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DRAFT

Reflective Thinking for Intelligence Analysis using a Case Study

Charlene Tan

Abstract

Despite the potential of reflective thinking to help intelligence analysts avoid intelligence failures and become skilful practitioners, there has been limited research on how reflective thinking can be taught to the analysts. This article aims to fill the gap by discussing how reflective thinking is essential to and applicable for intelligence analysis in the field of epistemology. Using the example of the concept of knowledge as ‘justified true belief’, this article explains how the various theories of truth and types of justification are integrated into and applicable for intelligence analysis. To facilitate the link between epistemology and intelligence analysis, this article refers to the case study of Iraq’s alleged Weapons of Mass Destruction (WMD).

Keywords: case study; epistemology; intelligence analysis; reflective thinking; reflective practice

Introduction

Intelligence analysis is basically about “monitoring important countries, trends, peculiar events, and other phenomena and in identifying patterns or anomalies in behaviour and cause-effect relationships among key factors that explain past outcomes and might point to future developments with policy implications” (Bruce & George, 2008, p. 1). Despite the potential of reflective thinking to help intelligence analysts avoid intelligence failures and become skilful practitioners, there has been limited research on how reflective thinking can be taught to the analysts. This article aims to fill the gap by discussing how reflective thinking is essential to and applicable for intelligence analysis in the field of epistemology.

Using the example of the concept of knowledge as ‘justified true belief’, this article explains how the various theories of truth and types of justification are integrated into and applicable for intelligence analysis. To facilitate the link between epistemology and intelligence analysis, this article refers to the case study of Iraq’s alleged Weapons of Mass Destruction (WMD). The article begins by discussing the nature and current challenges in intelligence analysis. This is followed by introducing the concept and characteristics of reflective thinking. The last section explains how

reflective practice can be fostered in intelligence analysts in epistemology through a real-life case study.

Intelligence Analysis

Intelligence analysts play a crucial role in the ‘intelligence cycle’. The intelligence cycle comprises four main components: (1) requirements by the customers who are the nation’s leaders, policymakers, armed forces, homeland defense, and law enforcement, (2) collection using human intelligence, signals intelligence, imagery and geospatial intelligence, measurement and signature intelligence, and open source intelligence, (3) analysis and production by intelligence analysts, and (4) dissemination of the product to the customers (Bruce & George, 2008, p. 2). Analysts are the producers of ‘finished’ intelligence, the conduit between the collectors who are the producers of ‘raw’ intelligence, and customers – policymakers, armed forces, homeland defense and law enforcement – who are users of raw and finished intelligence (Bruce & George, 2008).

Bruce and George (2008, p. 12) identify three potential pitfalls for intelligence analytical errors: (1) ambiguous, deceptive, contradictory, and missing information (2) faulty assumptions, poor critical thinking and understanding of epistemology and (3) policy bias and politicisation.

Intelligence analysts face the constant challenge of having to think their way through an issue, recognise the most salient data, and reject that which is wrong, misleading and unhelpful (Pherson & Pherson, 2013, p. xix). The urgency for intelligence analysts to critically reflect and improve their work is due to the probability of intelligence failures. Pherson and Pherson (2013), in their assessment of intelligence failures, conclude as follows:

Almost every postmortem of past intelligence failures concludes that analysts were working from outdated or flawed mental mindsets and had failed to consider alternative explanations. Most recently, the Iraq WMD commission’s indictment of ‘poor tradecraft’ [critical thinking] and the 9/11 Commission’s judgement that analysis suffered from a ‘failure of imagination’ signaled the need to incorporate more rigour and creativity into the analytic process (p. xxi.).

The Silberman-Robb WMD Commission, in its critique of the United States’ intelligence analysis, reports that there was a “lack of rigorous analysis” with “too many analytical products that obscured how little the intelligence community actually *knew* about an issue and how much their conclusions rested on *inferences* and *assumptions*” (Commission on the Intelligence Capacities of the United States Regarding Weapons of Mass Destruction, 2005, as cited in Bruce & George, 2008, p. 4, italics in the original; also see Lowenthal, 2008, Bruce, 2008a, b). Clearly, basing one’s analysis on knowledge rather than inferences and assumptions is essential for intelligence analysts, not only in the United States but also in other countries.

