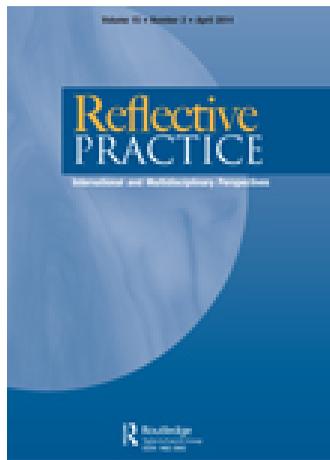


This article was downloaded by: [National Institute of Education]

On: 07 September 2014, At: 20:29

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



## Reflective Practice: International and Multidisciplinary Perspectives

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/crep20>

### Reflective thinking for intelligence analysis using a case study

Charlene Tan<sup>a</sup>

<sup>a</sup> Nanyang Technological University, Singapore

Published online: 18 Dec 2013.

To cite this article: Charlene Tan (2014) Reflective thinking for intelligence analysis using a case study, *Reflective Practice: International and Multidisciplinary Perspectives*, 15:2, 218-231, DOI: [10.1080/14623943.2013.868792](https://doi.org/10.1080/14623943.2013.868792)

To link to this article: <http://dx.doi.org/10.1080/14623943.2013.868792>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

## Reflective thinking for intelligence analysis using a case study

Charlene Tan\*

*Nanyang Technological University, Singapore*

*(Received 28 June 2013; final version received 4 November 2013)*

Despite the potential of reflective thinking to help intelligence analysts avoid the potential pitfalls for intelligence analytical errors, there has been limited research on how reflective thinking can be taught to analysts. This paper aims to fill the gap by discussing how reflective thinking is essential to and applicable for intelligence analysis in the field of epistemology. Drawing upon Dewey's conception of reflective thinking as forming conclusions that are grounded in evidence and rationality, it is argued that reflective thinking enables analysts to guard against ambiguous, deceptive, contradictory and missing information, faulty assumptions, poor critical thinking, inadequate understanding of epistemology and policy bias. Using the case study of Iraq's alleged Weapons of Mass Destruction (WMD), this paper explains how the concept of knowledge as 'justified true belief' can be used to promote reflective thinking in intelligence analysts.

**Keywords:** case study; epistemology; intelligence analysis; reflective thinking; Weapons of Mass Destruction

### 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 the potential pitfalls for intelligence analytical errors, there has been limited research on how reflective thinking can be taught to the analysts.

Drawing upon Dewey's conception of reflective thinking as forming conclusions that are grounded in evidence and rationality, this paper explains how the concept of knowledge as 'justified true belief' can be taught to improve intelligence analysis in the field of epistemology. To facilitate the link between epistemology and intelligence analysis, this paper refers to the case study of Iraq's alleged Weapons of Mass Destruction (WMD). The paper begins by discussing the nature of and current challenges in intelligence analysis. This is followed by introducing the concept of reflective thinking and its relationship with epistemology. The final section explains how reflective thinking in epistemology can be fostered in intelligence analysts through a real-life case study.

---

\*Email: [charlene.tan@nie.edu.sg](mailto:charlene.tan@nie.edu.sg)

## 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, policy makers, armed forces, homeland defence 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). Analysts are the producers of ‘finished’ intelligence, sandwiched between the collectors who are the producers of ‘raw’ intelligence on the one hand, and customers – policy makers, armed forces, homeland defence and law enforcement – who are users of raw and finished intelligence, on the other (Bruce & George, 2008).

Bruce and George (2008) identified 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). The urgency for intelligence analysts to critically reflect and improve their work is due to the probability of intelligence failures. In their assessment of intelligence failures, Pherson and Pherson (2013) concluded 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, reported that there was a lack of rigorous analysis within the intelligence community as their conclusions rested not so much on knowledge but on inferences and assumptions (Commission on the Intelligence Capacities of the United States Regarding Weapons of Mass Destruction, 2005). 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 (Lowenthal, 2008).

Although the concept of ‘critical thinking’ (according to Hart & Simon, 2006, it is known as ‘tradecraft’ in the intelligence community) 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) added 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, a former chief of the State Department’s Bureau of Intelligence and Research, gave 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)

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 critical approach in intelligence analysis through *reflective thinking*. The next section explains the concept of reflective thinking and its relationship with epistemology.

### Reflective thinking and epistemology

John Dewey’s conception of reflective thinking provides a useful definition for intelligence analysts to avoid the potential pitfalls in their line of work. Dewey (1933) defined reflective thinking as:

active, persistent, and careful consideration of any belief or supposed form of knowledge *in the light of the grounds that support it* and the further conclusions to which it tends [that] includes a conscious and voluntary effort to establish belief *upon a firm basis of evidence and rationality*. (p. 9, italics added)

A reflective thinker is one who is open-minded, whole-hearted and intellectually responsible (Dewey, 1933). 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 thinker is one who constantly reviews and changes his or her goals, methods and materials (Tan, 2006, 2008).

