

The Gettier Intuition from South America to Asia

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# **The Gettier Intuition from South America to Asia<sup>1</sup>**

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## **1. Introduction**

In a Gettier case, an agent forms a justified true belief that, according to most philosophers, fall short of being an instance of knowledge (Gettier, 1963). Following the tradition, we will call the judgment that the agent does not have knowledge despite having a justified true belief “the Gettier intuition.” Gettier concluded that the philosophical tradition had been wrong in identifying knowledge with justified true belief (but see Antognazza, 2015; Dutant, 2015 on whether the justified true belief analysis of knowledge has ever been part of the philosophical tradition). Agreeing by and large with his conclusion (but see Sartwell, 1991; Weatherson, 2003), philosophers have attempted to reformulate the analysis of knowledge in response to the cases Gettier put forward. Unfortunately, each proposal has been itself undermined by further counterexamples (for an early review, see Shope, 1983).

This sprawling literature was rejuvenated when experimental philosophers and then psychologists started examining whether lay people possess the Gettier intuition.<sup>2</sup> In

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<sup>2</sup> Starmans & Friedman, 2012; Turri, Buckwalter, & Blouw, 2015; Machery, Stich, Rose, Chatterjee, Karasawa, Struchiner, Sirker, Usui, & Hashimoto, forthcoming b.

a groundbreaking, influential article, Weinberg, Nichols, and Stich (2001) reported evidence that the Gettier intuition varies across cultures, and they argued that if true, such cross-cultural variation would undermine important projects in epistemology. More recent work has however cast doubt on the reality of the alleged cultural variation. In particular, Machery, Stich, Rose, Chatterjee, Karasawa, Struchiner, Sirker, Usui, and Hashimoto (forthcoming a) have examined whether the Gettier intuition differs across populations in the USA, Japan, Brazil, and India (see also Kim & Yuan, 2015), and they have provided evidence that, for at least some ways of eliciting the Gettier intuition, Americans, Japanese, Brazilians, and Indians share the Gettier intuition (Figure 1).

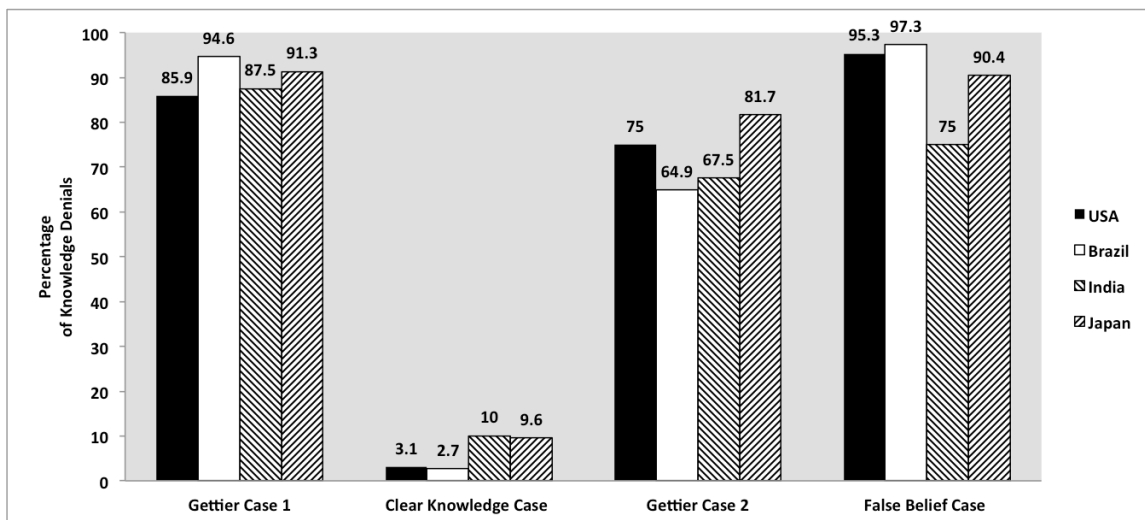


Figure 1: Proportion of knowledge denials for two Gettier cases, a clear knowledge case, and a false belief case in the USA, Japan, Brazil, and India (based on Machery et al., forthcoming a)

Machery and colleagues concluded that the Gettier intuition may well be part of a core epistemology, a universal way of thinking about epistemic matters: In all cultures, the standard translations of “knowledge” refer to an epistemic state that differs from the mere possession of a justified true belief. They also warned philosophers not to interpret

these results as showing that the concept of knowledge is universal: People may think of the epistemic state referred to by the standard translations of “knowledge” differently in different cultures and languages. Finally, they called for further inquiries into folk epistemology, aimed at identifying the aspects of folk epistemology that vary across cultures and languages and those that are invariant (see Mizumoto, Stich, and McCready, forthcoming for relevant articles).

We now think these conclusions may have been premature. After all, Machery et al. (forthcoming a) presented data from only 4 cultures and languages, which leaves plenty of room for surprising cross-cultural and cross-linguistic variation. In addition, while these four societies are quite different and while English, Portuguese, Bengali, and Japanese differ in many respects, the USA, Japan, India, and Brazil are large, industrial societies with a market economy, and the Machery et al. (forthcoming a) results may not generalize to other societies, including small-scale societies. Finally, those data came partly from students, and it is unclear whether the findings would generalize to other populations. One of our goals in the present article is thus to extend the results of Machery et al. (forthcoming a) by looking at a much larger range of cultures and languages.

In addition, previous work by Machery et al. (forthcoming a) on the Gettier cases did not examine whether demographic factors predict the Gettier intuition beyond culture and language, including gender, people’s reflective tendencies, and personality. It is controversial whether gender has an effect on the judgments elicited by philosophical cases (Buckwalter & Stich, 2014; Adleberg, Thompson, & Nahmias, 2015; Seyedsayamdost, 2015; Holtzman, 2016), in particular on the Gettier intuition. Early

work suggested it does, but the gender effect on the Gettier intuition has been difficult to replicate. In the present article, we will examine the role of gender with a very large sample size. Some have also argued that personality influences the judgments elicited by philosophical cases (Feltz and Cokely, 2009, 2012, 2013), but the evidence bearing on this claim is limited. Our data will allow us to look at this question. Finally, some critics of experimental philosophy have highlighted the distinction between “reflective” and “non-reflective” judgments, but previous work has not supported the idea that reflection changes the judgments people make in response to cases (Weinberg, Alexander, Gonnerman, and Reuter, 2012; Colaço, Kneer, Alexander, & Machery, ms). We will examine this question as well in this article.

Here is how we will proceed. Section 2 presents our empirical research and Section 3 discusses its significance for epistemology as well as for the empirical study of core epistemology.