Although the concept of ‘critical thinking’ (known as ‘tradecraft’ in the intelligence community according to Hart & Simon, 2006) is emphasised in intelligence analysis, it is not well defined and understood, and consequently the practice of tradecraft fails to address the problems faced in intelligence analysis (Hendrickson, 2008). Hart and

Simon (2006) add that what is known as ‘critical thinking’ “remains hidden from the intended consumers, summarised and sanitised into written documents that often constitute rote recapitulation of previous ‘official’ positions” (p. 49). Rather than focusing on probing and predicting through in-depth and inference-based analysis, a tendency is for intelligence analysts to be trained and rewarded for collecting data and current reporting (Hart & Simon, 2006; also see Johnston, 2005; Risen, 2006). Carl Ford who is a former chief of the State Department’s Bureau of Intelligence and Research gives the following assessment of intelligence analysis:

If I had to point to one specific problem that explains why we are doing such a bad job on intelligence, it is the almost single minded focus on current reporting. Analysts today are looking at intelligence coming in and then writing what they think about it, but they have no depth of knowledge to determine whether the current intelligence is correct. There are very few people left in the intelligence community who even remember how to do basic research (cited in Hart & Simon, 2006, p. 45).

Rønn & Høffding (2012), observing that the epistemological contributions to intelligence theory are “still alarmingly low in number and thoroughness”, add: “Even though fundamental questions from the domain of epistemology are often posed in the field of intelligence (such as: how do we arrive at new knowledge? and how robust are our conclusions related to the evidence at hand?), there are, to our knowledge, very few attempts to qualify these questions from the perspective of professional epistemology” (pp. 4-5). The above shows that what is needed to address the current challenges in intelligence analysis is not more ‘tradedcraft’ in terms of techniques and reports, but a more reflective approach towards intelligence analysis. In other words, what is recommended is reflective thinking, as I shall elaborate in the next section.

Reflective Thinking and Reflective Practice

Reflective thinking is generally characterised by open-mindedness, whole-heartedness and intellectual responsibility (Dewey, 1933). According to Dewey, open-mindedness refers to the freedom from the prejudice, partisanship and other such habits which close the mind, and the willingness to consider multiple or novel ideas. Whole-heartedness, on the other hand, points to the genuine enthusiasm to channel one’s mental, emotional, and physical resources to resolve a problem. It is essential for learners to examine, frame and attempt to solve the dilemmas of their practice. Finally, intellectual responsibility refers to the consideration of the consequences of any proposed plan and the willingness to adopt these consequences. It follows that a reflective practitioner is one who constantly reviews and changes his or her goals, methods and materials.

Reflective practice is defined as “an active process whereby the professional can gain an understanding of how historical, social, cultural, cognitive and personal experiences have contributed to professional knowledge acquisition and practice” (Wilkinson, 1999, p. 36). Such an understanding is obtained when one challenges the constraints of habituated thoughts and practices and identifies new potentials within practice, thus (Wilkinson, 1999). Schon (1983, 1987)’s work is helpful for us to further understand reflective practice. Schon identifies two kinds of knowledge:

‘technical rationality’ and ‘tacit’ knowledge. Technical rationality is manifested in a practitioner who possesses the technical knowledge and skills who applies routinisable and pre-specifiable procedures and strategies. This form of knowledge is also ‘rationalist’ as it emphasises applying scientific theory and external research to solve the problems faced by teachers in their practice. McLaughlin (1999) associates this to Aristotle’s notion of *techne*, which is “an activity of making or production (*poesis*), aimed at a pre-specifiable and durable outcome (a product or state of affairs) which constitutes its purpose (*telos*)” (p. 12).

While technical rationality is associated with empirical science, tacit knowledge is a way of knowing and understanding that which cannot be articulated, but which guides practice and is linked to experience and expertise (Schon, 1987; Wilkinson, 1999; Tan, 2008). This type of knowledge is implicit and intuitive. Arguing that professional decisions require judgements, which go beyond the technical, Schon (1987) points out that they involve ‘reflection in action’ which is tacit and intuitive. Given that the process of intelligence analysis involves cases which are unique, uncertain and value-conflict, analysts need to set, frame, construct and solve problems based on their professional judgements. McLaughlin (1999) sees a parallel between Schon’s account of reflection and Aristotle’s *praxis* that requires “a kind of knowledge that was more personal and experiential, more supple and less formulable than the knowledge conferred by *techne*” (Dunne, 1993, p. 10, cited in McLaughlin, 1999, p. 15). Schon (1983, 1987) further distinguishes two types of reflection: ‘reflection-in-action’ that refers to reflection on what one is doing as he or she is doing it, and assess what else needs to be done at that moment, and ‘reflection-on-action’ that refers to reflection on what he or she has done to identify problems encountered, and reconsider actions taken.

McLaughlin (1999)’s work on the object of reflection is also relevant to intelligence analysts (although McLaughlin’s concern in his article was the teaching profession). He distinguishes between reflection that involves specific and proximate matters, and that which involves general and contextual. The former relates to the present and particular concerns of the practitioner such as the specific skills, strategies and approaches one adopts. By contrast, general and contextual reflections are concerned with matters relating to the enterprise viewed from a broader and less immediate perspective. This involves questions such as the overall aims and purposes of the enterprise, the significance of wider influences on the system as a whole, and other questions of a philosophical, psychological, social and political kind.