Dewey’s concept of reflective thinking implies that intelligence analysts need to form conclusions not on the basis of ‘ambiguous, deceptive, contradictory, and missing information’ (Bruce & George, 2008, p. 12), ‘rote recapitulation of previous “official” positions’ (Simon, 2006, p. 49) or ‘outdated or flawed mental mindsets’ and a failure ‘to consider alternative explanations’ (Pherson & Pherson, 2013, p. xxi). Rather, analysts should arrive at conclusions that are supported by ‘grounds’ and ‘a firm basis of evidence and rationality’ (Dewey, 1933, p. 9). Rather than lacking ‘the depth of knowledge to determine whether the current intelligence is correct’, to repeat the words of former chief of the State Department’s Bureau of Intelligence and Research (cited in Hart & Simon, 2006, p. 45), analysts need to actively, persistently and carefully consider any claims by probing and predicting through in-depth and inference-based analysis. By being open-minded, whole-hearted and intellectually responsible, analysts are able to go beyond simply collecting data and current reporting as well as failing to consider alternative explanations (Hart & Simon, 2006; Pherson & Pherson, 2013) to evaluate multiple or novel ideas, channel their resources to resolve problems, and objectively extrapolate the consequences of any proposed plan.

Echoing the need for reflective thinking, Hart and Simon (2006) proposed 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) added that critical thinking needs to include routine and 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.

What then is the relationship between reflective thinking and epistemology? Epistemology, or the theory of knowledge, is crucial to intelligence analysts as it empowers them to understand and apply the concept and construction of knowledge to their analysis. 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). However, as noted earlier, major potential pitfalls for intelligence analytical errors are faulty assumptions, poor critical thinking, inadequate understanding of epistemology and policy bias (Bruce & George, 2008). Rather than really ‘knowing’ something (which is the focus of epistemology), the intelligence community tends to make claims that rest more on conjectures and assumptions (Commission on the Intelligence Capacities of the United States Regarding Weapons of Mass Destruction, 2005). Rønn and Høffding (2013), observing that the epistemological contributions to intelligence theory are ‘still alarmingly low in number and thoroughness’, stated:

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)

Against this backdrop of potential pitfalls and intelligence failure, thinking reflectively on epistemological issues is helpful to equip intelligence analysts with the requisite robust mental mindsets and rigorous analytic process. Returning to Rønn and Høffding (2013)’s questions, namely ‘How do we arrive at new knowledge?’ and ‘How robust are our conclusions related to the evidence at hand?’, these questions could be answered when we actively, persistently and carefully arrive at our conclusions on the basis of the grounds that support them, which is what reflective thinking is about. Furthermore, reflective thinking is salubrious in assisting analysts to go beyond a superficial application of critical thinking (tradecraft) by including routine and systematic questioning of the premises upon which decisions are based (Moore & Krizan, 2003). The next section explains how reflective thinking is applicable for intelligence analysis in epistemology through a real-life case study.

### **Teaching epistemology using a case study**

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).

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' 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).

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. The objective of the case study is not so much on truth seeking or rational decision making (although these are included as well) but on applying reflective thinking to epistemology. In other words, the aim is to encourage analysts to critically examine the available information and the relationships between the available evidence and the conclusions that should follow. To do so, analysts need to understand the concepts of 'knowledge', 'truth' and 'justification', and identify ambiguous, deceptive, contradictory and missing information as well as faulty assumptions. By probing and predicting through in-depth and inference-based analysis, they will then form judgements that are well grounded, defensible and robust. The lesson discussed in this paper is targeted at analysts who have some experience in intelligence work, and assumes that they have no prior training in epistemology. The content on epistemology is divided into three related parts:

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

As mentioned, this case study is on Iraq's alleged Weapons of Mass Destruction (WMD). Specifically, the focus is on the United States' National Intelligence Estimate (NIE)'s claim in 2002 that Saddam Hussein's Iraq possessed fairly significant WMD capabilities across a broad spectrum of prohibited weapons (Bruce, 2008b, 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 Capabilities of the United States Regarding Weapons of Mass Destruction (2005), newspaper articles and academic papers written by researchers (e.g. see Bruce, 2008a, 2008b; Bruce & George, 2008; Smith, 2008). The lesson begins with the instructor asking the students this question:

How do I *know* that Saddam Hussein's Iraq possessed 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'. A

systematic instruction on the theory of knowledge at the start of the lesson is necessary to address the common pitfall of analysts having a poor understanding of epistemology (Bruce & George, 2008) and inadequately qualifying fundamental questions from the perspective of professional epistemology (Rønn & Høffding, 2013). 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 this case study, ‘S’ refers to the students themselves (‘I’) while ‘p’ refers to ‘Saddam Hussein’s Iraq possessed 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. Space does not permit me to discuss the conditions in detail so only a brief explanation is given here.

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 this case study, this means that one cognitively and emotionally accepts the claim about Iraq possessing WMD capabilities. 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 believed that Saddam Hussein’s Iraq possessed fairly significant WMD capabilities across a broad spectrum of prohibited weapons.