## **2. Empirical Findings**

### *2.1 Materials*

Participants were presented with the following Gettier case:

Paul Jones was worried because it was 10 pm and his wife Mary was not home from work yet. Usually she is home by 6 pm. He tried her cell phone but just kept getting her voicemail. Starting to worry that something might have happened to her, he decided to call some local hospitals to ask whether any patient by the name of “Mary Jones” had been admitted that evening. At the University Hospital, the person who answered his call confirmed that someone by that name

had been admitted with major but not life-threatening injuries following a car crash. Paul grabbed his coat and rushed out to drive to University Hospital. As it turned out, the patient at University Hospital was not Paul's wife, but another woman with the same name. In fact, Paul's wife had a heart attack as she was leaving work, and was actually receiving treatment in Metropolitan Hospital, a few miles away.

This Gettier case was followed by four questions in a fixed order. The first question was a comprehension question:

According to the story, which of the following statements is correct?

- (1) At 10 pm Paul's wife was in a hospital
- (2) At 10 pm Paul's wife was in a movie theater

This comprehension question was then followed by two different questions intended to examine whether participants shared the Gettier intuition (which we respectively call "Knowledge 1" and "Knowledge 2"):

**(Knowledge 1)** In your personal opinion, when Paul rushed out to drive to University Hospital, did he know whether or not his wife was hospitalized?

- (1) Yes, he knew
- (2) No, he did not know

**(Knowledge 2)** In your personal opinion, which of the following sentences better describes Paul's situation?

- (1) When Paul rushed out to drive to University Hospital, he knew that his wife was hospitalized.

(2) When Paul rushed out to drive to University Hospital, he thought he knew that his wife was hospitalized, but he did not actually know this.

Knowledge 1 and Knowledge 2 were each followed by a question meant to probe participants' certainty:

How certain are you of your response to question 2 [4] on a (0-100)% scale, with low numbers indicating that you are not sure and high numbers indicating that you are sure?

I am \_\_\_\_\_ % certain of my response.<sup>3</sup>

Finally, between Knowledge 1 and Knowledge 2, participants were asked a question about the protagonist's justification:

In your personal opinion, how justified was Paul in thinking that his wife was hospitalized when he rushed out to drive to University Hospital?

- (1) Completely unjustified
- (2) Unjustified
- (3) Somewhat unjustified
- (4) Neutral
- (5) Somewhat justified
- (6) Justified
- (7) Completely justified

The Gettier case is an adaptation of a case found in Nagel et al. (2012), and has been used in previous cross-cultural studies (Machery et al., forthcoming a, forthcoming

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<sup>3</sup> In Columbia, the 100-point confidence scales for Knowledge 1 and Knowledge 2 were replaced with 7-point scales.



b). The questions used in the present study are identical to the questions used in Machery et al. (forthcoming a, forthcoming b) and Rose et al. (forthcoming), which are themselves adaptations of the questions used in Nagel et al. (2012). Because “to know” is sometimes used to mean “believe with certainty,” answers to Knowledge 1 may not genuinely reflect people’s judgments about knowledge. Knowledge 2 is meant to control for this possibility by contrasting the subjective certainty of the agent with his genuine knowledge. While Nagel et al. (2012) presented Knowledge 2 only when participants answered “know” to Knowledge 1, all our participants saw both questions about knowledge (for discussion of the limits of Nagel et al.’s methods, see Starmans & Friedman, 2013).

The Gettier case was the first case of a survey containing four other philosophical cases (in a fixed order) and the Asian disease case (Tversky & Kahneman, 1981), followed by 5 social-psychology scales: The Cognitive Reflection test or CRT (Frederick, 2005), our own adapted version of the Disjunctive Thinking Test (Shafir, 1994), the 18-item Need for Cognition Scale or NFC (Cacioppo, Petty, & Kao, 1984)<sup>4</sup>, the 12-item Personal Need for Structure Scale or NFS (Thompson, Naccarato, Parker, & Moskowitz, 2001), and the 10-item Personality Inventory or TIPI (Gosling, Rentfrow, & Swann, 2003). A demographic questionnaire concluded the survey. None of the philosophical cases following the Gettier case in the survey was epistemological.

## *2.2 Participants*

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<sup>4</sup> In Korea the 18-item NFC scale was replaced with the standardized 15-item NFC scale in Korean (Kim, 2007).

We collected data from 2838 participants in 24 sites, located in 23 countries (counting Hong-Kong as a distinct country) and 17 languages. Some participants were recruited on the web, others by means of data collection companies, yet others in universities. Some participants received a small fiduciary compensation, some received course credits in exchange for participation, others were volunteers. Some participants completed paper-and-pencil versions of the survey, others were read the survey, yet others completed web-based surveys.

We excluded data from participants who were younger than 18 years old, did not answer the comprehension question (see below), or did not answer it correctly. Because we are interested only in the answers of participants who take the belief of the protagonist in the vignette to be justified, we excluded participants who gave an answer lower than 4 to the justification question. Our final sample consisted of 2230 respondents (46.0% males; mean age: 31.7; age SD=14.2; age range: 18-88).

Table 1 indicates the country in which the data were collected and presents the demographic information for each sample. In some countries, several samples were collected either because several research groups were involved (e.g., China) or because we sampled from different demographic groups (e.g., Lithuania). The column “Method” indicates how the survey was given: Surveys were either completed on the web, presented on paper, or read. The column “Payment” indicates whether participants received a compensation for participation. Participants who received compensation received either some money or school credits.

<b>Sample</b>	<b>Students</b>	<b>Method</b>	<b>Payment</b>	<b>Language</b>	<b><i>N</i></b>
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<b>Europe</b>					
Bulgaria	Both	Web-based	Volunteers	Bulgarian	155
France	N	Web-based	Compensation & volunteers	French	178
Germany	N	Web-based	Compensation	German	88
Italy	Y	Paper-pencil	Volunteers	Italian	90
Lithuania	Both			Lithuanian	154
Portugal	Y	Paper-pencil	Volunteers	Portuguese	73
Spain	N	Web-based	Compensation	Spanish	116
Switzerland	Y	Paper-pencil & web-based	Compensation & volunteers	French	26
UK	N	Web-based	Compensation	English	120
<b>Middle East</b>					
Iran	N	Paper-	Volunteers	Persian	90

		pencil			
Israel (Bedouins)	N	Paper- pencil	Compensation	Arabic	21
Israel (Jews)	Y	Web- based	Volunteers	Hebrew	70
Lebanon	Y	Paper- pencil	Volunteers	English	75
<b>Central &amp; North America</b>					
Mexico	N	Paper- pencil	Volunteers	Spanish	64
USA	N	Web- based	Compensation	English	116
<b>South America</b>					
Brazil	Y	Paper- pencil	Volunteers	Portuguese	61
Columbia	N	Read	Compensation	Spanish	50
<b>Asia</b>					