Drawing upon our discussion of reflective thinking and reflective practice above, it is proposed that intelligence analysts would benefit from reflective thinking by engaging in an active process to challenge the constraints of habituated thoughts and practices that contribute towards intelligence pitfalls and failures. At the same time, reflective practice will spur intelligence analysts to identify new potentials within practice through asking critical and unpopular questions, digging for missing information, and considering contradictory evidence and alternative hypotheses. To carry out reflective practice, analysts need to go beyond technical rationality and the narrow focus on specific and proximate matters, as evidenced in the emphasis in churning out current reports at the expense of in-depth and critical analysis. In other words, what is not enough for analysts to apply ‘tradecraft’ (critical thinking) in a technical and mechanical fashion without considering intelligence pitfalls such as ambiguous,

deceptive, contradictory, and missing information, faulty assumptions and understanding of epistemology, and policy bias and politicisation.

What is recommended for the analysts, instead, is for them to apply reflective thinking by being open-minded, whole-hearted and intellectually responsible. Hart and Simon (2006, p. 49) propose the adoption of a form of thinking where the process and product of intelligence analysis facilitate dialogues that centre on questions such as ‘what was your line of reasoning’, ‘what were the dissenting opinions’ and ‘what was the evidence you used to support this assertion’? Moore and Krizan (2003, p. 113) add that critical thinking need to include routine, systematic questioning of the premises upon which decisions are based; without critical thinking, current beliefs and methods are not questioned, as long as they appear to produce results that can be reasonably explained. The next section explains how reflective practice is applicable for intelligence analysis in epistemology through a real-life case study.

Teaching Epistemology using a Case Study

Epistemology (theory of knowledge) is highly relevant and helpful to practitioners of all fields as it empowers them to understand and apply the concept and construction of knowledge to their line of work. One such field where its practitioners will benefit from learning about epistemology is intelligence analysis. Against this backdrop of the problem of intelligence failure mentioned earlier, an understanding of epistemology has the potential of equipping intelligence analysts with the robust mental mindsets and rigorous analytic process. After all, intelligence is intricately linked to knowledge, as noted by Bruce (2008a): “Intelligence is knowledge and foreknowledge of the world around us that allows civilian leaders and military commanders to consider alternative options and outcomes in making decisions” (p. 171).

Despite the relevance of epistemology to intelligence analysis, there has been limited research on how key concepts in epistemology are related to and integrated with intelligence analysis, and how these concepts can be taught to intelligence analysts. Rønn & Høffding (2012), observing that the epistemological contributions to intelligence theory are “still alarmingly low in number and thoroughness”, add: “Even though fundamental questions from the domain of epistemology are often posed in the field of intelligence (such as: how do we arrive at new knowledge? And how robust are our conclusions related to the evidence at hand?), there are, to our knowledge, very few attempts to qualify these questions from the perspective of professional epistemology” (pp. 4-5).

Case study refers to “the use of a case – a written description of a problem or situation – to present a problem for analysis” (McDade, 1995, p. 9). First used in the teaching of law and medicine, and popularised at the Harvard Business School, the case study method has since been widely used in many other disciplines (Kreber, 2001). Case studies are helpful to bridge the gap between the theoretical concepts discussed in the text and actual practical experience, as well as increasing the students’ interest and motivation for learning (Stewart & Dougherty, 1993).

Case studies serve as a useful platform to promote reflection in the learner. This article draws upon John Dewey (1993)'s conception of reflection as being characterised by open-mindedness, whole-heartedness, and intellectual responsibility. According to Dewey, open-mindedness refers to the freedom from the prejudice, partisanship and other such habits which close the mind, and the willingness to consider multiple or novel ideas. Whole-heartedness, on the other hand, points to the genuine enthusiasm to channel one's mental, emotional, and physical resources to resolve a problem. It is essential for learners to examine, frame and attempt to solve the dilemmas of their practice. Finally, intellectual responsibility refers to the consideration of the consequences of any proposed plan and the willingness to adopt these consequences. It follows that a reflective practitioner is one who constantly reviews and changes his or her goals, methods and materials.

The type of case study selected for our lesson is 'real world case study' in the context of intelligence. This type of case studies is chosen as the intelligence analysts' familiarity with it means that such cases are effective means to facilitate the analysts' learning of and linking between epistemology and their practical work. As such cases are based on real events, students are encouraged to understand contextual nuances, make references and analyses accordingly, and identify and challenge their assumptions about situations and people (McDade, 1995). The case studies are complemented by the discussion method where the instructor facilitates a structured, preplanned discussion to lead students through the process of analysing a piece of material (McDade, 1995).

