ψ -ing. Of course, understanding a way of performing an action does not invariably produce action in any particular individual. Nevertheless, it is clearly *apt* to do so. Consequently, we believe that (‡) is well suited to accomplish the difficult task of simultaneously accounting for the practical import of know-how while acknowledging its cognitive nature.

We expect that, at this point, many readers will accept that (‡) provides a plausible set of sufficient conditions for know-how, but they will balk at the claim that these conditions are necessary. The problem cases will be run of the mill know-how attributions where an individual’s know-how appears to be grounded in nothing more than the mere fact that the individual can (reliably and intentionally) perform the action. The five year old, for instance, who can ride her bike is said to know how to ride her bike with little or no thought about her cognitive situation. (The preceding ear-wiggling case is another potential counterexample.)

We believe that these reservations are misplaced for a number of reasons. First, such concerns appear to be motivated by a confusion between our typical epistemic grounds for attributing know-how to an individual and the actual metaphysical basis for that attribution. There is no question that for a wide range of cognitive agents in a wide range of circumstances, the fact that an individual is able to ψ is adequate grounds for believing that the individual knows how to ψ . Cases like those involving Irina above are sufficiently rare that they can be safely ignored in most circumstances. Notice, in fact, that in the Irina cases we would be justified, though mistaken, in believing that Irina knows how to do a salchow unless we were apprised of her conceptual shortcomings. But when so apprised, it becomes evident that the know-how attribution is misplaced, although the ability attribution remains appropriate.

Second, such concerns underestimate both the significance of intentional action to know-how and the significance of understanding to intentional action. An adequate philosophical theory of know-how must acknowledge that know-how requires intentional action, which in turn requires understanding. It follows that

⁴⁰ This objection was raised by Kevin Falvey.

understanding must be either present in or entailed by the final account. Attempting to avoid the consequence that understanding is a generally necessary condition for know-how, the response in question presupposes a disjunctive account of know-how: one is either in some particular cognitive state (such as the one on the right-hand side of (‡)) or one has a certain sort of ability. But, in light of the Irina cases, (conceptual) understanding must also make an appearance somehow in the second disjunct, presumably as a restriction against misunderstanding. Thus, the response concedes that misunderstanding plays a role in undermining know-how, but denies that understanding is positively required for it.

Although the suggested asymmetry between understanding and misunderstanding is difficult to motivate, it might be said that the default practical assumption that one who is able to ψ also knows how to ψ is an indication that while failure to have reasonable mastery of certain concepts can perhaps interfere with know-how, it is not required for it. This point, however, is moot because it is easily construed as an observation about the nature of those concepts, namely, that there are often relatively minimal cognitive requirements for reasonable mastery of them.⁴¹ This construal is supported by the fact that it alone explains why misunderstanding undermines know-how. Insofar as the response in question denies that know-how requires understanding, it leaves the vulnerability of know-how to misunderstanding wholly unexplained.

The problem, to put a somewhat finer point on things, is that the response posits an *ad hoc* restriction against misunderstanding in order to ward off counterexamples to the disjunctive account. But such cases are more than mere counterexamples. Arguably, they highlight the fact that understanding is ubiquitous in intentional action (and thus know-how) by underscoring what happens when it goes awry. Indeed, casting around a bit provides support for the ubiquity claim. For instance, as suggested above, practicing complex actions seems to presuppose some conception of how the action should be performed. The fact that this conception recedes to the background once the skill is mastered is not a reason for downplaying its philosophical and psychological significance.

In light of these considerations, we submit that the necessity claim in (‡) is well-motivated. In fact, although we have not here offered a full defense of this analysis

⁴¹ This raises the issue of animal know-how, which is both interesting and delicate. Consistent with ordinary usage and work in contemporary cognitive ethology (Allen and Bekoff 1999) we take it that animals across a wide range of taxa possess mental states (including propositional attitudes). But since, on our view, know-how is more conceptually demanding than propositional knowledge, we are committed to either denying that animals can possess know-how or accepting that they can have reasonable mastery of certain concepts. Although there will no doubt be some relatively clear cut cases (e.g., chimpanzees know how to extract termites from their nests), we think that most cases should be decided by the best explanatory theory of animal behavior. In those cases where attributions of know-how are scientifically indispensable, we are comfortable with the corresponding attributions of reasonable conceptual mastery. (Of course, many attributions of know-how to cognitively unsophisticated animals, such as the caddis fly larvae (Wallis Forthcoming), may in fact be ultimately scientifically dispensable. For, presumably, many such attributions can be replaced without loss by attributions of reliable ability or, at most, so-called 'procedural knowledge', which is importantly distinct from know-how, as many cognitive scientists recognize (Stillings et al. 1995, 396).) As in the case of young children, the fact that some animals may be able to attain such mastery reflects, in our opinion, the relatively light cognitive demands such mastery often imposes.

(for that, see Bengson and Moffett Unpublished Manuscript), we believe that the foregoing reveals the plausibility of (§) as a general theory of know-how.

5 Conclusion

We began with a puzzle: why do some know-how attributions entail ability attributions while others do not? Our answer, which both respects the genuineness of the puzzle and avoids positing unnecessary ambiguities, required us to make explicit certain intuitively plausible connections between know-how and reasonable conceptual mastery with respect to the class of select activities. Briefly, when ψ is a select activity, knowing how to ψ requires a minimal understanding of ψ -ing, which in turn requires reasonable mastery of certain ability-based concepts. But when the concepts are ability-based, reasonable mastery requires that one possess the corresponding ability.

By taking seriously the role of concept possession in know-how involving select activities, we were able to provide a natural solution to the puzzle. While the connection between know-how and concept possession appears at first to be grounded solely in the cognitive nature of select activities, we argued that the connection between know-how and concept possession can be generalized via reflection on the cognitive nature of intentional action and the potential of certain misunderstandings to undermine know-how even when the corresponding abilities and associated propositional knowledge are in place. As a consequence, the connections exhibited in our earlier discussion could be re-established in a more general setting. The result was a fully general intellectualist analysis of know-how.⁴²

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⁴² Earlier versions of the present paper were presented at a graduate colloquium at the University of Texas at Austin, the 2006 Mountain-Plains Philosophy Conference, and a symposium at the 2007 Pacific APA. Thanks to audiences at those events and, in particular, Derek Ball, George Bealer, Josh Brown, David Christenson, Jonathan Dancy, Louis de Rossett, Andy Egan, Kevin Falvey, Franz-Peter Griesmaier, Shieva Kleinschmidt, Ishani Maitra, Aidan McGlynn, Doug Patterson, Mark Sainsbury, Brian Weatherston, Jennifer Wright, Elia Zardini, and Aaron Zimmerman for helpful comments and discussion.

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