

Know-How and Gradability

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1. Introduction

Absolutism about knowledge is the view that knowledge is absolute—that is, cannot come in different degrees or hold to different extents. Perhaps the most explicit expression of absolutism is due to Fred Dretske (1981, 363), who famously observed, “Knowing that something is so, unlike being wealthy or reasonable, is not a matter of degree. . . . In this respect factual knowledge is absolute.”

Dretske’s absolutism is not at all isolated. Many epistemologists nowadays believe that propositional knowledge is an all or nothing matter.¹ By contrast, it seems almost platitudinous that know-how is a state in which a subject can be to different degrees or to different extents—that is, a nonabsolute or gradable state. As observed by Gilbert Ryle (1949, 59) in *The Concept of Mind*, we do ordinarily speak as if know-how could hold to different degrees:

We never speak of a person having partial knowledge of a fact or truth, save in the special sense of his having knowledge of a part of a body of facts or truths. A boy can be said to have partial knowledge of the counties of England, if he knows some of them and does not know others. But he

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1. One exception is Hetherington (2001), who considers absolutism to be one of the current dogmas of epistemology. Another notable exception is Sosa’s notion of “knowing full well” (Sosa 2001, 2009, 2011).

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could not be said to have incomplete knowledge of Sussex being an English county. Either he knows this fact or he does not know it. On the other hand, it is proper and normal to speak of a person knowing in part how to do something—that is, of his having a particular capacity in a limited degree.

Call the phenomenon whereby we speak as if know-how could hold to different degrees or to different extents “the phenomenon of gradability.” When coupled with absolutism about propositional knowledge, the phenomenon of gradability can be used to mount a powerful argument against *intellectualism about know-how*—the view that know-how is a species of propositional knowledge. The argument (henceforth *The Argument from Gradability*) proceeds as follows: if, as the phenomenon of gradability suggests, know-how can hold to different degrees or to different extents, whereas propositional knowledge is absolute, then know-how and propositional knowledge have different properties; hence they must be different kinds of states (*anti-intellectualism about know-how*).

In the passage above, Ryle has used *The Argument from Gradability* in favor of a view on which know-how is not a propositional knowledge state but rather a complex of dispositions to behavior. In the most recent debate, the gradability of ascriptions of know-how has been mentioned by many as evidence against intellectualism about know-how (Sgaravatti and Zardini 2008, Michaelis 2011, Bengson and Moffett 2011, Wiggins 2012). For example, Bengson and Moffett (2011, 183) explicitly argue from the gradability of know-how ascriptions to the conclusion that the relation picked out by those ascriptions is gradable and, because of that, not propositional knowledge:

This relation seems to behave more like an objectual knowledge relation than a propositional knowledge relation. . . . if it were a simple propositional knowledge relation, then presumably it would not be gradable. Thus the following, for example, sounds bad:

19. ?Rebecca knows that swimming is a sport far better than Michael does.

By contrast, the relation picked out by ‘knows’ in ‘*x* knows how to φ ’ is gradable. Thus the following sound just fine:

20. Rebecca knows how to swim far better than Michael does.

Intellectualism about know-how is a controversial view, one that has been attacked on several fronts. Not everybody has found Stanley and Williamson’s (2001) initial linguistic argument for intellectualism fully

persuasive (Noë 2005, Glick 2011, Devitt 2011, Hornsby 2011, Brown 2013). Moreover, many have argued, in a variety of different ways, that the doxastic and epistemic profiles of know-how and propositional knowledge may come apart (Poston 2009, Cath 2011, Setiya 2011, Brownstein and Michaelson 2016, Carter and Pritchard 2015, Small 2016). Still others have formulated new versions of Ryle's regress against intellectualism (Koethe 2002, Fridland 2013, Weatherson 2017) or accused intellectualism of obscurity and circularity (Schiffer 2002, Noë 2005, Glick 2013).

Although there is no shortage of problems for intellectualism, in recent years a considerable amount of work has been done by the proponents of this view to provide novel motivations for the view that do not rely at all on linguistic considerations (Stanley and Krakauer 2013; Pavese 2015a; Valaris, n.d.) and to respond to many outstanding objections (Stanley 2011; Pavese 2015b; Pavese 2016; Marley-Payne, n.d.; Pavese, forthcoming-a). *The Argument from Gradability* still remains among the challenges to intellectualism that have thus far gone unaddressed.

On behalf of intellectualism, this essay responds to *The Argument from Gradability* by motivating and defending a particular diagnosis of the phenomenon of gradability. It argues that the phenomenon should be discounted as a rather superficial linguistic phenomenon, one that can be explained in a way compatible with the absoluteness of the state ascribed by means of ascriptions of know-how. Language can sometimes mislead us, and it is the moral of this essay that it does mislead us in this particular case, when superficially know-that ascriptions and know-how ascriptions appear to differ as to whether they ascribe a gradable state. Several opponents of intellectualism have cautioned against relying on linguistic data to argue for intellectualism (Noë 2005, Glick 2011, Devitt 2011, Hornsby 2011, Abbott 2013, Brown 2013). This essay cautions against relying on a linguistic phenomenon—the phenomenon of gradability—to argue against intellectualism.

This essay is organized as follows. In section 2, I introduce the distinction between two sorts of gradability: *quantitative gradability* and *qualitative gradability*. Section 3 discusses the methodology that I shall adopt in showing the compatibility of these two sorts of gradability with intellectualism about know-how. Section 4 is devoted to a discussion of quantitative gradability and section 5 to a discussion of qualitative gradability. In each case, by adhering to the methodology outlined in section 3, I show that the phenomena can be analyzed in a way compatible with intellectualism about know-how, and I point out some theoretical advantages of analyzing it along the lines I suggest.

2. The Nature of the Phenomenon

The phenomenon of gradability comes in two different flavors: quantitative and qualitative.

The phenomenon of “quantitative gradability,” as I propose to call it, is the phenomenon whereby ascriptions of know-how can be sensibly modified by “proportional modifiers,” such as ‘in part’, ‘for the most part’, ‘partly’, and ‘partially’.² For example, we might say that Carla knows in part how to fix the sink, that Francesca knew how to read Latin for the most part, and that my students largely knew how to solve their math problem. In striking contrast, the most typical ascriptions of propositional knowledge—ascriptions of the form ‘*s* knows that *p*’ (henceforth “know-that ascriptions”)—cannot be sensibly modified by the same modifiers, as evidenced, for instance, by the infelicity of (1a)–(1c):

- (1) a. ??The math teacher knows in part that his or her students cheated on the final.
- b. ??Pierre in part knows that his friends are arriving.
- c. ??Pierre knows in part that Ale’s recipe is a way to make lasagna.

Not every way in which we speak as if know-how can be graded can be classified as an instance of quantitative gradability, however. Two persons may know how to do something to the same extent while differing as to how *well* they know how to do it. For example, even if each student in a math class found exactly one method to solve a certain problem and each of them knew how to solve the problem to the same extent, provided that Mary’s technique was the most elegant and straightforward, it would still be true that Mary knew how to solve the problem better than any other student.

In other words, there seems to be a more *qualitative* dimension to the phenomenon of gradability that deserves separate consideration and that is signaled in English by the use of *non*proportional degree modifier phrases, such as ‘well’ and its modifications (‘full well’, ‘very well’, and so forth). Such degree phrases can also enter in comparative constructions,

2. Another proportional modifier that is sometimes used with ascriptions of know-how, especially in Romance languages, is ‘a little’, as in *So un po’ cucinare* (= ‘I know a little how to cook’). My final analysis will take ‘a little’ to be semantically equivalent to ‘for some small part’.

as in ‘Williams knows how to play tennis better than Pennetta’, through the comparative phrase ‘-er than’.³

As observed by Dutant (n.d.) and Schaffer and Szabó (2014, 503–4), know-that ascriptions also tolerate degree modification of the qualitative sort, as in “President Obama knows very well that the biggest challenge in the economy’s pivot away from manufacturing/services to information technology is in the disproportionate distribution of the income and wealth benefits” (Arbess 2016). Such knowledge ascriptions can also enter in degree constructions, as in “but Popper is not concerned to defend that rule, since he knows as well as the next man that it can produce ugly results and paradoxical ones” (Ryan 2012, 419).

Because qualitative constructions are available with know-that ascriptions too, it might seem tempting to assimilate the phenomenon of qualitative gradability to this pattern of degree modifications into know-that ascriptions and to provide for the former whatever explanation is plausible to give for the latter.

However, this sort of analysis would not be correct. Whereas with know-that ascriptions, degree modification affects the evidential status or the degree of confidence/awareness of the subject, in the case of know-how, qualitative gradability does not necessarily have to do with the strength of one’s epistemic position or with one’s degree of confidence and awareness. A coach may know much more than his or her baseball player about closing, may even have much more evidence and confidence about the effectiveness of certain strategies for closing, and still fail to know how to close as well as the player. More generally, as observed by David Wiggins (2012, 121–22), a sentence like (2b) does not adequately paraphrase a sentence like (2a):

- (2) a. Mariano Rivera knew how to close very well.
- b. Mariano Rivera knew very well that a certain way is how to close.

3. Note that I am using the label “gradability” more loosely than it is used in the linguistics literature. There an expression is said to be gradable just in case it can directly compose with comparison constructions such as ‘-er/more than’, ‘less . . . than’, and ‘as much as’ (Kennedy and McNally 2010). Neither know-that ascriptions nor ascriptions of know-how are gradable in this sense, for neither can directly compose with such comparative constructions:

- (i) a. ??Carla knows how to play the trumpet more than you do.
- b. ??Jonathan knows that the streets are wet more than you do.

Furthermore, in striking contrast with know-that ascriptions, degree constructions into know-how ascriptions are systematic, and they can systematically embed. For example, it is perfectly in order for me to wish that I knew how to make lasagna as well as Ale or for me to wonder who among my friends knows how to make it better. By contrast, it would be unusual, if not utterly bizarre, for me to wish that I knew as well as Ale that my uncle's recipe is a way to make lasagna or for me to wonder who among my friends knows that better.

These two points suggest that gradability in know-that ascriptions and gradability in know-how ascriptions are not the same phenomenon. If so, we should not aim to explain them uniformly. Because of the less systematic character of gradability into know-that ascriptions, an analysis that, along the lines suggested by Stanley (2005, 35–46) and Schaffer and Szabó (2014, 504), explains this gradability away as a fixed construction or that diagnoses it as fringe nonliteral parlance may be on the right track. Such a line of explanation may even be preferable to one explanation that instead takes the gradability into know-that ascriptions literally, for it would have the advantage of aligning our ordinary talk about knowledge with absolutism—a very popular view among epistemologists. Given the systematicity and the pervasiveness of the adverbial modification into know-how ascriptions, however, the phenomenon of qualitative gradability cannot be similarly explained away as a fixed construction or diagnosed as fringe nonliteral parlance.