A Lesson on Teaching the Concept of Knowledge to Intelligence Analysts

This section explains how the traditional definition of knowledge in epistemology as 'justified true belief' can be taught to intelligence analysts using a real world case study. Our lesson is targeted at analysts who have some experience in intelligence work, and assumes that they have no prior training in epistemology.¹ The lesson is divided into three related sections:

- (1) the definition of knowledge as justified true belief;
- (2) the three theories of truth; and
- (3) the seven types of justification.

As mentioned, our case study is on Iraq's alleged Weapons of Mass Destruction (WMD). Specifically, our focus is on United State's National Intelligence Estimate (NIE)'s claim in 2002 that Saddam Hussein's Iraq possesses fairly significant WMD capabilities across a broad spectrum of prohibited weapons (Bruce, 2008, p. 201). This case study has been chosen as it is a well-publicised and much-analysed case familiar to most intelligence analysts. Relevant documents to be distributed to students include the report by the Commission on the Intelligence Capacities of the United States Regarding Weapons of Mass Destruction (2005), newspaper articles and academic papers written by researchers (e.g. see Bruce, 2008a, b; Bruce and

¹ The materials on epistemology are taken from [Tan & Crawford \(2006\)](#).

George, 2008; Smith, 2008). The objective of the lesson is for the analysts to (re)visit a well-known topic with a fresh pair of eyes through an *epistemological* perspective. To do so, the students are posed this question at the start of the lesson:

How does NIE know that Saddam Hussein's Iraq possesses fairly significant WMD capabilities across a broad spectrum of prohibited weapons?

To assist the students in answering this question from an epistemological perspective, they will be introduced to the concept of knowledge as justified true belief. It is explained to students that the focus here is not ability knowledge (i.e., to have some special form of competence) or acquaintance knowledge (i.e., to be acquainted with someone or something), but propositional knowledge (i.e., to recognise something as information) (Lehrer, 1990). In defining knowledge, philosophers turn to a set of necessary and sufficient conditions (known as 'if and only if') for knowledge. The definition of (as well as the conditions for) knowledge since Plato's time is *justified true belief*, i.e.,

S knows that p if and only if

- (1) p is true (truth condition)
- (2) S believes that p (belief condition)
- (3) S is justified in believing that p (justification condition)

Applying the above conditions of knowledge to our case study, 'S' refers to NIE while 'p' refers to "Saddam Hussein's Iraq possesses fairly significant WMD capabilities across a broad spectrum of prohibited weapons". The instructor will then explain each of the conditions to the students with reference to the case study on Iraq's alleged WMD.

First, students will learn that a necessary condition for knowledge is one's personal belief in something (i.e., S believes that p). One accepts something for the purpose of attaining truth (or epistemic purpose) and avoiding error with respect to the very thing one accepts. With reference to our case study, this means that NIE's knowledge claim about Iraq possessing WMD entails that the NIE believes or accepts this claim. It is important to add that our belief in something comes in varying degrees, and is not an all-or-nothing state. The report released by NIE informs us that the NIE strongly believes that Saddam Hussein's Iraq possesses fairly significant WMD capabilities across a broad spectrum of prohibited weapons.

How NIE (or anyone) arrives at such a strong belief is related to the question of truth and justification. Students will proceed to learn about the truth condition (i.e., p is true). There are three main theories of truth. First, the *correspondence theory of truth* states that a sentence 'p' is true if it corresponds with a fact, some situation or state-of-affairs. The word 'fact' here refers to something that is actually the case or has really happened. Audi (2003) explains that the correspondence theory of truth is linked to realism in the sense that the proposition "there is a green field before me" is true provided that in reality there is a green field before me. Whether there is a green field before me is not dependent on what I think. In other words, the truth of our beliefs is not mind-dependent. The correspondence theory of truth is also associated with empiricism; statements in science such as "iron expands when heated" are based

on direct perceptions of the world with the help of our senses. With reference to our case study, a claim that “Iraq had missiles whose range exceeded permissible limits under UN sanctions” is true in the sense that it corresponds to an actual state of affairs, i.e., Iraq indeed had been found to have missiles whose range exceeded permissible limits under UN sanctions. Another related example is the claim that “Saddam had previously used chemical weapons against Iran”. This claim is true in the sense that it corresponded with an undisputed historical fact, i.e., Saddam had indeed used chemical weapons against Iran in the past.

Linking this theory of truth to intelligence analysis, analysts are relying on this theory if they refer to *direct evidence* such as tangible evidence and authoritative evidence about the subject matter (I shall elaborate on these two types of evidence later). One criticism about this theory is that it cannot explain statements where there is no obvious fact, situation or state-of-affairs to correspond to (Hospers, 1995). For example, statements such as “The hydrogen atom has one electron”, and “Honesty is a virtue” do not correspond to a particular fact or situation. This theory also assumes that the knower has direct access to the facts, which is not always the case, especially for intelligence work where secrecy and deception make the collection of facts challenging.

