



# Expert or Esoteric? Philosophers Attribute Knowledge Differently Than All Other Academics

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Received 13 September 2019; received in revised form 17 April 2020; accepted 4 May 2020

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## Abstract

Academics across widely ranging disciplines all pursue knowledge, but they do so using vastly different methods. Do these academics therefore also have different ideas about when someone possesses knowledge? Recent experimental findings suggest that intuitions about when individuals have knowledge may vary across groups; in particular, the concept of knowledge espoused by the discipline of philosophy may not align with the concept held by laypeople. Across two studies, we investigate the concept of knowledge held by academics across seven disciplines ( $N = 1,581$ ) and compare these judgments to those of philosophers ( $N = 204$ ) and laypeople ( $N = 336$ ). We find that academics and laypeople share a similar concept of knowledge, while philosophers have a substantially different concept. These experiments show that (a) in contrast to philosophers, other academics and laypeople attribute knowledge to others in some “Gettier” situations; (b) academics and laypeople are much less likely to attribute knowledge when reminded of the possibility of error, but philosophers are not affected by this reminder; and (c) non-philosophy academics are overall more skeptical about knowledge than laypeople or philosophers. These findings suggest that academics across a wide range of disciplines share a similar concept of knowledge, and that this concept aligns closely with the intuitions held by laypeople, and differs considerably from the concept of knowledge described in the philosophical literature, as well as the epistemic intuitions of philosophers themselves.

**Keywords:** Knowledge; Belief; Expertise; Folk epistemology; Academics; Gettier cases; Theory of Mind

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Research Data Related to this Submission: <https://osf.io/5eskf/>.

## 1. Introduction

Advancing and transmitting knowledge is the fundamental objective of researchers and scholars worldwide. While the pursuit of knowledge is becoming increasingly specialized and segregated as our knowledge base increases and people become expert in increasingly detailed and specific areas of study (Bender, 1998; Geiger, 1993; Snow, 2012), many urge that interdisciplinary collaboration is essential for continued progress (Austin, 1990; Boyer, 1990; Clark, 1983; Damrosch, 1995; Kerr, 1982). E.O. Wilson (1998) implored us toward consilience, the “jumping together” of knowledge from different specialized fields, suggesting that philosophers and scientists working together at the borders between the hard sciences, social sciences, and the humanities can lead the way to scientific advancement.

However, members of different academic disciplines may hold very different conceptions of knowledge. One reason to suspect this is that different academic disciplines use vastly different methods to pursue knowledge. For example, natural scientists typically engage in empirical observation, while philosophers often test and revise theories by using the “method of cases” (Machery, 2017), consulting their intuitions about various thought experiments (sometimes referred to as intuition pumps; Dennett, 1995), and scholars in the humanities engage in yet other methods, such as historical analysis or textual criticism. Given that members of different academic disciplines pursue knowledge using radically different means, they might likewise have differing views of what counts as knowledge.

In the present paper, we investigate this possibility by examining how members of different academic disciplines attribute knowledge to others. The question of how people decide when someone knows something, as opposed to just believing it, or simply being ignorant, has been extensively studied over the past 35 years. Many of these papers have examined the developmental origins of theory of mind by studying how typically developing preschoolers attribute knowledge and belief (e.g., Moore, Bryant, & Furrow, 1989; Pratt & Bryant, 1990; Sodian, 1988; Sodian & Wimmer, 1987; Wimmer, Hogrefe, & Perner, 1988; Woolley & Wellman, 1993). Although the simple knowledge tasks that are used with children do not pose much of a challenge for adults, more complex tasks show that even adults exhibit some difficulty separating their own knowledge from that of others (Birch & Bloom, 2007). Researchers have also been interested in examining group differences in attributions of knowledge, both in cases of developmental or sensory impairments (Bedny, Pascual-Leone, & Saxe, 2009; Karmiloff-Smith, Klima, Bellugi, Grant, & Baron-Cohen, 1995; Minter, Hobson, & Bishop, 1998; Perner, Frith, Leslie, & Leekam, 1989; Peterson, & Wellman, 2009; Peterson, Wellman, & Liu, 2005), and across diverse cultural backgrounds (Dixson, Komugabe-Dixson, Dixson, & Low, 2018; Machery et al., 2017; Shahaiean, Peterson, Slaughter, & Wellman, 2011; Wellman, Fang, Liu, Zhu, & Liu, 2006). However, the present investigation is the first, to our knowledge, to examine whether and how attributions of knowledge depend on higher education and, in particular, training and experience in the pursuit of knowledge.

### 1.1. Gettier cases

Our investigation was prompted by recent findings that individuals in at least one discipline—philosophy—seem to attribute knowledge in a way that differs from the average person. One much-studied example focuses on knowledge attributions in situations termed “Gettier cases” (after their originator; Gettier, 1963). Gettier developed these cases to dispute the standard philosophical view that whenever someone has a belief that they are justified in holding, and that belief is true (typically referred to as a justified true belief, or JTB), then that person also has knowledge. The scenarios Gettier developed to illustrate that this could not be true typically involved a kind of lucky accident. For instance, suppose that Sam saw a cat run into his shed, and now believes there is a cat in his shed. Here, it might seem obvious that Sam knows that a cat is in the shed. But suppose that unbeknownst to Sam, the cat has actually squeezed out through a tiny hole in the back wall of the shed, but that there was already a different cat in the shed. This puts Sam in a Gettier-style situation, in which his belief is true only because of a strange sort of accident. Although most discussions of Gettier cases have been among philosophers, many psychologists have also discussed them and acknowledged their importance (e.g., Bradmetz & Gauthier, 2005; Horschler, Santos, & MacLean, 2019; Koriat & Adiv, 2012; Kovic & Fuchslin, 2018; Oktay-Gür & Rakoczy, 2017; Rapaport, Shapiro, & Wiebe, 1997; Smith, 1992).

The widely shared consensus in the philosophical literature is that people in Gettier-style situations lack knowledge (see Hetherington, 2018 for a recent review). However, to our knowledge, there has been no empirical investigation of philosophers’ knowledge attributions in these cases (although Horvath & Weigmann, 2016 examined epistemologists’ judgments of some related issues). Laypeople agree that knowledge is lacking in *some* cases of this type (Machery et al., 2018; Powell, Horne, Pinillos, & Holyoak, 2015; Starmans & Friedman, 2012), thus supporting Gettier’s main point that knowledge cannot simply be a matter of justified true belief. These cases have been termed “apparent evidence” Gettier cases (Starmans & Friedman, 2012) and share the feature that the protagonist originally formed their belief based on faulty evidence—say, a stopped clock, or a hologram they took to be real.

However, lay judgments differ from those of philosophers when they consider other types of Gettier cases that do not share this feature. When a protagonist’s belief was formed due to “authentic evidence” (Starmans & Friedman, 2012), as in the example of Sam and the cat above, laypeople typically attribute knowledge to Sam, while philosophers typically deny it (Horvath & Wiegmann, 2016; Nagel, San Juan, & Mar, 2013 in light of Powell et al., 2015; Starmans & Friedman, 2012; 2013; Turri, Buckwalter, & Blouw, 2015).

Taken together, the research reviewed above has shed light on the factors that ordinary people consider important when deciding if someone knows something, or just believes it. As predicted by philosophers, laypeople are sensitive to whether a person’s belief is true, and whether the person has a well-justified reason to believe it. More interestingly, laypeople, like philosophers, do not hold the view that anyone with a justified true belief

possesses knowledge. However, careful empirical study of these kinds of cases has suggested that laypeople are sensitive to factors that philosophers have not previously considered important. For example, the philosophical literature has not recognized the importance of whether a belief was formed based on ‘apparent’ or ‘authentic’ evidence, while laypeople clearly see these cases very differently.

### *1.2. Skeptical pressure and other factors*

Another striking example of such group differences is the effect of “skeptical pressure”—a simple reminder that a person might easily have been deceived about any number of things. While such reminders lead laypeople to deny that an agent has knowledge (Buckwalter, 2010, 2014a, 2014b; Feltz & Zarpentine, 2010; May, Sinnott-Armstrong, Hull, & Zimmerman, 2010; Nagel, San Juan, et al., 2013; Powell et al., 2015; Schaffer & Knobe, 2011), there has long been debate in the philosophical literature about whether knowledge should be affected by this sort of skeptical pressure (Berkeley, 1710/1982; DeRose, 1995; Descartes, 1641/2006; Hawthorne, 2004; Hume, 1748/1993; Russell, 2005; Unger, 1975; Vogel, 1990).

Other unexpected factors affecting lay knowledge attributions include whether one’s belief was acquired correctly or through an illusion or mistake (Powell et al., 2015; Starmans & Friedman, 2012; Turri et al., 2015), whether the consequences of the belief being wrong would be large or small (Buckwalter & Schaffer, 2015; Cohen, 1999; DeRose, 1992, 2009; Fantl & McGrath, 2009; Nagel, 2008; Rose et al., 2019; Rysiew, 2001; Stanley, 2005), the moral valence of the potential knowledge (Beebe & Buckwalter, 2010; Beebe & Shea, 2013; Buckwalter, 2014b), and even the order of presentation of different cases (Machery et al., 2018; Wright, 2010). Thus, empirical study of the knowledge attributions made by non-philosophers has the potential to illuminate important factors determining whether someone is thought to have knowledge which had not been theorized by philosophers.

### *1.3. Understanding group differences in knowledge attributions*

Understanding why these group differences occur may help to clarify their importance and their ramifications. We outline below three potential theories, all of which point to the importance of our main question: How do academics in disciplines other than philosophy view knowledge?

One possibility is that the knowledge attributions made by ordinary people are simply unsophisticated or unreflective, because they are on average less highly educated than professional epistemologists, and have spent little time reflecting on what knowledge is and how best to acquire it (Egler & Ross, 2018; Hales, 2006; Weinberg, Gonnerman, Buckner, & Alexander, 2010; Williamson, 2005, 2007, 2011). Perry (1999) argued that students beginning an undergraduate education had simplistic ideas about knowledge, which progressed to a more sophisticated understanding by the time they reached the postgraduate level. On this view, we might expect that laypeople’s judgments would align more closely with those of philosophers if they carefully reflected before responding.

Broadly consistent with this, Turri (2013) found that when laypeople are guided through Gettier-style cases in a particular order, with certain prompt questions, their judgments align with those of philosophers (i.e., they deny knowledge). However, it is also possible that this procedure simply induces a general skepticism, and would thus yield lower knowledge attribution even in ordinary cases of justified true beliefs.

If this “expertise account” is correct, then we might also expect other highly educated people, especially academics who have dedicated their professional lives to the pursuit of knowledge, to show intuitions about knowledge that resemble the philosophical view. That is, we might expect that people who invest considerable time thinking about knowledge and how to pursue it will tend to converge on a common concept of knowledge, much as we would hope for a common view to emerge among scientists independently investigating the same question.

