Lecture 1: The strange divergence between intuitive and reflective knowledge attribution

1. Q: Is knowledge itself easily known?
This could be understood as a question about whether particular instances of knowledge are easily recognized as such, or as a question about whether the general nature of knowledge itself is easily recognized (or known).
In both senses, there is a strong case to be made for a positive answer. Oddly, there is also a strong case to be made for a negative answer. The instability here points to something strange in our natural capacity to detect knowledge. This series of lectures takes a fresh look at that capacity, and then at knowledge itself.

2. Ancient philosophical motivation
Background: The *Nyāya-sūtra* consists in a series of 528 philosophical observations or sūtras, transmitted in oral tradition for centuries, written down by the time of commentator Vātsyāyana (c.450), well after the sūtra-maker Gautama's initial composition (the timing of which is unclear, perhaps c.150-200 CE, perhaps much earlier). Quotations here are from Matthew Dasti and Stephen Phillips's translation, *The Nyāya-sūtra: Selections with Early Commentaries*, Hackett 2017 (NS).
Knowledge is defined as "veridical cognition produced in the right way" (Vātsyāyana) (NS p.14).
1.1.3. "The knowledge sources [*pramānas*] are perception, inference, analogy, and testimony" (NS p.17).
1.1.4 "Perceptual knowledge arises from a connection of sense faculty and object, does not depend on language, is inerrant, and is definitive." (NS p.20)
(Vātsyāyana) "During the summer, the sun rays and the warmth radiating from the hot ground pulsate together and come into sensory connection with the visual organ of a person situated at a distance. In such a situation, the cognition 'Water' arises for the observer owing to the connection between his sense organ and the object. So to exclude such false cognition from the definition of perception proper, the author of the sūtras includes the qualifier 'inerrant'. .. Perception, which is inerrant, cognizes something as it truly is, undeviating from what is true." (NS p.23)
When efforts at reasoning go astray, according to Vātsyāyana, "It is not the case that there is an inference that deviates. Rather, there has been no inference at all—this is erroneously considered an inference" (Nyāya-bhāsya 2.1.38; as quoted in Dasti, M., & Phillips, S. H. (2010). Pramana Are Factive: A Response to Jonardon Ganeri. *Philosophy East and West*, *60*(4), 535-540, p.538).
1.1.7 "Testimony is instruction by a trustworthy authority." (NS p.35)
(Vātsyāyana) "A trustworthy authority is someone who knows something directly, an instructor with the desire to communicate it faithfully as it is known." (NS p.35)
2.1.16 "And knowledge sources may be objects of knowledge, like a measuring scale." (NS p.53)
(Vātsyāyana) "perception and the rest are sources of knowledge insofar as they are causes of knowledge, and they are objects of knowledge insofar as they are the content of knowledge. Moreover, that they are commonly known as such is illustrated by statements such as, 'It is by perception that I know it,' 'It is by inference that I know it' (…), and 'My knowledge is perceptual' (…) 'My knowledge is testimonial.' Then they are grasped in individual instances." (NS p.53)
(Vātsyāyana) "Furthermore, we understand them in specific ways through technical analyses, like the definition of perceptual knowledge [1.1.4]: 'knowledge that arises from a connection of a sense faculty with an object'."
2.1.17 (Objector:) "On the view (a) that knowledge sources are themselves established by knowledge sources, the unwanted consequence would be that still other knowledge sources would have to be proved." (NS p.54)
2.1.18 (Objector:) "Or if we say (b) one *pramāna* need not be established by another, then, in the same way, we should accept objects without reasons." (NS p.54)
2.1.19 (Answer:) "No, *pramānas* are established like the light of a lamp." (NS p.54)
(Vātsyāyana) "For example, the light of a lamp can be a knowledge source as part of the process of perception when something visible is apprehended by sight, while it itself would be known through another instance of perception through its connection with the visual organ." (NS pp. 54-5)
2.1.20 "Sometimes we find that no further source is required, while sometimes we find that another source is required. There is no fixed rule." (NS p.56)

3. Knowledge is easily known
We detect gaze direction with extremely high acuity: Symons, L. A., Lee, K., Cedrone, C. C., & Nishimura, M. (2004). What are you looking at? Acuity for triadic eye gaze. *The Journal of General Psychology*, *131*(4), 451-469.
Infant understanding of gaze develops rapidly at nine months: Brooks, R., & Meltzoff, A. N. (2005). The development of gaze following and its relation to language. *Developmental Science*, *8*(6), 535-543.

Infants understand testimonial knowledge transmission: Harris, P. L., & Lane, J. D. (2014). Infants understand how testimony works. *Topoi*, *33*, 443-458.

Social referencing at 12 and 18 months: Moses, L. J., Baldwin, D. A., Rosicky, J. G., & Tidball, G. (2001). Evidence for referential understanding in the emotions domain at twelve and eighteen months. *Child Development*, *72*(3), 718-735.

