Descartes's Schism, Locke's Reunion:
Completing the Pragmatic Turn in Epistemology*

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Abstract: Centuries ago, Descartes and Locke initiated a foundational debate in epistemology over the relationship between knowledge, on the one hand, and practical factors, on the other. Descartes claimed that knowledge and practice are fundamentally separate. Locke claimed that knowledge and practice are fundamentally united. After a period of dormancy, their disagreement has reignited on the contemporary scene. Latter-day Lockeans claim that knowledge itself is essentially connected to, and perhaps even constituted by, practical factors such as how much is at stake, how important the situation is, or how one should act. Latter-day Cartesians claim, by contrast, that knowledge is entirely constituted by truth-related factors such

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as truth, belief, and evidence. Each side has supported its case with claims about patterns in ordinary behavior and knowledge judgments. Lockeans argue that these patterns are best explained by positing a fundamental and direct link between knowledge and practical factors. Cartesians argue that the patterns can be equally well explained by positing an indirect link, entirely mediated by the traditional factors of truth, belief, and evidence, thereby rendering the Lockean hypothesis unnecessary. We argue that Cartesians are right about some practical factors, in particular stakes and how important a situation is, which have, at best, a modest indirect relationship to knowledge. However, Lockeans are right about actionability: whether a person should pursue a course of action is unquestionably very powerfully and directly connected to knowledge.

1. Introduction

1.1. Schism and reunion

It is hard to overestimate Rene Descartes's impact on epistemology from the seventeenth-century till today (Descartes, 1641). Skeptics and non-skeptics about knowledge, internalists and externalists about justification, foundationalists and coherentists, naturalists and non-naturalists alike have found inspiration in his writings (e.g. Spinoza, 1677; Locke, 1690; Berkeley, 1710; Reid, 1764; Kant, 1783; Chomsky, 1966; Stroud, 1984; Kornblith, 1985; Chisholm, 1989; Greco, 2000; BonJour, 2002; Sosa, 2009). But one aspect of Descartes's influence has been seriously unappreciated: his assumption that knowledge is *fundamentally separable* from action and other practical concerns. Call this *the Cartesian schism*.

Toward the end of Meditation One, after concluding that he should "withhold assent" from any claim that is the least bit doubtful, Descartes admits that this will be very hard to do. "Habit" and "laziness" tempt him back to trusting his sensing. In a vivid, memorable, and unexpected twist, in order to enable the withholding of assent, Descartes decides to "pretend" that there exists,

> an evil genius supremely powerful and clever, who has directed his entire effort at deceiving me. I will regard the heavens, the air, the earth, colors, shapes, sounds, and all external things as nothing but the bedeviling hoaxes of my dreams, with which he lays snares for my credulity. I will regard myself as not having hands, or eyes, or flesh, or blood, or any senses, but as nevertheless falsely believing that I possess all these things.

At this point, a sensible person is bound to wonder, what makes it acceptable to engage in such fanciful pretense? Is this any way to begin the task of accomplishing Descartes's professed overarching goal in the *Meditations*, namely, to "establish something firm and lasting in the sciences"? Won't a sensible person do in the first place what Descartes ultimately ends up doing in Meditation Six, namely, "reject as ludicrous" the procedure of "hyperbolic doubt"?

Descartes anticipated this question and offered the following answer:

> I know . . . that it is impossible for me to indulge in too much distrust, since I am now concentrating only on knowledge, not on action.

This is the Cartesian schism. Descartes introduces it as though he is confident that it will be accepted as uncontroversial once clearly stated.

However, in his response to Descartes, John Locke rejected the schism as illegitimate. Wrote Locke,

> The notice we have by our senses, of the existence of things without us, though it be not altogether so certain, *deserves the name of knowledge*. … For, our faculties being suited not to a perfect knowledge free from all doubt, but to the preservation of us, serve our purpose well enough, if they will but give us certain notice of those things, which are convenient or inconvenient to us, which is assurance enough, when no man requires greater certainty to govern his actions by. (Locke, 1690, book 4.11.3-8, abridged; emphasis in original)

Call this *the Lockean reunion*.

The early pragmatists sided with Locke in touting the role of practical factors in cognition. Indeed, they went one step further than Locke's explicit remarks by claiming that knowledge is partly *constituted* by "practical interests." Moreover, they explain this constitutive fact by appeal to scientific facts about the intellect's evolution. As William James wrote:

> It is far too little recognized how entirely the intellect is built up of practical interests. The theory of evolution is beginning to do very good service by its reduction of all mentality to [a] type of reflex action. Cognition, in this view, is but a fleeting moment, a cross-section at a certain point, of what in its totality is a motor phenomenon. In the lower forms of life no one will pretend that cognition is anything more than a guide to appropriate action. (James, 1879, p. 18)[1]

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1   In the spirit of the nomenclature used here, we might call this *the Jamesian constitution*.

As time goes on, cognitive science uncovers more and more evidence that cognitive processes ought to be understood in terms of "sensorimotor coupling" and "action generation," and, indeed, that "action is not just a product of cognitive operations, but constitutive [of] cognition" (Engel et al., 2013, p. 202). To date, relevant behavioral and neurological findings pertain to sensory processing (Majewska & Sur, 2006), predicting events (Schubotz, 2007), object categorization (Barsalou, 2009), attention (Cisek & Kalaska, 2010), decision-making (Donner, Siegel, Fries & Engel, 2009), memory (Beauchamp & Martin, 2007), social cognition (Gallese, Keysers & Rizzolatti, 2004), and language use (van Ackeren et al., 2012).

1.2. Latter-day Cartesians and Lockeans

The disagreement between Descartes and Locke was forgotten for much of the twentieth-century in Anglo-American philosophy. As with so much else in epistemology and the philosophy of mind, the Cartesian position won a silent victory for the most part (for example, see Chisholm, 1989; Steup, 1996; Audi, 1998; Feldman, 2003; Pritchard, 2006). Leading contemporary figures describe the suggestion of Lockean or Jamesian views — not necessarily recognized as such — as "decidedly odd" and "strangely pointless" (Fumerton, 2010, p. 243). As one contemporary critic of Lockeanism recently said of the Cartesian schism,

> Traditionally, this point of agreement was so widely and deeply shared that epistemologists never really thought about it. It has been given a name . . . only recently and only by the relatively small number of philosophers who have argued against it. (Reed, 2013, p. 95)

Even latter-day Lockeans admit, in confessional tones, that their view is "surprising" (Sripada &

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Stanley, 2012, p. 4) and that it can sound like "madness" (Fantl & McGrath, 2009b, p. 66).