China	Both	Paper-pencil and web-based	Volunteers and Compensation	Chinese, Simplified and Traditional	196
Hong Kong	Y	Web-based	Compensation	Chinese, Traditional	72
India	Y	Paper-pencil	Volunteers	Bengali	86
Indonesia	Y	Paper-pencil	Compensation	Indonesian	73
Japan	N	Web-based	Compensation	Japanese	146
Mongolia	N	Paper-pencil	Volunteers	Mongolian	33
South Korea	N	Web-based	Compensation	Korean	73

Table 1: Participants' characteristics

### 2.3 Results

A logistic regression was first conducted to assess whether site, gender, age, CRT scores, NFC scores, NFS scores, and the five dimensions of personality (extraversion<sup>5</sup>, agreeableness, conscientiousness, neuroticism<sup>6</sup>, and openness to experience) predicted whether or not people answer “does not know” to Knowledge 1. When all 11 variables are entered simultaneously, they significantly predict whether or not people choose “Does not know” over “Knows” in response to Knowledge 1,  $\chi^2(36, N=2033)=197.13, p<.000$  (Nagelkerke  $R^2=.123$ ). Table 2 presents the relevant statistics for all these variables.

<b>Variable</b>	<b><math>\beta</math></b>	<b>SE</b>	<b><i>p</i></b>	<b>Odds ratio</b>	<b>Odds ratio 95% CI</b>
Age	.01	.01	.29	1.01	[.996, 1.01]
Gender <sup>a</sup>	.00	.10	.99	1.00	[.83, 1.21]
<b>Europe</b>					
Bulgaria <sup>b</sup>	.28	.24	.24	1.33	[.83, 2.12]
Germany <sup>b</sup>	.50	.29	.09	1.64	[.92, 2.92]
Italy <sup>b</sup>	-.42	.31	.17	.66	[.36, 1.19]

<sup>5</sup> While our scale ranged from 1 to 7, the data from Germany ranged from 1 to 8. We do not know where the disagreement comes from. Assuming a coding error, we decided to transform the 8's into 7's.

<sup>6</sup> TIPI codes for emotional stability, the inverse of neuroticism. So high scores correspond to a low neuroticism.

Lithuania <sup>b</sup>	.68	.25	.007	1.98	[1.21, 3.25]
Portugal <sup>b</sup>	1.30	.33	<.001	3.67	[1.93, 7.00]
Spain <sup>b</sup>	.47	.29	.08	1.60	[.95, 2.70]
Switzerland <sup>b</sup>	.20	.44	.65	1.23	[.51, 2.92]
UK <sup>b</sup>	1.3	.28	<.001	3.72	[2.13, 6.48]
<b>North America</b>					
Mexico <sup>b</sup>	.78	.33	.02	2.38	[1.15, 4.91]
USA <sup>b</sup>	.86	.28	.002	2.36	[1.38, 4.06]
<b>South America</b>					
Brazil <sup>b</sup>	1.51	.34	<.001	4.51	[2.31, 8.80]
Columbia <sup>b</sup>	.88	.34	.01	2.42	[1.24, 4.72]
<b>Middle East</b>					
Iran <sup>b</sup>	-.14	.29	.63	.87	[.50, 1.53]
Israel (Bedouins) <sup>b</sup>	-1.61	1.06	.13	.20	[.03, 1.60]
Israel (Jews) <sup>b</sup>	.90	.33	.006	2.45	[1.30, 4.63]
Lebanon <sup>b</sup>	-.20	.32	.53	.82	[.44, 1.52]
<b>Asia</b>					
China <sup>b</sup>	1.26	.26	<.001	3.53	[2.13, 5.84]
Hong Kong <sup>b</sup>	.88	.34	.01	2.42	[1.24, 4.72]
India <sup>b</sup>	.26	.34	.43	1.30	[.68, 2.45]
Indonesia <sup>b</sup>	.64	.32	.05	1.90	[1.01, 3.56]
Japan <sup>b</sup>	.59	.25	.02	1.81	[1.10, 2.98]
Mongolia <sup>b</sup>	1.10	.45	.01	3.02	[1.25, 7.26]

South Korea <sup>b</sup>	1.35	.32	<.001	3.86	[2.07, 7.21]
Disjunctive thinking <sup>c</sup>	.02	.11	.85	1.02	[.83, 1.26]
CRT (=1) <sup>d</sup>	.25	.13	.06	1.23	[.995,1.66]
CRT (=2) <sup>d</sup>	.60	.15	<.001	1.82	[1.37,2.42]
CRT (=3) <sup>d</sup>	.71	.15	<.001	2.03	[1.51, 2.72]
NFC	.06	.10	.55	1.06	[.88,1.27]
NFS	-.003	.01	.67	1.00	[.98,1.01]
Extraversion	-.07	.04	.06	.93	[.87,1.00]
Agreeableness	-.01	.05	.86	.99	[.91, 1.09]
Conscientiousness	-.11	.05	.01	.89	[.82, .97]
Neuroticism	-.05	.04	.23	.95	[.88, 1.03]
Openness to experience	.10	.05	.04	1.11	[1.01, 1.22]

Table 2: Logistic regression results for Knowledge 1 (a: reference class – males; b: reference class - France; c: reference class – correct answer; d: reference class - CRT score = 0)

Of the variables introduced in the regression model, site, CRT, and conscientiousness significantly predict people’s answers to Knowledge 1. Compared to the answers given in France, people in 15 countries are more likely to share the Gettier intuition: Germany, Lithuania, Portugal, UK, Mexico, USA, Brazil, Columbia, Israel (Jewish people), China, Hong Kong, Indonesia, Japan, Mongolia, and South Korea. Compared to participants with a CRT score equal to 0, people with a CRT score equal to 2 and 3 are more likely to



share the Gettier intuition. Finally, conscientious people are less likely to share the Gettier intuition.

The same procedure was conducted for Knowledge 2. When all 11 variables are entered simultaneously, they significantly predict whether or not people choose “thinks he knows, but does not actually know” over “knows” in response to Knowledge 2,  $\chi^2(36, N=2028)=229.06, p<.000$  (Nagelkerke  $R^2=.169$ ). Table 3 presents the relevant statistics for all these variables.