Everyday conversation is guided by representations of epistemic disparity: Heritage, J. (2012). The epistemic engine: Sequence organization and territories of knowledge. *Research on Language & Social Interaction*, *45*(1), 30-52.

Across cultures, 2-year old children use the verb "to know" heavily and competently: Harris, P. L., Yang, B., & Cui, Y. (2017). 'I don't know': Children's early talk about knowledge. *Mind & Language*, *32*(3), 283-307.

English-speaking children (ages 2-5) hear the verb "to know" 17 times in an average conversation, and use it themselves in one out every 30 utterances: Dudley, R., Rowe, M., Hacquard, V., & Lidz, J. (2017). Discovering the factivity of" know". *Semantics and Linguistic Theory* 27, 600-619.

A quarter of the world's languages have obligatory grammatical marking of evidence source: Aikhenvald, A. (2006). *Evidentiality*. Oxford University Press.

Makah and Tibetan as examples of languages with evidentials: Jacobsen, W. H. (1986). The heterogeneity of evidentials in Makah. In W. Chafe & J. Nichols (Eds.), *Evidentiality: The Linguistic Encoding of Epistemology*. Ablex Publishing Corporation; Garrett, E. J. (2001). *Evidentiality and assertion in Tibetan*. Doctoral thesis, University of California, Los Angeles.

There are four main categories of evidentials (my labels, but following Speas's theory): 1) Inner sense (hunger, moods, inner seemings, dizziness), (2) Perception, (3) Inference, and (4) Testimony Speas, M. (2004). Evidential paradigms, world variables and person agreement features. *Italian Journal of Linguistics*, *16*(4), 253-280.

Summing up: "all children, irrespective of culture and language, eventually arrive at the same fundamental conception of knowledge in the preschool years." Ronfard, S., Bartz, D. T., Cheng, L., Chen, X., & Harris, P. L. (2018). Children's developing ideas about knowledge and its acquisition. *Advances in Child Development and Behavior* (Vol. 54, pp. 123-151), p.123-4.

Factive attitudes (knowing that *p*, realizing that *p*, recognizing that *p*, being aware that *p*, seeing that *p*, etc.) are necessarily restricted to true complements; nonfactive attitudes (believing that *p*, suspecting that *p*, feeling sure that *p*, being confident that *p*, hoping that *p*, etc.) range over true and false complements. Knowing is the most general factive mental state: Williamson, T. (2000). *Knowledge and its Limits*. Oxford University Press.

Knowledge is stronger than (subjectively) justified true belief: desert traveller example from Dharmottara's 8th-century *Explanation of [Dharmakirti's] Ascertainment of Valid Cognition,* as described at p.292 of G. B. Dreyfus, *Recognizing reality: Dharmakirti's philosophy and its Tibetan interpretations*. Suny Press; Gettier, E. L. (1963). Is Justified True Belief Knowledge? *Analysis*, *23*, 121-123.

It is controversial which Sanskrit author first recognized what we will call 'Gettier cases': Ganeri, J. (2007). *The Concealed Art of the Soul: Theories of self and practices of truth in Indian ethics and epistemology*. Oxford University Press.

Across cultures, Gettier cases are recognized as cases of ignorance, and paradigmatic instances of knowledge are easily recognized as such: Nagel, J., San Juan, V., & Mar, R. (2013). Lay Denial of Knowledge for Justified True Beliefs. *Cognition*, *129*(3), 652-661; Machery, E., Stich, S., Rose, D., Chatterjee, A., Karasawa, K., Struchiner, N., Sirker, S., Usui, N., & Hashimoto, T. (2015). Gettier across cultures. *Noûs* 51, no. 3 (2017): 645-664.

4. Knowledge is hard to know

Aristotle: "For as the eyes of bats are to the blaze of day, so is the reason in our soul to the things which are by nature most evident of all." (*Metaph*. 2.1, trans. W. D. Ross).

On the classical (infinitely iterated) understanding of common knowledge, there is no common knowledge of any empirical fact: Lederman, H. (2018). Uncommon Knowledge. *Mind*, *127*(508), 1069-1105.

If you mention that clocks are sometimes stopped, the person glancing at a working clock is no longer seen as knowing: Nagel, J., San Juan, V., & Mar, R. (2013). *Cognition*, *129*(3), 652-661.

Skeptical intuitions are cross-culturally robust: Waterman, J., Gonnerman, C., Yan, K., Alexander, J., Stich, S., Mizumoto, M., & McCready, E. (2018). Knowledge, Certainty, and Skepticism. In S. Stich, M. Mizumoto, & E. McCready (Eds.), *Epistemology for the Rest of the World* (pp. 187-214). Oxford University Press.

5. The path forward

Model-free learning guides us in habitual action, while model-based learning enables flexible planning: Dayan, P. (2009). Goal-directed control and its antipodes. *Neural Networks*, *22*(3), 213-219; Dayan, P., & Niv, Y. (2008). Reinforcement learning: the good, the bad and the ugly. *Current Opinion in Neurobiology*, *18*(2), 185-196.