Reflective Reasoning & Philosophy

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Abstract. Philosophy is a reflective activity. So perhaps it is unsurprising that many philosophers have claimed that reflection plays an important role in shaping and even improving our philosophical thinking. This hypothesis seems plausible given that training in philosophy has correlated with better performance on tests of reflection and reflective reasoning has correlated with demonstrably better judgments in a variety of domains. This article reviews the hypothesized roles of reflection in *philosophical* thinking as well as the empirical evidence for these roles. This reveals that although there are reliable links between reflection and philosophical judgment among both laypeople and philosophers, the role of reflection in philosophical thinking may nonetheless depend in part on other factors, some of which have yet to be determined. So progress in research on reflection in philosophy may require further innovation in experimental methods and psychometric validation of philosophical measures.

Keywords: reflection, reflection test, reflective equilibrium, reflective endorsement, experimental philosophy, metaphilosophy, epistemology

"A preoccupation with reflection is, arguably, the Western philosophical tradition's most distinctive feature, in both historical and contemporary contexts." –John Doris (2015)

Some questions prompt an intuitive response. When we ask, "How much should I donate?", our first response might be to opt for the first amount that feels right. Of course, we can step back and reflect on this feeling. "Is that enough?" "Can I afford to give that much?" This reflection may either reinforce our initial impulse—"That much is fine"—or revise it—"Upon reflection, I can afford to give much more".

Many philosophers accept that such intuition and reflection are standard fare in philosophical thinking. Philosophers appeal to intuition in arguments for or against certain claims or views (e.g., Chalmers, 2014; Climenhaga, 2018; De Cruz, 2014b; Mallon, 2016). As Hilary Kornblith puts it, "George Bealer does it. Roderick Chisholm does it a lot. Most philosophers do it openly and unapologetically, and the rest arguably do it too, although some of them would deny it" (Kornblith, 1998; cf. Cappelen, 2012; Machery, 2017; Williamson, 2008). Philosophers also consider reflection essential for double-checking our philosophical intuitions—e.g., "render[ing] coherent and …justify[ing] our convictions of social justice" (Rawls, 1971, p. 18).

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Intuition and reflection are also hot topics in cognitive science. Daniel Kahneman's popular book *Thinking Fast & Slow* (2011) may be the most well-known compendium of this literature. Of course, some of the findings in that book have been disputed (Kahneman, 2017; Schimmack, 2020). Indeed, research on intuitive impulses and more deliberative responses is an ongoing topic of investigation in cognitive science with unresolved and still-unfolding discoveries (e.g., De Neys, 2018; Pennycook, 2018).

At some point the philosophy and cognitive science of intuition and reflection collided: scholars started running studies and experiments to test claims about how intuition and reflection actually impact philosophical thinking. They found some evidence that moral, political, and other philosophical beliefs seemed to vary depending on the degree to which people employed intuitive or reflective reasoning. However, not all these results have replicated and some methods produce different results than others. So many questions about how intuition and reflection feature in philosophical thinking remain unanswered.

In what follows, I will review some of this literature. First, I will elaborate on reflection's theoretical role in philosophy. Then I will explicate the notion of 'reflection' that we will focus on in this article. That will pave the way to consider how reflection is measured as well as how its psychological construct features in empirical investigations of philosophical reasoning. I also consider whether the philosophical judgments that correlate with or result from reflection are normatively superior to their alternatives. This leads me to the conclusion that progress in research about reflection in philosophy may require advancements in experimental manipulations of reflection as well as measurement of philosophical tendencies.

Reflection In Philosophy

Recent philosophy is rife with concepts that involve reflection. Consider some examples.

- "Reflective knowledge", unlike animal knowledge, was said to involve understanding of not just a perceived, remembered, or inferred fact but its relationship to the broader network of beliefs and knowledge (Sosa, 1991, p. 240).
- "Reflective equilibrium" has been invoked explicitly in discussions of how to determine what is just (Rawls, 1971) and invoked implicitly in discussions of how to justify the rules of logic (Daniels, 2013; Goodman, 1983).
- "Reflective agency" was considered important to understanding human action (Kennett & Fine, 2009; Velleman, 1989, 2000; Wallace, 2006).
- "Reflective scrutiny" has been said to allow us to evaluate our ethical view from within the confines of that view (Hursthouse, 1999, Chapter 8).
- "Reflective persons" have been described as unlikely to accept certain claims (e.g., Sidgwick, 1874).
- "Reflective self-knowledge" has referred to the unique awareness we enjoy over our own—as opposed to others'—beliefs, desires, intentions, and other mental states (Peacocke, 2014).