A second possibility, alluded to above, is that a person’s concept of knowledge is shaped by the manner in which they pursue it, and the aims and methods of their specific field. On this view, we might expect academic’s concepts to differ not only from those of laypeople, but also to differ across disciplines. If so, this would suggest that previously documented differences in the concepts held by philosophers and laypeople are simply one example of wide-ranging epistemological differences across many groups. This outcome would also contribute to an ongoing debate regarding whether knowledge attributions vary across groups. Some studies originally found that attributions differ across groups distinguished by culture, gender, age, personality, and socioeconomic status (Buckwalter & Stich, 2014; Colaço, Buckwalter, Stich, & Machery, 2014; Machery et al., 2017; Weinberg, Nichols, & Stich, 2001), while subsequent studies have found stable patterns across these groups (Adleberg, Thompson, & Nahmias, 2015; Machery et al., 2017; Seyedsayamdost, 2015a, 2015b), and in some cases have failed to replicate the original findings. Differences in knowledge attributions across academic fields might provide evidence for an important group difference in concepts of knowledge.

A final possibility is that concepts of knowledge are generally uniform across groups (Knobe, 2019; Machery et al., 2017). This view predicts that most people—including academics across disparate disciplines, as well as laypeople—share a similar concept of knowledge. However, philosophers may be outliers, who hold a unique concept of knowledge not shared by any other group. Although academics spend time considering what knowledge is and how to acquire it, philosophers may be more likely than members of other academic disciplines to theorize about the knowledge. However, the very act of theorizing about knowledge could affect how it is conceptualized. Theorizing is a form of explaining, and good explanations are those that are simple and broad (Lombrozo, 2016). Seeking out good explanations leads people to search for broad generalizations, and although this can have positive impact on learning, it can also lead to error—explaining can lead people to overgeneralize and to see broad patterns where none exist (Kuhn & Katz, 2009; Williams & Lombrozo, 2010; Williams, Lombrozo, & Rehder, 2013). Hence, theorizing about knowledge could lead philosophers to view knowledge as simpler or more principled than it actually is.

To test these three accounts, we examined knowledge attributions in academics with PhDs in a wide variety of disciplines, including philosophy, as well as in laypeople. Although there could be many differences between the knowledge attributions of these groups, we focused our investigation on authentic evidence Gettier-style cases, as well as cases of skeptical pressure. Previous findings suggest that laypeople's judgments about such cases may not align with the philosophically endorsed conclusions. However, it is important to recognize that judgments about such cases could vary across populations for relatively superficial reasons. For instance, expertise in certain disciplines could result in an overall skepticism, or unwillingness to attribute knowledge to others, while the *relative* degree of knowledge attribution in different types of scenarios might nonetheless resemble that of philosophers. Our principle question, then, is not whether various populations differ in whether they attribute knowledge in these cases. Instead it is whether they differ in the extent to which they attribute knowledge *relative* to other cases, including cases where agents have ordinary beliefs that are both justified and true (Experiments 1 and 2) and false beliefs (Experiment 1).

## 2. Experiment 1

In our first experiment, we compared judgments about authentic evidence Gettier cases (referred to henceforth simply as Gettier cases) with those about cases where agents have justified true beliefs and false beliefs. Based on previous findings and the philosophical literature, we expected that philosophers would attribute knowledge at high rates in cases of ordinary justified true belief, and deny knowledge in cases of false beliefs and in Gettier cases. Conversely, we expected that laypeople would attribute knowledge at high rates in cases of ordinary justified true beliefs and in Gettier cases, but deny knowledge in cases of false belief. Of key interest was whether academics from disciplines besides philosophy would show either of these patterns, or a different pattern of knowledge attributions.

### 2.1. Method

#### 2.1.1. Participants

We recruited 950 academics with PhDs in a wide range of disciplines, including the hard sciences (biology, chemistry, and physics), the humanities (history, English), mathematics, psychology, and philosophy. We obtained email addresses of potential participants from the websites of academic departments at 11 universities in the United States and Canada, and sent emails inviting recipients to participate in an online study (see Supplementary Material for details of recruitment). A further 103 academics also completed the experiment, but they were excluded from analysis: Three academics did not hold a PhD; 24 were not from the targeted disciplines; and 76 incorrectly answered simple comprehension questions about the scenarios (see below). Academic participants indicated the number of years since they had received their PhD (0–5 years, 5–10 years, 10–15 years, more

than 15 years). For every discipline, the modal time since completion of the PhD was 10–15 years, and the modal age was 46–55 years. We also tested 224 lay participants, recruited using Amazon Mechanical Turk. A further 20 lay participants also completed the experiment, but they were excluded for incorrectly answering comprehension questions. The modal age range of lay participants was 26–35 years. They typically had some college education (44%) or a bachelor's degree (36%), and only 6% had a master's degree, and 1% had a PhD. Table 1 provides additional demographic information for all participants.

### 2.1.2. Materials and procedure

Each participant read a brief scenario (taken from Starmans & Friedman, 2012<sup>1</sup>) in which a protagonist had either (a) a standard justified true belief (JTB); (b) a justified true belief in a Gettier-style situation (Gettier); or (c) a justified false belief (FB). The scenario read as follows, with brackets indicating text in the JTB and Gettier conditions (pen) and in the FB condition (bandana):

Katie is in her locked apartment writing a letter. She puts the letter and her blue Bic pen down on her coffee table. Then she goes into the bathroom to take a shower. As

Table 1  
Demographic information for Experiments 1 and 2

	<i>N</i>	Proportion Female	Modal Age Range (years)	Modal Years Since PhD	Average Number of Philosophy Courses	Proportion Who Have Heard of Gettier Cases
Experiment 1						
Lay participants	224	29%	26–35	N/A	0.47	2%
Biology	104	36%	46–55	10–15	0.49	0%
Chemistry	88	38%	46–55	10–15	0.43	2%
English	142	39%	46–55	10–15	0.99	2%
History	121	44%	46–55	10–15	0.61	1%
Math	158	15%	46–55	10–15	0.73	2%
Philosophy	75	28%	46–55	10–15	N/A	95%
Physics	136	15%	46–55	10–15	0.60	0%
Psychology	126	38%	46–55	10–15	0.78	7%
Total	1174					
Experiment 2						
Lay participants	112	45%	26–35	N/A	0.39	1%
Biology	170	33%	46–55	10–15	0.51	1%
Chemistry	101	15%	46–55	10–15	0.46	3%
English	94	44%	46–55	10–15	0.86	1%
History	90	50%	46–55	10–15	0.80	0%
Philosophy	129	28%	46–55	10–15	N/A	95%
Physics	155	14%	46–55	10–15	0.63	1%
Psychology	96	43%	46–55	10–15	0.79	4%
Total	947					

Katie's shower begins, two burglars silently break into the apartment. One burglar takes Katie's blue Bic pen from the table. But the other burglar absentmindedly leaves his own [identical blue Bic pen / bandana] on the coffee table. Then the burglars leave. Katie is still in the shower, and did not hear anything.

Participants then answered four comprehension questions to ensure they had read the scenario (see Supplementary Material), followed by the test question: "At the end of the story, Katie \_\_\_\_\_ that there is a pen[letter] on the table." Participants in the Gettier and FB conditions were asked about the pen; participants in the JTB condition were asked about the letter. Response options were 'knows,' or "thinks, but doesn't know," presented in randomized order. These response options were chosen for two reasons: (a) to be in line with previous research investigating the lay concept of knowledge (e.g., Buckwalter, 2014c; Starmans & Friedman, 2012; Turri, 2013; Turri et al., 2015); and (b) to provide participants with the contrast we are interested in, that is, knowing versus believing, rather than, say, knowing versus being ignorant. Participants then rated their confidence in this judgment on a scale from 1 to 10, answered demographic questions, and then were given the opportunity to optionally comment on their responses.

## 2.2. Results and discussion

We conducted two primary analyses. Both included discipline and experimental condition as factors, but they differed in how the sample was divided into subgroups. The first analysis compared three groups: philosophers, academics from all other disciplines, and laypeople. In this analysis, we sought to examine whether knowledge attributions are affected by extensive education and a career focused on the pursuit of knowledge (which predicts that laypeople's judgments should differ from both philosophers and other academics, and that philosophers and other academics should have similar judgments), as well as whether there is a specific effect of specialized training in philosophy (which predicts that philosopher's judgments should differ from those of both laypeople and other academics). In the second analysis we examined participants from each field of expertise separately, to characterize any field-specific differences in knowledge attribution. Our analyses focus on dichotomous responses to the knowledge question ("really knows" vs. "only believes") throughout the paper for the sake of clarity. Previous researchers on similar topics have used either this approach (e.g., Friedman & Turri, 2015; Machery et al., 2017; Nagel, San Juan, et al., 2013; Starmans & Friedman, 2012; Turri, 2015; Turri et al., 2015; Weinberg et al., 2001), or an approach that combines the dichotomous scores with the confidence ratings to create a continuous measure (e.g., Kim & Yuan, 2015; Starmans & Friedman, 2012; Turri & Friedman, 2014). The results reported here are similar to the results obtained using the continuous measure; see Supplementary Material for these analyses.

In all cases, we found no effect of gender, age, or time elapsed since receiving the PhD (treated as a categorical variable, since participants indicated a range of years, e.g., 5–10 years since completing the PhD); thus, subsequent analyses collapsed across these variables.

### 2.3. Comparing philosophers, other academics, and laypeople

We first compared the dichotomous responses of philosophers, non-philosophy academics, and laypeople. All groups reported being highly confident in all conditions; see Supplementary Material for analyses of confidence levels. A logistic regression was performed to ascertain the effects of discipline and condition (JTB, Gettier, FB) on knowledge attributions. Including the main effects of condition (with JTB as the reference category) and discipline (with non-philosophy academics as the reference category), as well as the interaction term, provided the best model fit. The logistic regression model was statistically significant,  $\chi^2(8) = 111.82$ ,  $p < .001$ . The model explained 12.3% (Nagelkerke  $R^2$ ) of the variance in knowledge attribution and correctly classified 66.3% of cases.

The model revealed that both condition, Wald  $\chi^2(2) = 6.73$ ,  $p = .035$ , and discipline, Wald  $\chi^2(2) = 27.31$ ,  $p < .001$ , were significant predictors of knowledge attribution. Overall, laypeople were more likely to attribute knowledge than both philosophers,  $\chi^2(1) = 29.14$ ,  $p < .001$ , Cramer's  $V = 0.312$ , and academics,  $\chi^2(1) = 64.19$ ,  $p < .001$ ,  $V = 0.242$ , while academics and philosophers were equally likely to attribute knowledge,  $\chi^2(1) = 1.26$ ,  $p = .261$ ,  $V = 0.036$ . Participants were overall more likely to attribute knowledge in the JTB condition than the Gettier condition,  $\chi^2(1) = 6.01$ ,  $p = .014$ ,  $V = 0.086$ , and marginally more likely to attribute knowledge in the Gettier condition than in the FB condition,  $\chi^2(1) = 3.67$ ,  $p = .056$ ,  $V = 0.069$ . Of primary interest was the interaction between discipline and condition, Wald  $\chi^2(4) = 11.05$ ,  $p = .026$ ; see Fig. 1. To follow up on this interaction, we conducted two additional logistic regressions examining whether the non-philosophy academics differed from the laypeople, and whether they differed from philosophers.

