



What is Intelligence For? A Peircean Pragmatist Response to the Knowing-How, Knowing-That Debate

Catherine Legg¹ · Joshua Black²

Received: 13 September 2019 / Accepted: 22 July 2020 / Published online: 13 August 2020
© Springer Nature B.V. 2020

Abstract

Mainstream philosophy has seen a recent flowering in discussions of intellectualism which revisits Gilbert Ryle’s famous distinction between ‘knowing how’ and ‘knowing that’, and challenges his argument that the former cannot be reduced to the latter. These debates so far appear not to have engaged with pragmatist philosophy in any substantial way, which is curious as the relation between theory and practice is one of pragmatism’s main themes. Accordingly, this paper examines the contemporary debate in the light of Charles Peirce’s habit-based epistemology. We argue both that knowing-that can be understood as a particularly sophisticated form of knowing-how, and that all bodily competencies—if sufficiently deliberately developed—can be analysed as instantiating propositional structure broadly conceived. In this way, intellectualism and anti-intellectualism are seen to be not opposed, and both true, although Peirce’s original naturalistic account of propositional structure does lead him to reject what we shall call ‘linguistic intellectualism’.

1 Introduction

Mainstream analytic philosophy has seen a recent flowering in discussions of *intellectualism*, drawing on work by Gilbert Ryle (1946, 1949) which distinguishes ‘knowing how’—behavioural competencies such as riding a bicycle—from ‘knowing that’—appreciating that a proposition is true. Ryle famously argued that knowing-how cannot be reduced to knowing-that, thereby challenging the allegedly erroneous “intellectualist legend” (Ryle 1949, 32), which holds “that intelligent performance involves the observance of rules, or the application of criteria”, so that,

✉ Catherine Legg
c.legg@deakin.edu.au

Joshua Black
black.joshuad@gmail.com

¹ Philosophy Program, Deakin University, 221 Burwood Hwy, Burwood, VIC 3125, Australia

² Philosophy Program, University of Canterbury, 20 Kirkwood Avenue, Upper Riccarton, Christchurch 8041, New Zealand

“the agent must first go through the internal process of avowing to himself certain propositions about what is to be done [...] only then can he execute his performance in accordance with those dictates” (Ryle 1949, 29). This understanding of intelligence has many unfortunate results, Ryle suggested. A key formal or structural problem is that interpreting a proposition seems itself to be a form of intelligent performance, introducing an infinite regress of proposition-avowal before one actually does anything (1946, 2; 1949, 31–32). The account also seems a poor conceptual analysis of intelligence insofar as it encourages us to view education as rote learning of propositions (a relatively ‘stupid’ form of learning) (Ryle 1946, 5; 1949, 146).

Early this century Jason Stanley and Timothy Williamson revived the issue by challenging Ryle’s anti-intellectualism and offering a new form of intellectualism which has stimulated a wealth of further work. Fantl taxonomises the landscape of current debate as follows (2008, 452):

1. Intellectualism: “knowing how reduces to or is a species of knowing that; at the very least, knowing how to do something importantly requires a prior bit of propositional knowledge”.
2. Strong anti-intellectualism: “knowing that reduces to or is a species of knowing how; at the very least, knowing that something is the case importantly requires a prior bit of know-how”.
3. Weak anti-intellectualism: “knowing how and knowing that are independent”.

Surprisingly, these debates appear to have so far almost entirely ignored potential contributions from pragmatist philosophy. This is curious because Ryle is clear that his distinction between knowing-how and knowing-that is made as a contribution to the more general issue of the relationship between theory and practice (Ryle 1949, 26), which is one of pragmatism’s main themes. Key classical pragmatists even deployed the term ‘intellectualism’, and strenuously critiqued it, in ways that appear similar to Ryle. For instance, in 1910 Dewey published a paper entitled “Some Implications of Anti-Intellectualism”, and in his widely-read 1929 book *The Quest for Certainty*, Dewey commented on how pragmatism’s definition of knowers as agents in the world dislodges the so-called ‘spectator’ theory of knowledge as follows:

[T]he first direct and immediate effect of this shift from knowing which makes a difference to the knower but none to the world, to knowing which is a directed change within the world, is the complete abandonment of what we may term the intellectualist fallacy. By this is meant something which may also be termed the ubiquity of knowledge as a measure of reality. Of the older philosophies...it may be said that they made a definite separation between the world in which man thinks and the world in which he acts (Dewey 1929, 291–2).¹

¹ In our view, at some point the question will really have to be asked about the timing of Ryle’s pronouncements on this topic, merely 15–20 years after Dewey gave his celebrated Gifford lectures, in a context of mid-century ‘capture’ by analytic philosophy of problems hitherto developed in other traditions—the politically progressive Deweyanism being a notable example (Katsav 2018).

This paper will urge that pragmatism can provide fresh conceptual resources to contemporary discussions of intellectualism. The pragmatist we shall look to, though, is the tradition's founder, Charles Peirce. Despite the fact that Peirce himself did not use the term 'intellectualism', we believe that his habit-based theory of signs is exceptionally helpful to theorise both knowing-how and knowing-that, and teach us how best to understand the relationship between them.

Perhaps surprisingly, we will argue that, on Fantl's taxonomy, Peirce is both an intellectualist *and* a strong anti-intellectualist. That a pragmatist could be any kind of intellectualist will likely surprise those who accept popular views of pragmatism as 'antirepresentationalist' (Rorty 1982) or 'radically enactive' (Hutto and Myin 2013).² That *anyone* could be both intellectualist and strongly anti-intellectualist will offend those with low tolerance for apparent paradox. However the paradox may be dispelled by considering that Fantl's taxonomy of positions regarding knowing-how and knowing-that does not consider the possibility that neither is a 'species' of the other, *nor* are they mutually independent—rather, the two are *co-extensive*.³ Peirce's account of habituation supports an anti-intellectualist understanding of propositional knowledge as the possession of certain kinds of habits. Meanwhile, his theory of the proposition supports the view that our deliberately developed habits replicate the formal structure of knowledge-that, even if we cannot linguistically articulate them, which we shall argue is a form of intellectualism.

We begin with a short summary of the current intellectualism debate, before turning to Peirce's account of habits and habit-development, which are building blocks for his sign theory. We then turn to that theory, and especially his account of the proposition, to show how it allows Peirce's view to be simultaneously a kind of intellectualism and a kind of strong anti-intellectualism.

2 Contemporary Intellectualism

Contemporary intellectualism in analytic philosophy begins with an alleged refutation of Ryle's anti-intellectualism. Paul Snowdon calls Ryle's account the "standard view" and characterises it as follows:

1. 'Knowing how does not consist in knowing that some proposition is true or that some fact obtains; knowing how cannot be reduced to or equated with (any form of) knowledge that'.
2. 'Knowing how to G does in fact consist in being able to G, in having the capacity to G. Knowing how ascriptions ascribe abilities or capacities to do the mentioned action' (Snowdon 2003, 2).