The second theory is the *coherence theory of truth* that states that a proposition ‘p’ is true if it fulfils two conditions: (1) p is not inconsistent with any other propositions in a system of beliefs, and (2) all the propositions mutually support one another by adding some probability to the others in the system. Take for example the following propositions (Bruce, 2008a):

- Saddam had previously used chemical weapons against Iran.
- Saddam blunted the United Nations inspection process that had been set up to confirm their destruction.
- Iraq had ballistic missiles capable of ranges that exceeded limits allowed under United Nations sanctions.

The above propositions are true by coherence in the sense that they are not inconsistent with one another and they mutually support one another to a certain extent. Together, they form a body of beliefs that leads to a probable conclusion that Iraq possesses WMD. Intelligence analysts are relying on the correspondence theory of truth if they refer to *indirect evidence* such as testimonial evidence and circumstantial evidence (I shall elaborate on these types of evidence later). One criticism of this theory is that it is possible to have a coherent body of beliefs that is nevertheless false. For example, the religious beliefs of certain cult groups may be coherent but false. Likewise, in the case of intelligence work, it is plausible for a claim to be true by coherence and yet be false, as we shall see in the case of Iraq’s alleged WMD.

The third theory is the *pragmatic theory of truth* that holds that true propositions are simply those that work, in the sense that they are successful in practice – pragmatically. This means that believing them, acting on them, and otherwise confirming them lead (at least in the long run) to positive results (Audi, 2003). Conversely, a false proposition is one where there is disconfirmation or falsification with enough testing. An example is the proposition that “Iraq has ballistic missiles

capable of ranges that exceeded limits allowed under UN sanctions.” This proposition is true in the sense that the ballistic missiles, upon testing, indeed exceeded the limits. Intelligence analysts are relying on this theory of truth if they refer to *indirect evidence* such as verified/non-falsified evidence that is obtained from testing. The testing is based on abductive reasoning where a hypothesis related to the subject matter is formed for the purpose of verifying or falsifying it. One criticism of this theory is that a false proposition may work because it survives the testing. It may be the case that repeated testing yields the result and the falsity is never discovered. It is also difficult, in intelligence work, for analysts to test their hypotheses all the time due to the sensitive nature of their work.

The three theories may be applied separately or jointly. All the three theories of truth are relevant to intelligence analysis, especially in Intelligence and Warning (I&W) indicators – known or presumed activities that correlate with a higher threat potential (Smith, 2008, p. 273). Smith (2008) alludes to the three theories in his explanation of the observance of overt or concealed threat activities:

If observed, one can postulate the possibility that either overt or concealed threat activity might be under way. Such inferences postulate a correlation in which the premises function as independent variables and the expected outcomes are dependent variables—deductions that must be *tested*, first for logico-mathematical *coherence* and then for *correspondence* with observed fact. Testing typically is conducted through laboratory experimentation in which independent variables are manipulated and their outcomes recorded and then compared with field observation (e.g., intelligence collection).” (Smith, 2008, pp. 273-274, italics added)

In the case of NIE’s claim that Saddam Hussein’s Iraq possesses fairly significant WMD capabilities across a broad spectrum of prohibited weapons, applying the three theories refers to testing this claim or hypothesis by checking if it coheres with other propositions such as Saddam’s past record of possessing biological weapons. It also entails checking whether this claim corresponds with observed fact, i.e., the reality that there are indeed WMD in Iraq.

In teaching epistemology to intelligence analysts, it is important for the instructor to link the epistemological concepts to the various types of evidence used in intelligence work. According to Pherson and Pherson (2013, pp. 90-92) who draw upon Schum (2001)’s schema, there are six main types of evidence or sources in intelligence work:

- (1) *Tangible Evidence*: direct observation and consists of such material as original documents, pictures, or physical objects.
- (2) *Authoritative Evidence*: scientific data such as the periodic table of elements and tidal charts, government records such as birth and death certificates, property records, and motor vehicle records.
- (3) *Testimonial Evidence*: reports of a development, conversation, or event by an observer or participant in the activity.

- (4) *Circumstantial Evidence*: conclusions that rest on some observations plus assumptions that the analyst has made.
- (5) *Negative Evidence*: information that falsifies or is not consistent with a hypothesis.
- (6) *Missing Evidence*: information that one would expect if a hypothesis were to be verified, but which has not been found yet.

Besides the above types of evidence, I would like to add one more type, what I call ‘Verified/Non-falsified Evidence’:

Verified/Non-falsified Evidence: findings obtained from tests that verify or falsify a hypothesis.