3. The Strategy

The objective of this essay is to argue for the compatibility of the phenomenon of gradability with the absoluteness of the state ascribed by know-how ascriptions. Compare this project to that of a nominalist about numbers who seeks to show that our talk about numbers is compatible with the nonexistence of numbers. One way of approaching this task is by looking for an analysis of our math talk that does not commit us to the existence of numbers. In analytic philosophy, this sort of analysis takes the form of the *method of paraphrase*, which in this case would consist in paraphrasing sentences that appear to talk about numbers in terms of sentences that are noncommittal about the existence of numbers but that nonetheless preserve the original sentences' truth conditions (or meaning).⁴

4. The first use of the method of paraphrase is often credited to Russell (1905). One example of this paraphrase strategy in philosophy of mathematics is Quine's (1960)

Just as our talk about numbers seems to commit us to the existence of numbers, in a similar way our ordinary talk about know-how seems to commit us to there being a gradable state of know-how irreducible to an absolute state of propositional knowledge. Just like the nominalist, my strategy will be to provide an analysis of graded ascriptions of know-how that is compatible with the absoluteness of the knowledge state ascribed by means of them. In particular, I will show that the satisfaction conditions of the gradable predicate ‘knowing how to ϕ ’ can be stated in terms of the satisfaction conditions of an absolute propositional knowledge predicate. In this way, the gradability of the ascriptions of know-how can be shown to be compatible both with the absoluteness of the state ascribed and with that absolute state’s being a state of propositional knowledge.

Suppose we reached a way of stating the truth conditions of graded know-how ascriptions—“target truth conditions”—that is satisfactory by intellectualism’s lights in the sense just clarified. But suppose also that these target truth conditions were not easy to implement through a compositional semantics that meets widespread assumptions about the syntax of the ascriptions. Or suppose that my proposed compositional semantics were not sufficiently systematic in that it would not be easy to extend to a wider fragment of the language. In these cases, one could object that my proposed analysis is ad hoc and leaves it open that, as a matter of fact, the best compositional semantics of ascriptions of know-how does commit us to the existence of an irreducibly gradable state of know-how.⁵ To forestall objections like this one, I will take on the further task of showing how my target truth conditions can be “implemented compositionally”—by which I mean that they can be derived from a systematic and compositional assignment of semantic values, together with structural rules and logic. The complete compositional semantics as well as the derivation is provided in sections C–D of the technical appendix to this article.⁶

paraphrase of math talk into sentences quantifying over classes. Other examples are Hellman 1989, Field 1980, and Dorr 2008. See Beaney 2016 for a helpful overview on the use of the method of paraphrase in analytic philosophy.

5. The objection that the proposed paraphrase may be ad hoc or arbitrary is often leveled against nominalist paraphrases (Benacerraf 1973). As an antidote to the objection from arbitrariness, Marconi (forthcoming) emphasizes the need for the relevant paraphrase to be integrated with a compositional and systematic semantics.

6. The technical appendix is available as online-only supplemental material at <http://dx.doi.org/10.1215/00318108=3878493>.

In looking for the appropriate analysis of the phenomenon of gradability, I will be guided by English graded ascriptions of know-how. However, some have observed that in certain languages, such as Italian, French, German, and Russian, among others, ascriptions of know-how can take a different form from the one they have in English (Rumfitt 2003, Wiggins 2012, Abbott 2013, Ditter 2016). On the basis of this cross-linguistic evidence, it would be incorrect to assume that in every language, ascriptions of know-how have the same logical form as English ascriptions of know-how.

My argument will not rely on this assumption. Rather, it will proceed as follows. Plausibly, ascriptions of know-how in languages other than English can be correctly translated by English know-how ascriptions. Call this *The Expressive Assumption*. Rejecting it would amount to taking English to be somehow expressively limited when it comes to ascribing know-how—an unpalatable commitment, one that many, anti-intellectuals included, would want to eschew.

If *The Expressive Assumption* holds true, then every dimension along which know-how appears to be gradable in some language will be expressible in English through some graded ascription of know-how. In Pavese 2016, 653–54, and in section B of the technical appendix, I provide new arguments that ascriptions of know-how univocally have a certain logical form in English. Call this *The English Univocal Logical Form Assumption*. Sections 4 and 5 then develop my analysis of English graded ascriptions of know-how in terms of sentences that are true entirely in virtue of the holding of an absolute propositional knowledge state. If my analysis is correct, then, given both *The Expressive Assumption* and *The English Univocal Logical Form Assumption*, we are entitled to conclude that the phenomenon of gradability in English or any other language can be analyzed in a way compatible with the absoluteness of the state ascribed.

Every way in which we speak as if know-how were gradable can then be deemed to be a superficial feature of the ascriptions. Though their gradability seems to affect the state reported by them, we need not analyze it that way.

4. Quantitative Gradability

4.1. *The Counting Approach*

The phenomenon of quantitative gradability extends well beyond ascriptions of know-how. It is not just that one can know in part how to do something. One can also learn in part how to do it, decide in part how

to do it, or partly tell others how to do it. One can also in part know where to find good groceries, in part learn where to find them, and partly tell somebody where to find them.

The systematicity of the phenomenon puts constraints on its satisfactory analysis. For example, consider a *prima facie* plausible explanation of quantitative gradability that, however, has the disadvantage of being nonuniform. Certain kinds of knowledge, such as knowledge by acquaintance, can hold to different extents: for example, one may know somebody (in the sense of being acquainted with them) only in part (Russell 1910, Russell 1912, chap. 12). On this basis, one may be attracted to a view on which know-how is not a knowledge relation toward a proposition but rather a gradable relation to some other sort of object—a way to do things (*objectualism about know-how*). In support of objectualism, one might even observe that ‘knowing how to ϕ ’ and ‘knowing a way to ϕ ’ are intersubstitutable in many contexts (Bengson and Moffett 2011).

This objectualist analysis of the phenomenon of gradability would not do justice to the systematicity of the phenomenon. Quantitative gradability extends to reports that cannot plausibly be taken to report objectual states. Reports that do report objectual relations, such as knowledge by acquaintance reports or ‘understand’-reports, allow for referential complements, such as proper names or pronouns. For example, we might say that Meghan understands her daughter Anna very well and knows her well enough to leave her alone when she needs it. But now consider ‘learn’-reports. They also allow for quantitative gradability; for example, we might say that Mark has learned for the most part where to find good groceries or that Ale has learned in part how to play guitar. However, these reports cannot plausibly ascribe objectual relations, for they do not similarly tolerate referential complements—for example, we cannot say that Mary has learned Rome because she has learned the capital of Italy; and if Mark has learned where to find good groceries in New York, he has not thereby learned Fairways (see Cumming 2008, 533–34).⁷

7. This is one of the main reasons why in the linguistics literature it is widely thought that when a verb such as ‘learn’ embeds a nominal (or quantifier) phrase, as in ‘Mary learned the capital of Italy’ or ‘Mary learned a way to close’, the complement is a “concealed interrogative”—that is, ‘Mary learned the capital of Italy’ is true just in case Mary learned what the capital of Italy is and ‘Mary learned a way to close’ is true just in case she learned what a way to close is (see Nathan 2006).

The objectualist would have to analyze the quantitative gradability of ‘learn’-reports in a different way. This is a cost, for it is a conceptual truth that one has learned in part how to do something if one has come to know in part how to do it.

The systematicity of quantitative gradability across reports with different embedding verbs suggests that the complement of those reports is what licenses the grading constructions. Hence, this systematicity encourages an analysis of the phenomenon of quantitative gradability as an instance of a more general phenomenon of *adverbial modification into argument position*. Adverbial modification into argument position is quite common. To illustrate, consider:

- (3) a. Karen’s PhD students have for the most part found a job.
 b. Most of Karen’s PhD students have found a job.

The most natural reading of (3a) is not the one according to which all of Karen’s PhD students participate to a large extent in the property of having found a job. Rather, the most natural reading is the reading stated in (3b), according to which most of Karen’s PhD students have found a job. In (3a) what is being graded is the argument ‘Karen’s PhD students’—the expression ‘for the most part’ quantifies over Karen’s PhD students. Moreover, the possibility of adverbial modification in (3a) is surely compatible with the obvious fact that one either finds a job or one does not—that is, the property of finding a job cannot hold to different extents.

By parity of structure, adverbial modification into know-how ascriptions may be susceptible to the same kind of analysis. If so, what we want is an analysis of ‘s knows in part how to ϕ ’ in terms of

For some—in the denotation of ‘How to ϕ ’, s knows—,

where ‘know’ is an absolute propositional knowledge predicate, parallel to an analysis of (3a) in terms of (3b).

The question then is over what kind of objects the modifiers ‘in part’ and ‘for the most part’ quantify. By and large, linguists take the complement of ascriptions such as ‘Mary knows who came to the party’, ‘Mary learned how to play guitar’, and ‘Mary decided who will replace her’ to be an interrogative.⁸

8. I will adopt the convention of using quotes to refer to interrogatives—for example, ‘How to ϕ ’—and simply emphasis to refer to the question that an interrogative can be used to raise—for example, *How to ϕ* . And I will indicate the denotation of an inter-

There are very good reasons for this analysis. It is extremely common to say things such as “The question is not *if* but how and why to keep the shuttles flying”⁹ and “The question is not how to survive but how to thrive with passion, compassion, humor, and style.”¹⁰ We can even ask direct questions in the form ‘How to ϕ ?’, as in ‘How to accomplish your goals?’ or ‘How to make somebody fall in love with you fast?’¹¹

All of this is evidence that the complement ‘how to ϕ ’ can occur as an interrogative. Can the complement ‘how to ϕ ’ occur as *something other* than an interrogative? Although in some of its occurrences, it may appear to work as a quantifier phrase over ways—roughly equivalent to ‘a way to ϕ ’—we have seen that this analysis is implausible in the case of know-how ascriptions and learn-how ascriptions. Another possibility is that ‘how’ works as an adverbial quantifier phrase, modifying the embedded infinitival ‘to ϕ ’, so that ‘*s* knows how to ϕ ’ would have the logical form ‘for some way, *s* knows to ϕ in that way’. This analysis bears little plausibility, however, because adverbial phrases occurring—as ‘how’ does in ascriptions of know-how—between the embedding verb *v* and the embedded infinitival verb ‘to ϕ ’ typically cannot modify the embedded ‘to ϕ ’. For example, ‘Karen learned effortlessly to swim’ entails that Karen’s learning was effortless, not that her swimming is.