² At least, we urge that this is the best direction in which the pragmatist tradition may be continued.

³ We *do* thus have to abandon the talk of 'a prior bit of' know-how or of propositional knowledge in Fantl's taxonomy. If they are co-extensive, in the sense we will outline, then it's not sensible to talk of one requiring a 'prior bit' of the other.

Claim (1) is the *anti-intellectualist thesis*,⁴ while (2) provides a positive account of knowledge-how which Snowdon calls the *capacity thesis*. Intellectualists reject (1) and offer their own alternative in place of (2). We shall consider the intellectualists' rejection of (2), before considering their positive account.

Both Snowdon and Stanley and Williamson offer a series of counterexamples to the capacity thesis. Consider the following from Snowdon (2003, 8)⁵:

Raymond Blanc, the world's greatest chef, knows how to make an excellent omelette. He loses his arms in a car accident, and is no longer able to make omelettes. However, he retains his knowledge how to make omelettes...He has...not lost his knowledge, merely his capacity

There is an irregular and rather narrow opening in a rock. S, who is fairly agile and thin, can certainly get through it. If, however, he has no knowledge of the rock or the task it would be odd to say that he knows how to get through it.

The Blanc example is intended to demonstrate that one might lose one's practical capacity to ϕ , but still know how to ϕ . Conversely, in the second example it seems that one might have a capacity without having the relevant knowledge-how.

Whilst contemporary intellectualists generally take these examples to be knock-down arguments against the capacity thesis,⁶ we need not be so quick. For instance, the second example seems a rather strange ascription of knowledge-how. We usually say that someone knows how to perform a certain *type* of action rather than a specific act. So we might say, instead, that S knows how to maneuver his body into tight spaces. His capacity to get through the rock opening is relevant to *this* knowledge ascription, although we would not say that S knows how to get through that particular rock. From the other side, it would be very strange to ascribe knowledge of how to get through a particular gap in a particular rock in the absence of some more general knowledge ascription concerning types of actions.

We turn now to the intellectualist's positive account of ascriptions of knowing-how. Both Stanley and Williamson, and Snowdon, offer similar accounts in terms of 'indirect propositional knowledge'. For instance, to know *who* the current pope is, is to know that some proposition which answers the question, 'Who is the current pope?' is true (e.g. 'Pope Francis is the current pope'). Similarly, to know *where* the library is, is to know the truth of some proposition which answers the question 'Where is the library?' (e.g. 'The library is next to the mathematics department'). Stanley and Williamson apply this as follows:

⁴ Snowdon uses the phrase 'intellectualist legend' more narrowly than is currently common. By intellectualism he means the view that the proper application of 'intelligence epithets' such as 'clever', 'witty' and 'rational', to public acts requires a prior intellectual act. Snowdon holds both that Ryle is right to reject the intellectualist legend, and wrong to think that knowing-how and knowing-that are distinct (Snowdon 2003, 16–17). We follow the broader usage, which has become standard.

⁵ Stanley and Williamson offer similar examples (2001, 416).

⁶ Stanley and Williamson (2001, 416).

[Hannah knows how to ride a bicycle] is true...if and only if, for some contextually relevant way w for Hannah to ride a bicycle, Hannah knows that w is a way for Hannah to ride a bicycle (2001, 426).⁷

In short: the proposition that one knows when one knows how to φ is an answer to the question, ‘How could you φ ?’. This will be the proposition that some ‘way’ is a way for one to φ .

It is worth considering more closely what a ‘way’ might consist in. According to Stanley and Williamson, it is a property of token events (Stanley and Williamson 2001, 427) of which *riding a bike* is the event type. For any token of bike-riding, there is a way in which it is done, which may be instantiated in multiple further token events, and “entertained under distinct modes of presentation” (Stanley and Williamson 2001, 428). In order for a ‘way’ to feature in a proposition, the knower can simply point to someone who instantiates it; she need not be able to provide any informative description of it:

...for [Hannah knows how to ride a bicycle] to be true, there need be no sentence she understands and accepts containing a purely nonindexical description of a way of riding a bicycle (Stanley and Williamson 2001, 432).⁸

For contemporary intellectualists, the idea that knowing how to do something depends on indexical reference is no more surprising than it is for any other standard indexical term, such as the word ‘here’ (Stanley and Williamson 2017, 5).

An anti-intellectualist desiring to make sense of the difference between the ability to recall and recite propositions and the ability to perform certain acts, may find the indexical proposition ‘ w is a way for me to φ ’ quite uninformative. *Understanding* such a proposition might seem to depend on exactly the kind of habitual or skillful capacities that anti-intellectualists such as Ryle make it their business to articulate. Isn’t it possible for Hannah to know that w is a way in which she *could* ride a bicycle, even though she has never learned how to ride a bicycle? For such reasons, intellectualism has been accused of a *sufficiency problem* (Glick 2015, 538). We shall return to this issue later, but note now that this objection does not seem to bother Stanley and Williamson, who state:

[i]It is simply a feature of certain kinds of propositional knowledge that possession of it is related in complex ways to dispositional states. Recognizing this fact eliminates the need to postulate a distinctive kind of nonpropositional knowledge (Stanley and Williamson 2001, 430).

Here we agree regarding the close link between propositional knowledge and dispositional states, especially habits. However we shall argue that Stanley and

⁷ See also (Snowdon 2003, 26).

⁸ Snowdon makes the same point as follows:

‘[I]t is a philosophical myth to suppose that knowledge that standardly and centrally equips the knower with words which amount to a complete expression of his knowledge. Think how often the expression of knowledge ineliminably involves either gesture and/or a response to the indication of samples’ (Snowdon 2003, 27).

Williamson's response to the sufficiency problem is deeply uninformative insofar as it completely fails to explicate the 'complex ways' in which dispositional states are connected to possession of propositional knowledge. Explicating such links along Peircean lines is a key task of this paper.⁹

Developing our position must begin with a shift of perspective. Where contemporary intellectualists wish to read agency or practice through a 'propositional lens', as pragmatists, we wish to read propositional knowledge through an 'agentive lens'. In order to explore this different approach, we begin in the next section by introducing our Peircean account of agency, and its central concepts of *habit* and *self-control*. We shall distinguish Peirce's understanding of habit from Ryle's more mechanical one through an analysis of six layers of increasingly reflexive, and thus sophisticated, self-control. Following that, in Sect. 3 we shall use these concepts to build a Peircean account of knowing-how. Then in Sect. 4 we shall build a Peircean account of knowing-that, after which we shall explore ways in which these two accounts describe *essentially the same phenomenon*, thereby emphasising the intellectualist side of the Peircean position.