But, as has happened in the cognitive sciences more generally (Engel et al., 2013; Barsalou, 2008), professional epistemology recently has witnessed a dramatic "pragmatic turn." Unlike other cultural upheavals where dissenters cause schism, in this case the rebels advocate reunion. Latter-day Lockeans, sometimes called *impurists* or *pragmatic encroachers*, argue that the knowledge relation is partly constituted by purely "practical" or "non-truth-related" factors (Hawthorne, 2004; Stanley, 2005; see also Grimm, 2011; Pace, 2011). In contrast to the "traditional" factors of truth, belief, evidence and reliability, the practical includes the knower's "interests," "stakes," and potential "costs of being wrong" (Hawthorne, 2004: ch. 4; Stanley, 2005: ch. 5). More radical yet, perhaps, is the view that identifies knowledge as a "natural," "ecological kind" constituted by "reliably produced true belief" that is "instrumental in the production of behavior successful in meeting biological needs" (Kornblith, 2002, pp. 62, 64). On this view, "the very idea of knowledge is implicated in the explanation of complex animal behavior" (Kornblith, 2002, p. 61) — shades of James's characterization of cognition as a "cross-section" of "motor phenomena" (James 1879, p. 18).[2]

A related but different line of research focuses on knowledge's normative role in licensing activities. For instance, many philosophers have recently argued that knowledge is the norm of assertion, practical reasoning, or action generally (Unger, 1975; Williamson, 2000; Reynolds, 2002; Hawthorne & Stanley, 2008; Turri, 2013a; Buckwalter & Turri, 2014). On this approach,

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2 We acknowledge that it might be possible to combine Kornblith's remarks with other commitments that arguably render them inconsistent with a Jamesian view, or perhaps even consistent with a Cartesian view.

knowledge sets the standard for how agents should behave — shades of James's claim that cognition is "a guide to appropriate action." These researchers claim that abstract philosophical speculation has largely lost sight of why knowledge matters, namely, because it sets the standard for appropriate assertion, practical reasoning, or action.

Before proceeding, we would like to note that the "Cartesian" and "Lockean" groupings are united by their answer to whether knowledge is *fundamentally separable* from action and other practical concerns. The groupings are meant primarily to capture this broad but important distinction. As with any categorization, ours abstracts away from various other differences, which could still be important in their own ways. We discuss some of these differences below.

1.3. Observation and experimentation

In his response to Descartes, Locke suggested that observations about how we *talk* and *act* are relevant to a correct theoretical understanding of the relationship between knowledge and practice. He claimed that certain perceptual beliefs deserve "*the name knowledge*" and cited facts about when we have "assurance enough" to act. Similarly, influential latter-day Lockeans rely on introspection and social observation to identify relevant linguistic and behavioral data. For example, Jeremy Fantl and Matt McGrath begin their defense of "a pragmatic condition on knowledge" by noting that ordinary "knowledge-citations play an important role in defending and criticizing actions" (2007, p. 562). John Hawthorne and Jason Stanley write, "ordinary folk appraisals of the behavior of others suggest that the concept of knowledge is intimately intertwined with the rationality of action" (2008, p. 571).

The emphasis on knowledge-citations and ordinary folk appraisals should come as no

surprise. Epistemologists have long taken it for granted that patterns in ordinary usage should constrain substantive epistemological theorizing (e.g. Reid, 1764; Moore, 1959; Stroud, 1984; Vogel, 1990). Nowhere is this more evident than the enormous recent literature on the semantics and pragmatics of knowledge attributions. Philosophers working in these areas frequently appeal to how we would ordinarily think, talk, or act in certain situations (DeRose, 1992; Cohen 1999; Rysiew, 2001; Hawthorne, 2004; Stanley, 2005; Brown, 2005; Turri, 2010). And, overall, philosophers' introspective and social observations have been promising enough to propel several lines of research into the semantics and pragmatics of knowledge attribution.

Introspection and social observation, however, are forms of empirical inquiry with well known limitations (Becker, 1958; Milgram, 1974, pp. 103–4; Kawulich, 2005; Schwitzgebel, 2008; Lieberman, 2013). Fortunately, ordinary usage and behavior can also be systemically investigated by established methods of experimental cognitive and social science. So it is unsurprising that, in the pursuit of greater clarity, rigor and precision, philosophers have begun taking advantage of these established methods (for reviews see Buckwalter, 2012; Knobe et al., 2012). Far from being a radical step, this is a natural and beneficial extension of previous philosophical research. Careful, theoretically informed experimentation supplements introspection and social observation by simultaneously building on the insights they afford and overcoming their limitations. Far from being opposed to one another, philosophical inquiry and experimentation in this area complement and enhance one another. Philosophers have even begun investigating questions related to the very hypotheses that Locke formulated in his response to Descartes, namely, how we apply the term 'knowledge' in response to practical considerations relevant to action.

1.4. Cartesian Mediations

Cartesians have not stood idly by while Lockeans try to retake the field. Many have favored a two-part resistance strategy. First, *accept* the behavioral data highlighted by Lockeans: knowledge attributions and appraisals of action are sensitive to practical factors such as increased stakes. Second, propose that the sensitivity is *indirect*: practical factors affect knowledge only by influencing our estimation of the traditional factors associated with knowledge: belief, truth, and quality of evidence. In short, Cartesians accept the behavioral data and propose that the influence of practical factors on knowledge is *entirely mediated* by one or more of the three traditional factors. (See Fig. 1.) Descartes talked meditations; latter-day Cartesians talk mediations.

For example, some propose that Lockean arguments show that "we should work with a pragmatic notion of belief rather than" endorse a Lockean view of knowledge (Weatherson, 2005, p. 419; see also Ganson, 2007).[3] Others propose that heightened practical stakes cause us to have "reservations about the truth of the proposition in question," which "raises [the] bar for attributing knowledge to someone" (Bach, 2005, p. 78). And others propose that we are prone to interpret someone in a relevant high-stakes case as having "unfounded confidence" based on "slim evidence" (Nagel, 2008, p. 292).