The logistic regression model comparing non-philosophy academics and laypeople was statistically significant,  $\chi^2(5) = 77.03$ ,  $p < .001$ . The model explained 9.1% (Nagelkerke  $R^2$ ) of the variance in knowledge attribution, and it correctly classified 65.2% of cases. The model revealed that both condition, Wald  $\chi^2(2) = 6.73$ ,  $p = .035$ , and discipline, Wald  $\chi^2(1) = 24.31$ ,  $p < .001$ , were significant predictors of knowledge attribution, reflecting that laypeople were more likely overall to attribute knowledge than non-

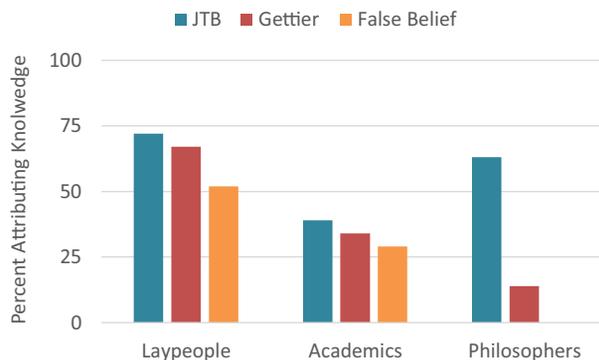


Fig. 1. Experiment 1. Mean knowledge attribution for laypeople, philosophers, and other academics in JTB, Gettier, and FB scenarios. Note: Zero philosophers attributed knowledge in the False Belief condition.

philosophy academics. Importantly, there was no significant interaction between condition and discipline, Wald  $\chi^2(2) = 1.38$ ,  $p = .502$ , suggesting that these groups responded similarly to each type of scenario.

The logistic regression model comparing academics and philosophers was also statistically significant,  $\chi^2(5) = 38.18$ ,  $p < .001$ . The model explained 5.5% (Nagelkerke  $R^2$ ) of the variance in knowledge attribution, and it correctly classified 66.8% of cases. Both condition, Wald  $\chi^2(2) = 6.73$ ,  $p = .035$ , and discipline, Wald  $\chi^2(1) = 13.11$ ,  $p = .001$ , were significant predictors of knowledge attribution, reflecting that philosophers were overall more likely to attribute knowledge than non-philosophy academics. Importantly, there was a significant interaction between condition and discipline, Wald  $\chi^2(2) = 9.63$ ,  $p = .008$ , suggesting that the way in which these groups responded to each type of scenario differed. To follow up on this interaction, we separately examined responses from each participant group.

As predicted by the philosophical literature, philosophers were less likely to attribute knowledge in the Gettier condition (14%) than in the JTB condition (63%,  $\chi^2(1) = 14.42$ ,  $p < .001$ ,  $V = 0.508$ ), and they attributed knowledge equally in the Gettier and FB conditions (0%,  $\chi^2(1) = 2.86$ ,  $p = .091$ ,  $V = 0.244$ ); see Fig. 1.

Replicating previous studies of authentic evidence Gettier cases (e.g., Powell et al., 2015; Starmans & Friedman, 2012; Turri et al., 2015), laypeople's knowledge attributions did not significantly differ between the JTB condition (72%) and the Gettier condition (67%),  $\chi^2(1) = .579$ ,  $p = .447$ ,  $V = 0.062$ , nor between the Gettier condition and the FB condition (52%),  $\chi^2(1) = 3.28$ ,  $p = .070$ ,  $V = 0.149$ , but they were more likely to attribute knowledge in the JTB condition than in the FB condition,  $\chi^2(1) = 6.55$ ,  $p = .010$ ,  $V = 0.109$ . The number of philosophy courses taken ( $M = .47$ ) did not have a significant effect on laypeople's knowledge attributions,  $\chi^2(1) = .412$ ,  $p = .521$ ,  $V = 0.043$ , and did not interact with condition,  $\chi^2(2) = .641$ ,  $p = .726$ ,  $V = 0.038$ .

While one might worry that laypeople's chance responding in the False Belief condition suggests that laypeople simply use the word 'know' interchangeably with the word 'believe,' previous work in this area shows that laypeople do not indiscriminately treat 'know' and 'believe' interchangeably (Horvath & Wiegmann, 2016; Machery et al., 2018; Nagel, San Juan, et al., 2013; Powell et al., 2015; Starmans & Friedman, 2012; Turri et al., 2015), and even preschoolers use the terms differently (e.g., Hogrefe, Wimmer, & Perner, 1986; Moore et al., 1989). More importantly, we can also see in the present data that our lay participants did not use the terms interchangeably. If they had, this would have led to 50-50 responses in all conditions, a pattern we did not observe.

Non-philosophy academics showed the same pattern as laypeople. They were equally likely to attribute knowledge in the JTB condition (39%) and the Gettier condition (34%),  $\chi^2(1) = 1.69$ ,  $p = .194$ ,  $V = 0.053$ , and in the Gettier condition and the FB condition (29%),  $\chi^2(1) = 1.87$ ,  $p = .172$ ,  $V = 0.057$ . They were also more likely to attribute knowledge in the JTB condition than in the FB condition,  $\chi^2(1) = 6.76$ ,  $p = .009$ ,  $V = 0.109$ . Again, the number of philosophy courses taken ( $M = 0.67$ ) did not have a significant effect on knowledge attributions,  $\chi^2(1) = 0.660$ ,  $p = .416$ ,  $V = 0.026$ , and did not interact with condition,  $\chi^2(2) = 0.351$ ,  $p = .173$ ,  $V = 0.014$ .

Thus, philosophers responded to Gettier cases very differently than they responded to standard cases of justified true belief, attributing knowledge at high rates in the latter, and denying it at high rates in the former. Conversely, both laypeople and other academics treated Gettier cases similarly to cases of justified true belief, attributing knowledge at similar rates across both types of stories. It is important to stress that while the absolute value of response rates may seem to suggest that laypeople tend to attribute knowledge in our authentic evidence Gettier cases, while non-philosophy academics moderately deny knowledge, and philosophers strongly deny knowledge, these data must be interpreted with respect to the relevant control conditions. That is, to the extent that laypeople are inclined to attribute knowledge in a standard justified true belief case (72%), they are similarly inclined to do so in an authentic evidence Gettier case (67%). The same is true for non-philosophy academics (39% vs. 34%). But philosophers show a very different pattern and are largely inclined to attribute knowledge in standard JTB cases (63%) and to deny it in authentic evidence Gettier cases (14%). Thus, non-philosophy academics show a relative pattern of knowledge attribution akin to that of laypeople, and substantially different from that of philosophers. This emphasis on relative knowledge attribution is important because, as discussed above, judgments about such cases could vary across populations for relatively superficial reasons. Expertise in certain disciplines, or higher education in general, could result in an overall skepticism, or unwillingness to attribute knowledge to others. Thus, it is only informative to examine knowledge attribution in authentic evidence Gettier cases *relative* to the extent to which one is willing to attribute knowledge in any scenario.

#### 2.4. Analysis by field of expertise

An initial binary logistic regression comparing responses from the seven non-philosophy academic disciplines revealed no main effect of discipline, Wald  $\chi^2(6) = 9.01$ ,  $p = .173$ , and no interaction with condition, Wald  $\chi^2(12) = 8.03$ ,  $p = .783$ , suggesting that non-philosophy academics from all disciplines were largely similar in their responses. To further characterize whether any disciplines in particular hold the standard philosophical view of knowledge, we examined knowledge attribution across the nine groups separately (i.e., laypeople, philosophers, and academics from the seven other disciplines). Table 2 shows the percentage of participants from each discipline who attributed knowledge in each condition (see Supplementary Material for figures). Because the analyses above showed that groups varied in the extent to which they attributed knowledge in our baseline justified true belief condition, we considered each group's responses to the Gettier and False Belief scenarios in relation to their responses to the JTB scenario. That is, there are many reasons that a skeptical person may not want to attribute knowledge even in a standard case where a protagonist has a JTB—one might say, for example, that unless there is direct perceptual evidence, one cannot have knowledge. Our interest here was to examine how the pattern of judgments relates to each other for each group, regardless of baseline differences in overall levels of skepticism.

Table 2  
 Knowledge attribution percentages for Experiments 1 and 2

Experiment 1	JTB	Gettier	False Belief	Gettier Score	False Belief Score
Lay participants	72	67	52	93	72
Biology	47	52	33	110	70
Chemistry	54	29	31	54	57
English	43	37	40	86	93
History	39	50	34	128	87
Math	28	25	20	89	71
Philosophy	63	14	0	22	0
Physics	28	18	14	64	50
Psychology	44	33	33	75	75

Experiment 2	JTB	Gettier	Skeptical Pressure	Gettier Score	Skeptical Pressure Score
Lay participants	83	68	6	82	7
Biology	41	18	2	44	5
Chemistry	26	25	4	96	15
English	40	18	0	45	0
History	32	37	21	116	66
Philosophy	64	24	58	38	91
Physics	25	12	6	48	24
Psychology	22	28	3	127	14

To examine this, we calculated two scores for each discipline: a Gettier score, generated by dividing the percentage of participants attributing knowledge in the Gettier condition by the percentage attributing knowledge in the JTB condition; and a False Belief Score, generated by dividing the percentage of participants attributing knowledge in the False Belief condition by the percentage attributing knowledge in the JTB condition. For example, 43% of English PhDs attributed knowledge in the JTB condition, while 37% did in the Gettier condition, resulting in a Gettier score of 86%. This suggests that on average, people with a PhD in English attributed knowledge in a Gettier case about 86% as often as they did in a standard case of a justified true belief.

We have plotted each discipline on these two dimensions in Fig. 2, which reveals that none of the seven other academic disciplines, nor the laypeople, showed the same pattern of knowledge attributions as the philosophers. Philosophers' knowledge attributions were strongly reduced by both Gettier cases and by cases of false belief.<sup>2</sup> All other groups were much more willing to attribute knowledge in Gettier cases (historians and biologists doing so even more often than in standard cases of justified true belief), and even in cases of false belief.

The patterns of knowledge attribution in our first experiment suggest that one explanation for the previously documented difference in lay knowledge attributions and those of philosophers is unlikely to be true. The so-called expertise defense argues that philosophers have a different set of intuitions about knowledge than laypeople do because they

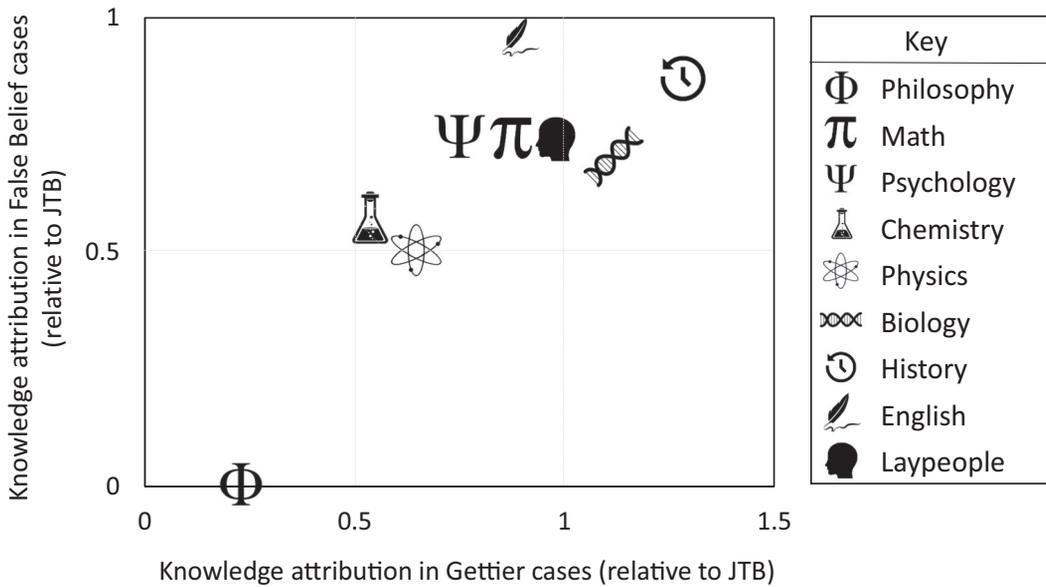


Fig. 2. Experiment 1. Percentage of participants by discipline attributing knowledge in the Gettier and False Belief conditions, plotted as a proportion of JTB knowledge attributions.

are highly educated experts who spend a great deal of time thinking about how knowledge is acquired. However, we found that other such experts—professional academics working as faculty members in a wide range of other disciplines—also do not show the same pattern of knowledge attribution as philosophers.