For these and other reasons (see Pavese 2016, 653–54; technical appendix, sec. B), it is good methodology to proceed on the assumption that, in English, ascriptions of know-how univocally have the logical form that they appear to have—that is, ‘S knows + (interrogative) how to ϕ ’—and to look for a semantics for interrogatives that can help explain the phenomenon of gradability in its generality.

rogative (relative to a context *C* and assignment *g*) by double brackets—for example, $\llbracket \text{How to } \phi \rrbracket^{g,C}$. By “question,” I mean not the linguistic entity (the interrogative) but the metaphysical entity that can be raised by use of an interrogative. I will use ‘*Q*’ as a metavariable over questions and ‘*Q*’ as a metavariable over interrogatives. I will adopt a parallel convention for complements of the form “that *p*” (henceforth “that-clauses”) and their denotation. I will use emphasis to refer to the propositions that that-clauses denote—for example, *that p*.

9. Keith Cowing, “The Question Is Not ‘If’ but How and Why to Keep Shuttles Flying,” NASA Watch, April 4, 2010, <http://nasawatch.com/archives/2010/04/the-question-is.html>.

10. “Quote addicts,” <http://quoteaddicts.com/866413> (accessed March 22, 2017).

11. Yahoo! Answers, https://answers.yahoo.com/question/index;_ylt=AwrC1CjVI9VYhxoASV1PmolQ;_ylu=X3oDMTEyYmdmanA3BGNvbG8DYmYxBHBvcwMyBHZ0aWQDQjI1NTIfMQRzZWMDc3I-?qid=20150429112547AAz31xd (accessed April 5, 2017).

In the linguistics literature, one particular semantic theory of interrogatives seems to be just what we need. This semantics identifies the denotation of embedded interrogatives such as ‘Who sang?’ (relative to a context) with sets of true propositions. The propositions in the set are those obtainable by first replacing the question word in the interrogative with a variable and by letting the assignment to that variable vary for every individual that actually satisfies the predicate of the interrogative. For example, the set of propositions denoted by ‘Who sang’ is the set of true propositions of the form *that x sang* for every assignment to *x* with a distinct individual who actually sang, such as *that Mary sang*, *that John sang*, and so on, for any person who actually sang:

$$\llbracket \text{Who sang} \rrbracket^{g,C} = \begin{cases} \text{that Mary sang} \\ \text{that George sang} \\ \text{that Alan sang} \\ \dots \end{cases}$$

Each proposition so derived is a “true Hamblin proposition,” and the set of every true Hamblin proposition is the interrogative’s “true Hamblin denotation.”

On this semantics, it is extremely natural to understand quantitative gradability in terms of quantification over true Hamblin propositions.¹² Accordingly, a sentence such as ‘Ale knows in part/for the most part who came to the party’ is true, just in case Ale knows some/most propositions in the true Hamblin denotation of ‘Who came to the party’—that is, if and only if Ale knows, for some/most persons that came to the party, that they did; and ‘Ale knows who came to the party’ is true just in case Ale knows every proposition in the true Hamblin denotation—that is, if and only if Ale knows, of every person that came to the party, that they did. Whereas interrogatives denote sets of propositions, that-clauses denote not a set but a single proposition—not the right kind of entity to be quantified over. So this approach correctly predicts that gradability is not licensed into know-that ascriptions. Call it *The Counting Approach*.¹³

12. Because I am concerned here with knowledge ascriptions, which are factive both when embedding interrogatives and when embedding that-clauses, I will follow Karttunen 1977 in taking only *true* Hamblin propositions to belong to the denotation of interrogatives.

13. In the current linguistics literature, *The Counting Approach* is the standard approach to adverbial modifications into reports embedding interrogatives, thanks to

The problem is that *The Counting Approach* fails to deliver the right predictions in the case of graded ascriptions of know-how. Consider Gianni, who knows only one recipe for preparing *tagliatelle al ragù*—a Bolognese recipe he learned at Bologna’s Culinary Institute. In this circumstance, it is natural to describe Gianni as knowing only one way of preparing that dish: he knows how to make *tagliatelle al ragù* simply by virtue of knowing not every but only one recipe for making *tagliatelle al ragù*. In other words, ascriptions of know-how can be true in their so-called mention-some reading.¹⁴

But now, suppose Gianni tries to teach John, who learns from Gianni only how to knead the pasta for *tagliatelle* but not how to make the Bolognese sauce. In this situation, John knows in part how to prepare *tagliatelle al ragù*. But because John does not know any proposition in the true Hamblin denotation of ‘How to prepare *tagliatelle al ragù*’, *The Counting Approach* incorrectly predicts that John does not know in part how to prepare *tagliatelle al ragù*.

On behalf of *The Counting Approach*, one may try to argue that ways of performing tasks can be less than complete methods for performing them, so that there may be many ways for performing a task (such as making *tagliatelle al ragù*) corresponding to one fully specific and complete recipe. This proposal, however, flies against intuitions: in our story Gianni does not know many ways for making *tagliatelle al ragù* but only one.

Moreover, there are reasons to depart from *The Counting Approach* that are independent of our metaphysics of ways. Suppose my department just relocated to a new address. I may have learned in part its complete new address—that is, I may have come to know in part what its complete new address is—by learning its street number. According to *The Counting Approach*, that could be true only if the true Hamblin denotation of ‘What is the complete new address of my department?’ con-

Lahiri’s (1991, 2000, 2002) seminal work. For variations on Lahiri’s approach, see Groenendijk and Stokhof 1993, Williams 2000, and Beck and Sharvit 2002.

14. George (2013) argues that the truth of mention-some knowledge ascriptions is sensitive to the presence or absence of false answers. If so, their truth conditions may not be reducible to propositional knowledge. See Theiler, Roelofsen, and Aloni 2016 for a response to George. In recent experimental work, George and Phillips (n.d.) have observed that the phenomenon of false-answers sensitivity discussed in George 2013 may be explainable in terms of a conventional implicature or a presupposition. In this case, the phenomenon may turn out to be compatible with the reducibility claim, for it would not have to do with the core truth conditions of know-how ascriptions.

tained more than one true Hamblin proposition, one for each proper part of my department's complete new address. But proper parts of complete addresses are not complete addresses themselves. So if x is a proper part of the address, the Hamblin proposition *that x is the complete new address of my department* cannot be true and, hence, cannot be included in the true Hamblin denotation for the interrogative 'What is the complete new address of my department?' Even in this case, *The Counting Approach* makes an incorrect prediction—that is, that one cannot partly learn a department's complete new address by learning part of the address.

4.2. *The Part-Whole Approach*

The source of the problem is *The Counting Approach's* identification of answers with propositions—in particular, with Hamblin propositions. On a closer look, this identification is puzzling. Intuitively, answers can be known in part or completely. For example, Mary may know in part the answer to the question *Who came to the party*. By contrast, as noted by Ryle (1949, 59), it does not make much sense to say that one knows in part or completely a proposition. For example, it does not make much sense to say that Mary knows in part that John, Jack, and Kathy came to the party or that she knows part of the proposition that John, Jack, and Kathy came to the party.

Moreover, there seem to be cases where a single proposition settles two distinct questions but we need to distinguish between two different answers. Knowledge ascriptions embedding interrogatives of the form 'whether p ' (henceforth "whether-interrogatives") offer a nice illustration of this point. Consider the contrast in acceptability between (4) and (5) (Lahiri 2000, Beck and Sharvit 2002, Roberts 2009):

- (4) ??Bob knows in part whether Rutgers's philosophy department has relocated to 106 Somerset Street, New Brunswick.
- (5) Bob knows in part where/at which address Rutgers's philosophy department has relocated.

If this contrast is to be explained semantically in terms of whether the denotation of their complements does or does not have parts, then the answers to the questions expressed by the two embedded interrogatives must have a different part-whole structure. But if so, the two answers must be different, even though the same proposition completely settles both

questions. Hence, an answer to a question cannot simply be a proposition that completely settles it.

One way to account for these intuitive contrasts is to take answers to be something that although different from the denotations of that-clauses and from propositions, can have propositions as their parts. Accordingly, knowing an answer to a question would be a matter of knowing all of its parts—all the propositions that are parts of that answer. Where could the part-whole structure of answers come from? An answer is relative: an answer is always an answer to a question. And the questions that we can raise by means of interrogatives are naturally thought of as having parts. For example, your question may have been only partly addressed by the speaker, or entirely addressed but only partly answered. Hence, it is plausible to think of the part-whole structure of an answer as inherited from the part-whole structure of a question in virtue of the relativity of answers to questions.

Here is the general picture. A proposition has parts or no parts only relative to a question, so that the same proposition may have parts relative to one question, no parts relative to another question, and, more generally, may have different part-whole structures relative to different questions. To capture the relativity of the part-whole structure of an answer to its question, we can model a complete answer as an ordered pair of a proposition p and a question \mathbb{Q} that p completely settles.¹⁵ (In order to forestall possible confusions between propositions and my technical notion of an answer, instead of saying that a proposition answers a question, I will say that a proposition that is the first element of an answer to \mathbb{Q} “settles” \mathbb{Q} .) An answer is true just in case its first element p is; and it entails a proposition q just in case its first element p does. To a first approximation, parts of an answer to a question are propositions that settle part of that question. The resulting semantic analysis is one on

15. Notice that arbitrary pairs such as \langle that Justin Trudeau is PM of Canada, What time does the Super Bowl start \rangle , where the first element does not completely settle the second element, do not count as answers in my sense. This technical notion of answer resembles very closely Yablo’s (2014) *directed propositions*. A directed proposition for Yablo (2014, 21) is a proposition “equipped together with a subject matter or a question.” Similarly, an answer in my sense is a proposition equipped with a question and that—just like Yablo’s directed propositions—can have other propositions as parts. Both my technical notion of an answer and Yablo’s notion of directed propositions come apart from the ordinary notion of an answer in that they individuate answers/directed propositions by their respective questions. By contrast, it is ordinary to say things such as that Mary and John gave the *same* answer to different questions.

which the denotation of an interrogative is not a set of true propositions but, rather, a set of complete true answers.

By distinguishing between answers and propositions, and by allowing only the former to have parts, we can explain why it makes sense to say that one can know in part an answer to a question, while it does not make much sense for one to know in part that something is the case. This approach also provides an extremely natural analysis of knowledge ascriptions embedding interrogatives as existentially quantified knowledge ascriptions over complete answers:

- (6) a. Mary knows who came to the party iff Mary knows a complete answer to the question ‘Who came to the party?’
 b. Mary partly knows how to swim iff Mary knows part of a complete answer to the question ‘How to swim?’