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3   Weatherson explicitly says "justification" rather than "knowledge." But just prior to the quoted passage, he writes, "What I say about justification here should carry over to a theory of knowledge."
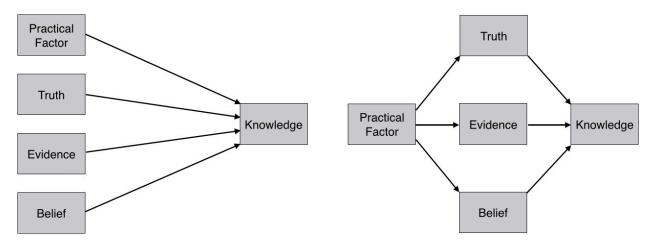
Fig. 1. Two models of knowledge. On the left, a possible Lockean model showing knowledge being constituted by a practical factor, along with the traditional factors of truth, evidence and belief. On the right, a possible Cartesian model showing the influence of a practical factor being entirely mediated by the traditional factors of truth, evidence and belief.

More generally, Lockeans and Cartesians both aim to offer *charitable* and *psychologically plausible* interpretations of the behavioral data (for example, Fantl & McGrath 2002, 2009; Hawthorne, 2004; Williamson, 2005; Brown, 2005, 2008; Nagel, 2008; Hawthorne & Stanley, 2008; DeRose, 2009). The less one's theory requires reading error into the behavioral data, the better. And if one's theory must account for behavior in terms of error, the more reasonable and natural the error, the better.

1.5.   Questions and methods

Having situated our topic within the broad arc of modern philosophy and currents of contemporary scholarship, and having motivated the methodological approach we will employ, it is time now to sharpen our focus considerably.

Our narrative pits Cartesians on one side against Lockeans on the other. Our topic is one of

the most fundamental issues in all of philosophy: the nature of knowledge. Our main question is whether knowledge ordinarily understood is entirely constituted by the traditional truth-related factors that Cartesians identify, or whether it is also fundamentally and directly connected to the practical factors that Lockeans identify. The truth-related factors are truth, belief, and quality of evidence. The practical factors are how important the situation is and how the agent should act.

In order to answer our main question, we will report the results from some experiments specifically designed to answer two subordinate questions. If the answer is affirmative to both subordinate questions, then the Lockeans prevail. But if the answer is not affirmative to both further questions, then the Cartesians prevail.

The first subordinate question is whether manipulating practical factors causes knowledge judgments to change significantly. In short, *is there a pragmatic-effect on knowledge attribution*? If there is a pragmatic-effect, the second subordinate question is whether it is direct or mediated by the traditional truth-related factors. In short, *is the pragmatic-effect direct*?

Above we mentioned two different potential ways of linking knowledge to the practical. One way focuses on how important the situation is, which we will call an *importance-effect* or *stakes-effect*. The other focuses on how the agent should act, which we will call an *action-effect*.

We will analyze our data by using two standard techniques, linear regression and mediation analysis. Linear regression is a statistical technique for investigating the strength of the relationship between an outcome variable and one or more predictor variables. Linear regression is "unquestionably the most widely used statistical technique in the social sciences" (Allison, 1999, p. 1). It allows the researcher to estimate the unique contribution that each of the predictors makes to the outcome, controlling for the influence of the others. In our studies, the outcome is a

knowledge attribution, as measured by participant response to a knowledge statement. The predictors include the set of independent variables of the experimental design and some dependent variables in the form of participant response to statements about evidence, truth, belief, how important the situation is, and how the agent should act.

Mediation analysis is clearly relevant to test the Cartesian proposal that practical factors affect knowledge attributions only indirectly. Mediation analysis is a technique for clarifying how a predictor influences an outcome. In particular, it helps to estimate how much of the predictor's influence on the outcome is direct and how much is indirect. Indirect influence is mediated by other variables, whereas direct influence is not. As explained above, we are interested in not only whether there is a pragmatic-effect on knowledge attributions, but also whether the effect is direct. To assess this, we use the standard approach to mediation analysis in the social sciences, which uses bootstrap confidence intervals (Hayes, 2013).

1.6. Drawbacks and advantages

Prior work on the relationship between knowledge and practical factors has focused mostly on *stakes*, in particular the difference between knowledge attribution to agents in high and low stakes settings. This research has treated stakes as an independent variable that the researcher manipulates in order to assess whether it causes changes in knowledge judgments. Some studies found no evidence of a stakes-effect, while others found evidence of a modest stakes-effect (Feltz & Zarpentine, 2010; May, Sinnott-Armstrong, Hull & Zimmerman, 2010; Buckwalter, 2010; Pinillos, 2011; Sripada & Stanley, 2012; Pinillos, 2012; Pinillos & Simpson, 2014; Shin, 2014). Epicycles have ensued, with some experiments undermining the claim of prior researchers

to have undermined other claims (Buckwalter & Schaffer, 2013). All the while, researchers have raised potentially serious methodological concerns about work in the field, such as overly complicated and confusing stimuli, task demand, ineffective manipulations, confounding indirect causal pathways that were not accounted for (Sripada & Stanley, 2012, pp. 5-11), and confounding variables that were not controlled for (Buckwalter & Schaffer, 2013, pp. 22ff.; compare Williamson, 2005, p. 226).

Our research has an importantly different focus. We are not solely or even primarily interested in the effect of the independent variable stakes *per se*. Instead, we aim to settle whether patterns in knowledge attribution ultimately favor the Lockeans (direct pragmatic-effect) or the Cartesians (no direct pragmatic-effect). Our focus is whether knowledge judgments are directly sensitive to judgments about how important the situation is or how the agent should act. Instead of simply assuming that our manipulations are effective, or that people understand the cases in the relevant way, we collect people's judgments, in carefully controlled conditions, about the relevant factors and then use the appropriate statistical techniques to reveal underlying patterns. It is crucial to emphasize that, given the way the philosophical debate has actually unfolded, an approach like ours is required to answer the underlying questions.