There are no doubt more examples of how the concept of reflection appears in English-speaking philosophy (Byrd, 2021a). Analyzing all of them is a valuable project that goes beyond the limits of this article. The point is just that 'reflection' often appears in some of philosophy's most influential concepts, arguments, and views.

Of course, not all philosophers mean the same thing when they use 'reflect' and its cognates. So it is worth explaining the notion of 'reflection' on which I focus in this article.

Explicating 'Reflection'

If you spend enough time reading English philosophy, you may find that 'reflection' is often used as a term of art that means something specific and technical. Consider a classic description of reflection.

> I find myself with a powerful impulse to believe. But I back up and bring that impulse into view […]. Now the impulse doesn't dominate me and now I have a problem. Shall I believe? (Korsgaard, 1996, Lecture 3)

Those who are familiar with the rest of that text will know that Christine Korsgaard is explaining how the human mind "cannot settle for [mere] perception and desire" because "it needs a reason" (1996, Lecture 3). The idea is that reflection is supposed to help us find a reason to accept or modify our initial perceptions, desires, impulses, intuitions, etc.

> The role of reflection is […] to step back from the immediate situation, to calculate consequences, to compensate for the immediate force of one desire which might not be the most advantageous to follow […]. (Taylor, 1976, p. 287)

Thus, the notion of reflection that these philosophers are interested has a purpose: double-checking our initial responses. Further, this notion of reflection involves at least two components: stepping back and consciously reconsidering. So, roughly, reflective equilibrium involves pausing to reconsider whether our first response coheres with the rest of our considered beliefs. Likewise, reflective endorsement would involve some sort of assent after deliberately inhibiting and evaluating our initial response. This two-factor account of reflection is not isolated to philosophy. It is also found in cognitive science.

Reflection in Cognitive Science

Dual process theories in cognitive science distinguish between at least two reasoning types or processes (Frankish, 2010). For example, dual process theories might distinguish between fast and slow, associative and non-associative, or reflective and unreflective reasoning (Byrd, 2019). Importantly, some of these distinctions are orthogonal to one another preventing us from, say, inferring that reasoning is reflective just because it is slow or non-associative (ibid.).

Nonetheless, experimental psychologists, behavioral economists, and other social scientists have been developing tests of people's disposition to reason reflectively for decades. Consider one of the most famous reflection test questions: "A bat and a ball cost $1.10 in total. The ball costs $1.00 more than the ball. How much does the ball cost?" (Kahneman & Frederick, 2002). Cognitive scientists have found that the first answer that jumps to many people's minds is "10 cents" (Frederick, 2005). Of course, a moment's reflection can reveal that the correct answer is actually "5 cents".

Because reflection tests are designed to lure us toward a particular response that, upon reflection, can be determined to be incorrect, they seem to track the two behavioral components of reflection stepping back and reconsidering an initial impulse (Byrd, 2021b). Moreover, some evidence suggests that cognitive reflection tests like the bat-and-ball problem measure a domain-general disposition. For instance, people who performed better on reflection tests have also reasoned more reflectively about probability (Liberali, Reyna, Furlan, Stein, & Pardo, 2012), logic (e.g., Byrd & Conway, 2019, Tables 1 and 2), and Newtonian physics (Gette & Kryjevskaia, 2019).

It is worth noting that authors of some reflection tests realize that these tests track not only the disposition to reflect, but related phenomena such as reading comprehension and—for mathematical reflection tests like the bat-and-ball problem—mathematical ability (Frederick, 2005). Indeed some have found that mathematical reflection test performance can be indistinguishable from general math test performance (e.g., Attali & Bar-Hillel, 2020; Erceg, Galic, & Ružojčić, 2020). So non-mathematical reflection tests have been developed in order to overcome these limitations (e.g., Sirota, Kostovičová, Juanchich, Dewberry, & Marshall, 2020).