We may want to allow for ‘in part’ to possibly pick different sets S of parts relative to different contexts c . The truth conditions of graded ascriptions of know-how are then given as follows:

The Part-Whole Approach

‘ s knows in part how to ϕ ’ is true (relative to c) if and only if, for some true Hamblin answer in the denotation of ‘How to ϕ ’ (relative to c), and for some part of that answer in the set S fixed by s , s knows that part—that is, if and only if, for some true complete answer in the denotation of ‘How to ϕ ’ (relative to c), s knows some part of that answer (relative to c).

Because parts of a complete answer are themselves propositions, *The Part-Whole Approach* succeeds at specifying the satisfaction conditions of the predicate ‘know how to ϕ ’ in terms of an absolute propositional knowledge predicate. Therefore, it qualifies as an adequate paraphrase from the intellectualist’s point of view. Because the denotation of that-clauses is simply a proposition, not an answer, it does not have a part-whole structure. Hence, the proposal can correctly predict that adverbial modification is infelicitous into know-that ascriptions.

The Part-Whole Approach does better than *The Counting Approach* at predicting the full scope of the phenomenon of gradability. If a question is mention-all, such as *Who came to the party*, a complete answer to it must specify all the individuals that satisfy the predicate of the interrogative—in this particular case, all the participants to the party. However, if the relevant question is mention-some, a single true “Hamblin answer” counts as a complete answer to it—where a Hamblin answer is an ordered pair of a Hamblin proposition and a question \mathbb{Q} that that Hamblin

proposition completely settles. Thus *The Part-Whole Approach* correctly predicts that, for example, the sentence ‘John knows in part how to make *tagliatelle*’ can be true provided that John knows at least part of a single Hamblin answer to the question *How to make tagliatelle*.

Hence, *The Part-Whole Approach* can be generalized to a unified analysis for graded reports embedding interrogatives—whether mention-some or mention-all and for any embedding verb *v*:

The Part-Whole Approach General

- ‘*s v s* in part/mostly *Q*’ is true (relative to *c*) if and only if, for some complete true answer to the question expressed by ‘*Q*?’ (relative to *c*), *s v s* part/most parts of that answer (relative to *c*).
- ‘*s v s Q*’ is true (relative to *c*) if and only if, for some complete true answer to the question expressed by ‘*Q*?’ (relative to *c*), *s v s* every part of that answer (relative to *c*).

So much for the general picture. In the next section, I look deeper into the nature of *practical answers*—the kind of answers that one knows partly or entirely when one knows in part or entirely how to do something—and I flesh out the proposal a bit more by sketching a mereology of practical answers.

4.3. *Practical Answers and Their Structure*

Just like any other answer, a practical answer inherits its part-whole structure from a question. For example, consider the following contrast:

- (7) a. ??Mark partly knows whether this recipe is a way to make *tagliatelle*.
b. Mark partly knows how to make *tagliatelle*.

Although the same proposition (one about a certain recipe for making *tagliatelle*) completely settles both the question expressed by the interrogative embedded in (7a) and that expressed by the interrogative embedded in (7b), only the latter ascription is felicitous. Like before with (4) and (5), this observation is evidence for distinguishing practical answers from “practical propositions.”

What is a practical proposition? It is not simply a proposition of the form *that m is how to ϕ* , for some substitution of *m* with a method to ϕ . For one may certainly know that a certain method is how to ϕ , without knowing how to ϕ . For instance, suppose I watch Phelps’s swimming and I

come to know of his way of swimming that it is a method to swim. But I do not thereby come to know how to swim in the relevant sense.

The standard response to this sort of challenge is to appeal to “practical modes of presentation” (Stanley and Williamson 2001, Pavese 2015b). Accordingly, knowing how to ϕ is a matter of knowing that a certain method to ϕ is a way to ϕ under a practical mode of presentation. Practical modes of presentation can be thought of along Fregean lines, as components of practical propositions. Or they can be thought of along Russellian lines, as ways in which one can stand in the knowledge relation toward propositions about ways to ϕ . In the following, I will develop the Fregean construal of practical modes of presentation, in continuity with my proposal in Pavese 2015b.¹⁶

On the Fregean construal, practical propositions have “practical senses” as their components and such practical senses practically represent methods for ϕ -ing. It is a vexed question how we should think of practical senses. In Pavese 2015b, I propose that we think of them on the model of computer programs—more precisely, on the model of operational semantic values for program texts—and that we think of the practical sense-method relation on the model of the program-algorithm relation. Programs represent algorithms practically, in the sense that they represent them *in terms of operations that a system can “primitively perform”*—where an operation can be primitively performed by a system if the system can perform it immediately, without thereby performing any other operation. Practical senses practically represent methods for performing tasks in the very same sense—that is, *in terms of operations that a subject can primitively perform* (see also Pavese, forthcoming-b).

Let us indicate a Fregean practical proposition as $\langle \mathcal{P} \oplus \text{IS-HOW-TO-}\phi \rangle$, where $\lceil \oplus \rceil$ stands for an operation that combines the practical sense

16. A Russellian construal of practical modes of presentation is also possible (see also Pavese, forthcoming-b). A Russellian can think of the contributions of the interrogatives as ordered sets of answers and practical modes of presentation: $\langle \langle \text{that } w \text{ is how to } \phi, \text{ how to } \phi \rangle, \mathcal{P} \rangle$. The first element is an answer—itsself an ordered pair, $\langle \text{that } w \text{ is how to } \phi, \text{ how to } \phi \rangle$ —the first element of which is the Russellian proposition *that } w \text{ is how to } \phi and the second element is the question *How to } \phi. The second element is a practical mode of presentation. Then for the Russellian, knowing how to ϕ is a matter of knowing every part of an answer to the question *How to } \phi under a practical mode of presentation; and knowing in part how to ϕ is a matter of knowing part of an answer under the corresponding part of the practical mode of presentation. If one thinks of practical modes of presentation along the lines of programs, it is quite easy to work out the part-whole structure of practical modes of presentation and to put it into some correspondence with parts of methods.***

\mathcal{P} with the Fregean sense of ‘is how to ϕ ’ (see also Yalcin 2015, 216, on this notation). Because a practical sense represents a way to ϕ in terms of operations that a *subject* can primitively perform, the relevant practical reading of the subject of the infinitival ‘is how to ϕ ’ is *de se*. (Hence, the Fregean proposition is more carefully indicated by $\langle \mathcal{P} \oplus_{\text{IS-A-WAY-FOR-ONE-ONESELF-TO-}\phi} \rangle$, where $\text{IS-A-WAY-FOR-ONE-ONESELF-TO-}\phi$ is the Fregean sense of ‘is how to ϕ ’ in its *de se* reading. I will omit this qualification in the following.) A practical answer can then be thought of as an ordered pair whose first element is a practical proposition and whose second element is the question *How to ϕ* that the first element completely settles. A practical answer is true if its first element is, and it entails a proposition if its first element does.

In order to reach the target Fregean truth conditions for an ascription of know-how, it is helpful to review standard Fregean analyses of *de re* belief ascriptions (Kaplan 1968, Yalcin 2015). According to Yalcin (2015, 216–17), in particular, the Fregean truth conditions of a belief ascription such as (8a) (in its *de re* reading and relative to a context c) are given by (8b):

- (8) a. Mark believes somebody to be a spy.
 b. $\exists x : \exists m \in C : M(m, x) \ \& \ \text{Mark believes } (m \oplus_{\text{IS-A-SPY}})$.

$M(m, x)$ iff m is a mode of presentation of x ; and C is the contextually restricted domain of modes of presentation. According to (8b), for Mark to believe *de re* that somebody is a spy, relative to a context c , there must be a mode m of presentation of some person x among those selected by c such that Mark believes the Fregean proposition $m \oplus_{\text{IS-A-SPY}}$.

By extending this analysis to know-how ascriptions and by integrating it with *The Part-Whole Approach*, the Fregean truth conditions for (9a) can be stated as in (9b)–(9c):

- (9) a. Mark knows how to swim.
 b. $\exists w : w$ is a way to swim $\ \& \ \exists m \in C : M(m, w) \ \& \ \exists \alpha : \alpha = \langle p, \text{How to swim} \rangle \ \& \ p = m \oplus_{\text{IS-HOW-TO-SWIM}} \ \& \ \text{Mark knows every part of } \alpha$ (relative to c).
 c. $\exists w : w$ is a way to swim $\ \& \ \exists \mathcal{P} : \text{PM}(\mathcal{P}, w) \ \& \ \exists \alpha : \alpha = \langle p, \text{How to swim} \rangle \ \& \ p = \mathcal{P} \oplus_{\text{IS-HOW-TO-SWIM}} \ \& \ \text{Mark knows every part of } \alpha$ (relative to c).

(9b) specifies the truth conditions of a know-how ascription relative to a context c . Not in every context do know-how ascriptions receive genuinely practical readings. As observed by Schaffer (2007, 396), for example, in some context, one may count as knowing how to play the flute simply by

coming to know Monty Python’s explanation of how to play the flute, which is as follows: “Well, you blow in one end and move your fingers up and down the outside.” On the current analysis, know-how ascriptions receive a genuinely practical interpretation when the context selects a *practical* mode of presentation (PM). The resulting truth conditions are stated in (9c): for Mark to know how to swim in a genuinely practical sense (relative to a context c), there must be a practical mode of presentation \mathcal{P} of a way w for him to swim such that, for some practical answer α to the question *How to swim*, Mark knows every part of that answer (relative to c). Pavese 2017, sec. C, implements the truth conditions in (9c) into the compositional semantics, by combining Yalcin’s Fregean semantics for *de re* belief ascriptions (Yalcin 2015, 227–34) with *The Part-Whole Approach*.

Although for the purpose of showing the compatibility of the phenomenon of quantitative gradability with intellectualism, we could simply take the notion of part of a true practical answer as primitive (at least once it is clear that parts of answers are propositions), it might be helpful to flesh out the proposal a bit more by sketching a mereology of practical answers.

In order to make progress on this issue, let us first ask: what is a question and what are its parts?

A long tradition in semantics and philosophical logic models a question as the set of propositions that settle it completely, whether or not truly (Belnap 1976, Groenendijk and Stokhof 1984, Lewis 1988a). Some questions—strongly exhaustive questions—determine *partitions*—that is, sets of mutually exclusive and jointly exhaustive propositions (or *cells*). Other questions—mention-some questions—do not determine partitions: they are sets of propositions that settle them completely but do not need to be mutually exclusive.