<b>Variable</b>	<b><math>\beta</math></b>	<b>SE</b>	<b><i>p</i></b>	<b>Odds ratio</b>	<b>Odds ratio 95% CI</b>
Age	-.01	.005	.04	.99	[.98, .999]
Gender <sup>a</sup>	.13	.12	.29	1.14	[.89,1.45]
<b>Europe</b>					
Bulgaria <sup>b</sup>	.67	.29	.02	1.95	[1.11, 3.44]
Germany <sup>b</sup>	.86	.35	.01	2.35	[1.18, 2.48]
Italy <sup>b</sup>	.57	.38	.13	1.77	[.84, 3.70]
Lithuania <sup>b</sup>	1.14	.33	.001	3.12	[1.63, 5.96]
Portugal <sup>b</sup>	1.68	.49	.001	5.38	[2.06, 14.04]
Spain <sup>b</sup>	.34	.29	.25	1.40	[.79, 2.48]
Switzerland <sup>b</sup>	.18	.53	.73	1.20	[.43, 3.40]
UK <sup>b</sup>	1.26	.33	<.001	3.54	[1.83, 6.84]

<b>North America</b>					
Mexico <sup>b</sup>	.27	.39	.48	1.31	[.62, 2.79]
USA <sup>b</sup>	1.38	.39	<.001	3.98	[1.84, 8.59]
<b>South America</b>					
Brazil <sup>b</sup>	1.25	.44	.005	3.48	[1.46, 8.26]
Columbia <sup>b</sup>	.88	.43	.04	2.42	[1.04, 5.62]
<b>Middle East</b>					
Iran <sup>b</sup>	-.20	.31	.53	.82	[.44, 1.52]
Israel (Bedouins) <sup>b</sup>	-1.81	.81	.03	.16	[.03, .80]
Israel (Jews) <sup>b</sup>	.52	.40	.20	1.68	[.76, 3.71]
Lebanon <sup>b</sup>	-.23	.35	.51	.80	[.40, 1.58]
<b>Asia</b>					
China <sup>b</sup>	1.77	.41	<.001	5.86	[2.64, 13.04]
Hong Kong <sup>b</sup>	.72	.45	.11	2.06	[.85, 5.01]
India <sup>b</sup>	-.34	.37	.36	.71	[.34, 1.47]
Indonesia <sup>b</sup>	.30	.36	.41	1.35	[.66, 2.74]
Japan <sup>b</sup>	.13	.29	.66	1.14	[.65, 2.01]
Mongolia <sup>b</sup>	2.12	.78	.007	8.32	[1.80, 38.51]
South Korea <sup>b</sup>	1.51	.43	<.001	4.51	[1.95, 10.45]

Disjunctive thinking <sup>c</sup>	.07	.14	.63	1.07	[.81, 1.41]
CRT (=1) <sup>d</sup>	.46	.16	.003	1.58	[1.17, 2.15]
CRT (=2) <sup>d</sup>	1.05	.19	<.001	2.86	[1.97, 4.15]
CRT (=3) <sup>d</sup>	1.01	.20	<.001	2.73	[1.85, 4.04]
NFC	.24	.12	.04	1.27	[1.01, 1.61]
NFS	-.00	.01	.85	.998	[.98, 1.02]
Extraversion	-.10	.05	.03	.91	[.83, .99]
Agreeableness	.09	.06	.14	1.09	[.97, 1.23]
Conscientiousness	-.13	.06	.03	.88	[.78, .99]
Neuroticism	-.18	.05	<.01	.83	[.75, .92]
Openness to experience	.14	.06	.02	1.15	[1.02, 1.30]

Table 3: Logistic regression results for Knowledge 2 (a: reference class – males; b: reference class - France; c: reference class – correct answer; d: reference class - CRT score = 0)

Of the variables introduced in the regression model, age, site, CRT, NFC, extraversion, neuroticism, openness to experience, and conscientiousness significantly predict people's answers to Knowledge 2. Compared to the answers given in France, people in 11 countries were more likely to share the Gettier intuition: Bulgaria, Germany, Lithuania, Portugal, UK, USA, Brazil, Columbia, China, Mongolia, and South Korea; Bedouins from Israel were significantly less likely to share the Gettier intuition. Compared to people with a CRT score equal to 0, people with a CRT score equal to 1, 2, and 3 are more likely to share the Gettier intuition. Finally, conscientious and extravert people are less likely to share the Gettier intuition, while people open to experience and neurotic

people (see footnote 3 on neuroticism in TIPI) are more likely to share the Gettier intuition.

To control for the influence of uncertain answers, we reproduced these two analyses with participants who reported a degree of confidence higher than 66% on the 0-100 confidence scale after Knowledge 1 or after Knowledge 2 (or higher or equal to 5 on the 7-point scales used in Columbia). When all 11 variables are entered simultaneously, they significantly predict whether or not people choose “Does not know” over “Know” in response to Knowledge 1,  $\chi^2(36, N=1510)=192.78, p<.000$  (Nagelkerke  $R^2=.160$ ). Table 4 presents the relevant statistics for all these variables.

<b>Variable</b>	<b><math>\beta</math></b>	<b>SE</b>	<b><math>p</math></b>	<b>Odds ratio</b>	<b>Odds ratio 95% CI</b>
Age	.008	.01	.14	1.01	[.998, 1.02]
Gender <sup>a</sup>	.04	.11	.74	1.04	[.83,1.30]
<b>Europe</b>					
Bulgaria <sup>b</sup>	.01	.29	.99	1.01	[.57, 1.77]
Germany <sup>b</sup>	.55	.33	.10	1.73	[.90, 3.32]
Italy <sup>b</sup>	-.15	.36	.68	.86	[.42, 1.76]
Lithuania <sup>b</sup>	.93	.29	.001	2.54	[1.45, 4.45]
Portugal <sup>b</sup>	1.16	.41	.005	3.19	[1.42, 7.18]
Spain <sup>b</sup>	.41	.31	.19	1.50	[.82, 2.76]

Switzerland <sup>b</sup>	.37	.56	.50	1.45	[.49, 3.73]
UK <sup>b</sup>	1.44	.32	<.001	4.22	[2.26, 7.88]
<b>North America</b>					
Mexico <sup>b</sup>	.88	.38	.02	2.41	[1.14, 5.09]
USA <sup>b</sup>	1.09	.32	.001	2.99	[1.60, 5.56]
<b>South America</b>					
Brazil <sup>b</sup>	1.98	.42	<.001	7.23	[3.15, 16.58]
Columbia <sup>b</sup>	1.10	.42	.009	2.99	[1.31, 6.84]
<b>Middle East</b>					
Iran <sup>b</sup>	-.35	.35	.32	.70	[.35, 1.40]
Israel (Bedouins) <sup>b</sup>	-1.44	1.07	.18	.24	[.03, 1.94]
Israel (Jews) <sup>b</sup>	1.06	.40	.008	2.89	[1.32, 6.29]
Lebanon <sup>b</sup>	-.40	.39	.31	.67	[.31, 1.44]
<b>Asia</b>					
China <sup>b</sup>	1.32	.29	<.001	3.74	[2.11, 6.64]
Hong Kong <sup>b</sup>	.72	.40	.07	2.06	[.94, 4.48]
India <sup>b</sup>	.54	.40	.17	1.71	[.79, 3.71]
Indonesia <sup>b</sup>	.58	.37	.12	1.79	[.86, 3.73]
Japan <sup>b</sup>	.53	.30	.08	1.69	[.94, 3.06]
Mongolia <sup>b</sup>	1.27	.47	.007	3.54	[1.42, 8.87]
South Korea <sup>b</sup>	1.30	.36	<.001	3.67	[1.81, 7.47]