Based on the above seven types of evidence used in intelligence, the following table links the theories of truth to the various types of evidence by highlighting the respective strengths and weaknesses:

Table 1: Linking the theories of truth to the types of evidence used in intelligence

Main Types of Evidence Used		Strengths	Weaknesses
Correspondence Theory	<ul style="list-style-type: none"> • Tangible evidence • Authoritative records • Testimonial evidence (primary source) 	Generally reliable & credible based on direct evidence	<ul style="list-style-type: none"> • Direct evidence is not always available • This theory is not always applicable eg. moral claims (‘Killing is morally wrong’)
Coherence Theory	<ul style="list-style-type: none"> • Testimonial evidence (secondary source) • Circumstantial evidence • Negative/Missing evidence 	Relies on multiple evidence/sources to confirm or disconfirm a statement	A statement can be ‘true’ by coherence and yet be false, eg. teaching from cults, theory influenced by confirmation bias/missing evidence

Pragmatic Theory	<ul style="list-style-type: none"> • Verified/Non-falsified evidence (testing based on available evidence) 	Relies on testing so the result can be repeated for checking	<ul style="list-style-type: none"> • This theory is not always applicable, eg. general claims ('All men are mortal') • A statement can be 'true' by testing and yet be false: inadequate, flawed testing
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After learning about the truth condition, the students are introduced to the justification condition (i.e., S is justified in believing in p). Justification is necessary for knowledge because a belief that is true just because of luck does not qualify as knowledge. To be justified is to have good reasons or evidence for believing something. This in turn depends on how knowledge is obtained. Hospers (1995) identifies seven main types of justification or sources of knowledge.

The first type is *perception*; for example, if you are asked how you know that there is a table before you, you reply that "I see and touch it." Perception is used especially in the sciences and is the basis for empiricism: the view that sense experience is the sole/primary source of our knowledge about the world. Empiricists argue that all genuine knowledge is *a posteriori*: knowledge that is based on (or posterior to) experience. For example, the claim that Iron expands when heated" is based on experience, not reflection. A limitation of perception as a type of justification is that our senses may deceive us and hence we may not know whether what we perceive is true.

The second type of justification is *reason*; for example, if you are asked how you know that A is larger than C, you reply that "If A is larger than B, and B is larger than C, then A is larger than C." Reason is used especially in mathematics and is the basis for rationalism: the view that reason or the intellect is the primary source of our fundamental knowledge about reality. Rationalists hold that all genuine knowledge is *a priori*: knowledge that is independent of or prior to experience, and is obtained through reason. A limitation of reason as a type of justification is that the reasoning process itself may be theory-laden or ideologically biased. For example, some feminists have charged that the over-emphasis on reason to at the expense of one's emotions is male-biased. Reason alone is also inadequate to give us knowledge of the real world since we do not have the opportunity to experience or test out our ideas.

The third type of justification is *introspection* that refers to one's mental and emotional states. For example, you are using introspection when you remark that "I feel sort of down in the dumps, depressed" or "I don't have a good feeling about the situation/that person/the device." Introspection is important in emotional intelligence where one develops self-awareness and sensitivity towards others through empathy. A limitation of introspection as a type of justification is that our emotions, being subjective, may be biased and may contradict reason and reality.

The next type of justification is *memory*; for example, if you asked how you know that you had breakfast this morning, and you reply: “I remember it, that’s how I know.” Memory is used in our everyday life and especially in crime scene investigation. For example, a suspect, when asked by the crime scene investigator where he was on the night X was killed, remembered: “I was having dinner with my wife at home.” A limitation of memory as a type of justification is that our memory may be unreliable and selective, and different people may give contradictory accounts based on their memories.

The fifth type of justification is *faith*; this could be religious in nature (“I know that God exists by faith”), political (“I vote for this political party/leader as I’ve faith in it/him/her”) or personal (“I don’t believe that my husband’s having an affair as I’ve faith in him”). A limitation of faith as a type of justification is its high possibility of subjectivity and bias, making it difficult to verify or falsify.

The next type of justification is *testimony*. This may be the testimony of eyewitnesses of crime scene (“I saw this man stab the girl”), testimony of someone who has personally experienced something (“This product really works because I’ve tried it”) or testimony from authoritative sources (“I know that Brutus killed Caesar because I read it in my History textbook/My teacher told me”). A limitation of testimony as a type of justification is the possibility of unreliable testimony, subjectivity and bias. It is therefore important for us to distinguish different sources and levels of reliability of testimony; for example we would rely more on a trusted source with a good track record as compared to a dubious source or an eyewitness who has a motive to lie in giving his testimony.

The final type of justification is *intuition*; for example, when you are asked how you know the way out of the forest, you reply: “I trust my instinct.” It is interesting to note that even scientists rely on intuition to generate scientific hypotheses. Kerson Huang who is the Professor of Physics Emeritus at the MIT, when asked how he hit upon his famous Hard-Sphere Bose Gas Theory, replied: “By intuition; you develop a certain view of the world and when you face something new, you say: Hmm, maybe I should try that.” (cited in *The Straits Times*, 20 Sep 2011, p. A22). A limitation of intuition as a type of justification is its high possibility of subjectivity and bias; it is also elusive in nature and therefore hard to obtain.