Let us start with the former kind of questions and consider the following definition (see Beck and Sharvit 2002, 121):

Parts of Strongly Exhaustive Questions Let \mathbb{Q} and \mathbb{Q}' be strongly exhaustive questions. \mathbb{Q}' is part of \mathbb{Q} just in case every proposition that completely settles \mathbb{Q}' (that is, every proposition in \mathbb{Q}') “partially settles” \mathbb{Q} .

Following Groenendijk and Stokhof (1984, 233–37), “partial settlers” can be defined as follows:¹⁷

17. Groenendijk and Stokhof (1984) speak of “partial answers,” not of “partial settlers.” However, in order to forestall confusions between my technical notion of an answer

Partial Settler: p partially settles \mathbb{Q} just in case p is incompatible with some, but not all, of the cells of the partition determined by \mathbb{Q} ; a “proper” partial settler is a partial settler that does not completely settle \mathbb{Q} .

(Note that, according to this definition, contradictions and tautologies cannot be partial settlers.) Given *Parts of Strongly Exhaustive Questions*, consider now the following account of (proper) parts of a true answer:

Parthood Let $\alpha = \langle p, \mathbb{Q} \rangle$ be a true complete answer. A proposition q is a (proper) part of α iff q completely and truly settles some (proper) part of \mathbb{Q} —that is, iff q is true and (properly) partially settles \mathbb{Q} .

According to *Parthood*, a proposition counts as a part of a true answer only if it completely settles part of that answer’s question—that is, only if it partially settles it. Hence, which set of propositions is the set of parts of an answer to \mathbb{Q} turns out to depend on the part-whole structure of \mathbb{Q} . Because of this, *Parthood* vindicates the initial idea according to which the part-whole structure of an answer to \mathbb{Q} is inherited by the structure of \mathbb{Q} .¹⁸

One of the payoffs of understanding parts of a true answer in accordance with *Parthood* is that, together with *The Part-Whole Approach General*, it affords an explanation of the contrast between (4) and (5) and of the contrast between (7a) and (7b) (see also Roberts 2009, 28). Questions expressed by whether-interrogatives include only two possible and mutually incompatible propositions that completely settle them: ‘yes’ and ‘no’. It follows that no proposition can be a proper partial settler of a yes-no question, for if a proposition partially settles a yes-no question, that proposition will be incompatible with one of either *yes* or *no* and will entail the other. So, any proposition that partially settles a yes-no question thereby completely settles that question. Thus, *The Part-Whole Approach General*, together with *Parthood*, correctly predicts that adverbial modification can be felicitous into a know-where ascription but not felicitous into the corresponding know-whether ascription. For although the same proposition completely settles both questions, the knowledge ascription quantifies on

(on which answers are not propositions) and the ordinary notion of an answer (on which answers are propositions), I am replacing “partial answers” with “partial settlers.”

18. Note that *Parthood* states necessary and sufficient conditions for a proposition to be part of a true strongly exhaustive answer. As observed in the text, the English ‘in part’ is, plausibly, context sensitive and will pick up different subsets of the set of parts of a true answer in different contexts—that is, the subset determined by that context.

parts of answers that are different in the two cases because these two answers have a different part-whole structure.

However, *Parthood* does not work quite as well for mention-some questions. The first problem is that propositions that completely settle mention-some questions are not necessarily incompatible. For example, suppose both Toro Pizzeria (Chapel Hill Street) and Lucia Pizzeria (Main Street) are the only possible pizzerias in Durham and let \mathbb{Q} be the question *Where one can find a pizzeria in Durham*. The proposition that one can find a pizzeria on Main Street goes some way toward settling the question \mathbb{Q} —and hence, in an intuitive sense, it partially settles \mathbb{Q} —even though the fact that one can find a pizzeria on Main Street is not incompatible with the fact that one can also find one on Chapel Hill Street.

Relatedly, not every proposition that settles some part of a mention-some question need be part of a particular complete answer to that question. For example, let α and β be two mention-some answers to the question \mathbb{Q} —as before, the question *Where one can find a pizzeria in Durham*. α specifies where Toro Pizzeria is located in Durham, whereas β specifies where Lucia Pizzeria is located in Durham. The question *In which street of Durham one can find a pizzeria* is (intuitively) part of \mathbb{Q} . But now that question itself will be completely settled by different propositions—for example p_1 , which specifies the street where Toro Pizzeria is located, and p_2 , which specifies the street where Lucia Pizzeria is located. And even though p_2 settles some part of \mathbb{Q} , p_2 is not part of α . After all, we do not need to find out about Lucia's location in order to come to know where Toro is located!

Note that in this last example, only propositions about Toro Pizzeria matter for the part-whole structure of α and only propositions about Lucia Pizzeria matter for the part-whole structure of β . That suggests that the part-whole structure of α —which is about the location of Toro Pizzeria—should be thought to be inherited not just from the question *Where one can find a pizzeria in Durham* but from that question *together* with the topic of α —which in this case is Toro Pizzeria and its location.

Then, say that a proposition partially settles the mention-some question *Where one can find a pizzeria in Durham*, relative to the pizzeria Toro, just in case it partially settles the more specific question expressed by the interrogative 'Where one can find Toro Pizzeria in Durham', when interpreted strongly exhaustively. Thus interpreted, the interrogative expresses a question that determines a partition, each cell of which describes completely, but possibly inaccurately, the location of Toro Pizzeria in Durham.

By mapping pairs of mention-some questions and topics into more specific strongly exhaustive questions, we get around the first difficulty mentioned above. For in this way we recover a partition relative to which it makes sense to talk of partial settlers. If, moreover, we require, for a proposition to be part of a complete answer to a mention-some question, not only that it be a true partial settler (relative to this more specific question) but also that it be *entailed* by the original answer, we get around the second difficulty: in the example above, while α entails p_1 , it does not entail p_2 . Hence, we correctly predict that p_1 but not p_2 counts as a part of α . In this way, Groenendijk and Stokhof's technical notion of partial settlers—together with a slight modification of *Parthood*—can be used to find out the part-whole structure of mention-some answers too.

The case of practical answers is analogous. Just like other mention-some questions, a practical question—a set of practical propositions—by itself does not suffice to determine the part-whole structure of a practical answer. In addition, what has to be specified is the practical answer's *method*.

As an illustration, suppose one wants to sort a list of names into alphabetical order. One method is to scroll through the whole list and move to the top of the list the items that are first in alphabetical order among the items of the whole list. Another method consists in sorting into alphabetical order every successive two members-subset of the list. These two different methods break down the problem of ordering the names alphabetically *into different parts*. In the first case, the main parts of the task will be (roughly): (1) scroll down the list until you find the item that comes first alphabetically; (2) move that item to the top; (3) repeat the operation until the whole list is alphabetically ordered from bottom to the top. In the second case, the main parts of the same task will be instead: (1)* divide the list into every possible combination of two successive items; (2)* for any of those parts, order them alphabetically; (3)* continue for every part of the list.

Generalizing, different methods to perform a task can be thought of as different ways of breaking that task into parts (see Pavese 2015b, 2–3); hence, the same task may have a different part-whole structure relative to different methods for performing it (see Pavese, forthcoming-b).

Now, for every part of the task ϕ -ing, relative to a method M for ϕ -ing, there corresponds a part of the question *How to ϕ* , relative to M —the part asking how to perform ϕ , relative to M . These ways of breaking a task into parts can in turn be described more or less correctly by different

practical senses \mathcal{P} —which purport to describe those ways in terms of operations that a given subject s can primitively perform. A practical sense \mathcal{P} for a method M has parts too, just like programs do, each practically describing (for s) different parts of M . So, for every part of the task ϕ -ing (relative to method M and to the subject s 's set of primitive abilities), there corresponds a part of a practical answer to the question *How to ϕ* that practically describes that part of the task.

Accordingly, we can think of finding a practical answer to the question *How to ϕ* for a subject s as the process of answering first the questions that are the smallest parts of the question *How to ϕ* , then the questions of which those questions are parts, up and up through the tree of subquestions and subtasks, until a complete practical answer to *How to ϕ* is reached, while keeping the relevant method M and s 's set of primitive abilities fixed throughout. Hence, only by fixing the method will one have fixed the decomposition of a task and of the practical question into parts. And so only by fixing the method will one have fixed the decomposition of the practical answer into parts.

But just like before, we can think of the part-whole structure of a practical answer to the question *How to ϕ* for a subject s and about a method M for ϕ -ing as inherited from that question together with M . In other words, we can think of its part-whole structure as inherited from a more specific practical question—expressed by the practical interpretation of the interrogative ‘How to ϕ by method M ’ on its strongly exhaustive reading. So interpreted, relative to a subject s and their set of primitive abilities, the interrogative expresses a practical question that determines a partition, each cell of which completely, but possibly incorrectly, practically describes (for s) the method M 's way of breaking the task of ϕ -ing into parts.¹⁹ Relative to such a partition, it makes sense to talk of partial settlers. A partial settler will be incompatible with some of these cells and will rule them out as incorrect practical descriptions of M for s . Then, we say that a part of a true practical answer to the original question *How to ϕ* is a partial settler (relative to such a derived partition) that is *entailed* by that practical answer. In this way, by mapping sequences of practical questions, methods, and subjects into more specific strongly

19. I am assuming that, given a subject s and a method M , there will be one and only one correct practical description of M . But nothing in my apparatus rules out that the same subject might represent a method M through more than one practical sense. In this case, think of each cell as a disjunction of practical propositions, each describing M through different practical senses \mathcal{P} for s .

exhaustive practical questions, Groenendijk and Stokhof's notion of partial settlers can be used to find out the part-whole structure of practical answers too.

5. Qualitative Gradability

In section 2, we observed that not every comparison of know-how can be explained as an instance of quantitative gradability, for two persons may know how to do something to the same extent while still differing as to how well they know how to do it. Nor can every such comparison have to do with the number of practical answers that one knows. Consider, for example, the case of Mariano Rivera, whose pitch repertoire was, as compared to many other great relief pitchers, ridiculously small: he famously knew how to close in only one way, by a cut fastball. Arguably, then, he only knew one practical answer to the question *How to close*. Yet, it is still true of him that he knew how to close better than anybody else.

If so, then, the gradability of ascriptions of know-how cannot entirely be a quantitative matter. There is a qualitative dimension to comparisons such as (10) that requires a separate treatment:²⁰

- (10) Louis Armstrong knew how to play the trumpet better than any of his contemporaries.

In order to even state the issue that the availability of sentences such as (10) raises for intellectualism, it is paramount to get clear on their logical form. In particular, what does the comparative phrase 'better than' modify?