### 3. Experiment 2

In Experiment 2 we sought to replicate these findings using a different scenario and to extend our investigation to another type of scenario, in which the participant is faced with “skeptical pressure.” These scenarios are identical to the cases of ordinary justified true belief, but the participant is simply reminded that some unexpected thing *might* have happened that would make the person’s belief false (though it has not). This condition serves as a useful comparison to a Gettier-style case, because Skeptical Pressure cases, like Gettier cases, highlight the lucky nature of the true belief. Here, in addition to replicating the results of Experiment 1 with respect to Gettier cases and cases of justified true beliefs, we expected based on the philosophical literature that philosophers would attribute knowledge at high rates in skeptical pressure cases. Based on previous findings (Nagel, San Juan, et al., 2013), we expected that laypeople would deny knowledge at high rates in such cases. Of primary interest was whether academics from disciplines besides philosophy would show either of these patterns or a different pattern of knowledge attributions.

### 3.1. Method

#### 3.1.1. Participants

A new group of 835 academics from 25 universities in the United States and Canada were recruited by email as in Experiment 1; all were employed at different universities than the participants in the first experiment (see Supplementary Material for details of recruitment). These participants held PhDs in one of seven disciplines (the same disciplines as in Experiment 1, except for Mathematics). A further 46 academics also completed the experiment, but they were excluded from analysis: Eight academics did not hold a PhD, seven were not from the targeted disciplines, and 31 incorrectly answered comprehension questions about the scenarios. We also tested 112 lay participants, recruited using Amazon Mechanical Turk. A further nine lay participants also completed the experiment, but they were excluded for incorrectly answering comprehension questions. Lay participants typically had some college education (30%) or a bachelor's degree (42%), and only 7% had a master's degree, and 3% had a PhD. Table 1 provides additional demographic information for all participants.

#### 3.1.2. Materials and procedure

Each participant read a brief scenario in which a protagonist had either (a) a standard justified true belief (JTB); (b) a justified true belief in a Gettier-style situation (Gettier); or (c) a justified true belief, but with a reminder that the belief could easily have been false (Skeptical Pressure). All scenarios opened with the following:

Waitresses at Mory's Pub are not allowed to wear red shirts to work. One day, the doorman Tom sees waitress Krista come in to work wearing a long-sleeve red shirt. Tom goes to the kitchen to tell the manager that Krista is wearing a red shirt. And Krista is, in fact, still wearing a red shirt.

The JTB scenario ended at this point. Participants in the Skeptical Pressure condition read a final sentence:

However, because Tom is in the kitchen, he would not have seen if Krista had changed out of her red shirt and into a different colored shirt.

Participants in the Gettier condition saw an alternate final sentence that read:

However, while Tom is in the kitchen, Krista quickly changes out of her long-sleeve red shirt and into a red t-shirt.

All participants then answered a question about Tom's knowledge, in the form of a fill-up-the-blank sentence: "At the end of the story, while Tom is still in the kitchen, Tom \_\_\_\_\_ that Krista is wearing a red shirt." Responses options were 'knows' or

“thinks but does not know,” presented in random order. Participants then rated their confidence in this judgment on a scale from 1 to 10. Following this, participants answered three comprehension questions (see Supplementary Material), answered demographic questions, and then had the opportunity to optionally comment on their responses.

### 3.2. Results and discussion

We again conducted two main analyses, first comparing philosophers, other academics, and laypeople, and then examining the judgments made by each field individually.

#### 3.2.1. Comparing philosophers, other academics, and laypeople

All groups again reported being highly confident in all conditions; see Supplementary Material for analyses of confidence levels. A logistic regression was performed to ascertain the effects of condition and discipline on dichotomous knowledge attributions. Including the main effects of condition (with JTB as the reference category) and discipline (with non-philosophy academics as the reference category), as well as the interaction term, provided the best model fit. The logistic regression model was statistically significant,  $\chi^2(8) = 215.97$ ,  $p < .001$ . The model explained 29.3% (Nagelkerke  $R^2$ ) of the variance in knowledge attribution and correctly classified 78.2% of cases.

The model revealed that both condition, Wald  $\chi^2(2) = 43.00$ ,  $p < .001$ , and discipline, Wald  $\chi^2(2) = 37.33$ ,  $p < .001$ , were significant predictors of knowledge attribution. Overall, philosophers were more likely to attribute knowledge than other academics,  $\chi^2(1) = 49.22$ ,  $p < .001$ , Cramer's  $V = 0.243$ , but equally likely as laypeople to attribute knowledge,  $\chi^2(1) = 1.02$ ,  $p = .312$ ,  $V = 0.065$ . Participants were overall more likely to attribute knowledge in the JTB condition than the Gettier condition,  $\chi^2(1) = 14.62$ ,  $p < .001$ ,  $V = 0.151$ , and more likely to attribute knowledge in the Gettier condition than in the Skeptical Pressure condition,  $\chi^2(1) = 18.21$ ,  $p < .001$ ,  $V = 0.171$ . Of primary interest was the interaction between discipline and condition, Wald  $\chi^2(4) = 43.09$ ,  $p < .001$ ; see Fig. 3. To follow up on this interaction, we again conducted two additional logistic regressions examining whether the non-philosophy academics differed from the laypeople, and whether they differed from philosophers.

The logistic regression model comparing academics and laypeople was statistically significant,  $\chi^2(5) = 170.24$ ,  $p < 0.001$ . The model explained 27.9% (Nagelkerke  $R^2$ ) of the variance in knowledge attribution and correctly classified 80.2% of cases. The model revealed that both condition, Wald  $\chi^2(2) = 43.00$ ,  $p < .001$ , and discipline, Wald  $\chi^2(1) = 27.71$ ,  $p < .001$ , were significant predictors of knowledge attribution, reflecting that laypeople attribute knowledge more often overall than non-philosophy academics. Here, we find a borderline significant interaction between condition and discipline, Wald  $\chi^2(2) = 6.15$ ,  $p = .046$ , suggesting that these groups responded somewhat differently across the types of scenario.

The logistic regression model comparing academics and philosophers was also statistically significant,  $\chi^2(5) = 120.19$ ,  $p < .001$ . The model explained 20.0% (Nagelkerke  $R^2$ ) of the variance in knowledge attribution and correctly classified 77.8% of cases. The

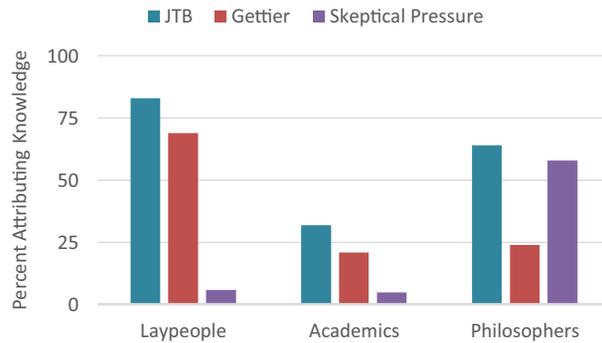


Fig. 3. Experiment 2. Mean knowledge attribution for laypeople, philosophers, and other academics in JTB, Gettier, and Skeptical Pressure scenarios.

model revealed that both condition, Wald  $\chi^2(2) = 43.00$ ,  $p < .001$ , and discipline, Wald  $\chi^2(1) = 13.69$ ,  $p < .001$ , were significant predictors of knowledge attribution, reflecting that, unlike in Experiment 1, here philosophers were overall more likely to attribute knowledge than non-philosophy academics. Importantly, there was also a significant interaction between condition and discipline, Wald  $\chi^2(2) = 28.91$ ,  $p < .001$ , suggesting that the way in which philosophers and non-philosophy academics responded to each type of scenario differed. To follow up on this interaction, we separately examined the responses from each participant group.

Philosophers were again less likely to attribute knowledge in the Gettier condition (24%) than in the JTB condition (64%),  $\chi^2(1) = 13.38$ ,  $p < .001$ ,  $V = 0.406$ , or Skeptical Pressure condition (58%),  $\chi^2(1) = 10.94$ ,  $p = .001$ ,  $V = 0.349$ ; see Fig. 3. They were equally likely to attribute knowledge in the JTB and Skeptical Pressure conditions,  $\chi^2(1) = 301$ ,  $p = .583$ ,  $V = 0.059$ , suggesting that the reminder that someone might have had a false belief, though they did not, did not impact philosophers' knowledge attributions.

Conversely, laypeople were equally likely to attribute knowledge in the JTB (83%) and Gettier (69%),  $\chi^2(1) = 1.90$ ,  $p = .168$ ,  $V = 0.155$ , conditions, but less likely to attribute knowledge in the Skeptical Pressure condition (6%) than in the JTB,  $\chi^2(1) = 42.33$ ,  $p < .001$ ,  $V = 0.762$ , or Gettier,  $\chi^2(1) = 29.65$ ,  $p < .001$ ,  $V = 0.642$ , conditions. The number of philosophy courses taken ( $M = .39$ ) did not have a significant effect on laypeople's knowledge attributions,  $\chi^2(1) = 0.000$ ,  $p = .999$ ,  $V = 0$ , and did not interact with condition,  $\chi^2(2) = 0.171$ ,  $p = .918$ ,  $V = 0.028$ .

Finally, unlike in Experiment 1, non-philosophy academics were more likely to attribute knowledge in the JTB condition (32%) than in the Gettier condition (21%),  $\chi^2(1) = 6.90$ ,  $p < .009$ ,  $V = 0.120$ ). Unlike philosophers, but like laypeople, other academics were less likely to attribute knowledge in the Skeptical Pressure condition (1%) than in either the JTB condition,  $\chi^2(1) = 53.74$ ,  $p < .001$ ,  $V = 0.337$ , or the Gettier condition,  $\chi^2(1) = 25.24$ ,  $p < .001$ ,  $V = 0.235$ . Again, the number of philosophy courses taken ( $M = 0.65$ ) did not have a significant effect on laypeople's knowledge attributions,

$\chi^2(1) = 0.290$ ,  $p = .089$ ,  $V = 0.019$ , and did not interact with condition,  $\chi^2(2) = .390$ ,  $p = .142$ ,  $V = 0.015$ .