Disjunctive thinking <sup>c</sup>	.04	.13	.73	1.05	[.81, 1.35]
CRT (=1) <sup>d</sup>	.25	.15	.10	1.29	[.95, 1.75]
CRT (=2) <sup>d</sup>	.66	.17	<.001	1.93	[1.37, 2.70]
CRT (=3) <sup>d</sup>	.64	.18	<.001	1.89	[1.33, 2.67]
NFC	.13	.11	.24	1.14	[.92, 1.42]
NFS	-.01	.01	.34	.99	[.97, 1.01]
Extraversion	-.05	.04	.22	.95	[.88, 1.03]
Agreeableness	-.09	.06	.11	.92	[.82, 1.02]
Conscientiousness	-.18	.05	.001	.84	[.75, .93]
Neuroticism	.003	.05	.95	1.00	[.92, 1.10]
Openness to experience	.11	.06	.06	1.12	[.997, 1.26]

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Table 4: Logistic regression results for Knowledge 1 for confidence  $\geq 66$  (a: reference class – males; b: reference class - France; c: reference class – correct answer; d: reference class - CRT score = 0)

Of the variables introduced in the regression model, site, CRT, NFC, and conscientiousness significantly predict people's answers to Knowledge 1. Compared to the answers given in France, people in 12 countries are more likely to share the Gettier intuition: Lithuania, Portugal, UK, Mexico, USA, Brazil, Columbia, Israel (Jewish people), China, Japan, Mongolia, and South Korea. Compared to people with a CRT score equal to 0, people with a CRT score equal to 2 and 3 are more likely to share the Gettier intuition. Finally, conscientious people are less likely to share the Gettier intuition. These results are very similar to those obtained with all participants.

When all 11 variables are entered simultaneously, they significantly predict whether or not people choose “Thinks he knows, but does not actually know” over “Knows” in response to Knowledge 2,  $\chi^2(36, N=1742)=205.85$ ,  $p<.000$  (Nagelkerke  $R^2=.179$ ). Table 5 presents the relevant statistics for all these variables.

<b>Variable</b>	<b><math>\beta</math></b>	<b>SE</b>	<b><math>p</math></b>	<b>Odds ratio</b>	<b>Odds ratio 95% CI</b>
Age	-.01	.01	.03	.99	[.98, .999]
Gender <sup>a</sup>	.11	.14	.40	1.12	[.86, 1.46]
<b>Europe</b>					
Bulgaria <sup>b</sup>	.72	.31	.02	2.05	[1.11, 3.78]
Germany <sup>b</sup>	.86	.36	.02	2.37	[1.16, 4.83]
Italy <sup>b</sup>	1.20	.47	.01	3.30	[1.32, 8.29]
Lithuania <sup>b</sup>	1.13	.35	.001	3.09	[1.56, 6.13]
Portugal <sup>b</sup>	1.80	.54	.001	6.05	[2.12, 17.29]
Spain <sup>b</sup>	.31	.31	.32	1.36	[.74, 2.52]
Switzerland <sup>b</sup>	.15	.60	.80	1.17	[.36, 3.75]
UK <sup>b</sup>	1.36	.36	<.001	3.90	[1.95, 7.83]
<b>North America</b>					
Mexico <sup>b</sup>	.57	.43	.18	1.77	[.77, 4.08]
USA <sup>b</sup>	1.35	.41	.001	3.87	[1.75, 8.57]

**South America**

Brazil <sup>b</sup>	1.38	.47	.004	3.95	[1.56, 10.01]
Columbia <sup>b</sup>	1.06	.46	.02	2.88	[1.18, 7.02]

**Middle East**

Iran <sup>b</sup>	-.11	.35	.75	.90	[.45, 1.77]
Israel (Bedouins) <sup>b</sup>	-1.42	.85	.10	.24	[.05, 1.28]
Israel (Jews) <sup>b</sup>	.85	.47	.07	2.33	[.93, 5.83]
Lebanon <sup>b</sup>	.04	.40	.93	1.04	[.48, 2.26]

**Asia**

China <sup>b</sup>	1.76	.42	<.001	5.82	[2.56, 13.21]
Hong Kong <sup>b</sup>	.75	.51	.15	2.11	[.77, 5.76]
India <sup>b</sup>	-.23	.42	.57	.79	[.35, 1.78]
Indonesia <sup>b</sup>	.23	.38	.55	1.26	[.59, 2.67]
Japan <sup>b</sup>	.47	.34	.17	1.60	[.82, 3.11]
Mongolia <sup>b</sup>	2.12	.79	.01	8.30	[1.77, 30.01]
South Korea <sup>b</sup>	1.54	.46	.001	4.64	[1.88, 11.46]
Disjunctive thinking <sup>c</sup>	.09	.16	.56	1.10	[.81, 1.49]



CRT (=1) <sup>d</sup>	.43	.17	.012	1.54	[1.10, 2.16]
CRT (=2) <sup>d</sup>	1.02	.21	<.001	2.76	[1.84, 4.15]
CRT (=3) <sup>d</sup>	1.07	.22	<.001	2.92	[1.88, 4.53]
NFC	.28	.13	.03	1.33	[1.03, 1.71]
NFS	.003	.01	.80	1.003	[.98, 1.02]
Extraversion	-.08	.05	.11	.93	[.84, 1.02]
Agreeableness	.08	.07	.24	1.08	[.95, 1.23]
Conscientiousness	-.14	.06	.03	.87	[.76, .98]
Neuroticism	-.21	.06	<.001	.81	[.72, .90]
Openness to experience	.16	.07	.02	1.17	[1.02, 1.34]

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Table 5: Logistic regression results for Knowledge 2 for confidence  $\geq 66$  (a: reference class – males; b: reference class - France; c: reference class – correct answer; d: reference class - CRT score = 0)

Of the variables introduced in the regression model, age, site, CRT, NFC, neuroticism, openness to experience, and conscientiousness significantly predict people's answers to Knowledge 2. Compared to the answers given in France, people in 11 countries are more likely to share the Gettier intuition: Bulgaria, Germany, Italy, Lithuania, Portugal, UK, USA, Brazil, Columbia, China, Mongolia, and South Korea. Compared to people with a CRT score equal to 0, people with a CRT score equal to 2 and 3 are more likely to share the Gettier intuition. Finally, conscientious people are less likely to share the Gettier

intuition, while people open to experience and neurotic people are more likely to share the Gettier intuition. These results are very similar to those obtained with all participants.