3 Peirce on Habit and Habit-Change

A habit extends beyond any single act, encompassing tendencies to act in distinctive ways across relevantly similar situations, unless those tendencies are actively inhibited. A further notable feature of habit is that it tends to reinforce itself and recur the more it is manifested, which ensures its profound influence in human life. Our presentation of Peirce's view will proceed in three stages: (i) outlining his understanding of *habit* as an objective behavioural regularity, (ii) presenting his account of *self-control*: the means by which an agent modifies its own habits, (iii) distinguishing between an agentive *foreground* and *background*, defined in terms of what falls within the scope of *deliberate* self-control. This last feature is, we believe, what distinguishes habits of *knowing* (both knowing-how and knowing-that), and thus intelligence, from the many other kinds of habits to be found within a living organism.

3.1 Habit

For Peirce, habit is the ur-ingredient of mental life. This derives from the origins of pragmatism in discussions of Alexander Bain's naturalistic claim that a belief may be understood solely as a habit, from which, Peirce remarked, all pragmatism follows as a mere corollary (Peirce 1931–1958, 5.12, 1905). This constitutes a naturalistic approach, since habits are: (i) open to empirical study (observable, not merely introspectable), (ii) shared by humans and all living organisms, down to the most

⁹ Our Peircean objection to contemporary intellectualism thus has a family resemblance to the charge that Stanley and Williamson, by appealing to 'practical modes of presentation', sneak anti-intellectualist claims into their position (Glick 2015, 544–6). See also (Hetherington 2006).

simple single-celled creatures, (iii) already subject to fundamental empirical work in biology.¹⁰

Peirce understands all living organisms as at least partly constituted by a body of habits which is constantly developing in response to their environment. His precise definition of ‘habit’ is any tendency to respond (whether consciously or no) in generally specifiable ways to generally specifiable situations.¹¹ Thus, he writes:

A habit is not an affection of consciousness; it is a general law of action, such that on a certain general kind of occasion a man will be more or less apt to act in a certain general way (Peirce 1931–1958, 2.148, 1902).

[Habit] determines the suchness of that which may come into existence, when it does come into existence (Peirce 1998, 269, 1903).¹²

Although the first definition restricts habit to the actions of a person, the second provides a much broader sense, which is arguably Peirce’s true conception. Note that for there to be generally specifiable ways of responding to generally specifiable situations, there must be genuine regularities in both our environment and our responses. This understanding of habit is therefore a manifestation of Peirce’s scholastic realism: a general is something over and above any collection of its particular instances.

Peirce’s understanding of habit differs importantly from Ryle’s, which refers only to what Ryle calls “*one-track dispositions*”—stimulus-reaction pairs where the reaction is always near-identical (Ryle 1949, 42–5). For instance, diamonds resist sharp blades in a predictable manner, and many dogs bark repetitively. Ryle distinguishes such dispositions from “intelligent capacities” that are “indefinitely heterogeneous” (Ryle 1949, 43–4), such as a master chef’s habit of producing excellent meals which respond creatively to present ingredients. Ryle claims that by contrast to “merely habitual” practices, each occurrence of which is a “replica” of its predecessors, genuinely intelligent practice is “modified by its predecessors. The agent is still learning” (Ryle 1949, 30).

¹⁰ It’s worth noting that although Peirce’s account of habit can be in some respects tested against the data of the empirical sciences, it is not developed merely through appeal to them, which would fall foul of Peirce’s anti-psychologism. Peirce has a series of arguments against various forms of psychologism. Some, turning on the inability of immediate feeling to justify anything, anticipate in some respect Sellarsian arguments against the Myth of the Given (e.g. Peirce 1998, 165–9). Others concern the possibility of a vicious circle whereby the results of psychology would back up a methodology on which they themselves depended (e.g. Peirce 1931–1958, 8.167, 1903). The distinction between the ‘foreground’ and ‘background’ of human action developed below will also undermine any attempt to study habit merely through introspection.

¹¹ This definition gathers together the key features of Peirce’s various descriptions of habit. The importance of generally specifiable actions and circumstances is made clear at (Peirce 1931–1958, 2.148; 5.480; 5.538, 1902) and (Peirce 1998, 401–2; 413). The importance of the habit *determining* the kind of action is made clear at (Peirce 1931–1958, 8.361; Peirce 1992, 198; 202) and (Peirce 1998, 269; 401–2). I have used the word ‘respond’ rather than ‘act’ to avoid confusion about the various kinds of habit that Peirce recognises. These include habits of action (1931–1958, 5.538, 1902), expectation (Peirce 1931–1958, 2.148; 5.539, 1902), and feeling (Peirce 1998, 377–8).

¹² This characterisation of habit is taken up in Rosenthal’s notion of general concept-schemas, which will be important in our discussion of Peirce’s account of the proposition.

Ryle also differentiates habits from intelligent capacities in that not only is a habitual response always the same, it is *mechanical* in that once it is triggered, the agent cannot avoid performing it—hence the association of habit with addiction and other so-called ‘bad habits’. Such habits are often theorised as threats to genuine agency which one should try to eliminate. Yet the chef’s meal falls under Peirce’s broader conception of habit, and we claim that Ryle is here setting up a false dichotomy between intelligent action and bodily routine. The Peircean answer to ‘bad habits’ does not consist in extirpating one’s own bodily mechanisms (if that were even possible), but in learning to bring them under greater conscious control. We shall return to this issue at the conclusion of the paper.

3.2 Self-control

Peirce takes our *control* of habits to be our primary means of manifesting our agency. This perspective turns much current philosophy of action on its head, seeing self-control as fundamentally manifesting itself diachronically over general patterns of behaviour, rather than synchronically in particular acts. In fact, Peirce takes the notion of individual acts entirely abstracted from actual or potential habits to be unintelligible. Peirce views self-control, then, as the capacity for an organism to *change its own habits*. He notes that this is most profoundly effected by the development of *further habits*: habits of habits. Once we cease to see habits as Ryle did, as relatively mechanical one-track dispositions, this enables new analyses of human autonomy in which habit may be understood as not a *stifling* but precisely an *enabling* force.¹³

A further notable feature of Peircean habit is how in a healthy, growing organism it tends to become increasingly skilful and precise over time, which means that we need pay less and less conscious attention to our habitual acts as they become ‘automatic’. This is a form of dissociation which, although it might sound unnerving, is actually an essential feature of our capacity to navigate our environment. If we had to plan and perform every action *de novo*, we would be too slow and clumsy to function.¹⁴ This automaticity allows us to attend to creating both new and higher-order habits, which will be discussed further below. Nevertheless, it does arguably have disadvantages in deadening our experience just as we become most accomplished. Some of the “stupid” intellectualism that Ryle deplores in certain pedagogical contexts might come down to this.¹⁵

The kinds of self-control that Peirce considers range greatly in sophistication. At one point he explicitly distinguishes six degrees along a spectrum of self-control, noting that even this list should not be considered exhaustive. Given the

¹³ It has been noted that this idea goes at least as far back as the Irish philosopher and physician Joseph J. Murphy’s 1869 book *Habit and Intelligence*, which Peirce read closely (Kilpinen 2016, 203).