A first possibility is that 'better than' modifies only the embedding verb 'know', as in (11a) and (11b):

- (11) a. There is something that Louis Armstrong knew very well and his contemporaries did not know so well—that is, how to play the trumpet. [*V-Reading*]
b. ???How to play the trumpet. Who knew that better? Louis Armstrong, that's who.

This is the "verb-only-affecting reading" (*V-Reading* for short). As the evident weirdness of the discourse in (11b) brings out, it is not clear that such a reading of (10) is available. Even if it is available, it certainly can-

20. Kennedy and McNally (2010) first introduced the quantitative/qualitative distinction for the case of color predicates.

not be the privileged reading, because (10) is by comparison perfectly felicitous.

A second possibility is that the comparative clause ‘better than any of his contemporaries’ takes narrow scope, as in (12a) and (12b), where the comparative construction affects only the task that Armstrong is said to know how to perform:

- (12) a. There is a task—that is, the task of playing the trumpet better than any of his contemporaries—that Louis Armstrong knew how to perform. [*T-Reading*]
 b. So, playing the trumpet better than any other musician. Who knew how to do it? Louis Armstrong did, that’s who.

This is the “task-only-affecting reading” (*T-Reading* for short). If the *T-Reading* were the only possible reading for qualitative comparisons such as (10), it would be extremely easy for the intellectualist to discount the phenomenon of qualitative gradability as merely illusory—that is, as not at all reflective of the gradability of the state ascribed by know-how ascriptions. For, in that case, every apparent qualitative comparison of know-how of the form ‘*s* knows how to ϕ better than *s*’ could be paraphrased in terms of a sentence like (X), which does not compare the two subjects *s* and *s*’s know-how:

- (X) There is a task ψ that consists in ϕ -ing better than *s*’ such that *s* knows how to perform ψ and *s*’ does not know how to perform ψ .

Note that (X) is not a comparison—that is, it does not have the form ‘*Y* (is) better than *Z*’.

Things are not this simple for intellectualism. There is another possible reading of (10)—the “complex-predicate-affecting reading” (*C-Reading* for short)—that is distinct from both the *V-Reading* and the *T-Reading*. Consider:

- (13) a. There is a task that Louis Armstrong knew how to perform better than any of his contemporaries knew how to perform—that is, the task of playing the trumpet. [*C-Reading*]
 b. So, playing the trumpet. Who knew how to do it better than anybody? Louis Armstrong did, that’s who.

In (13a) and (13b), it is the complex predicate ‘knowing how to play the trumpet’ that is modified by the degree construction—not the phrase ‘to play the trumpet’ or the embedding verb ‘know’.

One might wonder whether the *C-Reading* is really distinct from the *T-Reading*. A vivid way to tell them apart is by invoking the *Know How/Intentionality Principle*—widely endorsed in the current literature of know-how by both sides of the intellectualism/anti-intellectualism debate (Hawley 2003, Setiya 2011, Pavese 2015a). According to the *Know How/Intentionality Principle*, one knows how to perform a task if and only if one has the ability to intentionally perform it. The left-to-right direction of this biconditional is usually motivated by cases such as Susie, who believes that she can annoy Joe by smoking, but in fact Joe is annoyed by Susie's tapping on her cigarette box, which she does whenever she smokes. Susie does have the ability to annoy Joe but does not know how to annoy him, for she does not have the ability to intentionally do it (Hawley 2003, 27; Setiya 2011, 297).

Now, imagine that Louis Armstrong has false beliefs about what counts as better trumpet playing or has false beliefs about how and how well his contemporaries play the trumpet. In this circumstance, when asked to play the trumpet, he can still play better than anybody; however, when explicitly asked to perform better than his contemporaries, Armstrong systematically responds by actually playing worse. While he possesses the ability to intentionally play the trumpet, and possesses that ability to a higher degree than any of his contemporaries, he does not possess the ability to intentionally play the trumpet better than his contemporaries. If know-how requires the ability to intentionally perform a task, (12a)'s and (13a)'s truth values can come apart: in this circumstance, (13a) can still be true but (12a) is no longer true, or at least there is a reading of (12a) on which it is no longer true.

Hence, if the *Know How/Intentionality Principle* holds, then there is a *C-Reading* of (10) (stated in (13a)), which is irreducible to its *T-Reading* (stated in (12a)). Furthermore, on this *C-Reading*, the comparative construction seems to genuinely compare two subjects' know-how: on this reading, (10) states that there is a property, the property of knowing how to play the trumpet, that Louis Armstrong possessed to a higher degree than any of his contemporaries. These truth conditions cannot be paraphrased in terms of a sentence that has the form stated in (X). Hence, the phenomenon of qualitative gradability cannot be discounted by the proponent of intellectualism as merely illusory (or at least not quite yet).

We can make progress in understanding this phenomenon of qualitative gradability by inquiring about its scope. As observed by Schaffer and Szabó (2014), far from being exclusive to ascriptions of know-how, qualitative comparisons extend beyond know-how ascriptions.

For example, we ordinarily say things such as ‘Ana knows better than Mary when to act tough’ and ‘Carla may know better than anybody where to find the good restaurants in New York’. The relevant reading here is the *C-Reading*: there is something—acting tough—that Ana knows when to do better than Mary; and there are certain things—good restaurants in New York—that Carla knows where to find better than anybody else.

The same pattern is perhaps even more evident with some verbs other than ‘know’, such as ‘decide’:

- (14) a. How can I best decide whether I should study for a master’s or a PhD degree?²¹
 b. How does one best decide which location is appropriate for one’s storefront?²²

Moreover, this sort of adverbial modification is not unique to sentences involving the adverb ‘well’ but can be observed with other adverbs too. For example, we may say ‘Mario has come to know exactly what will happen’ and ‘Carla knows very precisely where the restaurant is’. In these ascriptions, the manner adverbs ‘exactly’ and ‘precisely’ cannot be modifying ‘know’ alone, for such sentences can be paraphrased by sentences such as ‘Mario has come to know the exact answer to the question “What will happen?”’ and ‘Carla knows a very precise answer to the question “Where the restaurant is?”’ where it is the complement to be modified.²³

In conclusion, there seems to be a general pattern of gradability whereby qualitative modifiers such as ‘well’ modify complex predicates of the form ‘*v* + interrogative’—a pattern of which qualitative gradability into ascriptions of know-how is just an example. How are we then to analyze this pattern of qualitative gradability? A natural proposal is to take every dimension along which one’s know-how may be better than

21. Quora, www.quora.com/How-can-I-best-decide-whether-I-should-study-a-Masters-or-a-PhD-degree (accessed February 26, 2017).

22. Quora, www.quora.com/Small-Businesses/How-does-one-best-decide-which-location-is-appropriate-for-their-store-front (accessed February 26, 2017).

23. Also, consider:

- (i) Sparrow was the only one to know a precise answer to your question. (Quora, www.quora.com/Once-we-know-the-exact-answer-to-the-square-root-of-infinity-what-practical-problem-if-any-would-we-be-able-to-solve [accessed February 26, 2017])
 (ii) Sparrow finally found the exact answer to the teacher’s question. (Yahoo! Answers, www.answers.yahoo.com/question/index?qid=20151130224644AAVPxW [accessed February 26, 2017])

another's to be analyzed in terms of the quality of practical answers known by the subjects:

Qualitative Gradability

1. 's knows well how to ϕ ' is true (relative to a context c) if and only if there is a practical answer to *How to ϕ* that s knows (every part of) (relative to c) and that is good (relative to c).
2. 's knows how to ϕ better than/as well as s' knows how to ϕ ' is true (relative to a context c) if and only if there is a practical answer to *How to ϕ* that s knows (every part of) (relative to c) and that (relative to c) is better than/as good as any practical answer (every part of which is) known by s' (relative to c).

Qualitative Gradability specifies the satisfaction conditions of the gradable predicate 'knows how to ϕ ' in terms of an absolute knowledge predicate 'know'. Answers can be better or worse. And, moreover, they can be better or worse only qua answers to certain questions. By contrast, propositions known are not better or worse if they are considered independently of a question that they may answer. Hence, *Qualitative Gradability* predicts the difference in qualitative gradability between know-that ascriptions and ascriptions of know-how that we observed at the outset. Furthermore, *Qualitative Gradability* naturally extends to other reports embedding interrogatives, because it takes the answers known by the subjects to be the object of qualitative comparison. Thus, it can do full justice to the scope of the phenomenon.

Recall that on my proposed analysis, ascriptions of know-how are, at their logical form, existentially quantified sentences:

- (15) For some true practical answer to the question *How to ϕ* , s knows every part of that practical answer.

So the effect of adverbially modifying the whole complex predicate 'knowing how to ϕ ' by means of 'well' is that of predicating goodness of a practical answer that is known by the subject. On this picture, however, it is the practical answers *known* by the subjects that are said to be good. That explains why it is the whole predicate 'knowing how to ϕ ', and not just the embedded complement, or even just the predicate 'know', that is affected by 'well'. Furthermore, the fact that 'well' modifies the predicate 'know how to ϕ ' explains its adverbial form (compare it with the adjectival form 'good'): by modifying that predicate, 'well' grammatically works as an adverb rather than as an adjective.

What happens in a comparison, such as (10)? If the logical form of ascriptions of know-how is as stated in (15), it might seem that the current analysis predicts the following truth conditions:

- (16) There is a (true) practical answer known by Louis Armstrong to the question *How to play the trumpet* that is better than some (true) practical answer to the same question that is known by any of his contemporaries.

This outcome would be problematic, for according to *Qualitative Gradability*, in order for a qualitative comparison such as (10) to be true, some practical answer known by Louis Armstrong needs to be better than *every* practical answer known by any of his contemporaries, not just better than some of his contemporaries' practical answers.

If this is correct, the question arises of how one practical answer known by the first subject can be compared to every practical answer known by the second subject if, in accordance with the logical form stated in (15), the second ascription contributes an existential quantifier rather than a universal quantifier over practical answers.

The linguistics literature on degree constructions can help here. Degree constructions are well known to be “downward entailing” with respect to their clausal argument (von Stechow 1984, Schwarzschild and Wilkinson 1990, Beck 2010). That simply means that the comparative creates a linguistic context where the usual entailment patterns are reversed. To illustrate, ‘any’ and ‘ever’ have an existential meaning in the following linguistic contexts:

- (17) a. If you ever had sushi, you cannot be allergic to it.
 b. If you had sushi at least once before, you cannot be allergic to it.
 c. If you had any sushi, you cannot be allergic to it.
 d. If you had some sushi, you cannot be allergic to it.