Strong justification is obtained when we are able to draw upon as many types of justification as possible for the purpose of triangulation. With respect to intelligence analysis, the two most basic and important types of justification/ways of knowing are perception and reason. This does not mean that the other types of justification are unimportant. Other types of justification (e.g. memory, emotions, testimony) are important but serve to support perception and reason as they are relatively weaker and more prone to error. The table links the three theories of truth and seven types of justification to the types of evidence in intelligence:

Table 2: Linking the theories of truth and types of justification to the types of evidence used in intelligence

Main Types of Evidence Used		Types of Justification
Correspondence Theory	<ul style="list-style-type: none"> • Tangible evidence • Authoritative records • Testimonial evidence (primary source) 	Primarily perception & memory (observation & recall of direct evidence); reason (link between direct evidence & truth claim); testimony (primary source)
Coherence Theory	<ul style="list-style-type: none"> • Testimonial evidence (secondary source) • Circumstantial evidence • Negative/Missing evidence 	Primarily perception & memory (observation of indirect evidence); reason (link among different types of indirect evidence/sources/other truth claims); testimony (secondary source); introspection/emotion; faith & intuition (especially for circumstantial, negative & missing evidence)
Pragmatic Theory	<ul style="list-style-type: none"> • Verified/Non-falsified evidence (testing based on available evidence) 	Primarily perception & memory (observation & collation of test result); reason (link between test result & truth claim); testimony, introspection/emotion & intuition <u>only as basis</u> to form hypothesis for testing

After introducing the three theories of truth and seven types of justification, students may be asked to apply what they have learnt to the case study on Iraq’s alleged WMD. Specifically, they will be asked, through the discussion method, to identify the theory/theories of truth, type(s) of justification and associated types of evidence used by NIE to support its conclusion that Saddam Hussein’s Iraq possesses fairly significant WMD capabilities across a broad spectrum of prohibited weapons.

In terms of the theory of truth, the students should be able to see how NIE’s wrong conclusion about Iraq’s WMD was due to its over-reliance on the coherence theory of truth. The correspondence theory of truth was absent since there was no direct evidence that Iraq possesses WMD.² Related to absence of the correspondence theory of truth is the absence of perception as a type of evidence; there is no direct evidence obtained from one’s observation of WMD in Iraq. In terms of evidence used in intelligence, there is a palpable absence of tangible evidence or no material as original

² Note that as far as the correspondence theory of truth is concerned, NIE does not have direct evidence *for p*, where ‘p’ refers to “Saddam Hussein’s Iraq possesses fairly significant WMD capabilities across a broad spectrum of prohibited weapons”. This does not mean that NIE does not have any direct evidence *relevant to p*. For example, NIE has direct evidence that Iraq had been found to have missiles whose range exceeded permissible limits under UN sanctions, based authoritative records from the UN. But this evidence, although relevant to p, is not a direct evidence for p.

documents, pictures, or physical objects related to WMD. In addition, there is no authoritative evidence such as government records of Iraq possessing WMD. Bruce (2008a) rightly points out that “empirical, observations played a startlingly minimal role in the NIE on Iraq’s WMD: The IC [intelligence community] had no direct evidence of WMD in Iraq at the time the estimate confidently asserted knowledge of Iraq’s weapons programmes.” (p. 182). The absence of facts and direct evidence results in a subsequent refutation, after the fall of Saddam Hussein, of many of NIE’s judgements, as noted by Bruce and George (2008):

The now-well-known October 2002 NIE on Iraq made major errors in assessing Iraq’s WMD programs. This NIE erroneously judged that Iraq had stockpiled as much as 500 tons of chemical weapons (CW) and had an ongoing CW program; that Iraq had an active biological weapons (BW) programme with BW agent stored there, along with mobile BW labs; that Iraq was reconstituting its nuclear weapons program; that Iraq had a program of unmanned aerial vehicles that was probably capable of delivering BW agent to foreign shores, including to U.S. shores; and that Iraq had missiles whose range exceeded permissible limits under UN sanctions. Only the last of the five major judgments (on missiles) proved to be correct. Four were completely wrong (p. 11).

Compounding the problem of a lack of direct evidence is the error of NIE in relying on false information from a source known as Curveball. This type of evidence is testimonial evidence that refers to the reports of a development, conversation, or event by an observer or participant in the activity, in this case, the testimony of Curveball. The Commission on the Intelligence Capacities of the United States Regarding Weapons of Mass Destruction (2005) reports that the intelligence community had a “near-total reliance on Curveball for its BW [biological weapons] judgements” but Curveball was later exposed as a fabricator (as cited in Bruce, 2008a, p. 180).