Thus, in Experiment 2, philosophers again treated authentic evidence Gettier cases as cases of belief, rather than knowledge, while considering people with standard justified true beliefs as knowledgeable, even when reminded of the possibility that the person might have had a false belief. Conversely, both laypeople and other academics responded to this reminder by attributing knowledge at extremely low rates, suggesting that non-philosophers are much more affected by skeptical pressure than are philosophers. One possibility is that this effect arose because our skeptical pressure manipulation had a type of task demand for the laypeople and non-philosophy academics that it did not have for philosophers due to their academic training. That is, perhaps an experimenter's emphasis on the ways in which someone could have been wrong implies that the experimenter must think this information is crucial, and thus it would be impolite for the participant not to be swayed by this information. This proposal would require that philosophers' training makes them immune to this sort of pressure. However, this interpretation is somewhat implausible, since it seems likely that academic subjects may be more prone than most to take a critical, analytic, and argumentative approach to such scenarios (as evidenced by the overall skepticism displayed by this group), and because philosophical training has been previously shown not to reduce other sorts of biases shown by laypeople, such as order effects (Schwitzgebel & Cushman, 2012) or framing effects (Schwitzgebel & Cushman, 2015).

Finally, laypeople again treated Gettier cases similarly to cases of justified true belief, attributing knowledge at relatively high rates across both types of stories. However, in this study, non-philosophy academics showed some sensitivity to Gettier cases, although this effect was quite small ( $V = 0.12$  is classified by Cohen, 1988 as just past the threshold of the smallest effect size of interest,  $V = 0.10$ ). We also found that, as in Experiment 1, academics were substantially more skeptical about attributing knowledge to someone with a standard justified true belief than either laypeople or philosophers. We return to examine these findings further in the analysis across our two studies below.

### 3.2.2. *Analysis by field of expertise*

An initial binary logistic regression comparing responses from the six non-philosophy academic disciplines again revealed no main effect of discipline, Wald  $\chi^2(5) = 10.00$ ,  $p = .075$ , and no interaction of discipline and condition, Wald  $\chi^2(10) = 14.46$ ,  $p = .153$ , suggesting that non-philosophy academics from all disciplines were largely similar in their responses. To further examine whether any disciplines in particular hold the standard philosophical view of knowledge, we examined knowledge attribution across the eight groups separately (i.e., laypeople, philosophers, and academics from six other disciplines; see Supplementary Material for figures). Again, we calculated each group's responses to the Gettier and Skeptical Pressure scenarios in relation to their responses to the JTB scenario, to examine how the pattern of judgments relates to each other for each group, correcting for overall levels of skepticism (see Table 2). As can be seen in Fig. 4, none of the six other academic disciplines, nor the laypeople, showed the same pattern of

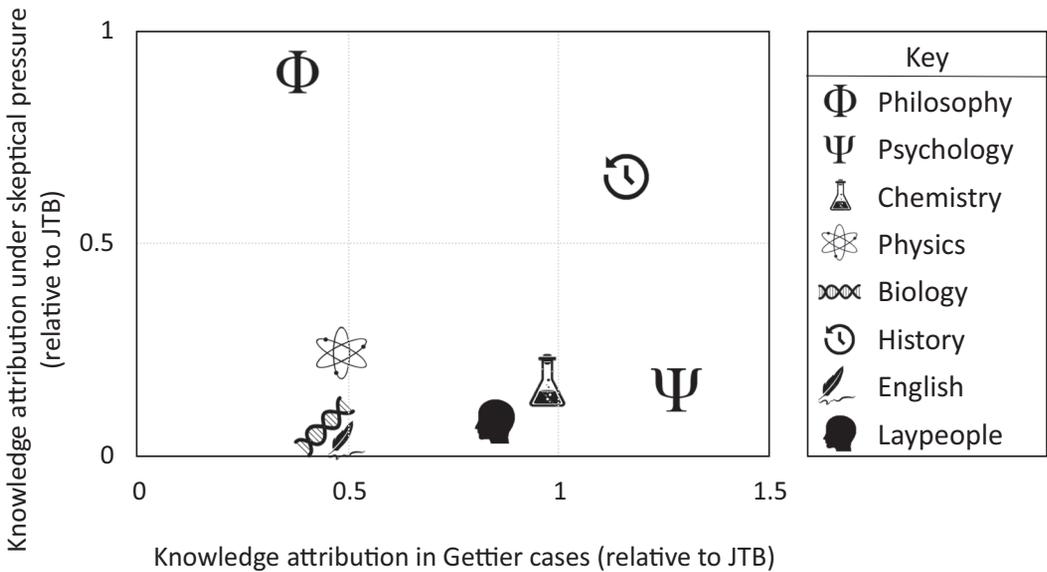


Fig. 4. Experiment 2. Percentage of participants by discipline attributing knowledge in Gettier and Skeptical Pressure condition, plotted as a proportion of JTB knowledge attributions.

knowledge attributions as the philosophers. Philosophers showed a Gettier effect but no effect of skeptical pressure, while all other disciplines (with the exception of historians) showed a large effect of skeptical pressure, and showed varying degrees of a Gettier effect. Historians, as the outlier, actually attributed knowledge more often in Gettier cases than in cases of justified true belief, but they were not as affected by skeptical pressure as the other disciplines.

### 3.2.3. Knowledge attribution in Gettier cases across our two studies

Because the question of whether non-philosophers attribute knowledge in Gettier cases in particular has recently received a fair amount of empirical attention, and because we found a significant Gettier effect for non-philosophy academics in Experiment 2 but not in Experiment 1, we conducted one final analysis collapsing across our two studies, and thus our two different vignettes, to examine the overall rates of knowledge attribution in authentic evidence Gettier cases as compared to cases of justified true belief. Across the two experiments, we had a total of 1,454 participants in these two conditions: 137 philosophers, 230 laypeople, and 1,087 non-philosophy academics.

A final binary logistic regression was performed to ascertain the effects of condition and discipline on knowledge attributions.<sup>3</sup> Including the main effects of condition (with JTB as the reference category), discipline (with non-philosophy academics as the reference category), and experiment (with Experiment 1 as the reference category), as well as the interaction terms, provided the best model fit. The logistic regression model was statistically significant,  $\chi^2(11) = 175.67, p < .001$ . The model explained 15.4% (Nagelkerke  $R^2$ ) of the variance in knowledge attribution and correctly classified 68.7% of cases.

The model revealed that the experiment (1 or 2) that someone participated in did not affect their overall levels of knowledge attribution, Wald  $\chi^2(1) = 3.20$ ,  $p = .073$ , and this variable did not interact with either condition, Wald  $\chi^2(1) = 1.50$ ,  $p = .221$ , or discipline, Wald  $\chi^2(2) = 3.29$ ,  $p = .193$ . There was also no main effect of condition (Gettier or JTB), Wald  $\chi^2(1) = 1.69$ ,  $p = .194$ . However, discipline (philosopher, other academic, layperson) was a significant predictor of overall knowledge attribution, Wald  $\chi^2(2) = 27.31$ ,  $p < .001$ . Laypeople were overall more likely to attribute knowledge than philosophers,  $\chi^2(1) = 29.14$ ,  $p < .001$ , Cramer's  $V = 0.312$ , and other academics,  $\chi^2(1) = 64.19$ ,  $p < .001$ ,  $V = 0.242$ , while philosophers and other academics were equally likely to attribute knowledge,  $\chi^2(1) = 1.26$ ,  $p = .261$ ,  $V = 0.036$ .

Of primary interest was the interaction between condition and group membership Wald  $\chi^2(2) = 9.67$ ,  $p = .008$ . As shown in Fig. 5, only philosophers showed a significant difference in knowledge attribution between Gettier cases (20%) and cases of justified true belief (64%),  $\chi^2 = 27.30$ ,  $p < .001$ ,  $V = 0.446$ . In contrast, laypeople attributed knowledge equally in the JTB (76%) and Gettier (68%) conditions,  $\chi^2 = 1.96$ ,  $p = .161$ ,  $V = 0.092$ . Notably, non-philosophy academics also attributed knowledge equally in the JTB (36%) and Gettier (29%) conditions,  $\chi^2 = 6.61$ ,  $p = .010$ ,  $V = 0.078$ . Although the chi-squared test shows a significant  $p$ -value due to the very large sample size, the effect size of .078 is tiny. In fact, as shown in Fig. 5, both the effect size and the absolute difference between the two conditions are smaller in magnitude for academics (7%,  $V = 0.078$ ) than for laypeople (8%;  $V = .092$ ), and they do not reach the threshold of even a small effect (minimum  $V = 0.10$ , Cohen, 1988). Thus, this analysis leads us to conclude that there is no meaningful difference in knowledge attribution in Gettier cases versus cases of justified true belief for either non-philosophy academics or laypeople across our two studies.

Again, we stress that while the absolute value of response rates may seem to suggest that laypeople tend to attribute knowledge in our authentic evidence Gettier cases, while non-philosophy academics and philosophers deny knowledge, these data must be interpreted with respect to the relevant control condition. That is, to the extent that laypeople are inclined to attribute knowledge in a standard justified true belief case (76%), they are similarly inclined to do so in an authentic evidence Gettier case (68%). The same is true for non-philosophy academics (36% vs. 29%). But philosophers show a very different pattern, and they are largely inclined to attribute knowledge in standard JTB cases (64%) and to deny it in authentic evidence Gettier cases (20%). Thus, non-philosophy academics show a relative pattern of knowledge attribution akin to that of laypeople, and substantially different from that of philosophers. This emphasis on relative knowledge attribution is important because, as discussed above, judgments about such cases could vary across populations for relatively superficial reasons. Expertise in certain disciplines, or higher education in general, could result in an overall skepticism, or unwillingness to attribute knowledge to others. Thus, it is only informative to examine knowledge attribution in authentic evidence Gettier cases *relative* to the extent to which one is willing to attribute knowledge in any scenario.

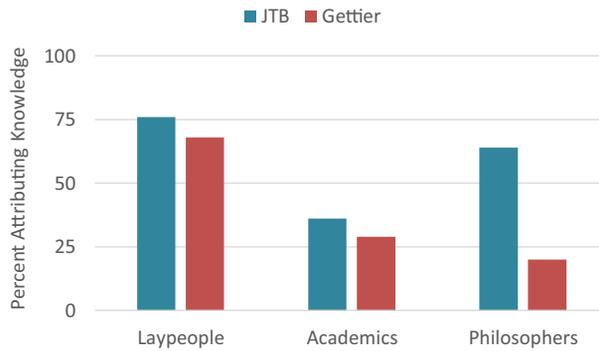


Fig. 5. Percentage of laypeople, philosophers, and other academics attributing knowledge in Gettier cases and cases of justified true belief, collapsed across Experiments 1 and 2.

#### 4. General discussion

Across two studies examining the knowledge attributions made by 1,785 academic faculty members and 336 laypeople, we found striking differences in knowledge attribution across groups. In particular, we found that non-philosophers deviate from philosophers in two major ways. First, laypeople and non-philosophy academics attribute knowledge in so-called ‘Gettier’ scenarios to the same extent as they attribute knowledge in non-controversial cases of justified true belief. Second, both laypeople and non-philosophy academics are much less likely than philosophers to attribute knowledge when faced with “skeptical pressure”—a reminder that someone’s belief may have been false, though it was not. We also found that non-philosophy academics were less likely than either laypeople or philosophers to attribute knowledge in a standard case of justified true belief, suggesting that higher education in any discipline other than philosophy may lead to greater overall skepticism about knowledge.