However, they acquire a universal meaning when embedded in a comparative clause:

- (18) a. Your cuisine is better than it has ever been before.
 b. For every time before, your cuisine is better than back then.

Thus it is independently plausible that the existential quantifier over practical answers in the logical form of the second ascription of know-how acquires a universal meaning in virtue of the comparative construction, just like an ‘any’ quantifier. Accordingly, the target truth conditions can be paraphrased as:

- (19) There is a true practical answer known by s to the question *How to ϕ* that is better than any practical answer known by s' to the question *How to ϕ* .

Section D of the technical appendix implements these target truth conditions into a systematic and compositional semantics.

Let me end here by considering three objections to *Qualitative Gradability*.

Could not two subjects possess the same amount and quality of propositional knowledge and yet differ in the degree to which they know how to perform a task? For example, could not two people have the same propositional knowledge about how to close in baseball and one simply be better at it? If so, one may be better at a task than another because one's ability to perform the task is superior, independently of what propositional knowledge one possesses. "Ability" here means mental or cognitive ability, not simply strength or fitness, just in the way in which, according to Lewis's Ability Hypothesis, mental or cognitive ability is needed in addition to factual knowledge for one to count as knowing what it is like to see red (Lewis 1988b; see Stalnaker 2010 on the cognitive aspect of Lewis's Ability Hypothesis).

This objection assumes that know-how has a genuinely mental ability component that can vary independently of the knowledge component. But that should not be easily granted. According to intellectualism, know-how is knowledge of an answer that involves a practical mode of presentation. The distinctive practical aspect of practical modes of presentation derives from the fact that one practically represents a task only if one possesses certain abilities—that is, the ability to follow certain rules (Pavese 2015b, 9–12). Hence, this ability is built into the knowledge component because it is built into the practical mode of presentation component of the knowledge.

Now, as we have already seen, the ability to follow a rule and know-how may come apart, for one may be able to follow a rule to ϕ without having the ability to intentionally ϕ (Hawley 2003; Bengson, Moffett, and Wright 2009; Setiya 2011; Pavese 2015a). But, according to intellectualism, this sort of ability too does not vary independently of the knowledge component. That is so because it is one's knowledge of a practical answer that grants one the ability to intentionally perform the task (Pavese 2015b, 17), as it is a requirement on intentional action that one have a correct belief about how to perform it (Goldman 1970, Gibbons 2001). Thus according to this version of intellectualism, both types of ability—the

ability to follow a rule to perform a task and the ability to intentionally perform a task—cannot vary independently of knowledge of a practical answer.

Following Hawley (2003), talk of “ability” here should be understood in terms of *counterfactual success over a sphere of relevantly close possibilities*. If, like in this case, mental/cognitive abilities are at issue, the relevantly close possibilities are ones where the mental facts are the same and the enabling conditions for the exercise of such mental abilities are in place. Now, according to Hawley (2003), counterfactual success at a task is a matter of succeeding at the task in *all* or *most* of the closest counterfactual circumstances. However, that may turn out to be too strong a requirement: a baseball player may know how to hit a home run, even if he or she would not succeed at it in all or most of the closest circumstances. After all, even the best player only succeeds at that task 9 percent of the time. According to a less demanding account of counterfactual success, modeled along Manley and Wasserman’s (2007) modal account of dispositions, one’s knowing how to ϕ entails that one would succeed at ϕ -ing not in all of the closest circumstances but rather in a sufficiently high proportion of relevantly close circumstances, where what counts as a sufficiently high proportion may vary from task to task (see Beddor and Pavese, n.d., on this issue).

We are now in position to appreciate that, on the general picture outlined thus far, the ability component cannot vary independently of the knowledge component, for it is knowledge of the relevant practical answer that endows one with the relevant ability and corresponding counterfactual success. Thus, on this proposal, it simply cannot be the case that two subjects have the same relevant kind of propositional knowledge about a task—and in particular, knowledge of the same practical answers—and yet differ in their ability to intentionally perform the task (although, of course, they may differ in their nonmental strength or fitness).²⁴

So much for the first objection. Here goes the second: one might wonder whether *Qualitative Gradability*, together with my picture of prac-

24. On my analysis, two subjects may differ in their nonmental abilities—for example, in their merely physical strength—while knowing how to perform the task equally well. For example, two subjects may differ in their motor acuity while knowing how to perform a motor task equally well, provided that motor acuity is conceived of—as, for example, Stanley and Krakauer (2013) conceive of it—as a nonmental ability, along the lines of muscle strength.

tical answers, can account for all the possible ways in which one may count as knowing how to perform a task better than another.

Let me address this worry by listing several possible ways allowed by my view in which one may count as knowing how to perform a task better than another. Suppose Carla and Ale both know several practical answers to the question *How to make ravioli* but one of the answers known by Carla is better than any of those known by Ale. One way that answer may be better is by being more detailed and precise; or it may be better by being about a better way of making ravioli (a better recipe); a further way her practical answer may be better is by practically presenting a recipe for making ravioli in a better way than any of Ale's answers.

Furthermore, if we think of practical senses in analogy with programs, as suggested earlier, a practical sense may be better by being more efficient or simpler, just as certain computer programs can be more efficient than others; or it may be better by being more reliable, just like programs can be more or less likely than others to enable the successful execution of the task. By exploiting this further dimension of gradability for programs, my proposal can also make room for the intuition, voiced by Wiggins (2012, 121–22), according to which one may know how to perform a task better because, everything else being equal and under appropriate conditions, one tends to be more successful at the task.

In conclusion, *Qualitative Gradability* allows for a variety of different ways in which one may count as knowing how to perform a task better than another.

Lastly, one might object to *Qualitative Gradability* that it assumes that qualitative comparisons of know-how can be true only if there is at least *one* true practical answer to the question *How to ϕ* . But consider the case of Kyle the babysitter, who knows how to deal with kids better than anybody else. But every kid is different and so he uses different methods to deal with them. Although there is no unique general answer to the question *How to deal with kids*, it may be nonetheless true that Kyle knows how to deal with kids better than anybody else.

One possible response is to appeal to higher-order methods and to insist that there are general practical answers to the question *How to deal with kids* that Kyle the babysitter knows—that is, answers concerning higher-order methods that enable him to choose among different possible methods to deal with kids depending on the circumstance.

Another response points out that ascriptions of know-how can quantify over circumstances, and qualitative comparisons are demonstrably affected by that. We routinely say things such as that when the children

are well behaved, Kyle knows how to deal with them but that he does not know how to deal with them if they are not well behaved. On the widespread assumption that restrictors such as ‘when’- and ‘if’-clauses restrict adverbs of quantification (Lewis 1975, Berman 1987, von Stechow 1994), the availability of restrictors for the ascription ‘Kyle knows how to deal with kids’ suggests that an adverb of quantification is being restricted by the relevant ‘when’- and ‘if’-clauses. We can therefore explain Kyle’s knowing how to deal with kids better than most people in terms of his knowing how to deal with kids better than most people *for most circumstances* involving kids—that is, in terms of his known practical answers, for most questions of the form *How to deal with kids in this circumstance*, being better than most people’s practical answers.

6. Conclusions

Ascriptions of know-how are gradable. The first dimension of gradability is quantitative—one may know how to ϕ to different extents. I motivated an analysis of quantitative gradability according to which knowing how to ϕ to different extents is a matter of knowing different extents of a practical answer. Because different extents of an answer are themselves propositions, my proposal succeeds at specifying the satisfaction conditions of the quantitatively gradable predicate ‘knowing how to ϕ ’ in terms of the satisfaction conditions of an absolute propositional knowledge predicate.

There is a second, qualitative dimension to the phenomenon of gradability. One may know how to ϕ better than another, or as well as another, or worse than another. I distinguished different possible readings of such comparisons, and I isolated a reading that may seem problematic for intellectualism. By looking at the distribution of the phenomenon across reports, I proposed an analysis according to which a subject s ’s knowing how to ϕ better than another subject s' is a matter of the practical answers that s knows being better than any of s' ’s practical answers. The upshot is that, even in the case of qualitative gradability, the satisfaction conditions of the gradable predicate ‘knowing how to ϕ ’ can be stated in terms of the satisfaction conditions of an absolute knowledge predicate.

Therefore, by appeal to the strategy outlined in section 3, every dimension along which know-how ascriptions can be graded has been shown to be compatible with intellectualism about know-how and with absolutism about knowledge. On the resulting picture, graded ascrip-

tions of know-how can be literally true in virtue of the holding of an absolute propositional knowledge relation.

If so, know-how may well be nongradable. We have been mistaken by language into thinking that it is.

References

- Abbott, Barbara. 2013. "Linguistic Solutions to Philosophical Problems: The Case of Knowing How." *Philosophical Perspectives* 27, no. 1: 1–21.
- Arbess, Daniel J. 2016. "Leaders, Get to Work Already on America's Economic Challenges." *Fortune*, May 5. www.fortune.com/2016/05/05/leaders-u-s-economy-challenges/.
- Beaney, Michael. 2016. "Analysis." In *The Stanford Encyclopedia of Philosophy* (Summer 2016 Edition), ed. Edward N. Zalta. plato.stanford.edu/archives/sum2016/entries/analysis.
- Beck, Sigrid. 2010. "Quantifiers in Than-Clauses." *Semantics and Pragmatics* 3: 1–72.
- Beck, Sigrid, and Yael Sharvit. 2002. "Pluralities of Questions." *Journal of Semantics* 19, no. 2: 105–57.
- Beddor, Bob, and Carlotta Pavese. n.d. "The Modal Dimensions of Skillfulness and Knowledge." Unpublished manuscript.
- Belnap, Nuel. 1976. *The Logic of Questions and Answers*. New Haven, CT: Yale University Press.
- Benacerraf, Paul. 1973. "Mathematical Truth." *Journal of Philosophy* 70, no. 19: 661–79.
- Bengson, John, and Marc Moffett. 2011. "Non-propositional Intellectualism." In *Knowing How: Essays on Knowledge, Mind, and Action*, ed. John Bengson and Mark Moffett, 161–95. Oxford: Oxford University Press.
- Bengson, John, Mark Moffett, and Jennifer Wright. 2009. "The Folk on Knowing How." *Philosophical Studies* 142, no. 3: 387–434.
- Berman, Stephen. 1987. "Situation-Based Semantics for Adverbs of Quantification." *University of Massachusetts Occasional Papers* 12: 45–68.
- Brown, Jessica. 2013. "Knowing-How: Linguistics and Cognitive Science." *Analysis* 73, no. 2: 220–27.
- Brownstein, Michael, and Eliot Michaelson. 2016. "Doing without Believing: Intellectualism, Knowledge-How, and Belief-Attribution." *Synthese* 193, no. 9: 1–22.
- Carter, Adam, and Duncan Pritchard. 2015. "Knowledge-How and Epistemic Luck." *Nous* 49, no. 3: 440–53.
- Cath, Yuri. 2011. "Knowing How without Knowing That." In *Knowing How: Essays on Knowledge, Mind, and Action*, ed. John Bengson and Marc Moffett, 113–35. Oxford: Oxford University Press.
- Cumming, Samuel. 2008. "Variabilism." *Philosophical Review* 117, no. 4: 525–54.