Figure 2 reports the percentages of Gettier intuition for Knowledge 1 and Knowledge 2 for our 24 sites (N=2228 for Knowledge 1 and N=2221 for Knowledge 2).

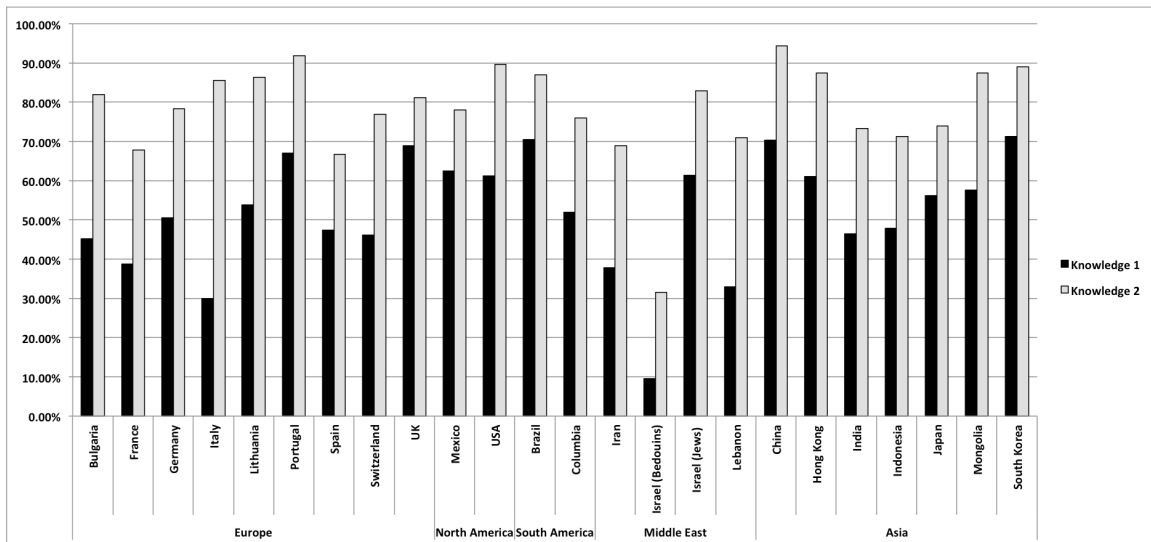


Figure 4: Proportion of Gettier intuitions across the 24 sites for Knowledge 1 and Knowledge 2

Table 6 reports whether for each site the proportion of Gettier intuition in response to Knowledge 1 and Knowledge 2 is significantly different from 50%.

Site	Knowledge 1		Knowledge 2	
	N	<i>p</i>	N	<i>p</i>
<b>Europe</b>				
Bulgaria	155	.23	155	<.001
France	178	.003	177	<.001
Germany	87	.92	88	<.001

Italy	90	<.001	90	<.001
Lithuania	154	.33	154	<.001
Portugal	73	.003	73	<.001
Spain	116	.58	114	<.001
Switzerland	26	.70	26	.006
UK	119	<.001	117	<.001
<b>North America</b>				
Mexico	64	.05	64	<.001
USA	116	.02	116	<.001
<b>South America</b>				
Brazil	61	.001	61	<.001
Columbia	50	.78	50	<.001
<b>Middle East</b>				
Iran	90	.02	90	<.001
Israel (Bedouins)	21	<.001	19	.11
Israel (Jews)	70	.06	70	<.001
Lebanon	79	.002	79	<.001
<b>Asia</b>				
China	196	<.001	196	<.001
Hong Kong	72	.06	72	<.001
India	86	.52	86	<.001
Indonesia	73	.73	73	<.001
Japan	146	.14	146	<.001

Mongolia	33	.38	32	<.001
South Korea	73	<.001	73	<.001

Table 6: P-values of chi-square tests for Knowledge 1 and Knowledge 2 for each of the 24 sites

Answers to Knowledge 1 differ from 50% in only 11 of the 24 sites, and in one of them only a minority of people report the Gettier intuition when probed by means of Knowledge 1 (Israel: Bedouins). In all sites, except for the Bedouins of Israel, the answers to Knowledge 2 are significantly larger than 50%: A majority of people share the Gettier intuition in 23 of the 24 sites.

Figure 3 reports the percentages of Gettier intuition for Knowledge 1 and Knowledge 2 across gender, aggregating across sites (N=2218 for Knowledge 1 and N=2211 for Knowledge 2).

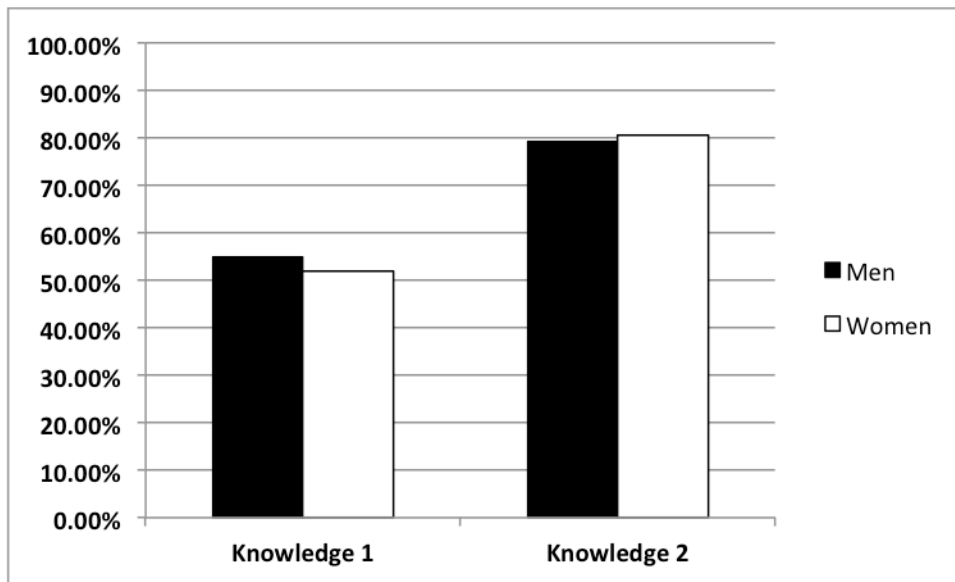


Figure 3: Proportion of Gettier intuitions for Men and Women for Knowledge 1 and Knowledge 2

Figure 4 does the same thing for the 4 levels of the CRT scale (N=2184 for Knowledge 1 and N=2178 for Knowledge 2).