Before proceeding, we want to highlight five advantages of our experiments. First, we test for knowledge judgments using a wide range of narrative contexts, not just one or a few variations of a single story. This decreases the chances that the results are due to incidental or superficial features of the stories used. Second, we use very short and simple stories, which minimizes cognitive load and avoids performance errors associated with it. Third, our stories do not provide participants with privileged information that is typically unavailable when we

ordinarily make knowledge judgments. Providing privileged information can interfere with performance, mask effects that are really there, or prevent us from determining whether an effect is direct rather than indirect. Fourth, and closely related, we do not simply stipulate crucial features of the case, or treat them as independent variables, such as evidence or true belief. Instead, we allow participants to judge these things for themselves, which is absolutely critical if we want to detect relationships among that set of judgments. Finally, we manipulate variables that vary widely in everyday settings and which have been shown to affect knowledge judgments. For example, prior work has shown that the *source of evidence* can have a profound qualitative effect on knowledge attributions. Even holding constant the reliability of source, people can view perception, testimony, and inference very differently in relation to knowledge (Turri & Friedman 2014). People's knowledge judgments can also be affected by whether the proposition in question is *affirmative* or *negative* (Turri, 2015b; Turri, 2015c). And there is a well known actor/observer bias, whereby people can respond differently to scenarios when presented in the first person or the third person (Jones & Nisbett, 1971; Choi & Nisbett, 1988; Tobia, Buckwalter & Stich, 2013). Neglecting these variables increases the chances that researchers could miss crucial contexts in which a pragmatic-effect on knowledge judgments manifests itself most clearly. Prior work on knowledge and practical factors does not exhibit this range of virtues.

2. Experiment 1

2.1. Method

Participants ($N = 602$)[4] were randomly assigned to one of forty conditions in a 5 (belief source) × 2 (stakes) × 2 (person) × 2 (content) between-subjects design. The levels for the different factors were as follows:

- *Source*: hunch, inference, testimony, memory, and perception
- *Person*: third, first
- *Stakes*: low, high
- *Content*: positive, negative

The conditions were distinguished by the story participants read. Each participant read only one story and answered one set of questions. The basic storyline features an intelligence analyst developing a file on a foreign operative, Ivan. The *source* factor varies the source that delivers a certain piece of information. We included this factor because prior work has shown that it significantly affects knowledge attribution and interacts with other factors, thus increasing the chance that we will find a pragmatic-effect, if it exists. The *person* factor varies whether the

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4 All U.S.A. residents, 211 female, aged 18–78, mean age = 29.7; 97% reporting English as a native language. As with the experiment reported below, participants were recruited using Amazon Mechanical Turk (AMT) (for details on the characteristics and quality of this sample see Paolacci & Chandler, 2014), tested online using Qualtrics survey software, and compensated $0.30 for approximately 2 minutes of their time. Participants were not allowed to re-take any survey reported here, and participants who had taken previous similar surveys were excluded by their AMT Worker ID.

analyst in the story is a third person ("Jennifer") or the experimental participant himself or herself ("You"). We included this factor because prior work in experimental philosophy has shown that intuitions in neighboring domains (such as moral responsibility) are susceptible to actor/observer biases (Tobia, Buckwalter and Stich 2012), suggesting that the effects of practical interests may also vary between first-person and third-person ascriptions. The *stakes* factor varies whether the information pertains to something seemingly trivial (Ivan's dominant hand) or something obviously very important (a nuclear weapon). Lastly, the *content* factor varies whether the relevant information is positive or negative: that Ivan is/isn't left-handed or that Ivan did/didn't purchase a nuclear weapon. Again, we included this factor because prior work has shown that it can significantly affect knowledge attribution and interact with other factors, thus increasing the chance that we will find a pragmatic-effect, if it exists.

All the stories are included in the file of supplementary materials. Here we reproduce two of them to give readers a sense of the materials. The first is a third-person, low-stakes, positive case involving testimony. The second is a first-person, high-stakes, negative case involving a hunch.

> Jennifer is an intelligence analyst developing a file on Ivan, an elusive foreign operative. Jennifer has a source who tells her something which strongly suggests that Ivan is left-handed.

> You are an intelligence analyst developing a file on Ivan, an elusive foreign operative. While working on the file, you have a hunch which strongly suggests that Ivan did not purchase a nuclear weapon.

After reading the story, participants were asked to rate their agreement or disagreement

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with six statements. The statements pertained to whether the analyst believes the relevant proposition,[5] whether the proposition is true, whether the analyst's evidence for the proposition is good, whether the analyst should act on the information by writing it in Ivan's file, whether the proposition's truth-value is important, and whether the analyst knows the proposition.

All the questions are included in the file of supplementary materials. Here we reproduce two sets of questions to give readers a sense of the materials. These sets are matched to the two sample stories included above. Participants who read a third-person, low-stakes, positive case were asked to rate these six statements:

1. Jennifer thinks that Ivan is left-handed.

2. It's true that Ivan is left-handed.

3. Jennifer has good evidence that Ivan is left-handed.

4. Jennifer should write in the file that Ivan is left-handed.

5. It's important whether Ivan is left-handed.

6. Jennifer knows that Ivan is left-handed.

Participants who read a first-person, high-stakes, negative case involving a hunch were asked to rate these statements:

1. You think that Ivan did not purchase a nuclear weapon.

2. It's true that Ivan did not purchase a nuclear weapon.

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5 Across our experiments we use 'thinks' instead of 'believes' because previous work suggests that 'thinks' more effectively cues the psychological component which philosophers typically assume is necessary for knowledge (Buckwalter, Rose and Turri, in press; Rose, Buckwalter & Turri, 2014).

3. You have good evidence that Ivan did not purchase a nuclear weapon.

4. You should write in the file that Ivan did not purchase a nuclear weapon.

5. It's important whether Ivan purchased a nuclear weapon.

6. You know that Ivan did not purchase a nuclear weapon.

Responses were collected on a standard seven-point Likert scale anchored with "Strongly Disagree," "Disagree," "Somewhat Disagree," "Neutral," "Somewhat Agree," "Agree," and "Strongly Agree," left-to-right on the participant's screen. We coded responses -3 to +3 for purposes of statistical analysis, creating a neutral midpoint of "0". Participants never saw the numerical values, only the qualitative anchors. The six statements were presented in random order and appeared on the participant's screen all at once, while the story remained at the top of the screen. Response options were always presented in the same order. After rating the statements, participants proceeded to a new screen where they completed a brief demographic questionnaire.