Besides not relying on the correspondence theory of truth, NIE also did not rely on the pragmatic theory of truth as it did not/could not carry out any test to verify or falsify its claim. This means that there was no verified/non-falsified evidence to inform NIE that Iraq indeed possesses WMD.

What NIE primarily relied on to establish ‘p’, instead, was the coherence theory of truth that is based on the following types of justification: reason (including fallacious reasoning), testimony, memory, faith and emotion. There are two problems with NIE’s reliance on the coherence theory of truth for p. First, one should be cautious about making strong claims based on the coherence theory of truth since one does not have access to direct evidence for p. The danger of jumping to conclusion based purely on the coherence theory of truth leads Hospers (1995) to caution that “the coherence theory is applicable to situations in which no direct evidence is possible; however, ‘coherence with a body of belief’ is acceptable only if it is coherence with a true body of belief – and the word ‘true’ in this last occurrence then means something like ‘correspondence with the facts’” (p. 186).

Secondly, while the coherence theory of truth is an acceptable theory for us to establish the truth of a proposition, we need to ensure that there is a *high probability* of support before we conclude that a proposition is true. This is because it is possible to have a coherent body of beliefs that is nevertheless false. To avoid this possibility, we need to ensure that our proposition fulfils two conditions mentioned earlier:

- (1) the proposition is not inconsistent with any other propositions in a system of beliefs, and
- (2) all the propositions mutually support one another by adding some probability to the others in the system.

In tandem with the above-mentioned types of justification are the following types of evidence used by NIE: testimonial evidence, circumstantial evidence, and negative/missing evidence. However, the propositions in the system of beliefs, although not inconsistent and mutually support one another, do not yield a high probability. This is because the propositions are based on relatively weak evidence such as testimony from a dubious source (Curveball), circumstantial evidence (Saddam's bad relationship with the United States), and even negative/missing evidence. On the last point, Bruce (2008b) points out that "the lack of fresh or convincing observable indicators of Iraq's purported weapons despite the concerted search for them – was either explained away as denial and deception or discounted because it did not support the habitual knowledge of a robust and active WMD capability" (p. 182).

Bruce (2008b) summarises the errors committed by the intelligence community (I have inserted the specific types of justification and evidence used by the NIE in the square brackets):

[T]he prevailing intelligence community consensus [testimony; testimonial evidence], built up over the preceding decade, that the Iraqi regime was hell-bent to assemble a significant arsenal of BW [biological weapons], CW [chemical weapons], and soon, nuclear weapons. ... Iraq's history and past practices supported this view [memory; circumstantial evidence]. Saddam had previously used CW against Iraqi Kurds and neighbouring Iran. ... all this conduct reinforced Western suspicions that he must have had something to hide [reason, emotion; circumstantial evidence, negative/missing evidence]. ... But their most egregious failing was to insufficiently challenge the evidence [faith]. ... And the most important evidence for BW was based on fabricated reporting (stories spun by "Curveball" that made their way to the Defense Intelligence Agency from a German liaison) [testimony; testimonial evidence] (p. 202).

The students are now in a position to answer the question posed to them at the start of the lesson:

*How does NIE **know** that Saddam Hussein's Iraq possesses fairly significant WMD capabilities across a broad spectrum of prohibited weapons?*

With reference to the definition of knowledge as justified true belief, it follows that NIE has not fulfilled all the three conditions for knowledge. While S (i.e, NIE)

strongly believes that p (i.e., Saddam Hussein's Iraq possesses fairly significant WMD capabilities across a broad spectrum of prohibited weapons), p is not probably true, and S is not justified in believing that p, given its weak justification. NIE could be more reflective and empowered if its analysts could learn more about the relationships between evidence, belief and justification, belief and action, and basic concepts in game theory.

Conclusion

Thinking reflectively about the key concepts in epistemology such as the 'knowledge', 'belief', 'truth' and 'justification' are instructive in cautioning analysts against 'confirmation bias' – the inherent human mental condition of analysts to see more vividly information that supports their mindset and discount the significance of information that contradicts what they judge the forces at work are likely to produce (Davis, 2008, p. 160; Moore, 2007). In short, epistemology is salutary for intelligence analysts to become more reflective. Recalling Dewey's conception of reflection, this means that the analysts will be open-minded by being free from the prejudice, partisanship and other such habits that close the mind, and the willingness to consider multiple or novel ideas. They will also be whole-hearted with the genuine enthusiasm to channel their mental, emotional, and physical resources to resolve problems related to their field. Finally, the analysts will possess the intellectual responsibility to consider the consequences of any proposed plan and the willingness to adopt these consequences.

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