These findings also suggest that the view of knowledge taken to be standard in the philosophical literature does indeed capture the intuitions of philosophers. Consistent with the philosophical literature, philosophers attributed knowledge to a protagonist with a justified true belief, and they showed the predicted low rates of knowledge attribution when the protagonist was ‘Gettiered.’ Previous studies assumed that philosophers generally hold this view, but they did not empirically test this (Horvath & Wiegmann, 2016; Powell et al., 2015; Starmans & Friedman, 2012; Turri et al., 2015), and so the present studies are the first to empirically confirm that laypeople and philosophers respond to these types of cases differently even when they are presented with exactly the same scenarios under exactly the same conditions.

The question of whether knowledge attributions should be affected by the simple reminder that one might have been wrong has been the topic of much debate in the philosophical literature (e.g., Berkeley, 1710/1982; DeRose, 1995; Descartes, 1641/2006; Hume, 1748/1993; Russell, 2005). Nonetheless, we find that philosophers’ knowledge attributions are largely robust to such skeptical pressure, and they do not appear to consider it a relevant factor for knowledge attribution.

Turning to our lay participants, these findings replicate work showing that laypeople are less likely to attribute knowledge when reminded that the protagonist's belief may have been false (Nagel, San Juan, et al., 2013). Notably, the effect we observed was substantially larger than that found in previous research. The findings also suggest that laypeople do not share the 'Gettier' intuition, and instead attribute knowledge equally to Gettiered protagonists and protagonists with a standard JTB. While some previous studies have likewise found such differences, a number of other researchers have found that laypeople deny knowledge in Gettier cases, and this has been the topic of extensive debate for the last decade (see, e.g., Machery et al., 2017; Nagel, Mar, & San Juan, 2013; Nagel, San Juan, et al., 2013; Powell et al., 2015; Starmans & Friedman, 2012; 2013; Turri, 2013).

Furthermore, these results viewed in contrast with other results in the literature (e.g., Machery, 2017) reinforce the finding that an important psychological factor in knowledge attributions is the original nature of the evidence (i.e., whether the original evidence for the person's belief was valid or faulty). Initially raised in Starmans and Friedman (2012), this distinction was also replicated in several other papers (Nagel, San Juan, et al., 2013; Powell et al., 2015; Turri et al., 2015), but overall it has received fairly little attention. While a thorough review of the cases used in all of these studies is beyond the scope of this paper, we suggest that a consistent finding across all of these papers is that laypeople attribute knowledge in Gettier cases when a person's belief is based on authentic evidence (that is, the evidence is not faulty when they observe it, like the pens and red shirts in the present scenarios), and that they deny knowledge in Gettier cases when the person's belief is based on apparent evidence (that is, the evidence that leads to their belief is faulty, like a stopped clock, a credible lie, or a case of mistaken identity). We note that this distinction is separable from the justification for one's belief, since one may be perfectly justified in believing a well-crafted lie from an otherwise honest person, and yet, the lie is still faulty evidence that is not connected in the right way to the reason that the belief is true.

Our central interest was whether non-philosophy academics view knowledge similar to philosophers, which would suggest that factors such as advanced education and the general pursuit of knowledge inevitably lead to the standard philosophical view. Alternatively, if non-philosophy academics view knowledge similar to laypeople, this would suggest that the study of knowledge itself may lead philosophers to a unique concept of knowledge that is not shared by others outside the field. Our findings suggest that the latter is correct: Academics across our wide range of other disciplines did not share the philosophical concept of knowledge, and instead showed a similar pattern of judgments as laypeople (i.e., although they were generally more skeptical than laypeople, the relative differences between their judgments were similar to those of laypeople, and dissimilar to those of philosophers). In particular, neither academics nor laypeople showed the "Gettier effect" expected by philosophers, both groups judging people in Gettier-style situations to be equally knowledgeable as people in standard cases of justified true belief. Although we did find that academics showed a small Gettier effect in our second study, a well-powered analysis across both studies suggests that the effect is so small as to be

practically insignificant, and certainly not in line with the judgments shown by philosophers. In fact, academics showed even less differentiation between cases of justified true belief and Gettier cases than our lay participants did, both in terms of the absolute difference and the effect size. Thus, academics in non-philosophy disciplines seem to view knowledge differently than both the philosophical literature and the philosophers in our sample, and their pattern of judgments was overall in line with those of laypeople.

Also in line with lay judgments, but unlike those of philosophers, academics were less likely to attribute knowledge when reminded that the protagonist easily could have been wrong. This effect of highlighting counterfactual possibilities was extremely similar for laypeople, so it is unlikely to reflect practices learned in higher education. Instead, the findings suggest that philosophers have a unique set of intuitions about the factors relevant for knowledge that is not shared even among other well-educated pursuers of knowledge.

#### 4.1. *The “expertise defense”*

The results of these two experiments help shed light on previously documented differences in how philosophers and laypeople attribute knowledge. In response to such differences, some philosophers have argued that the knowledge attributions made by ordinary people are simply unsophisticated or unreflective, because they are on average less highly educated than professional epistemologists, and have spent little time reflecting on what knowledge is and how best to acquire it (Egler & Ross, 2018; Hales, 2006; Weinberg et al., 2010; Williamson, 2005, 2007, 2011). Here, we have examined this claim by examining whether other highly educated people—professional academics who have dedicated their professional lives to the pursuit of knowledge—reason more like philosophers or more like laypeople. Our results suggest that these highly educated participants do not share the philosophical concept of knowledge, and that their pattern of judgments more closely resembles that of laypeople. This in turn suggests that the differences between laypeople and philosophers do not simply arise because laypeople are less likely than philosophers to reflect before responding, or because they lack education, or dedication to the pursuit of knowledge.

However, the expertise defense may also be understood in a more focused way. On this view, it is the very specific knowledge that philosophers gain in their philosophical training—extensive practice in analyzing concepts and considering thought experiments—that causes them to become ‘expert’ in determining when someone possesses knowledge. If we understand the expertise defense in this way, then philosophers may be thought of as experts in judging what counts as knowledge, even as compared to scientists, mathematicians, and other academics. However, framing the expertise defense in this way highlights a problem: If training in philosophy leads philosophers to have different intuitions about what knowledge is than any other group of people, then it is not clear whether we should think of this divergence as a type of expertise, or if it is better thought of as a type of indoctrination. Further, it raises important questions about whether an analysis of knowledge that captures only the judgments of a small, highly trained group is the analysis that philosophers are (or should be) interested in pursuing.

#### 4.2. Absolute rates of knowledge attribution

While baseline levels of knowledge attribution were not the focus of our studies, it is worth noting that both laypeople and non-philosophy academics attributed knowledge to protagonists with false beliefs at fairly high rates (52% and 29%, respectively). This may reflect a tendency to use the term ‘knows’ non-factively (e.g., “I knew I was going to die out there,” Hazlett, 2010), though careful disambiguation suggests that people attributing knowledge to those with false beliefs usually do not mean this literally and are happier to select the response that the protagonist “only thinks she knows” (Buckwalter, 2014c; Holton, 1997). It could also reflect a tendency for “protagonist projection” (Buckwalter, 2014c; Holton, 1997), rather than a genuinely non-factive concept of knowledge. One possibility for future research is to examine whether this tendency can be attenuated by using response options that highlight the distinction between believing and knowing, such as asking participants to choose whether the protagonist ‘knows,’ or merely “thinks she knows, but doesn’t actually know” (Machery et al., 2017).

We also found that academics were skeptical about the possibility of knowledge overall, attributing knowledge at low rates even in our baseline condition where the protagonist had a simple justified true belief (Experiment 1: 39%, Experiment 2: 32%). This may capture an attitude among academics that it is hard to be certain enough to conclusively decide we have knowledge; as one professor of chemistry commented, “*To a good scientist, everything that is known has a finite chance of turning out to be incorrect or sufficiently incomplete that surprises are possible. We think and operate in terms of degrees of confidence. So, Kate ‘knows’ the letter is on the table in the colloquial sense of the word, but from a science perspective what she ‘knows’ is that, with a very high degree of confidence, it is on the table. So she really ‘thinks’ it is there.*”<sup>4</sup> These findings may motivate future research on the underlying causes of skepticism, and how these may be affected by training in different academic disciplines.

#### 4.3. Differences across disciplines

One interesting, and perhaps unexpected, aspect of these findings is the discovery that there was fairly little variation in knowledge attributions among academics across a wide variety of non-philosophy disciplines (see Table 2). In particular, we expected that we might see differences in the concept of knowledge held by professors in the sciences (biology, chemistry, physics, psychology) as compared to those in the humanities (English, history). However, we did not see any systematic differences across disciplines in the tendency to attribute knowledge in Gettier situations, or the tendency to be affected by skeptical pressure. We did see a small tendency for academics in the humanities to be slightly less skeptical overall (see Supplemental Material for analyses), but as this was not a direct focus of our studies, it remains for further research to determine if this is a robust finding.

Although a detailed analysis of the responses of participants from each individual discipline was beyond the scope and the power of this paper, we aimed to characterize each discipline in terms of whether they showed a Gettier effect, a false belief effect, and an effect of skeptical pressure. In all cases, philosophers were in a quadrant unto themselves,

set apart from every other discipline (see Figs. 2 and 4). Philosophers' knowledge attributions were strongly reduced by both Gettier cases and by cases of false belief, but not by the application of skeptical pressure. No other group—neither the laypeople nor academics in any other discipline—showed this same pattern of judgments. Instead, academics from every other discipline attributed knowledge in Gettier cases and standard justified true beliefs at similar rates. Similarly, while exactly none of the philosophers attributed knowledge to someone with a false belief, academics from every other discipline showed some tendency to do so, ranging from 50% (Physics) to 93% (English) as often as they attributed knowledge to those with justified true beliefs. Finally, the effect of skeptical reminders varied somewhat across the six disciplines, with biologists, chemists, physicists, psychologists, and English professors largely refusing to attribute knowledge in these cases, while historians were somewhat more similar to philosophers in resisting the skeptical pressure. We hesitate to make inferences based on this unpredicted finding, but suggest that additional work investigating differences across these disciplines would be informative.

These results bear importantly on the ongoing debate in cognitive science about demographic differences in epistemic intuitions (e.g., Knobe, 2019; Stich & Machery, forthcoming). We see these results as providing some evidence for both sides of the debate: On one hand, people with PhDs in a wide variety of disciplines have largely similar judgments about when a person has knowledge, whereas we might have expected variation among these groups. Conversely, the large demographic difference between philosophers and all the other groups tested suggests there are at least some important group differences in knowledge attribution.

One of the reasons to be interested in demographic differences (including, e.g., cultural or gender differences) is that once these differences are established, they can guide a search for the underlying psychological factors that lead to differing judgments. In this case, we hope that future work will build on these findings to determine what features of an education in philosophy lead to such different judgments, and whether these factors represent a genuine shift in the knowledge concept for philosophers, or something more akin to “cultural knowledge,” that is, learning that, to fit in among philosophers, one should have this judgment about knowledge and not that one.

## **5. Limitations and future directions**

The present studies aimed to examine how laypeople and academics in different disciplines attribute knowledge to others and, specifically, whether non-philosophy academics reason more like laypeople or more like philosophers. The results—that the philosophical concept of knowledge is not shared by academics in any other discipline studied—are informative about the factors that affect knowledge attribution for most people, as well as helping to shed light on the reasons for previously documented group differences in epistemic intuitions.