Of course, with the advent of web-based research, many reflection tests are completed online, limiting researchers' ability to understand what people are actually thinking when they complete reflection tests. So cognitive scientists may wonder whether two common assumptions about the test are valid: that lured responses indicate a lack of reflection and correct responses indicate that reflection occurred. To test these assumptions, scientists have started recording people thinking aloud as they solve reflection tests (e.g., Szaszi, Szollosi, Palfi, & Aczel, 2017). Importantly, thinking aloud did not seem to impact performance on non-mathematical reflection tests and—even more importantly—the best predictor of performance on such reflection tests was the probability that participants stopped to reconsider their initial response (Byrd, Gongora, Joseph, & Sirota, 2021). Only a minority of responses violated the assumptions of reflection tests (ibid.). This suggests that reflection tests performance is usually a good measure of philosophers' and cognitive scientists two-factor notion of reflection. Even so, cognitive scientists may discover more and better ways to measure reflection in the future.

Reflection in Cognitive Science of Philosophy

At this point, one may wonder if cognitive scientists have collaborated with philosophers to study philosophical thinking. After all, cognitive scientists may be able to help philosophers test their claims about how reflection features in philosophical reasoning (Knobe, 2007). For instance, what patterns would find if cognitive scientists measured and manipulated reflection and then tracked corresponding changes in philosophical thinking? Cognitive scientists of philosophy have been doing this kind of research for over a decade. This section will review some of their prominent findings as well as some unanswered questions.

Reflection & Philosophy Among Laypeople

Some of the most well-known investigations of how reflection features in philosophical reasoning are in the domain of moral psychology. After neuroscientific research revealed that brain activity in areas associated with reflective reasoning predicted more consequentialist responses to moral dilemmas that propose mitigating a great harm by causing a smaller harm

(Greene, Nystrom, Engell, Darley, & Cohen, 2004), psychological research found some evidence that reflection caused and correlated with more consequentialist judgments about other moral thought experiments (Paxton, Ungar, & Greene, 2011).

Since this time, better reflection test performance has predicted moral judgments about unintended side effects (Pinillos, Smith, Nair, Marchetto, & Mun, 2011), a tendency toward atheism or agnosticism (Pennycook, Ross, Koehler, & Fugelsang, 2016), liberal political preferences (Byrd & Białek, 2021; Deppe et al., 2015; Saribay & Yilmaz, 2017; Yilmaz & Alper, 2019), and the orthodox "Gettier intuition" about knowledge (Byrd & Cullen, 2021; Machery et al., 2017).

However, not all these links between reflection and philosophical preferences are well understood. For example, the links between reflection and *consequentialist* moral judgments have also been found between reflection and *deontological* moral judgments (Byrd & Conway, 2019; Byrd & Cullen, 2021; Reynolds, Byrd, & Conway, 2021). Also, some links between reflection and political preferences have been stronger in western, educated, industrialized, rich, democratic—a.k.a., WEIRD—countries (Yilmaz & Alper, 2019).

Further, some research has not replicated links between reflection and moral judgments (e.g., Attie & Knobe, 2017; Gawronski, Armstrong, Conway, Friesdorf, & Hütter, 2017), politically liberal preferences (e.g. Price-Blackshear, Sheldon, Corcoran, & Bettencourt, 2019), and belief in god (e.g., Sanchez, Sundermeier, Gray, & Calin-Jageman, 2017). More research has found that the links between reflection and religiosity replicate in only some countries (Gervais et al., 2018) and religions (Byrd & Sytsma, In preparation). These results suggest that some reported reflection-philosophy relationships either depend on other factors—such as how one measures philosophical beliefs (e.g., Bahçekapili & Yilmaz, 2017)—or are false positives.

Finally, some have found that attempting to increase reflection experimentally has had underwhelming effects on philosophical judgments (e.g., Byrd & Cullen, 2021; de Bruin, 2020; Deppe et al., 2015; Kneer, Colaço, Alexander, & Machery, 2021; Paxton, Bruni, & Greene, 2014; Shenhav, Rand, & Greene, 2012). To boot, sometimes reflection's effect is the opposite of what we would expect based on the prior correlational findings (McPhetres, Conway, Hughes, & Zuckerman, 2018; Yilmaz & Isler, 2019).