¹⁴ In another context, Hubert Dreyfus makes the same point through a phenomenological investigation of master-level chess play (Dreyfus 2005, 53). See also (Railton 2009), (Sutton 2007).

¹⁵ Dewey wrote insightfully about this consequence, or risk, of intellectual development (Dewey 1925), so again it is to be regretted that Ryle doesn’t explicitly engage with him on these topics.

illuminating and original analysis that he provides, we shall first quote the list and then explain it stage by stage:

To return to self-control, which I can but slightly sketch, at this time, of course there are [1:] inhibitions and coördinations that entirely escape consciousness. There are, in the next place, [2:] modes of self-control which seem quite instinctive. Next, there is [3:] a kind of self-control which results from training. Next, [4:] a man can be his own training-master and thus control his self-control. When this point is reached much or all the training may be conducted in imagination. When a man trains himself, thus controlling control, he must have some moral rule in view, however special and irrational it may be. But next [5:] he may undertake to improve this rule; that is, to exercise a control over his control of control. To do this he must have in view something higher than an irrational rule. He must have some sort of moral principle. This, in turn, [6:] may be controlled by reference to an esthetic ideal of what is fine. (Peirce 1931–1958, 5.533, 1905, our numbering)

We shall explore these stages through the example of playing a musical instrument. The first two stages are exhibited by someone taking up the flute for the first time, who manages to avoid choking on her own saliva. Much of this kind of self-control lies below the level of consciousness, such as various movements of her larynx, and this is Peirce's first stage. Some other motions, such as swallowing, she will be consciously aware of, but are nonetheless instinctive. This second level of self-control is most characteristic of the animal kingdom, and possibly some plant life. Moving to the third stage, control by means of training, here our novice will allow her teacher to physically adjust the way she holds the flute, and will perform exercises given to her in class. This grade of self-control consists in a degree of behavioural plasticity. It is still *self*-control, though, insofar as this plasticity is enabled by the organism turning its own attention to the trainer, or at least 'allowing' the training to happen. A certain degree of self-regulation is required in order to make external training possible.

A major advance is made in moving from the third to fourth degree, at which we first begin to observe *deliberate* self-control. So our novice might begin to practice between lessons, bringing her playing closer to some more-or-less vaguely apprehended model of behaviour. Unlike in the external training of the third stage, she now needs to have some *internal* understanding of the form of action required, otherwise she will have no criterion for success in her practice, and it will not improve her playing. One mark of reaching this kind of understanding of target habits is that practice can now be carried out in the imagination. This is why this degree of self-control is the first deliberate one, as it is in some sense a *conscious* operation (Peirce 1931–1958, 1.574, 1906). The most basic form of deliberate control of habit is simply to "stamp" a habit of which we have become aware with some degree of

approval. Approving a form of action forms the genesis of taking responsibility for reproducing it.¹⁶

Now moving on to higher degrees of self-control, interestingly, we find that there is no definite upper limit. Our flautist, as she improves, will take increasing control over features of her playing for which she previously relied on her teacher. For instance, having learnt an arpeggio from the teacher, and listened to herself playing it, she might spontaneously decide to adjust her fingering in her daily practice, realizing that this produces a better tone than she was previously capable of (stage 5). At an even greater level of sophistication and autonomous control, she may decide that her teacher is actually incorrect in urging her to play the flute in a certain style, because she herself prefers—and has more aptitude for playing—a different style (stage 6). This is why in the passage above Peirce refers to stage 5's rules for 'control over control of control' as 'moral principles', which are potentially subject in turn to 'esthetic principles' in stage 6.¹⁷

Importantly, each degree of self-control presupposes all the earlier degrees. If the flautist could not breathe (stage 1), then she could not follow her teacher's instructions to direct air across the flute-head in a particular way (stage 2), and failing that, she could not produce a sound that she could record and analyse later in order to devise improvements (the later stages). Likewise, if she were not able to accept her teacher's training (stage 3), she would not be able to progress to 'guiding herself' towards further improvement (stage 4). It is also important to note that the earlier degrees do not require the apprehension of the truth of a proposition. They are adaptations of a body to a world—simple motions, some even innate. One might try to 'indicate' these simple motions as 'ways', per Stanley and Williamson, but in the case of, say, a subtle coordination of arms and fingers as the flautist performs a beautiful trill *at the very same time as* she blows harder in order to increase her volume, such 'pointing' would be exceedingly complex, to say the least. Nevertheless, as the spectrum of self-control increases in complexity, it becomes easier and easier to interpret it as emerging conceptual content of some form for the agent. So, at stage 4, the flautist might begin to consciously organise her thoughts about her playing through propositions such as "I am trying to breathe more gently while playing high notes". Then again, she may *not* do this—plenty of musicians do not find such articulations helpful. The point is that there is no sharp dividing line here between practices that are articulate, inarticulate and *articulable*.

In its earlier stages, Peirce's analysis might be understood to 'delve beneath' naïve intellectualist understandings of knowledge as a set of true propositions, producing what might be termed a *sub-linguistic analysis* of knowledge's bodily underpinnings. At the same time, interestingly, in its later stages (4, 5 and 6), Peirce's analysis might equally be understood to 'go above' intellectualist understandings

¹⁶ For this reason, the maintenance of a habit which we have become aware of counts as the "deliberate development" of a habit on this account. This is true even though the external behaviour which the habit determines does not change as a result of being "stamped with approval."

¹⁷ Peirce's working out of his so-called 'normative sciences' is an intriguing story which we do not have space to go into here. The interested reader is referred to Potter (1997), Atkins (2016), Masecar (2016) and Legg (2014).

of knowledge in its analysis of habits applied to habits. The later stages might be dubbed a *super-linguistic analysis*—a rather intriguing idea. Thus, where knowledge is arguably understood by contemporary intellectualists as ‘flat’—consisting in a single ‘representational level’ which lists what early Wittgenstein famously referred to as “states of affairs”, knowledge understood in this habitual sense is capable of indefinite refinement through an iterated self-reflexivity which inescapably blossoms into moral and aesthetic intuitions.

3.3 Foreground and Background

As noted above, on Peirce’s account the scope of *deliberate* self-control over our habits is relatively narrow: “our logically controlled thoughts compose a small part of the mind, the mere blossom of a vast complexus which we may call the instinctive mind” (Peirce 1998, 241). This scope of deliberate control may be usefully thought of as a “foreground” which is set against a “background” of habits which fall outside of deliberate self-control at any given time.¹⁸ Importantly, this is not necessarily a distinction between conscious and unconscious awareness, although Peirce does suggest that any process which is not controllable is thereby not *fully* conscious (Peirce 1931–1958, 5.181, 1903).¹⁹ In short, we can be conscious of bodily motions that we can’t deliberately control, such as our heartbeat, but nothing that we can deliberately control is entirely unconscious.