2.2. Results

Preliminary analysis revealed no main or interaction effects of participant age and gender on any of the six dependent variables. Preliminary analysis also revealed that the stakes manipulation was extremely effective: higher stakes cases received much higher importance scores (that is, were judged much more important).[6] The stakes manipulation had a statistically significant effect

6 Low, M = 0.00, SD = 1.71, SEM = 0.10. High, M = 2.27, SD = 0.97, SEM = 0.06. Independent samples t-test, $t(466.56) = -19.97$, $p < .001$, MD = -2.27, 95% CI for MD = -2.49 to -2.05. The magnitude of difference between the means was very large (Cohen's d = 1.17).

on evidence scores, with higher stakes cases receiving   lower evidence scores.[7] The stakes manipulation also had a statistically significant effect on truth scores, with higher stakes cases receiving lower truth scores.[8] Stakes did not affect belief scores.[9]

Regression analysis showed that importance scores (that is, response to the "importance" question) did not predict knowledge scores.[10] Assignment to a high or low stakes case did

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M = mean; SD = standard deviation; SEM = standard error of the mean; CI = confidence interval. Cohen's d is a standard measure of the size of a mean difference and is calculated by dividing the absolute mean difference by the (pooled) standard deviation. We follow Ellis's (2010) guidelines on interpreting effect sizes for d: values less than 0.20 are very small, between 0.20 and 0.50 are small, between .50 and 0.80 are medium, and values equal to or greater than 0.80 are large.

7   Low, M = 0.96, SD = 1.56, SEM = 0.09; high, M = 0.33, SD = 1.71, SEM = 0.10. Independent samples t-test, $t(597.26) = 4.70$, $p < .001$, MD = 0.63, 95% CI for MD = 0.37 to 0.89. The magnitude of difference between the means was small (Cohen's d = 0.38). This replicates the effect reported in previous research (Sripada & Stanley, 2012, p. 14).

8   Low, M = 0.12, SD = 1.36, SEM = 0.079. High, M = -0.28, SD = 1.49, SEM = 0.086. Independent samples t-test, $t(596.97) = 3.47$, $p < .001$, MD = 0.404, 95% CI for MD = 0.175 to 0.632. The magnitude of difference between the means was small (Cohen's d = 0.28). To some extent, this might violate the expectation of theorists who posit a stakes-effect on knowledge judgments, who write, "Stakes are not predicted to have much effect on truth" (Sripada & Stanley, 2012, p. 7).

9   Low, M = 1.81, SD = 1.19, SEM = 0.07. High, M = 1.66, SD = 1.18, SEM = 0.07. Independent samples t-test, $t(600) = 1.53$, $p = .127$, n.s., MD = 0.148, 95% CI for MD = -0.04 to 0.34.

10 $t(600) = -0.67$, Beta = -.027, $p = .502$, n.s.

significantly predict knowledge scores,[11] and although this effect was not mediated by belief scores,[12] it was entirely mediated both by truth scores[13] and by evidence scores,[14] respectively, and in each case the indirect effect of condition was much larger than the direct effect.[15] The reverse mediation models showed that knowledge scores only partially mediated the effect of condition on truth scores[16] and evidence scores,[17] and that in each case the direct effect of condition was larger than the indirect effect.

Regression analysis showed that action scores (that is, response to the "should act" question) significantly predicted knowledge scores and, moreover, the predictive value was very

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11 $t(600) = -2.85$, Beta $= -.116$, $p < .005$, adjusted $R^2 = .012$.

12 As determined by a bootstrap mediation analysis (Hayes, 2013) with condition as the independent variable, knowledge judgment as the dependent variable, and belief judgment as the potential mediator. A bias-corrected bootstrap confidence interval for the indirect effect based on 10,000 bootstrap samples included zero, 95% CI for the indirect effect = -0.06 to .004. The confidence interval for the direct effect did not include zero, 95% CI = -0.63 to -0.11.

13 95% CI for the indirect effect = -0.40 to -0.11; the confidence interval for the direct effect included zero, 95% CI = -0.35 to 0.10.

14 95% CI for the indirect effect = -0.37 to -0.14. the confidence interval for the direct effect included zero, 95% CI = -0.38 to 0.11.

15 Ratio of indirect to direct effect of condition on truth scores = 1.98; on evidence scores = 1.80.

16 Ratio of indirect to direct effect = 0.82. Indirect effect = -0.18, 95% CI = -0.31 to -0.06. Direct effect = -0.22, 95% CI = -0.42 to -0.29.

17 Ratio of indirect to direct effect = 0.31. Indirect effect = -0.15, 95% CI = -0.26 to -0.04. Direct effect = -0.48, 95% CI = -0.72 to -0.24.

large.[18] The effect of action scores was not mediated by belief scores.[19] The effect of action scores was only partially mediated by truth scores[20] and evidence scores,[21] and in each case the direct effect of action scores was much larger than the indirect effect.[22]

To further test the significance of action scores on knowledge scores, we conducted a multiple regression analysis that included all the independent, demographic, and dependent variables listed in the methods section (2.1 above) as predictors of knowledge scores. In this complete model, action scores made a unique statistically significant predictive contribution. (See Appendix: Table 1.) In fact, action scores made the single largest predictive contribution in the model. The only other factor that even came close to matching action scores was truth scores. In this same model, the unique predictive contribution of stakes and importance judgments was practically zero.[23]

2.3. Discussion

These results suggest that Cartesians are right about the relationship between stakes and importance, on the one hand, and knowledge judgments, on the other: judgments about importance had no effect on knowledge attribution, and increased stakes had an entirely indirect

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18 $t(600) = 18.30$, Beta $= .599$, $p < .000001$, adjusted $R^2 = .357$.

19 The confidence interval for the indirect effect included zero, 95% CI $= -0.01$ to 0.008. 95% CI for the direct effect $= 0.52$ to 0.64.