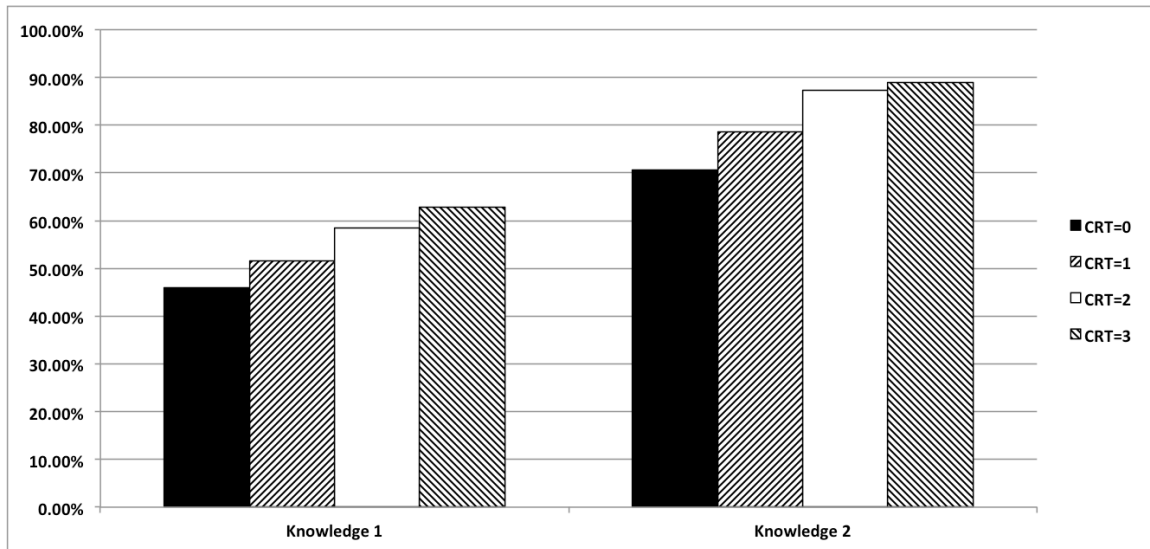


Figure 4: Proportion of Gettier intuitions for the four CRT scores for Knowledge 1 and Knowledge 2

### 3. Discussion

#### 3.1 Cultural Variation

We found that for 23 out of 24 sites and 16 out of 17 languages a large majority of people report the Gettier intuition when it is probed by means of a question contrasting “knowing” and “thinking one knows, but not actually knowing” (Knowledge 2). In all these sites between 70 and 90% of participants report the Gettier intuition (Figure 2). Our sample of sites is diverse in various respects. Participants in many sites were not students. One of our sites examines a non-industrialized society: In Columbia, the data were collected from the Nasa People, three fourths of whom report the Gettier intuition. The only exception to this pattern was the Bedouins in Israel. While the Bedouin data may be a counterexample to the claim that the Gettier intuition is universal, we advise

readers to interpret it with caution mostly because our sample size is very small. At the very least, a replication is called for before drawing any strong conclusion. In the meantime, we view our results as providing convergent evidence in support of the claim made in Machery et al. (forthcoming a): The Gettier intuition is robust across cultures and languages, suggesting that it is part of a core epistemology.

Answers to Knowledge 1 are more difficult to interpret. Out of 25 sites, they were significantly below 50% in 5 sites (France, Italy, Lebanon, Iran, and among the Bedouins of Israel) and significantly above 50% in 8 sites (Portugal, UK, USA, Mexico, Brazil, China, Hong Kong, and South Korea). No clear geographical or linguistic pattern emerges from this data. These findings show that “to know” and its standard translations are often used in a way that does not fit philosophers’ consensus that knowledge requires more than having a justified true belief, even if people may well have the Gettier intuition.

### *3.2 Gender Variation*

In a provocative, widely discussed essay, Buckwalter and Stich (2014) provided suggestive evidence that judgments elicited by at least some philosophical cases vary across genders, and they speculated that such variation partly explains the gender imbalance in American professional philosophy. Buckwalter and Stich’s hypothesis has been criticized along two different lines. Assuming for the sake of the argument the reality of gender variation in philosophical judgments, some have argued that it was unlikely to explain the gender imbalance in philosophy (Antony, 2012; Thompson, forthcoming). Others have rather focused on the evidential basis of Buckwalter and

Stich's hypothesis. Adleberg and colleagues (2015), Seyedsayamdost (2015), and Holtzman (2016) have examined some of the gender differences reported by Buckwalter and Stich, and they have been unable to replicate them.

The Gettier case has played an important role in this controversy since Stich and Buckwalter's research was inspired by reports that men and women react differently to this case. Adleberg and colleagues as well as Seyedsayamdost failed to find any difference in Gettier cases, but their sample sizes are not large (respectively, N=136 and N=105, 137, and 78) and their studies were limited to English-speaking subjects. The results reported in this article are more compelling. With more than 2,000 participants, we failed to find any difference between men and women (Figure 3). We conclude that the Gettier case does not elicit different judgments from men and women. This finding is consistent with the existence of gender variation for other cases in philosophy (for gender variation in moral judgment, see Friesdorf, Conway, & Gawronski, 2015).

### *3.3 Personality Variation*

Feltz and Cokely (2009, 2012, 2013) have argued that personality influences the judgments elicited by philosophical cases (see also Holtzman, 2013). For instance, they have shown that extraversion influences people's judgments about cases assessing the compatibility of free will and responsibility with determinism (Feltz & Cokely, 2009). Some of their results have however been empirically challenged. In particular, Nadelhoffer, Kvaran, and Nahmias (2009) were unable to find widespread influence of extraversion on free will judgment, although they report some significant effects for responsibility judgments. A second worry is that personality effects may be rare, or

limited to the domains of ethics and action theory. A third worry is that such effects are very small and insignificant from a philosophical point of view.

Our findings support Feltz and Cokely's contention that personality influences the judgments elicited by philosophical cases, extending the evidential basis beyond cases bearing on free will and responsibility. Conscientiousness correlated negatively with holding the Gettier intuition in all the analyses we reported above. Neuroticism and openness to experience correlated positively with reporting the Gettier intuition as measured by Knowledge 2 in our two analyses (Tables 3 and 5). The correlation between open to experience and reporting the Gettier intuition replicates the results reported by Holtzman (2013). Roughly, conscientiousness measures the disposition for self-discipline and reliability; neuroticism (aka emotional instability) the tendency to experience negative emotion; and openness to experience the tendency to seek new experiences and engage in creative ventures. Admittedly, it is not clear at all why these dimensions of human personality positively or negatively correlate with endorsing the Gettier intuition

Our findings also show that personality can have a substantial effect. The odds ratio for conscientiousness was between .84 and .89, meaning that the ratio  $P(\text{Gettier intuition} \mid \text{Conscientiousness} = x) / P(\text{no Gettier intuition} \mid \text{Conscientiousness} = x)$  decreases by 10% to 15% for a 1-point increase in conscientiousness (on a 7-point scale). The influence of neuroticism and openness to experience on answers to Knowledge 2 is of a similar size. Assuming an odds ratio of .85, this means that if people who are low in conscientiousness (Conscientiousness=1 on the TIPI) are equally likely to report and reject the Gettier intuition, people high in conscientiousness (Conscientiousness=7 on the TIPI) are about three times less likely to report the Gettier intuition than to reject it, a



striking difference (*mutatis mutandis* for neuroticism and openness to experience). Or to illustrate the effect size differently, assuming that 80% of people low on conscientiousness report the Gettier intuition, about 60% of people high on conscientiousness would report the Gettier intuition.