The foreground and the background are continuous insofar as what cannot be controlled now by a given agent might be controllable at a later time. As she grows and learns, a habit can shift from the heart of the background to the foreground. Such shifts often result from a surprising experience that breaks the course of usual activity. For example, consider a homophobic man whose beliefs that homosexuals wish to ‘destroy the moral fabric of the nation’ form part of the background of his activity and thought. Now imagine that his son ‘comes out’ to him. Sometimes, of course, this kind of situation goes very badly. But we can imagine that the man is surprised and thrown into doubt. He knows that his own son is not out to destroy the moral fabric of the nation, but has always seemed an exemplary person. This line of thinking might initiate a line of inquiry that results in a new set of beliefs. The man could not control his homophobic beliefs before, but the shock of this surprising experience has allowed him to deliberately develop and adopt new ones.

3.4 The Continuity of Foreground and Background Habits

We have seen that one consequence of Peirce’s account of habit and its control is that the foreground of human agency depends on a background network of automatic practices and basic animal competencies on which our relatively articulate

¹⁸ The use of the terms ‘foreground’ and ‘background’ here loosely follows (Colapietro 2009).

¹⁹ Elsewhere, Peirce claims that “to say that an operation of the mind is controlled is to say that it is, in a special sense, a conscious operation” (Peirce 1931–1958, 5.441, 1905). See also (Stjernfelt 2016, 252–257).

knowledge builds.²⁰ By contrast, the practical ‘ways’ which contemporary intellectualists take to be tightly linked with propositional knowledge are *indicated but not explicated*. We have seen that they are assumed to be sufficiently discrete and autonomous to be individuated through pointing—and even “entertained under distinct modes of presentation” (Stanley and Williamson 2001, 428)—and it is assumed that no further semantic account of them is possible or even desirable. This idea of a practical mode of presentation does allow the contemporary intellectualist to make knowing-how *dependent on* the dispositions of the agent entertaining the proposition, but the contemporary intellectualist does not think of these dispositions as *continuous with* the propositional aspect of his account. The dependence proposed by Peirce is something like that between earlier and later forms of development, while that proposed by the contemporary intellectualist seems to be something more like the dependence of a game of cricket on good weather conditions. (One might call this an external rather than internal dependence.)

We will discuss this issue further below, but in the meantime, we have promised to explain how, in a Peircean framework, knowing-that may be understood as not merely *dependent on* knowing-how, but as *itself* a form of knowing-how. Redeeming this promise will require us to present Peirce’s distinctive account of the proposition. First, however, it’s worth briefly returning to the counterexamples to the Capacity Thesis in the light of the account just presented. We may now say that knowing how to ϕ requires the possession of certain habits. The example of the now-armless omelette chef Raymond Blanc is instructive here. Whilst we can think of Blanc’s expertise as tightly connected to the practice of actually making omelettes, we need not think that Blanc’s deliberately developed habits of omelette-making cannot be manifested otherwise than in the actual making of omelettes. It will structure action in imagination, in counterfactual circumstances in which his arms are returned to him, and in his expectations when he observes others making omelettes; it need not disappear when Blanc has his unfortunate accident. This more generalised understanding of human capacities is a key benefit that Peirce hopes to gain from focusing on habits rather than individual acts. In the case of the agile and thin S, on the other hand, we do not have sufficient information to attribute to him anything other than basic habits of moving about in a world of physical objects. This kind of capacity seems a touch diffuse to count as knowing-how, although various more specific knowings-how may depend on it. (Perhaps, for instance, we can say that he knows how to climb Grade Seven rock faces.)

²⁰ Alva Noë has insightfully shown how representationalist theories of perception have taken for granted, and thereby dismissed, the rich bodily skill-set which underpins even simple perceptions (Noë 2004).

4 Habit and Knowing-How

Yet the mere possession of a habit of φ -ing by some agent is not sufficient for the agent to be rightly said to ‘know how to φ ’. Consider sleeping, for example. We shall argue that knowing how to φ is having a relevant habit that is *deliberately developed*.

Purposefulness lies at the heart of Peirce’s pragmatist account of mind and knowledge (Gava 2014). He suggests that the overarching end to which all human actions ought to be directed is the ‘growth of concrete reasonableness’ (Peirce 1931–1958, 2.34n2, CP 5.3). This means to “embody general ideas in art-creations, in utilities, and above all in theoretical cognition” (Peirce 1998, 443). How does one embody a general idea? Precisely by developing a habit. It might have cheered Ryle to learn that education viewed from our Peircean perspective does not consist in imbibing true propositions so much as in *character formation*.²¹

We saw above that habit-development may be understood as having a distinguishable background and foreground. Thinking about human practices in general, we can characterise the background as the attunement with the world characterised by pre-deliberate degrees of self-control, whilst the foreground is the deliberate development of habits to achieve certain *purposes*. I am attempting to learn, say, a certain arpeggio, or how to avoid contamination while brewing beer. We can now attempt a Peircean gloss on *knowing how to φ* : it is *to have a stable and deliberately developed habit such that, when relevant circumstances present themselves, one tends to φ* .

How do we know when we have developed a stable habit? Peirce gives the question a moral twist (in the broad sense of morality associated with Peirce’s fourth stage of self-control above) by counterposing self-control with ‘self-reproach’:

...there is a tendency, as action is repeated...for the action to approximate indefinitely toward the perfection of that fixed character, which would be marked by entire absence of self-reproach. The more closely this is approached, the less room for self-control there will be; and where no self-control is possible there will be no self-reproach (Peirce 1931–1958, 5.418, 1905; see also Peirce 1998, 247, 1903).

Here Peirce imagines ongoing processes of reflection on our patterns of action – measuring them against both our aims and worldly feedback. Perhaps our habitual actions fail to achieve our aims, or perhaps we make some new and surprising discovery which sets us on a new path. In aiming at an absence of ‘self-reproach’, we are not invited to evaluate our actions solipsistically, but within a natural and social environment which constrains, enables, and informs our self-criticism. The “fixed character” of a stable habit derives from its reliability in meeting these challenges.

This account of self-control thereby avoids mere subjectivity. The habits which tend towards the minimisation of reproach are those which *would* (the subjunctive

²¹ This idea is explored much further in Bergman (2016).

is important here) succeed across a wide range of situations, and maintain themselves even across development in the agent's own sense of what is admirable. Here, as in many other places, Peirce introduces a "limit" notion. Through the growth of self-control, habits "approximate indefinitely" towards a situation free from self-reproach. This, in turn, means that knowledge ascription comes in degrees. We take the flexibility this provides to be both useful and appropriate.²² When it comes to developing our *thinking*, we enter the realm of logic (which Peirce analysed as a sub-branch of ethics, due to its dependence on self-control²³). Peirce notes that here the desired end-point of stable habit is perfectly fixed belief (Peirce 1998, 337, 1905), and that a cognitive operation "is not worthy to be called reasoning unless it be deliberate, critical, self-controlled" (Peirce 1931–1958, 4.476, 1903). Thus Peirce's account of intelligence ultimately rests on self-control rather than the more popularly explored *consciousness*, although as noted above, the two are connected (Holmes 1966).