20 95% CI for the indirect effect $= 0.12$ to 0.19; for the direct effect $= 0.36$ to 0.49.

21 95% CI for the indirect effect $= 0.03$ to 0.10; for the direct effect $= 0.44$ to 0.58.

22 Ratio of indirect to direct effect with truth scores $= 0.36$; with evidence scores $= 0.13$.

23 For stakes, Beta $= .008$, $p = .866$. For importance scores, Beta $= -.003$, $p = .936$.

effect. In other words, there was no importance-effect and the stakes-effect detected in this study was entirely indirect and mediated by the traditional factors of truth and evidence.[24] The stakes-effect was not mediated by the traditional factor of belief, which some Cartesians have suggested.

By contrast, Lockeans are right about the relationship between how one should act and knowledge judgments. Actionability judgments were strongly and directly related to knowledge judgments. This relationship was mostly direct: it was only partly mediated by the traditional factors of truth and evidence, and not at all mediated by belief.

We observed these results by testing forty different versions of a simple, clear story on over six hundred participants. Still, it is unwise to draw firm conclusions based on a single study. Despite the many variations, large sample size, and unambiguous results, it is still possible that superficial features of the story somehow drove the critical findings. We think that this is very unlikely but, to guard against this possibility, we conducted a second experiment based on a completely different cover story.

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24 There is a further interesting question regarding interaction effects between stakes and other independent variables on knowledge judgments. In a 2 (stakes) × 2 (content) × 2 (person) × 5 (source) ANOVA, with truth and evidence judgments entered as covariates, we observed only one main effect (Source) and no interactions. Without the covariates, there were two main effects (Source and Stakes) and no interactions.

3. Experiment 2

3.1. Method

Participants (N = 302)[25] were randomly assigned to one of twenty conditions in a 5 (source) × 2 (stakes) × 2 (content) between-subjects design. The levels for the included factors are the same as in Experiment 1. The twenty conditions were distinguished by the story participants read. The basic storyline features a barista, Christina, in charge of updating the menu for cafe. The source and content manipulations were the same as in Experiment 1. The stakes factor varied what information Christina considers adding to the menu: something seemingly unimportant (whether today's coffee was grown in northern Colombia) or something much more important (whether the coffee contains trace elements that would affect customers with severe nut allergies). We omitted the person factor from this study.

The procedures for Experiment 2 were the same as Experiment 1. The stimuli for all twenty conditions are included in the file of supplementary materials. Here we reproduce two sample stories and questions to give readers a sense of the materials. The first is a low-stakes positive case involving memory; the second is a high-stakes negative case involving inductive inference.

> Christina is a barista in charge of updating the coffee shop menu each day. To some customers interested in the history and culture of coffee, it matters whether the coffee is from northern Colombia. While working on today's menu, Christina distinctly recalls that the latest shipment of coffee is from northern Colombia.

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25 One hundred thirteen female, aged 18–75; 96% reported English as a native language.

Christina is a barista in charge of updating the coffee shop menu each day. To some customers with severe nut allergies, it matters whether the coffee contains pine nuts. While working on today's menu, Christina notices a persistent pattern in the supplier's shipments which strongly suggests that the latest shipment of coffee does not contain trace amounts of pine nuts.

1. Christina thinks that the coffee is from northern Colombia/does not contain trace amounts of pine nuts.

2. It's true that the coffee is from northern Colombia/does not contain trace amounts of pine nuts.

3. Christina has good evidence that the coffee is from northern Colombia/does not contain trace amounts of pine nuts.

4. Christina should write on today's menu that the coffee is from northern Colombia/does not contain trace amounts of pine nuts.

5. It's important whether the coffee is from northern Colombia/contains trace amounts of pine nuts.

6. Christina knows that the coffee is from northern Colombia/does not contain trace amounts of pine nuts.

3.2. Results

Preliminary analysis revealed only one main effect for participant gender on one of the dependent variables (importance scores), no effects of participant age on any of the six dependent variables, and no interaction effects. The gender-effect on the one dependent variable

was very small and unpredicted.[26] Preliminary analysis also revealed that the stakes manipulation was extremely effective again: higher stakes cases were judged much more important.[27] As in Experiment 1, stakes did not affect belief scores;[28] but, unlike in Experiment 1, stakes did not affect evidence scores[29] or truth scores either.[30]

Regression analysis showed that stakes did not predict knowledge scores[31] and that importance scores marginally predicted knowledge scores.[32] However, the importance-effect was in the opposite direction of the stakes-effect observed in Experiment 1: in this study, higher importance scores predicted higher knowledge scores. In addition to being in the opposite

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26 Female, M = 2.26, SD = 1.12, SEM = 0.11. Male, M = 1.74, SD = 1.42, SEM = 0.10. Independent samples t-test, t(277.61) = 3.52, p = .001, d = 0.42, MD = 0.52, 95% CI for MD = 0.23 to 0.81.

27 Low, M =1.29, SD = 1.42, SEM = 0.12; high, M = 2.56, SD = 0.89, SEM = 0.07; independent samples t-test, t(2.49.6) = -9.26, p < .001, MD = -1.27, 95% CI for MD = -1.53 to -1.0. The magnitude of difference between the means was very large (Cohen's d = 1.85). All tests two-tailed.

28 Low, M = 2.10, SD = 1.21, SEM = 0.10. High, M = 2.03, SD = 1.21, SEM = 0.10. Independent samples t-test, t(300) = 0.53, p = .598, n.s., MD = 0.074, 95% CI for MD = -0.20 to 0.35.

29 Low, M = 1.11, SD = 1.72, SEM = 0.14. High, M = 1.07, SD = 1.85, SEM = 0.15. Independent samples t-test, t(300) = 0.20, p = .842, n.s., MD = 0.04, 95% CI for MD = -0.36 to 0.45.

30 Low, M = 1.11, SD = 1.60, SEM = 0.13. High, M = 1.03, SD = 1.63, SEM = 0.13. Independent samples t-test, t(300) = 0.47, p = .640, n.s., MD = 0.09, 95% CI for MD = -0.28 to 0.45.

31 t(300) = 0.27, Beta = .016, p = .787, n.s.