- Devitt, Michael. 2011. "Methodology and the Nature of Knowing How." *Journal of Philosophy* 108, no. 4: 205–18.
- Ditter, Andreas. 2016. "Why Intellectualism Still Fails." *Philosophical Quarterly* 66: 500–515.
- Dorr, Cian. 2008. "There Are No Abstract Objects." In *Contemporary Debates in Metaphysics*, ed. Jonathan Hawthorne, Ted Sider, and Dean Zimmerman, 32–63. Malden, MA: Blackwell.
- Dretske, Fred. 1981. "The Pragmatic Dimension of Knowledge." *Philosophical Studies* 40, no. 3: 363–79.
- Dutant, Julien. n.d. "The Limited Gradability of 'Know'." Unpublished manuscript.
- Field, Hartry. 1980. *Science without Numbers: A Defense of Nominalism*. Princeton: Princeton University Press.
- von Fintel, Kai. 1994. "Restrictions on Quantifier Domains." PhD diss., University of Massachusetts.
- Fridland, Ellen. 2013. "Problems with Intellectualism." *Philosophical Studies* 165, no. 3: 879–91.
- George, B. R. 2013. "Knowing-Wh, Mention-Some Readings, and Non-reducibility." *Thought* 2: 166–77.
- George, B. R., and Jonathan Phillips. n.d. "Non-reducibility with Knowledge-Wh: Experimental Investigations." Unpublished manuscript.
- Gibbons, John. 2001. "Knowledge in Action." *Philosophy and Phenomenological Research* 62, no. 3: 579–600.
- Glick, Ephraim. 2011. "Two Methodologies for Evaluating Intellectualism." *Philosophy and Phenomenological Research* 83, no. 2: 398–434.
- . 2013. "Practical Modes of Presentation." *Noûs* 49, no. 3: 1–22.
- Goldman, Alvin. 1970. *A Theory of Human Action*. Englewood Cliffs, NJ: Prentice Hall.
- Groenendijk, J. A. G., and M. J. B. Stokhof. 1984. "Studies on the Semantics of Questions and the Pragmatics of Answers." Joint PhD. diss., University of Amsterdam.
- . 1993. "Interrogatives and Adverbs of Quantification." In *Proceedings of the 4th Symposium on Logic and Language*, ed. Katalin Bimbo and Andras Mate, 1–29. Budapest: Aron.
- Hawley, Kathrine. 2003. "Success and Knowledge How." *American Philosophical Quarterly* 40, no. 1: 19–31.
- Hellman, Geoffrey. 1989. *Mathematics without Numbers: Towards a Modal-Structural Interpretation*. Oxford: Clarendon Press.
- Hetherington, Stephen. 2001. *Good Knowledge, Bad Knowledge: Two Dogmas of Epistemology*. Oxford: Oxford University Press.
- Hornsby, Jennifer. 2011. "Ryle's Knowing How and Knowing How to Act." In *Knowing How: Essays on Knowledge, Mind, and Action*, ed. John Bengson and Mark Moffett, 80–101. Oxford: Oxford University Press.

- Kaplan, David. 1968. "Quantifying In." *Synthese* 19: 178–214.
- Karttunen, Lauri. 1977. "Syntax and Semantics of Questions." *Linguistics and Philosophy* 1, no. 1: 3–44.
- Kennedy, Christopher, and Louise McNally. 2010. "Color, Context, and Compositionality." *Synthese* 174: 79–88.
- Koethe, John. 2002. "Stanley and Williamson on Knowing How." *Journal of Philosophy* 99: 325–28.
- Lahiri, Uptal. 1991. "Embedded Interrogatives and Predicates That Embed Them." PhD diss., Massachusetts Institute of Technology.
- . 2000. "Lexical Selection and Quantificational Variability in Embedded Interrogatives." *Linguistic and Philosophy* 23, no. 4: 325–489.
- . 2002. *Questions and Answers in Embedded Contexts*. Oxford: Oxford University Press.
- Lewis, David. 1975. "Adverbs of Quantification." In *Formal Semantics for Natural Languages*, ed. Edward Keenan, 178–88. Cambridge: Cambridge University Press.
- . 1988a. "Relevant Implication." *Theoria* 54, no. 3: 161–74.
- . 1988b. "What Experience Teaches." *Proceedings of the Russellian Society* 13: 29–35.
- Manley, David, and Ryan Wasserman. 2007. "A Gradable Approach to Dispositions." *Philosophical Quarterly* 57: 68–75.
- Marconi, Diego. Forthcoming. "Analysis as Translation." *Topoi*.
- Marley-Payne, Josh. n.d. "Know-How and Gettier: The Plot Thickens." Unpublished manuscript.
- Michaelis, Laura A. 2011. "Knowledge Ascription by Grammatical Construction." *Knowing How: Essays on Knowledge, Mind, and Action*, ed. John Bengson and Marc Moffett, 261–82. Oxford: Oxford University Press.
- Nathan, Lance E. 2006. "On the Interpretation of Concealed Questions." PhD diss., Massachusetts Institute of Technology.
- Noë, Alva. 2005. "Anti-intellectualism." *Analysis* 65, no. 288: 278–90.
- Pavese, Carlotta. 2015a. "Knowing a Rule." *Philosophical Issues: A Supplement to Nous* 25, no. 1: 165–88.
- . 2015b. "Practical Senses." *Philosophers' Imprint* 15, no. 29: 1–25.
- . 2016. "Skill in Epistemology, Part II: Skill and Know-How." *Philosophy Compass* 11: 650–60.
- . Forthcoming-a. "Know-How, Action, and Luck." *Synthese*.
- . Forthcoming-b. "A Theory of Practical Meaning." *Philosophical Topics*.
- Poston, Ted. 2009. "Know How to Be Gettiered?" *Philosophy and Phenomenological Research* 79: 743–47.
- Quine, W. V. O. 1960. *Word and Object*. Cambridge, MA: MIT Press.
- Roberts, Craige. 2009. "Know-How: A Compositional Approach." *Theory and Evidence in Semantics*, ed. Erhard Hinrichs and John Nerbonne, 1–31. Stanford: CSLI Publications.

- Rumfitt, Ian. 2003. "Savoir Faire." *Journal of Philosophy* 100: 158–66.
- Russell, Bertrand. 1905. "On Denoting." *Mind* 14: 479–93.
- . 1910. "Knowledge by Acquaintance and Knowledge by Description." *Proceedings of the Aristotelian Society* 11: 108–20.
- . 1912. *The Problems of Philosophy*. Oxford: Oxford University Press.
- Ryan, Alan. 2012. *The Making of Modern Liberalism*. Princeton, NJ: Princeton University Press.
- Ryle, Gilbert. 1949. *The Concept of Mind*. Chicago: University of Chicago Press.
- Schaffer, Jonathan. 2007. "Knowing the Answer." *Philosophy and Phenomenological Research* 75: 383–403.
- Schaffer, Jonathan, and Zoltán Szabó. 2014. "Epistemic Comparativism: A Contextualist Semantics for Knowledge Ascriptions." *Philosophical Studies* 168: 491–543.
- Schiffer, Stephen. 2002. "Amazing Knowledge." *Journal of Philosophy* 99, no. 4: 200–202.
- Schwarzschild, Roger, and Karina Wilkinson. 1990. "Quantifiers in Comparatives: A Semantics of Degree Based on Intervals." *Natural Language Semantics* 10: 1–41.
- Setiya, Kieran. 2011. "Knowing How." *Proceedings of the Aristotelian Society* 112, no. 3: 285–307.
- Sgaravatti, Daniele, and Elia Zardini. 2008. "Knowing How to Establish Intellectualism." In "Knowledge and Questions," ed. Franck Lihoreau, special issue, *Grazer Philosophische Studien* 77: 217–61.
- Small, Will. 2016. "The Transmission of Skill." *Philosophical Topics* 42, no. 1: 85–111.
- Sosa, Ernest. 2001. "Human Knowledge, Animal and Reflective." *Philosophical Studies* 106, no. 3: 193–96.
- . 2009. "Knowing Full Well: The Normativity of Beliefs as Performances." *Philosophical Studies* 142, no. 1: 5–15.
- . 2011. *Knowing Full Well*. Princeton: Princeton University Press.
- Stalnaker, Robert. 2010. *Our Knowledge of the Internal World*. Oxford: Oxford University Press.
- Stanley, Jason. 2005. *Knowledge and Practical Interests*. Oxford: Oxford University Press.
- . 2011. *Know How*. Oxford: Oxford University Press.
- Stanley, Jason, and John Krakauer. 2013. "Motor Skill Depends on Knowledge of Facts." *Frontiers in Human Neuroscience* 7, no. 503: 1–11.
- Stanley, Jason, and Timothy Williamson. 2001. "Knowing How." *Journal of Philosophy* 98, no. 8: 411–44.
- Theiler, Nadine, Floris Roelofsen, and Maria Aloni. 2016. "Truthful Resolutions: A New Perspective on False-Answer Sensitivity." *Semantics and Linguistic Theory* 26: 122–41.

- Valaris, Markos. n.d. "Skill, Control, and Knowledge in Action." Unpublished manuscript.
- von Stechow, Arnim. 1984. "Comparing Semantic Theories of Comparison." *Journal of Semantics* 3: 1–77.
- Weatherson, Brian. 2017. "Intellectual Skill and the Rylean Regress." *Philosophical Quarterly* 67: 370–86.
- Wiggins, David. 2012. "Practical Knowledge: Knowing How to and Knowing That." *Mind* 121, no. 481: 97–130.
- Williams, Alexander. 2000. "Adverbial Quantification over (Interrogative) Complements." *Proceedings of the 19th West Coast Conference on Formal Linguistics* 19: 574–87.
- Yablo, Stephen. 2014. *Aboutness*. Princeton: Princeton University Press.
- Yalcin, Seth. 2015. "Quantifying In from a Fregean Perspective." *Philosophical Review* 124, no. 2: 207–53.