This habit-based account of knowing-how captures many anti-intellectualist intuitions. Although it necessarily involves the concept of deliberate control, it does not require that the agent can articulate *in words* the habits they are developing. However, the appeal to "deliberately developed habit" may raise some eyebrows. Isn't the point of anti-intellectualism to show that action does not need to be connected to deliberation in order to count as successful, intelligent, or creative? This worry points us towards understanding Peirce as also a unique kind of intellectualist in the next section.

5 Habit and Knowing-That

5.1 Peirce's Account of the Sign

We are now ready to sketch how Peirce constructs propositional knowledge in terms of deliberately developed habits. To do this we will draw on Peirce's original theory of signs. We begin by presenting his general definition of a sign, then explain the

²² We are grateful to an anonymous reviewer for offering two considerations which help to explicate the features of Peirce's account we have just been discussing.

First, they note that skills can be practised or "rusty", and that being rusty is different from losing knowledge, even though it does make our habits less refined. Peirce can agree with this, since being rusty need not reduce the *stability* of one's habits below the relevant level for knowledge ascription. The Peircean approach can also capture the fact that, beyond a certain level of neglect, we cease to be merely rusty and do indeed lose our know-how.

Second, we consider the different ways in which damage to the body can affect habits and know-how. The case of Raymond Blanc featured the loss of arms. But what about damage to the brain? In such cases we might be more ready to deny know-how. Our response to the Blanc case turned on the way in which a habit can manifest itself outside its usual forms of action. Blanc can mentally rehearse his cooking skills in the absence of his arms, and thereby might even *improve* his knowledge of how to cook omelettes. However brain damage is apt to destroy a wider range of manifestations of our habits, and our capacity for deliberate controlling them. In such cases we can simply note that the brain is more intimately connected with our capacities for deliberate habit development than the rest of our bodies.

²³ Again, the interested reader is referred to authors listed in note 13 above.

specific features of propositional signs. We will then be in a position to see both that habitual action extends all the way ‘up’ to our most sophisticated intellectual manipulation of signs, while the semiotic—and indeed the propositional—extends all the way ‘down’ to our deliberately developed habitual behaviour (that is, our knowing-how). The former is a typically anti-intellectualist theme. The latter is intellectualist—*albeit* not in the contemporary sense which holds that knowing that is *more fundamental* than knowing how, but in the arguably even more radical sense that the former is *coextensive* with the latter.

Peirce taught that the structure of a sign is irreducibly *triadic*: comprised of not just ‘word and object’, but also an *interpretant*, which consists in further uses of the same sign to represent the same object. As Peirce puts it, “a sign is not a sign unless it translates itself into another sign in which it is more fully developed” (Peirce 1931–1958, 5.594, 1903). In this formal analysis of intelligibility as repetition we already start to see how signs themselves constitute a kind of habit. This idea is further developed in Peirce’s famous Pragmatic Maxim, which states that the true meaning of our concepts lies in our future expectations concerning their practical effects. In this way, the Maxim effectively translates every meaningful concept into *a set of hypothetical conditionals*, which is continually updated in the light of lived experience.²⁴ Crucially, it is the updating process itself, rather than any particular set of hypothetical conditionals, that should be understood as most fundamentally constituting the meanings of our terms. In other words, meaning lies “not in what is actually thought, but in what this thought may be connected with in representation by subsequent thoughts; so that the meaning of a thought is altogether something virtual” (Peirce 1931–1958, 5.289, 1868). Note how this understanding differs from the various static ‘meaning-objects’ generally envisaged by mainstream analytic philosophers, such as, for instance, a ‘way’ which may be referred to under alternative “modes of presentation” (or “ways of thinking” (Stanley 2011)). It speaks to Ryle’s desire to make sense of intelligence as lying most fundamentally not in an agent’s representations of the world, so much as in his capacity to modify them, and to be “still learning” (Ryle 1949, 30).

This modality at the heart of pragmatist semantics speaks to a question that naturally occurs to mainstream epistemologists insofar as they adhere to a broadly Cartesian, ‘representationalist’ theory of mind. How are these multifarious sets of hypothetical conditionals determined, ‘stored’, and accessed by any given agent, in order to maintain its habits? The radical Peircean pragmatist answer is that *the habits themselves* embody a schematic logical structure. Recall that we cited Dewey above criticising intellectualism for making “a definite separation between the world in which man thinks and the world in which he acts”. Here we are abandoning this separation. Rosenthal has written insightfully here, noting that Peirce, “takes from Kant the fundamental insight that concepts are empirically meaningful only if they contain schematic possibilities for their application to sensible experience” (Rosenthal 1994, 26),²⁵ and in this way, lived experience “reflects a semiotic structure operative

²⁴ Peirce clearly states the pragmatic maxim in this form at (Peirce 1998, 134-5, 1903).

²⁵ See also (Hookway 2002).

at its most fundamental level”, since “human behaviour is meaningful behaviour” (Rosenthal 1994, 27). In this way, then, Peirce’s pragmatism may be understood as a kind of intellectualism. Indeed, Peirce criticised fellow pragmatists for their tendency to undermine the importance of thought since, he claimed, the whole point of action is the development of ideas.²⁶

5.2 Peirce’s Account of the Proposition

We have not yet explained the distinctive features of propositional signs. Unlike simple referring terms, e.g. “Melbourne”, a proposition such as “Melbourne is in Victoria”, is *true or false*, which constitutes a distinct level of semantic functioning. Fredrik Stjernfelt, in his excellent recent exposition of Peirce’s theory of the proposition (Stjernfelt 2014, 2015, 2016), follows Peirce in using the term ‘*dicisign*’ to refer to propositional structures that may be identified both inside and outside language. A *dicisign*, he claims, is simply a sign with a “particular double structure”, which consists in an indexical sign and a concept-schema fused together such that something is both pointed to and described at the same time. Fundamentally: in order to make a truth-claim, one needs to *say something about something*. Thus, the proposition “Melbourne is in Victoria” both indicates a particular city and ascribes it a general property of location. The indexical and the concept-schema are both signs referring to the same object, and their juxtaposition allows the *dicisign* to perform its information-conveying function (Peirce 1998, 310, 1904).²⁷

We now need to show how our pragmatist account of knowing how as deliberately developed habit instantiates this formal structure. The key is to identify the *dicisign*’s indexical part with the particular stimulus which cues any given habit, and identify its concept-schema with the general behavioural response which ensues. Consider once again our flute player. She notices that when she plays a high note, her fingers tend to curl in a certain way, which can produce an unpleasant screeching sound. So she develops a habit of noticing when the screech feels imminent, then deliberately relaxing her fingers. She may thereby be analysed as knowing the following *dicisign*:

[[*this* →] imminent screeching] can be abated by means of [*general concept-schema*] relaxing the curl of fingers]

²⁶ For instance, in correspondence with William James, Peirce wrote: “Pragmatism is correct doctrine only in so far as it is recognised that material action is the mere husk of ideas [...] the end of thought is action only in so far as the end of action is another thought” (Peirce 1931–1958, 8.272, 1902).