32 t(300) = 1.94, Beta = .111, p = .053.

direction, the predictive value was extremely small: importance scores explained less than 1% of the total variance in knowledge scores.[33]

Regression analysis showed that action scores again significantly predicted knowledge scores, and, moreover, that the predictive value was very large.[34] The effect of action scores was not mediated by belief scores.[35] The effect of action scores was only partially mediated by truth scores[36] and evidence scores,[37] and in each case the direct effect of action scores was larger than the indirect effect.[38]

To further test the significance of action scores on knowledge scores, we conducted a multiple regression analysis that included all the independent, demographic, and dependent variables listed in the methods section (3.1 above) as predictors of knowledge scores. In this complete model, action scores made a unique statistically significant predictive contribution. (See Appendix: Table 2.) Its contribution rivalled that of evidence and was not too far behind that of truth.

3.3. Discussion

The results replicate and generalize the main findings from Experiment 1. The Cartesians are

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33 Adjusted R^2 = 0.009.

34 t(300) = 15.42, Beta = .665, p < 0.000001. Adjusted R^2 = .440.

35 The confidence interval for the indirect effect included zero, 95% CI = -0.001 to 0.03. 95% CI for the direct effect = 0.60 to 0.78.

36 95% CI for the indirect effect = 0.25 to 0.38; for the direct effect = 0.31 to 0.48.

37 95% CI for the indirect effect = 0.21 to 0.39; for the direct effect = 0.31 to 0.51.

38 Ratio of indirect to direct effect with truth scores = 0.79; with evidence scores = 0.72.

right that stakes and judgments of importance have no direct connection to knowledge judgments.[39] By contrast, Lockeans are right about the relationship between actionability and knowledge judgments: actionability was again strongly and directly related to knowledge judgments.

4. Conclusion

Descartes proposed that knowledge is fundamentally separable from action and other practical concerns. Locke rejected Descartes's view and proposed instead that knowledge is intimately linked to action. Locke cited linguistic and behavioral evidence in his favor. Centuries later, the dispute between these two giants of early modern philosophy has been renewed. With ever more subtlety and sophistication, latter-day Cartesians and Lockeans have debated the merits of a nascent "pragmatic turn" in contemporary epistemology. Lockeans claim that the linguistic and behavioral data are best explained by the hypothesis that knowledge is essentially connected to pragmatic factors, such as *how much is at stake* and *how one should act*. Cartesians concede the data but argue that the connection between knowledge and pragmatic factors is entirely indirect and mediated by the traditional factors of belief, truth, and evidence.

    Across two very large studies, we found that the Cartesians were right about stakes and how

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39 There is a further interesting question regarding interaction effects between stakes and other independent variables on knowledge judgments. In a 2 (stakes) × 2 (content) × 2 (person) × 5 (source) ANOVA, with truth and evidence judgments entered as covariates, we observed only one main effect (Source) and no interactions. Without the covariates, there were two main effects (Source and Stakes) and no interactions.

important a situation is. These practical factors have, at best, a modest indirect effect on knowledge attributions. However, the Lockeans are right about actionability, which has a powerful direct connection to knowledge judgments. Indeed, if our results are any indication, actionability influences knowledge judgments as much as truth and evidence do. We observed similar patterns using two different cover stories, including contexts that elicited low knowledge attribution and those that elicited high attribution, for both women and men, and for younger and older participants. One limitation of the present research is that the actions we tested either are, or directly implicate, making assertions, in the form of inscribing information. Future work should investigate whether the same pattern holds for actions more generally.[40] Another potential limitation is that participants were all U.S. residents (for details on the composition and quality of the population we sampled, see Paolacci & Chandler, 2014). Some have argued that cultural and linguistic factors affect knowledge judgments (e.g. Weinberg, Nichols & Stich, 2001). While this is certainly a hypothesis worthy of investigation, the balance of evidence thus far does not seem to support it (Turri, 2013b; Kim & Yuan, 2015; Seyedsayamdost, 2015). Nevertheless, we welcome and encourage further work on the question of demographic variability.

We found that the effect of stakes and importance is fully mediated by truth and evidence, which suggests an explanation for the inconsistency in previous empirical work on stakes. Some researchers have found a stakes-effect of various magnitudes (May et al., 2010; Pinillos, 2012; Sripada & Stanley, 2012), whereas others have not (Feltz & Zarpentine, 2010; Buckwalter, 2010; Buckwalter, 2012). If multiple mediating factors were not consistently controlled for across these

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40 One of us has already conducted follow-up research on this very question. The results show that the influence of knowledge on actionability extends beyond assertions. See Turri 2015a.

studies, that could explain the inconsistency in the findings. Prior research has also found some evidence that the stakes-effect is mediated by salience of error possibilities (Buckwalter & Schaffer, 2013). Our experiments were not designed to further test the mediating role of error salience, but our results are consistent with this proposal.

We were surprised by one finding from our studies. Philosophers have traditionally assumed that knowledge entails belief, but our results suggest that judgments about belief play, at most, a negligible role in making knowledge judgments. Some experimental philosophers have recently challenged the assumption that knowledge entails belief on the grounds that, in certain cases, people attribute knowledge at much higher rates than they attribute belief (Myers-Schulz & Schwitzgebel, 2013; Murray, Sytsma & Livengood, 2012). We have responded to these claims elsewhere and defended the view that knowledge entails belief of a sort (Buckwalter, Rose & Turri, in press). In our studies here, rates of belief attribution far surpassed rates of knowledge attribution, which is consistent with the traditional assumption that knowledge entails belief. But, setting that issue aside, there is a different and important point to be made: we found no evidence that people base their judgments about knowledge on a prior or accompanying judgment about belief. We flag for future investigation this potentially important finding.[41]

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41 In their discussion of the link between knowledge and action, Fantl and McGrath write, "Notice that when we defend or criticize actions by citing knowledge, it is irrelevant to us whether the subject actually believes or is psychologically sure of its truth or not" (2007, p. 562), and also, "In deliberating, we regard the mere psychological fact of belief or its absence as of little relevance" (2007, p. 563, n. 8). Rather than concluding that knowledge does not require belief, Fantl and McGrath accommodate these observations by weakening their theoretical account of the intuitive link between knowledge and action: it is not knowledge

Earlier we observed that theoretically informed experimentation can helpfully supplement more traditional philosophical methods. Our results here powerfully illustrate this point. For it is unreasonable to suppose that introspection or even the most astute social observations could isolate, manipulate, and glean the explanatory relationships among the many factors relevant to knowledge attribution. Fortunately, we have other means readily at our disposal that enable us to accomplish those things: the tools and methods of experimental cognitive and social science. Informed by the philosophical insights embodied in the recent pragmatic turn in epistemology, we have availed ourselves of these tools here. We encourage others interested in aspects of our ordinary practices to do the same.