Some philosophers and cognitive scientists are responding to these mixed results by conducting massive replication projects (Cova et al., 2018), developing better methods (Byrd et al., 2021; Cullen, Chapkovski, & Byrd, In preparation) and considering new interpretations of prior results (Knobe, 2021; cf. Machery & Stich, 2021). Some scholars are also pushing to include more underrepresented participants in research on philosophical thinking (Persson, Heilig, Tinghög, & Capusan, 2020), including actual philosophers (e.g., Bourget & Chalmers, 2014).

Reflection & Philosophy Among Philosophers

Around the time that some cognitive scientists were finding that philosophical *judgments* often correlated with reflection test performance, other cognitive scientists were finding that philosophical *education* also correlated with reflection test performance: those with more training in philosophy tended to be more reflective (Livengood, Sytsma, Feltz, Scheines, & Machery, 2010). This has recently been confirmed in a larger, cross-cultural dataset (Byrd & Sytsma, In preparation).

This led some researchers to look for links between reflection and philosophical judgments among those with advanced training in philosophy. Findings from smaller samples were unable to detect small correlations between philosophers beliefs and reflection test performance (Yaden & Anderson, 2021). However, multiple studies of larger samples that included people with a Ph.D. in philosophy, found that reflection test performance correlated with philosophical beliefs (such as theism) even when controlling for education, gender, personality, and other reasoning tests (Byrd, 2021d). This provides preliminary evidence that links between reflection and philosophy that have been detected among laypeople may be detectable among philosophers as well.

Reflection & Normativity

Some cognitive scientists have argued for the normative superiority of certain philosophical beliefs by appeal to their correlations with reflective reasoning (e.g., Baron, 1994; Greene, 2013). The idea is that reflection leads to better judgments. For instance, reflection test performance has been linked to correctly identifying fake news (Pennycook, McPhetres, Zhang, Lu, & Rand, 2020; Pennycook & Rand, 2019), recognizing pseudo-profound bullshit (Čavojová, Secară, Jurkovič, & Šrol, 2019; Pennycook, Cheyne, Barr, Koehler, & Fugelsang, 2015), rejecting conspiracy theories (Stecula & Pickup, 2021), overcoming the sunk cost fallacy (Ronayne, Sgroi, & Tuckwell, 2020), and less susceptibility to misinformation about their own eyewitness memory (C. M. Greene, Maloney-Derham, & Mulligan, 2020). So if more reflective people tend toward some philosophical beliefs over alternatives, then—according to the appeal to reflection—those philosophical beliefs are probably superior. While recent evidence undermines some appeals to reflection (Byrd & Conway, 2019), one might wonder if the appeal to reflection could be marshalled for or against other philosophical beliefs (Byrd, 2021c; cf. Easton, 2018).

Empirical Problems With Normative Appeals

There is at least one empirical obstacle for such a broad normative appeal to reflection: it is not obvious how dispositions to overcome faulty impulses about basic mathematical and logical questions entail or even imply normatively superior reasoning in higher-order domains such as academic philosophy. This challenge to the appeal to reflection resembles a challenge to the appeal to expert intuition (Clarke, 2013; Horvath & Koch, 2021; Machery, 2017, Chapter 5; Nado, 2014; Weinberg, Gonnerman, Buckner, & Alexander, 2010). Specifically, appeals to reflection *tests* still lack an empirically adequate account of how someone's reflection about contrived questions about bats and balls shows that their philosophical beliefs have also benefitted from reflection (De Neys, 2020). This has motivated some researchers to develop tools for stimulating reflection *during* the philosophical thinking and discourse that they observe (Cullen et al., In preparation).

Philosophical Problems With Normative Appeals

There are also philosophical obstacles to the appeal to reflection. For instance, some philosophers consider certain philosophical beliefs justified independently of reflective reasoning (cf. De Cruz, 2014a; Plantinga, 1967). Indeed, some of the beliefs that anti-correlate

with reflection test performance—e.g., theism (Byrd, 2021d; Byrd & Sytsma, In preparation; Freidin & Martini, 2021; Gervais et al., 2018; Pennycook et al., 2016)—are precisely the beliefs that some philosophers take to be justified independently of reflection. These philosophers are not alone in treating certain beliefs as less subject to certain epistemic norms than other beliefs: both Children and adults in the US seem to employ different epistemic criteria for scientific explanations or facts than they do for religious, ideological, or ethical beliefs (Cusimano & Lombrozo, 2021; e.g., Heiphetz, Spelke, Harris, & Banaji, 2013; Liquin & Lombrozo, 2018; Metz, Weisberg, & Weisberg, 2018). Thus, some people may find epistemically normative appeals to reflection more compelling for some domains than others.