²⁷ We are grateful to a reviewer for noting that this account of the proposition appears quite different from those which are assumed in contemporary literature on intellectualism. This is true. However, we do not think that it undermines our contribution. Note that Stanley and Williamson use a Russellian account of propositions (2001), later switching to a Fregean one (2011)—so trying a different account of the proposition cannot be off-limits in a response to these debates. We also note previous work on Peirce’s account of the proposition – for example Hilpinen (1982), Stjernfelt (2014), and Stjernfelt (2015)—which helps to situate Peirce’s account within more ‘mainstream’ discussions, and suggests that our introduction of Peirce’s account of the proposition to the intellectualism debate is not merely changing the topic.

Although this schematic proposition is relatively inarticulate, and vague, the flautist can recognise sufficient similarity between a wealth of particular instances of both the screeching sound, and the finger alignment that brings it about, for this insight to develop into a stable habit. The schema thereby allows for the indefinite generation of *conditionals* corresponding to all the possible situations which might cue the habit, and the range of different possible responses it allows for. It is such conditionals that, as noted above, express the true meanings of concepts under pragmatism. In the context of this understanding, and the flautist's overall purpose of producing pleasant music, the specific cue of imminent screeching triggers an *argument* whose conclusion is that she should move her fingers into the relaxed position. Stjernfelt has also noted this consequence of Peirce's account, writing:

Habits thus share the predicate/subject structure with propositions...The particular occasion that calls into action the general habit acts like the object of the proposition, the ensuing volitional act appearing as an inference from that proposition...(Stjernfelt 2016, 245).

There is much more to be said about Peirce's account of the proposition and its connection with habituation, but this awaits further research.

We may now more clearly define Peirce's stance on the question of intellectualism. Recall Glick's typology of positions according to which strong anti-intellectualism claims that knowing-that is a form of knowing-how. Peirce satisfies this as follows:

- *Peirce's Strong Anti-Intellectualism*: a proposition is known by an agent insofar as they possess a deliberately developed, stable habit of acting in ways which, *ceteris paribus*, would be successful were the proposition true.

On the other hand, Glick claims that intellectualism makes knowing-how a variety of knowing-that. Peirce satisfies this as follows:

- *Peirce's Intellectualism* The deliberate development of any habit consists in learning to predicate of certain specific cues, certain general patterns of behaviour which are considered appropriate to those situations. Because such schemas instantiate propositional form broadly understood, knowing-how is a form of knowing that.

These two positions, taken together, entail that knowing-how and knowing-that are co-extensive. This is, in turn, made possible by Peirce's generalisation of the notion of a proposition to include non-linguistic means of both referring to and characterising objects.

Let us now compare contemporary intellectualism. We've seen Stanley and Williamson claiming that knowing how to ϕ consists in knowing a proposition that some 'way' is a way for one to ϕ . Interestingly, this account does replicate the indexical sign that is the first essential component of the Peircean dicisign. But the second essential component—the concept-schema—arguably lacks traction in Stanley and Williamson's account. It might be argued that it is broadly present in the claim that

‘way’ w is a way to “ride a bike”. This effectively pins a label on w , which might be said to connect w in some sense with the general concepts of ‘riding’ and ‘bicycle’. But we shall now show how this connection misses the Peircean account’s modal structure, to its detriment.

We noted above that it is possible for Hannah to know that w is a way for her to ride a bicycle, although she has never learned to ride a bicycle. How a bicycle would feel beneath her body, how she would move the pedals—these are the “schematic possibilities for application to sensible experience” (in Rosenthal’s terms) which properly pertain to bicycle riding, but they are absent from Stanley and Williamson’s account of the meaning of “ w is a way for Hannah to ride a bicycle”. This is precisely why, as argued above, their account fails to resolve the sufficiency problem. Note also, that the deliberately developed habits which link w with these schemata on Peirce’s account are *brought within the domain of knowledge*, and form part of the ‘knowledge-how’ which we ascribe to the competent bicycle-rider. Yet on the contemporary intellectualist story, the dispositions of the agent are merely *something on which knowledge depends*. In this way, then, our Peircean intellectualism incorporates the lived experience of practices which anti-intellectualists typically pride themselves on offering.

6 Conclusion

What is intelligence for? Thinking may be regarded as the ultimate habit of habits, which is to say, the ultimate locus of self-control. Because of its plasticity (arguably far greater than that of our physical bodies), our thinking can assume the kind of reflexive, self-developing structure required for the ‘control of control’ that Peirce analyses as the true essence of intelligence, which *pace* Ryle should be understood as broader than just deliberately chosen actions. Rather, true intelligence requires a rich ‘background’ of habits which enable us to achieve certain tasks fluently *and automatically*, and a ‘foreground’ that purposefully mobilises these routines, combines them in new and creative ways, and at appropriate times subjects them to deliberate development. This, then, is the new analysis of human autonomy in which habit may be understood as not a *stifling* but precisely an *enabling* force, promised earlier.

Along the way, we have embraced the radical idea that habit itself should be understood as having logical structure. In this logical structure lies implicit an invitation to render our actions more *consistent*, which may be understood (in a Kantian spirit) as an invitation to lend our lives greater ethical integrity, and finally aesthetic harmony, through the growth of concrete reasonableness. In this regard, then, we suggest that paradigm cases of knowing-that (such as Pierre knowing that Paris is the capital of France) should be regarded as the ultimate, most sophisticated and powerful, form of knowing-how, rather than as an alternative to it. Yet as we are agents in the world, not spectators, as Dewey famously remarked, the ‘pinnacle of habit’ that is verbally articulate knowing-that must always rest on a broad base of knowings-how which (although *articulable* in propositional structure broadly construed, as we have seen) may never all be made fully explicit.

When thinking about the relationship between theory and practice in knowing, as in other areas of human life, why would one not consult pragmatist philosophy? Here we have argued that although pragmatism has often taken anti-intellectualism to be a defining feature, in an important sense Peirce may be understood as an intellectualist. Where Ryle draws a sharp distinction between on the one hand, disciplining someone into a way of acting, and on the other hand, telling them facts, Peirce's pragmatism teaches that these merely constitute two positions on a wide spectrum of sophistication of self-control. In this way, we can analyse propositional structure (taken in the broad sense of Peirce's 'dicisign') all the way 'down' this spectrum to simple learned bodily movements, thereby understanding our position as a form of intellectualism, whilst at the same time we can analyse embodied agency all the way 'up' the spectrum to the most sophisticated human theorising, thereby understanding our position as a strong anti-intellectualism.