Given that there clearly is a very tight link between actionability and knowledge judgments, the natural next question is, "What is the nature of that link?" There are at least two general ways to answer this question. (See Fig. 2.) One approach explains knowledge in terms of actionability. On this approach, knowledge is partly constituted by actionability, just as it is was traditionally assumed that knowledge is partly constituted by true belief. For instance, one might define knowledge as true belief that is a suitable basis for action or practical reasoning. This could explain the link between actionability and knowledge judgments. The other approach explains actionability in terms of knowledge. On this approach, although knowledge is entirely constituted by non-practical factors, it functions as an important norm of action. For instance,

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but *being in a position to know* that licenses action. Our studies corroborate Fantl and McGrath's important observation that belief is irrelevant in these matters. However, our results also suggest a different explanation for this observation. Rather than weakening the account by adverting to being in a position to know, one could simply accept that belief attribution is not central to the psychological process of knowledge attribution.

one might propose that knowing information necessarily suffices for appropriately acting on that information. This too could explain the link between actionability and knowledge judgments.
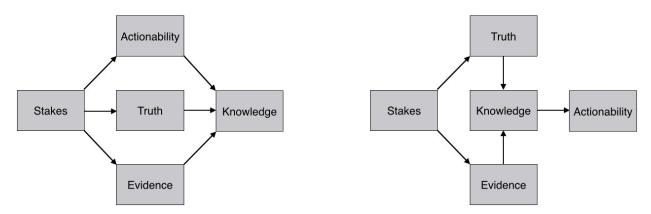

Fig. 2. Two possible Lockean models of knowledge consistent with our results on knowledge judgments. On the left, a model showing knowledge constituted by actionability, truth, and evidence, with the relation between stakes and knowledge entirely mediated by the three constitutive factors. On the right, a model showing actionability constituted by knowledge, knowledge constituted by the traditional factors of truth and evidence, and the influence of stakes on knowledge entirely mediated by truth and evidence.

Our results do not necessarily favor either explanation of the link between knowledge and actionability.[42] To settle that question, further research is needed that builds on our findings here. At this point, we expect that erstwhile Cartesians will favor the second approach and argue that knowledge constitutes actionability, without in any way being constituted by actionability. Similarly, Lockeans who are especially impressed by James's reflections (quoted in the

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42 A causal search on our data with the Greedy Equivalence Search was unable to definitively settle which way the causal arrow points, although a model that assigned knowledge primacy was a better fit for the data. We conducted the search with Tetrad V (http://www.phil.cmu.edu/projects/tetrad/).

Introduction) will favor the first approach and argue that actionability is partly constitutive of knowledge.

This is clearly still an open question, but if the latest trends in cognitive science are any indication, then the balance of evidence tips slightly in favor of the Jamesian approach. Either way, for anyone wishing to defend a theory knowledge that is even remotely connected to ordinary practice or our best cognitive science, there is no question: Descartes's schism was an ill conceived malady to which Locke's reunion is the perfect cure. Knowledge ordinarily understood, and scientifically understood, is fundamentally connected to action. We are all Lockeans now.[43]

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Appendix

Table 1. Experiment 1: Multiple linear regression predicting knowledge attribution.

Predictor	*b*	SE	Beta	*t*	*p*
Thinks	-0.099	0.044	-.071	-2.236	.026
Truth	0.394	0.038	.345	10.225	<.000001
Evidence	0.071	0.036	.072	1.977	.048
Action	0.402	0.035	.417	11.491	<.000001
Importance	-0.003	0.036	-.003	-0.08	.936
Source					
Hunch	-0.31	0.165	-.075	-1.879	.061
Inference	-0.097	0.155	-.024	-0.628	.53
Testimony	-0.674	0.158	-.162	-4.272	<.0001
Memory	0.019	0.155	.005	0.12	.904
Stakes	0.026	0.13	.008	0.197	.844
Person	-0.032	0.048	-.019	-0.659	.51
Content	0.111	0.099	.034	1.121	.263
Gender	-0.148	0.105	-.043	-1.412	.158
Age	-0.003	0.005	-.02	-0.671	.502
Constant	-0.068	0.263		-0.26	.795

N = 602; R^2= .495. *b* = unstandardized regression coefficient; SE = standard error of *b*; Beta = standardized regression coefficient. Reference class for source is perception; reference class for stakes is low; reference class for person is first-person; reference class for content is negative; reference class for gender is female.

Table 2. Experiment 2: Multiple linear regression predicting knowledge attribution.

Predictor	*b*	SE	Beta	*t*	*p*
Thinks	0.087	0.051	.053	1.7	0.09
Truth	0.398	0.055	.323	7.245	<.000001
Evidence	0.293	0.053	.263	5.553	<.000001
Action	0.265	0.048	.252	5.521	<.000001
Importance	-0.06	0.054	-.041	-1.114	.266
Source					
Hunch	-0.721	0.248	-.146	-2.91	.004
Inference	-0.862	0.211	-.173	-4.091	<.0001
Testimony	-0.123	0.194	-.025	-0.632	.528
Memory	0.383	0.197	.077	1.941	.053
Stakes	0.138	0.14	.035	0.983	.326
Content	-0.213	0.135	-.054	-1.576	.116
Gender	-0.129	0.136	-.031	-0.948	.344
Age	0.007	0.006	.036	1.122	.263
Constant	-0.085	0.327		-0.259	.796

$N = 302$; $R^2 = .728$. *b* = unstandardized regression coefficient; SE = standard error of *b*; Beta = standardized regression coefficient. Reference class for source is perception; reference class for stakes is low; reference class for content is negative; reference class for gender is female.