We conclude that personality matters when it comes to judgments in response to philosophical cases, as was already argued by James (1907). Furthermore, this finding matters philosophically (Feltz & Cokely, 2012; Machery, forthcoming). The influence of personality is hard to make sense of, as was noted earlier, and it is difficult to know why the judgments of conscientious people or those of people open to experience should be preferred to those of people who are less conscientious or less open to experience. But if we have no reason to prefer the judgment of one group to the judgment of another group, then we ought to suspend judgment.

### *3.4 Age*

Colaço, Buckwalter, Stich, and Machery (2014) reported that age influences the judgments elicited by fake-barn cases, but this result has not been replicated. Our results tentatively suggest that age also influences the Gettier intuition, at least when one examines confident answers: Older people are less likely to report the Gettier intuition for both ways of eliciting this intuition (Knowledge 1 and Knowledge 2). The odds ratio is about .99, meaning that the ratio  $P(\text{Gettier intuition} \mid \text{Age} = x) / P(\text{no Gettier intuition} \mid \text{Age} = x)$  decreases by 1% for a 1-year increase in participants' age. Here is one way to illustrate this effect size: It means that assuming that 80% of 18-year olds report the

Gettier intuition, only about 66% of 78-year olds would report the Gettier intuition, a noticeable difference.

### *3.5 Reflection*

Critics of experimental philosophy have often run versions of the following argument (e.g., Ludwig, 2007; Kauppinen, 2007; Bengson, 2013): When they consider cases, philosophers are only interested in judgments generated by careful reflection about the cases themselves and the concepts philosophers deploy in response to these cases, and whatever it is that experimental philosophers have been studying, they have not been studying those kinds of things. Thus, experimental studies revealing that unreflective judgments are susceptible to a host of irrelevant factors do nothing to disqualify reflective judgments from playing a role in philosophical argumentation. Following Colaço et al. (ms) and Machery (forthcoming), we can call this argument “the reflection defense.” Previous work has failed to find any evidence that reflection has any influence on philosophical judgment (Weinberg et al., 2012; Gerken and Beebe, 2016; Colaço et al., ms), but only a few cases have been examined. The study reported above extends the assessment of the reflection defense in a new direction.

The notion of a reflective judgment is often left vague by proponents of the reflection defense, and it can be characterized in thicker or thinner terms. Here, we embrace a thin characterization of reflection, as was done in previous empirical work on the reflection defense: A judgment is thinly reflective just in case it results from a deliberation process involving attention, focus, cognitive effort, and so on—the type of domain-general psychological resources that careful and attentive thinking requires—and

unreflective otherwise. We examined the possible effect of reflection by looking at people's disposition to engage in reflection, using the CRT as our measure (as was done in Livengood, Sytsma, Feltz, Scheines, & Machery, 2010).

In contrast to previous empirical work, we found that the more reflective one is, the more one is prone to give the standard philosophical answer in response to the Gettier case, namely that the agent does not know the relevant proposition (Figure 3), even after controlling for culture, age, gender, and other social-psychological measures.

Furthermore, the effect size is noticeable. For instance, for people with a CRT score equal to 3 the ratio of the probability of holding the Gettier intuition to the probability of rejecting it is two to three times as large as it is for people with a CRT score equal to 0.

It isn't entirely clear how to reconcile these findings with previous negative results. It isn't that the disposition to engage in reflective thinking was measured differently in the present study from other studies since Gerken and Beebe (2016) also relied on the CRT. Nor is it the case that reflection matters for some domains but not others (epistemology perhaps, but not ethics) or for some cases but not others (the Gettier case, but not the truetemp case) since Colaço and colleagues failed to find any influence of reflection on epistemic cases, including a clock case.

Be it as it may, our results show that reflection can have a substantial impact on the judgments elicited by at least some cases. This finding is significant in two respects. First, it provides some support to the reflection defense against the so-called negative program in experimental philosophy: It is *sometimes* too quick to challenge philosophical intuitions in light of their demographic variation and of framing effects since more reflective judgments could be universal and immune to framing effects. Proponents of the

negative program should thus ensure that the demographic variation they observe or the framing effects they report don't disappear once more reflective judgments are examined.

Second, the influence of reflection on the Gettier intuition suggests that people who do not report the Gettier intuition are making a performance error, reinforcing our claim that the Gettier intuition is part of a core epistemology. A performance error is a judgment that is not reflective of people's domain-specific competence, but rather results from the characteristics of the processes needed to make this judgment. For instance, the judgment that a center embedded sentence like "The rat the cat the dog bit chased escaped" is not acceptable is a performance error because it does not reflect people's grammatical competence but rather results from the processing limitations of working memory. Other types of sentences such as garden-path sentences elicit performance errors too. A garden-path sentence is grammatical, but sounds unacceptable because its beginning is similar to a salient syntactic construction and thus elicits an interpretation that ends up being incorrect. "The horse raced past the barn fell" and "The old man the boat" are classic examples of garden-path sentences. On reflection, however, competent speakers can see that such sentences are acceptable because they overcome the similarity between their beginning and the misleading syntactic constructions. We propose that something similar is happening with the Gettier case we used. In this case, the similarity between a case of genuine knowledge and the belief formed by the protagonist of the case may lead some participants to judge that the protagonist knows the relevant proposition, but on reflection careful thinkers see that the similarity is merely superficial. The more reflective one is, as measured by the CRT, the less likely one is to follow one's immediate reaction when making a judgment. If this analysis is correct, rejecting the

Gettier intuition is a performance error that is overcome on reflection, exactly as is the case of our immediate reactions to garden-path sentences.

## **Conclusion**

In this chapter we have presented a large-scale, cross-cultural, cross-linguistic study of the Gettier intuition. When the question is knowing vs. merely feeling one knows, we find that people share the Gettier intuition in a very diverse set of cultures and across many different languages. The Bedouin data may be an exception, but the data should be treated with circumspection. Men and women make the same judgment in response to a Gettier case. Age and personality have a noticeable effect on the Gettier intuition, as does people's reflectivity.

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