But we have also seen that Peirce's dicisign offers an account of the proposition that transcends verbal expression. This produces the surprising consequence that not all knowing-that is expressed in words. Consider, for example, my 'knowing that' President Obama visited India, after someone I trust simply shows me a photograph which both points out Obama and shows him in recognisably Indian surroundings. This powerful generalization in Peirce's sign theory enables us to finally identify another important sense in which Peirce is also a strong *anti-intellectualist*. In short, we may say that *Peirce rejects linguistic intellectualism*, and we speculate that this may have been an important reason for his developing the dicisign idea.

Finally, in closing we return to the issue of 'bad habits'. Contra Ryle, their problem arguably lies not in their 'mechanical' nature, but in their logical inconsistency with the rest of our habits. The smoker is troubled by his unstoppable practice of lighting up only because he has other habits which tend towards his own health and well-being. By contrast, our flautist after years of professional playing feels a compulsion to daily practice which is equal in strength to the smoker's craving, but that is welcome evidence of mastery in her chosen field.

References

- Atkins, R. K. (2016). *Peirce and the conduct of life: Sentiment and instinct in ethics and religion*. Cambridge: Cambridge University Press.
- Bergman, M. (2016). Beyond explication: Meaning and habit-change in peirce's pragmatism. In D. West & M. Anderson (Eds.), *Consensus on Peirce's concept of habit: Before and beyond consciousness* (pp. 171–198). Cham: Springer.
- Colapietro, V. (2009). Habit, competence, and purpose: How to make the grades of clarity clearer. *Transactions of the Charles S. Peirce Society*, 45(3), 348–377.
- Dewey, J. (1910). Some implications of anti-intellectualism. *The Journal of Philosophy, Psychology and Scientific Methods*, 7(18), 477–481.
- Dewey, J. (1925). *Experience and nature*. Chicago: Open Court.
- Dewey, J. (1929). *The quest for certainty: A study of the relation of knowledge and action*. New York: Milton Balch and Co.
- Dreyfus, H. (2005). Overcoming the Myth of the Mental: How philosophers can profit from the phenomenology of everyday expertise. *Proceedings and Addresses of the American Philosophical Association*, 79(2), 47–65.
- Fantl, J. (2008). Knowing-how and knowing-that. *Philosophy Compass*, 3(3), 451–470.

- Gava, G. (2014). *Peirce's account of purposefulness: A Kantian perspective*. London: Routledge.
- Glick, E. (2015). Practical modes of presentation. *Noûs*, 49(3), 538–559.
- Hetherington, S. (2006). How to Know (that Knowledge-That is Knowledge-How). In S. Hetherington (Ed.), *Epistemology futures* (pp. 71–94). Oxford: Clarendon Press.
- Hilpinen, R. (1982). On C. S. Peirce's theory of the proposition. *Monist*, 65(2), 182–188.
- Holmes, L. (1966). Peirce on self-control. *Transactions of the Charles S. Peirce Society*, 2(2), 113–130.
- Hookway, C. (2002). '...A Sort of Composite Photograph': Pragmatism, ideas, and schematism. *Transactions of the Charles S Peirce Society*, 38(1/2), 29–45.
- Hutto, D., & Myin, E. (2013). *Radicalizing enactivism. Basic minds without content*. Cambridge MA: MIT Press.
- Katsav, J. (2018). Analytic philosophy, 1925–69: Emergence, management and nature. *British Journal for the History of Philosophy*, 26(6), 1197–1221.
- Kilpinen, E. (2016). In what sense exactly is Peirce's habit-concept revolutionary? In D. West & M. Anderson (Eds.), *Consensus on Peirce's concept of habit: Before and beyond consciousness* (pp. 199–214). Cham: Springer.
- Legg, C. (2014). Logic, Ethics and the ethics of logic. In T. Thellefsen & B. Sorenson (Eds.), *Charles Sanders Peirce in His Own Words* (pp. 271–278). Berlin: De Gruyter.
- Massecar, A. (2016). *Ethical habits: A Peircean perspective*. New York: Lexington Books.
- Noë, A. (2004). *Action in perception*. Cambridge MA: MIT Press.
- Peirce, C. S. (1931–1958). *Collected Papers (CP)*, eds C. Hartshorne, P. Weiss and A. Burks, 8 vols. Massachusetts: Harvard University Press.
- Peirce, C. S. (1992). In N. Houser & C. Kloesel (Eds.), *Essential Peirce, vol. 1: Selected Philosophical Writings (1867–1893) (EPI)*. Indianapolis: Indiana University Press.
- Peirce, C. S. (1998). In N. Houser & C. Kloesel (Eds.), *Essential Peirce, vol. 2: Selected Philosophical Writings (1893–1913) (EP2)*. Indianapolis: Indiana University Press.
- Potter, V. G. (1997). *Charles S. Peirce on Norms & Ideals*. New York: Fordham University Press.
- Railton, P. (2009). Fluent agency. In D. Sobel & S. Wall (Eds.), *Reasons for action* (pp. 81–115). Cambridge: Cambridge University Press.
- Rorty, R. (1982). *Consequences of pragmatism*. Minneapolis: University of Minnesota Press.
- Rosenthal, S. (1994). *Charles Peirce's pragmatic pluralism*. Albany: SUNY Press.
- Ryle, G. (1946). Knowing how and knowing that. *Proceedings of the Aristotelian Society*, 46, 1–16.
- Ryle, G. (1949). *The concept of mind*. Chicago: University of Chicago Press.
- Snowdon, P. (2003). Knowing how and knowing that: A distinction reconsidered. *Proceedings of the Aristotelian Society*, 104(1), 1–29.
- Stanley, J. (2011). *Know how*. Oxford: Oxford University Press.
- Stanley, J., & Williamson, T. (2001). Knowing how. *The Journal of Philosophy*, 98(8), 411–444.
- Stanley, J., & Williamson, T. (2017). Skill. *Noûs*, 51(4), 713–726.
- Stjernfelt, F. (2014). *Natural propositions: The actuality of Peirce's Doctrine of dicisigns*. Boston: Docent Press.
- Stjernfelt, F. (2015). Dicisigns. *Synthese*, 192(4), 1019–1054.
- Stjernfelt, F. (2016). Dicisigns and habits: Implicit propositions and habit-taking in Peirce's pragmatism. In D. West & M. Anderson (Eds.), *Consensus on Peirce's concept of habit: Before and beyond consciousness* (pp. 241–262). Cham: Springer.
- Sutton, J. (2007). Batting, habit and memory: The embodied mind and the nature of skill. *Sport in Society*, 10(5), 763–786.

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.