Overcoming Obstacles To Normative Appeals

One way to surmount the obstacles to normative appeals to reflection is further experimentation. After all, we already established that, in principle, one could randomly assign participants to reflection-inducing, reflection-inhibiting, as well as control conditions and then test whether and how much philosophical tendencies vary between the conditions.

Alas, there are a variety of reasons to think that momentary manipulations of individuals' reflection may not reliably advance our understanding the causal role of reflection in philosophical thinking.

1. As previously mentioned, researchers frequently find that inducing reflective and unreflective reasoning is more difficult than earlier work suggested (e.g., Brañas-Garza, Kujal, & Lenkei, 2019; Enke et al., 2021; Markovits et al., 2020; Meyer et al., 2015; Thompson et al., 2013)
2. Even if we learn how to successfully and reliably produce immediate changes in reflection during experiments, these changes may only impact novel and, therefore, unfamiliar philosophical questions. Such momentary changes in individuals' reflection may not, however, produce changes in more considered, trained, and identity-based philosophical beliefs—e.g., the beliefs that some people (including philosophers) spend their lives publicly defending.

So how can we overcome these two methodological challenges to experimentally testing the effect of reflection on certain philosophical beliefs and judgments? Perhaps we cannot.

However, those who wish to appeal to reflection may want a more thorough test of reflection's impact on philosophical thinking. To do this, we may have to develop more potent interventions on reflection. Rather than momentary tasks that individuals complete during a short survey, we may need

- weeks-long interventions that teach people how to reason more reflectively (Cullen, Fan, Brugge, & Elga, 2018)
- consultations with peers that have experiences, values, and beliefs that are difficult for us to conceive on our own (Cullen et al., 2021; Elga, 2007).

In other words, manipulating reflection may require more than what most cognitive interventions require. It may require the kind of interventions that students of philosophy tend

to experience: some training in how to use reflection, sustained periods of reflection, and discussion amongst peers. That way, when people are encouraged to step back and re-consider reasons for their philosophical judgment, they can competently do so.

Such longitudinal and social interventions are difficult, requiring more time, more funding, and additional analytic techniques. So philosophers and cognitive scientists may need to develop new tools that eliminate some of these impediments to more severe tests of reflection's causal and normative roles in philosophy thinking.

Conclusion

Reflective reasoning is central to both philosophy and the cognitive science thereof. The theoretical and empirical research about reflection and its relation to philosophical thinking is voluminous. The existing findings provide preliminary evidence that reflective reasoning may be related to tendencies for certain philosophical judgments and beliefs over others. However, there are some signs that there is more to the story about reflection's role in philosophical thinking than our current evidence can reveal. Scholars will need to continue developing new hypotheses, methods, and interpretations to reveal these hitherto latent details.

The recommendations in this article are by no means exhaustive. For instance, in addition to better experimental manipulations and measures of reflection (Byrd, 2021b), philosophers and cognitive scientists will also need to validate their measures of philosophical thinking to ensure that subtle differences in wording of thought experiments do not influence people's judgments in unexpected ways (Cullen, 2010). After all, philosophical judgments can vary significantly depending on slight differences in wording even when reflection is not manipulated (e.g., Nahmias, Coates, & Kvaran, 2007). Scholars may also need to develop ways to empirically dissociate previously conflated philosophical judgments (Conway & Gawronski, 2013) in order to prevent and clarify misleading results (Byrd & Conway, 2019; Conway, Goldstein-Greenwood, Polacek, & Greene, 2018).

All of this is to say that philosophers and cognitive scientists' preoccupation with reflection is here to stay. A few decades of investigation about reflection in philosophy has established not only a promising research program, but also a growing list of remaining questions that will require at least a few more decades to answer. I look forward to revisiting this article in a few years to see how far we have come.

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