It is worth acknowledging, though, that aspects of our methods may limit the conclusions that can be drawn about the ordinary concept of knowledge. In order to persuade

busy academics to participate, it was essential to keep our tasks extremely concise. This constraint meant that we could not further probe participants' judgments by asking follow-up questions about their understanding of different aspects of the scenarios. For example, it would be instructive to know the extent to which participants believed the protagonists' beliefs were true and justified, and the extent to which they were concerned that the protagonist might have been wrong. The present studies included attention checks to ensure that participants understood the facts of the story, but they did not include any questions to probe how participants understood specific aspects of the scenarios. However, the scenarios in these studies were identical or similar to those used in Starmans and Friedman (2012) and in numerous other papers exploring adults' attributions of knowledge (e.g., Nagel, San Juan, et al., 2013; Powell et al., 2015; Turri et al., 2015). Starmans and Friedman (2012) asked participants four comprehension questions requiring them to confirm what the character believed, whether their belief was true, the reason for their belief, and the reason the belief was true. Participants largely interpreted these factors as intended (>80%), and including those who answered one or more questions differently did not alter the results. Starmans and Friedman (2012) also directly tested participants' judgments about justification, and they found that people attribute knowledge in Gettier cases when they see the protagonist as justified, and deny knowledge when they do not see the person as justified. Thus, we considered these scenarios to have previously validated for this type of understanding.

A further consideration is that familiarity with Gettier cases differed across disciplines. Almost all philosophers were familiar with Gettier cases (95%), while those from other disciplines had by and large not heard of this type of case before (0–7%; see Table 1). One possible interpretation of the observed group differences, then, may be that familiarity with Gettier cases, rather than training in philosophy, is what differentiates these groups. This is a subtle distinction, but it suggests that if chemists or history professors were more familiar with Gettier cases (and had no other philosophical training), they, too, may have responded like philosophers. However, a comparison between the non-philosophy academics that reported having heard of Gettier cases and those who had not found that those who had heard of Gettier cases were not significantly more likely to report intuitions that aligned with philosophers (see Supplementary Material). A similar caveat is that our method of recruitment made clear that we were specifically targeting academics from particular disciplines. Highlighting disciplinary training in this way may have led philosophers to follow their philosophical training when faced with Gettier cases. Thus, our findings leave open the possibility that philosophers would have responded like laypeople or other academics if their training had not been invoked. In a similar vein, it would be interesting to investigate whether leading academic participants through a sequence of questions designed to draw their attention to relevant aspects of Gettier scenarios would cause them to deny knowledge to people in Gettier scenarios, as in Turri (2013), or if academics' views might persevere in the face of such reflection. Any of these follow-ups might plausibly discover differences among other academic groups, where we did not find any beyond philosophy.

It would also be useful to investigate the different measures of knowledge attribution, in order to assess whether different question framings or response options might influence participants' responses. In particular, it is possible that the findings here are reflective of how people use the word 'know,' but not of their underlying concept of knowledge. It would be interesting to explore whether the observed differences would extend to measures that do not explicitly or directly ask about knowledge, such as the inferences participants make about the protagonist, or their predictions about how the protagonist will act or the consequences they will face. Finally, although our findings reveal the patterns of attributing knowledge of each group we studied, it is important to acknowledge that our findings do not reveal why they responded as they did. For example, we do not know why laypeople and non-philosophy academics are so sensitive to skeptical pressure. We hope that these initial findings will spur further investigations of such interesting questions.

## 6. Conclusions

Taken together, these findings give us confidence that academics across a wide variety of disciplines share a similar view of knowledge, one that is in fact largely similar to that of an average layperson, though considerably more skeptical. This suggests that despite the myriad methods used to acquire knowledge across these different fields, we nonetheless share some common goals and conclusions in our pursuit of knowledge. Our findings also suggest that the main effect of advanced academic training is to make people more cautious about attributing knowledge overall, possibly due to the appreciation of how often what was once thought to be knowledge has been overturned.

Advanced training in philosophy, on the other hand, may have a large impact on how philosophers think about knowledge. While it is possible that people with a certain concept of knowledge are more likely to enter the field of philosophy, or are quickly driven out of the field (Buckwalter & Stich, 2014), it seems likely that most eventual philosophers entered into their first philosophy class with the intuitions that people in Gettier situations possess knowledge (since at that point they were similar to the laypeople in our sample), but their subsequent training led them to discard these intuitions. Likewise, a freshman philosophy student is likely to feel the effect of skeptical pressure—indeed, a full embracing of skepticism is endemic to Philosophy 101—yet by the time this student has finished her PhD, her intuitions will have changed such that reminders of the possibility of error no longer affect her knowledge ascriptions.

There are at least two ways of characterizing this shift: Either philosophy students are developing the necessary skills to appreciate the factors that 'really' do matter for knowledge, or the study of philosophy leads to a narrowing of acceptable theories about knowledge that results in a sort of echo chamber of intuitions disconnected from how concepts are used by others. We leave it to philosophers to determine which of these characterizations is correct, but we suggest that either way, it will be important to consider that not only laypeople, but others in the academy—psychologists, physicists, historians,

mathematicians, perhaps right down the hall—do not agree with them about when someone knows, and when they just believe.

## Acknowledgments

OF's contributions to this work were funded by a grant from the Natural Sciences and Engineering Research Council of Canada. This work benefited from helpful discussion with Stephen Stich.

## Open Research badges



This article has earned Open Data and Open Materials badges. Data and materials are available at <https://osf.io/5eskf/>.

## Notes

1. In order to acquire ‘fresh’ intuitions from our philosophical experts, we chose not to use well-known examples from the philosophical literature, but instead to present participants with variations of these cases that were likely unfamiliar to them. Although philosophers would likely be able to categorize each type of case, we nonetheless hoped to avoid philosophers simply recalling their earlier intuitions, or reporting the generally accepted consensus answer to well-known cases.
2. We were interested in whether philosophers who described themselves as epistemologists would show a different pattern of judgments than other philosophers; however, only eight participants explicitly described themselves using this label, so we were unable to determine whether this was the case.
3. See Supplementary Material for analyses using the continuous measure; the findings are substantially the same as those reported here.
4. As described in the methods sections, we provided an optional comment box at the end of the study for participants to provide any additional comments about their answers. Only 16% of respondents chose to do so. As such, formal analysis of these comments is not possible, and we provide this anecdote simply to stimulate future research.

## References

Adeberg, T., Thompson, M., & Nahmias, E. (2015). Do men and women have different philosophical intuitions? Further data. *Philosophical Psychology*, 28(5), 615–641.

- Austin, A. E. (1990). Faculty cultures, faculty values. In W. G. Tierney (Ed.), *Assessing academic climates and cultures* (pp. 61–74). San Francisco: Jossey-Bass.
- Bedny, M., Pascual-Leone, A., & Saxe, R. R. (2009). Growing up blind does not change the neural bases of Theory of Mind. *Proceedings of the National Academy of Sciences*, 106(27), 11312–11317.
- Beebe, J. R., & Buckwalter, W. (2010). The epistemic side-effect effect. *Mind & Language*, 25(4), 474–498.
- Beebe, J. R., & Shea, J. (2013). Gettierized Knobe effects. *Episteme*, 10(03), 219–240.
- Bender, T. (1998). Politics, intellect, and the American university, 1945–1995. In T. Bender & C. E. Schorske (Eds.), *American academic culture in transformation: Fifty years, four disciplines* (pp. 17–54). Princeton, NJ: Princeton University Press.
- Berkeley, G. (1710/1982). *Treatise concerning the principles of human knowledge*. In K. Winkler (Ed.), Indianapolis, IN: Hackett.
- Birch, S. A., & Bloom, P. (2007). The curse of knowledge in reasoning about false beliefs. *Psychological Science*, 18(5), 382–386.
- Boyer, E. (1990). *Scholarship reconsidered: Priorities of the professoriate*. Princeton, NJ: Princeton University Press.
- Bradmetz, J., & Gauthier, C. (2005). The development of interindividual sharing of knowledge and beliefs in 5-to 9-year-old children. *The Journal of Genetic Psychology*, 166(1), 45–53.
- Buckwalter, W. (2010). Knowledge isn't closed on Saturdays. *Review of Philosophy and Psychology*, 1(3), 395–406.
- Buckwalter, W. (2014a). The mystery of stakes and error in ascriber intuitions. *Advances in Experimental Epistemology*, 145–174.
- Buckwalter, W. (2014b). Gettier made ESEE. *Philosophical Psychology*, 27(3), 368–383.
- Buckwalter, W. (2014c). Factive verbs and protagonist projection. *Episteme*, 11(4), 391–409.
- Buckwalter, W., & Schaffer, J. (2015). Knowledge, stakes, and mistakes. *Noûs*, 49(2), 201–234.
- Buckwalter, W., & Stich, S. (2014). Gender and philosophical intuition. *Experimental Philosophy*, 2, 307–346.
- Clark, B. (1983). *The higher education system: Academic organization in cross-national perspective*. Berkeley, CA: University of California Press.
- Cohen, J. (1988). *Statistical power and analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Cohen, S. (1999). Contextualism, skepticism, and the structure of reasons. *Philosophical Perspectives*, 13, 57–89.
- Colaço, D., Buckwalter, W., Stich, S., & Machery, E. (2014). Epistemic intuitions in fake-barn thought experiments. *Episteme*, 11(2), 199–212.
- Damrosch, D. (1995). *We scholars: Changing the culture of the university*. Cambridge, MA: Harvard University Press.
- Dennett, D. C. (1995). Intuition pumps. In J. Brockman (Ed.), *The third culture: Beyond the scientific revolution* (pp. 180–197). New York: Simon & Schuster.
- DeRose, K. (1992). Contextualism and knowledge attributions. *Philosophy and Phenomenological Research*, 52, 913–929.
- DeRose, K. (1995). Solving the skeptical problem. *Philosophical Review*, 104(1), 1–52.
- DeRose, K. (2009). *The case for contextualism*. Oxford: Oxford University Press.
- Descartes, R. (1641/2006). Meditations on first philosophy. In I. R. Ariew & D. Cress (Eds.), *Meditations, objections, and replies*. Indianapolis: Hackett.
- Dixon, H. G., Komugabe-Dixon, A. F., Dixon, B. J., & Low, J. (2018). Scaling theory of mind in a small-scale society: A case study from Vanuatu. *Child Development*, 89(6), 2157–2175.
- Egler, M., & Ross, L. D. (2018). Philosophical expertise under the microscope. *Synthese*, 197, 1077–1098.
- Fantl, J., & McGrath, M. (2009). *Knowledge in an uncertain world*. Oxford, UK: Oxford University Press.
- Feltz, A., & Zarpentine, C. (2010). Do you know more when it matters less? *Philosophical Psychology*, 23, 683–706.

- Friedman, O., & Turri, J. (2015). Is probabilistic evidence a source of knowledge? *Cognitive Science*, 39(5), 1062–1080.
- Geiger, R. L. (1993). *Research and relevant knowledge: American research universities since World War II*. New York: Oxford University Press.
- Gettier, E. L. (1963). Is justified true belief knowledge? *Analysis*, 23, 121–123.
- Hales, S. D. (2006). *Relativism and the foundations of philosophy*. Cambridge, MA: MIT Press.
- Hawthorne, J. (2004). *Knowledge and lotteries*. Oxford, UK: Oxford University Press.
- Hazlett, A. (2010). The myth of factive verbs. *Philosophy and Phenomenological Research*, 80(3), 497–522.
- Hetherington, S. (Ed.). (2018). *The Gettier problem*. Cambridge, UK: Cambridge University Press.
- Hogrefe, G. J., Wimmer, H., & Perner, J. (1986). Ignorance versus false belief: A developmental lag in attribution of epistemic states. *Child Development*, 567–582.
- Holton, R. (1997). Some telling examples: A reply to Tsohatzidis. *Journal of Pragmatics*, 28, 624–628.
- Horschler, D. J., Santos, L. R., & MacLean, E. L. (2019). Do non-human primates really represent others' ignorance? A test of the awareness relations hypothesis. *Cognition*, 190, 72–80.
- Horvath, J., & Wiegmann, A. (2016). Intuitive expertise and intuitions about knowledge. *Philosophical Studies*, 173(10), 2701–2726.
- Hume, D. (1748/1993). *An enquiry concerning human understanding*. In E. Steinberg (Ed.). Indianapolis, IN: Hackett.
- Karmiloff-Smith, A., Klima, E., Bellugi, U., Grant, J., & Baron-Cohen, S. (1995). Is there a social module? Language, face processing, and theory of mind in individuals with Williams syndrome. *Journal of Cognitive Neuroscience*, 7(2), 196–208.
- Kerr, C. (1982). *The uses of the university*. Cambridge, MA: Harvard University.
- Kim, M., & Yuan, Y. (2015). No cross-cultural differences in the Gettier car case intuition: A replication study of Weinberg et al 2001. *Episteme*, 12(3), 355–361.
- Knobe, J. (2019). Philosophical intuitions are surprisingly robust across demographic differences. *Epistemology & Philosophy of Science*, 56(2), 29–36.
- Koriat, A., & Adiv, S. (2012). Confidence in one's social beliefs: Implications for belief justification. *Consciousness and Cognition*, 21(4), 1599–1616.
- Kovic, M., & Füchslin, T. (2018). Probability and conspiratorial thinking. *Applied Cognitive Psychology*, 32(3), 390–400.
- Kuhn, D., & Katz, J. (2009). Are self-explanations always beneficial? *Journal of Experimental Child Psychology*, 103(3), 386–394.
- Lombrozo, T. (2016). Explanatory preferences shape learning and inference. *Trends in Cognitive Sciences*, 20(10), 748–759.
- Machery, E. (2017). *Philosophy within its proper bounds*. Oxford, UK: Oxford University Press.
- Machery, E., Stich, S., Rose, D., Chatterjee, A., Karasawa, K., Struchiner, N., ... Hashimoto, T. (2017). Gettier across cultures 1. *Noûs*, 51(3), 645–664.
- Machery, E., Stich, S., Rose, D., Chatterjee, A., Karasawa, K., Struchiner, N., ... Hashimoto, T. (2018). Gettier was framed. In M. Mizumoto, S. Stich, & E. McCready (Eds.), *Epistemology for the rest of the world*, (123–148). Oxford, UK: Oxford University Press.
- May, J., Sinnott-Armstrong, W., Hull, J. G., & Zimmerman, A. (2010). Practical interests, relevant alternatives, and knowledge attributions: An empirical study. *Review of Philosophy and Psychology*, 1(2), 265–273.
- Minter, M., Hobson, R. P., & Bishop, M. (1998). Congenital visual impairment and 'theory of mind'. *British Journal of Developmental Psychology*, 16(2), 183–196.
- Moore, C., Bryant, D., & Furrow, D. (1989). Mental terms and the development of certainty. *Child Development*, 60(1), 167–171.
- Nagel, J. (2008). Knowledge ascriptions and the psychological consequences of changing stakes. *Australasian Journal of Philosophy*, 86(2), 279–294.

- Nagel, J., Mar, R., & San Juan, V. (2013). Authentic Gettier cases: A reply to Starmans and Friedman. *Cognition*, 129(3), 666–669.
- Nagel, J., San Juan, V., & Mar, R. A. (2013). Lay denial of knowledge for justified true beliefs. *Cognition*, 129(3), 652–661.
- Oktay-Gür, N., & Rakoczy, H. (2017). Children's difficulty with true belief tasks: Competence deficit or performance problem? *Cognition*, 166, 28–41.
- Perner, J., Frith, U., Leslie, A. M., & Leekam, S. R. (1989). Exploration of the autistic child's theory of mind: Knowledge, belief, and communication. *Child Development*, 60(3), 689–700.
- Perry Jr., W. G. (1999). *Forms of intellectual and ethical development in the college years: A scheme*. Jossey-Bass Higher and Adult Education Series. San Francisco, CA: Jossey-Bass .
- Peterson, C. C., & Wellman, H. M. (2009). From fancy to reason: Scaling deaf and hearing children's understanding of theory of mind and pretence. *British Journal of Developmental Psychology*, 27(2), 297–310.
- Peterson, C. C., Wellman, H. M., & Liu, D. (2005). Steps in theory-of-mind development for children with deafness or autism. *Child Development*, 76(2), 502–517.
- Powell, D., Horne, Z., Pinillos, N. Á., & Holyoak, K. J. (2015). A Bayesian framework for knowledge attribution: Evidence from semantic integration. *Cognition*, 139, 92–104.
- Pratt, C., & Bryant, P. (1990). Young children understand that looking leads to knowing (so long as they are looking into a single barrel). *Child Development*, 61(4), 973–982.
- Rapaport, W. J., Shapiro, S. C., & Wiebe, J. M. (1997). Quasi-indexicals and knowledge reports. *Cognitive Science*, 21(1), 63–107.
- Rose, D., Machery, E., Stich, S., Alai, M., Angelucci, A., Berniūnas, R., ... Cohnitz, D. (2019). Nothing at stake in knowledge. *Nous*, 53(1), 224–247.
- Russell, B. (2005). *Analysis of mind*, New York: Routledge. Available at: <http://www.gutenberg.org/files/2529/2529-h/2529-h.htm>.
- Rysiew, P. (2001). The context-sensitivity of knowledge attributions. *Nous*, 35, 477–514.
- Schaffer, J., & Knobe, J. (2011). Contrastivism surveyed. *Nous*, 46(4), 675–708.
- Schwitzgebel, E., & Cushman, F. (2012). Expertise in moral reasoning? Order effects on moral judgment in professional philosophers and non-philosophers. *Mind & Language*, 27(2), 135–153.
- Schwitzgebel, E., & Cushman, F. (2015). Philosophers' biased judgments persist despite training, expertise and reflection. *Cognition*, 141, 127–137.
- Seyedsayamdost, H. (2015a). On normativity and epistemic intuitions: Failure of replication. *Episteme*, 12(1), 95–116.
- Seyedsayamdost, H. (2015b). On gender and philosophical intuition: Failure of replication and other negative results. *Philosophical Psychology*, 28(5), 642–673.
- Shahaeian, A., Peterson, C. C., Slaughter, V., & Wellman, H. M. (2011). Culture and the sequence of steps in theory of mind development. *Developmental Psychology*, 47(5), 1239.
- Smith, L. (1992). Judgements and justifications: Criteria for the attribution of children's knowledge in Piagetian research. *British Journal of Developmental Psychology*, 10(1), 1–23.
- Snow, C. P. (2012). *The two cultures*. Cambridge, UK: Cambridge University Press.
- Sodian, B. (1988). Children's attributions of knowledge to the listener in a referential communication task. *Child Development*, 378–385.
- Sodian, B., & Wimmer, H. (1987). Children's understanding of inference as a source of knowledge. *Child Development*, 424–433.
- Stanley, J. (2005). *Knowledge and practical interests*. Oxford, UK: Oxford University Press.
- Starmans, C., & Friedman, O. (2012). The folk conception of knowledge. *Cognition*, 124(3), 272–283.
- Starmans, C., & Friedman, O. (2013). Taking 'know' for an answer: A reply to Nagel, San Juan, and Mar. *Cognition*, 129(3), 662–665.
- Stich, S., & Machery, E. (Forthcoming). Demographic differences in philosophical intuition: A reply to Joshua Knobe. *Review of Philosophy & Psychology*.

- Turri, J. (2013). A conspicuous art: Putting Gettier to the test. *Philosophers' Imprint*, 13(10), 1–16.
- Turri, J. (2015). Skeptical appeal: The source-content bias. *Cognitive Science*, 39(2), 307–324.
- Turri, J., Buckwalter, W., & Blouw, P. (2015). Knowledge and luck. *Psychonomic Bulletin & Review*, 22(2), 378–390.
- Turri, J., & Friedman, O. (2014). Winners and losers in the folk epistemology of lotteries. In *Advances in Experimental Epistemology*, 45–69). London: Bloomsbury.
- Unger, P. (1975). *Ignorance: A case for scepticism*. Oxford, UK: Oxford University Press.
- Vogel, J. (1990). Are there counterexamples to the closure principle? In M. D. Roth & G. Ross (Eds.), *Doubting* (pp. 13–27). Dordrecht: Kluwer Academic Publishers. Reprinted in *Epistemology: An anthology* (2nd ed.). In E. Sosa, J. Kim, J. Fantl, & M. McGrath (Eds.). Blackwell.
- Weinberg, J. M., Gonnerman, C., Buckner, C., & Alexander, J. (2010). Are philosophers expert intuiters? *Philosophical Psychology*, 23(3), 331–355.
- Weinberg, J. M., Nichols, S., & Stich, S. (2001). Normativity and epistemic intuitions. *Philosophical Topics*, 29, 429–460.
- Wellman, H. M., Fang, F., Liu, D., Zhu, L., & Liu, G. (2006). Scaling of theory-of-mind understandings in Chinese children. *Psychological Science*, 17(12), 1075–1081.
- Williams, J. J., & Lombrozo, T. (2010). The role of explanation in discovery and generalization: Evidence from category learning. *Cognitive Science*, 34(5), 776–806.
- Williams, J. J., Lombrozo, T., & Rehder, B. (2013). The hazards of explanation: Overgeneralization in the face of exceptions. *Journal of Experimental Psychology: General*, 142(4), 1006.
- Williamson, T. (2005). Armchair philosophy, metaphysical modality and counterfactual thinking. *Proceedings of the Aristotelian Society*, 105, 1–23.
- Williamson, T. (2007). *The philosophy of philosophy*. Oxford, UK: Blackwell.
- Williamson, T. (2011). Philosophical expertise and the burden of proof. *Metaphilosophy*, 42(3), 215–229.
- Wilson, E. O. (1998). *Consilience: The unity of science*. New York: Knopf.
- Wimmer, H., Hogrefe, G. J., & Perner, J. (1988). Children's understanding of informational access as source of knowledge. *Child Development*, 386–396.
- Woolley, J. D., & Wellman, H. M. (1993). Origin and truth: Young children's understanding of imaginary mental representations. *Child Development*, 64(1), 1–17.
- Wright, J. C. (2010). On intuitional stability: The clear, the strong, and the paradigmatic. *Cognition*, 115(3), 491–503.

### Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article:

**Data S1.** Supplementary Material