How one arrives at such a strong belief is related to the questions of truth and justification. Learning about the concepts of truth and justification is a prerequisite for analysts to overcome the potential pitfall of having no depth of knowledge to determine whether the current intelligence is correct (Hart & Simon, 2006) and rigorous analysis in their reports (Commission on the Intelligence Capacities of the United States Regarding Weapons of Mass Destruction, 2005). There are three main theories of truth that are briefly explained here. 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. With reference to this 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 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 work, 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, 2008b):

- 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 conclusion (although the degree of probability is debatable) that Iraq possessed WMD capabilities. 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 capabilities.

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). Smith (2008) alluded 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)

Returning to the question posed to the students (the claim that Saddam Hussein's Iraq possessed fairly significant WMD capabilities across a broad spectrum of prohibited weapons), applying the three theories means ascertaining whether this claim 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, and is verified through test results that point to the existence of WMD.

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. This will enable the analysts to actively, persistently and carefully consider any belief or supposed form of knowledge in the light of the grounds that support it and the further conclusions to which it tends that establish the belief upon a firm basis of evidence and rationality (Dewey, 1933). According to Pherson and Pherson (2013, pp. 90–92) who drew 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 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.

In addition to the above types of evidence, I would like to add one more type, what I call 'Verified/Non-falsified evidence'. This type of evidence is obtained when we carry out tests to verify or falsify a hypothesis. Based on the above seven types of evidence used in intelligence work, Table 1 links the theories of truth to the main types of evidence and highlights the respective strengths and weaknesses.

After learning about the truth condition, the students will be 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. Without justification, analysts may succumb to the pitfall of relying on ambiguous, deceptive, contradictory and missing information, faulty assumptions and policy bias (Bruce & George, 2008). To be justified is to have good reasons or evidence for believing something. This in turn depends on how knowledge is obtained. Hospers (1995) identified seven main types of justification or sources of knowledge, namely perception, reason, introspection, memory, faith, testimony and intuition. Students will be introduced to each type of justifications and discuss the respective strengths and weaknesses of each type.<sup>1</sup>

Strong justification is obtained when we 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, in most cases, to support perception and reason as they are relatively weaker and more prone to error. The process of justifying one's belief directs the analysts to rigorously examine the available evidence, identify any ambiguous, deceptive, contradictory and missing information as well as faulty assumption, and

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

Main types of evidence used		Strengths	Weaknesses
Correspondence Theory	<ul style="list-style-type: none"> <li>• Tangible evidence</li> <li>• Authoritative evidence</li> <li>• Testimonial evidence (primary source)</li> </ul>	Generally reliable & credible based on direct evidence	<ul style="list-style-type: none"> <li>• Direct evidence is not always available</li> <li>• This theory is not always applicable, e.g. moral claims ('Killing is morally wrong')</li> </ul>
Coherence Theory	<ul style="list-style-type: none"> <li>• Testimonial evidence (secondary source)</li> <li>• Circumstantial evidence</li> <li>• Negative/Missing evidence (not obtained through testing)</li> </ul>	Relies on multiple evidence/sources to confirm or disconfirm a statement	A statement can be 'true' by coherence and yet be false, e.g. teaching from cults, theory influenced by confirmation bias/missing evidence
Pragmatic Theory	<ul style="list-style-type: none"> <li>• Verified/Non-falsified evidence (obtained through testing)</li> </ul>	Relies on testing so the result can be repeated for checking	<ul style="list-style-type: none"> <li>• This theory is not always applicable, e.g. general claims ('All men are mortal')</li> <li>• A statement can be 'true' by testing and yet be false: inadequate, flawed testing</li> </ul>

use the evidence to support their conclusions. Table 2 links the three theories of truth and seven types of justification to the types of evidence in intelligence work.

After introducing the three theories of truth and seven types of justification, students will be asked to apply what they have learnt to the case study on Iraq’s alleged WMD capabilities. Specifically, through the discussion method, they need to identify the possible theory/theories of truth, type(s) of justification and associated types of evidence that may be used to support or deny the conclusion that Saddam Hussein’s Iraq possessed fairly significant WMD capabilities across a broad spectrum of prohibited weapons. This activity serves to prompt the analysts to go beyond a superficial application of critical thinking (tracraft) by probing and predicting through in-depth evidence and inference-based analysis (Hart & Simon, 2006).

An alternative activity is for the students to examine NIE’s analysis of the case study. In terms of the theory of truth, the students should be able to see how NIE’s wrong conclusion about Iraq’s WMD capabilities 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 possessed WMD capabilities.<sup>2</sup> 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 capabilities in Iraq. In terms of evidence used in intelligence work, there is a palpable absence of tangible evidence such as original documents, pictures or physical objects related to WMD capabilities. In addition, there is no authoritative evidence such as government records of Iraq possessing WMD capabilities. Bruce (2008a) rightly noted that ‘empirical, observations played a startlingly minimal role in the NIE on Iraq’s WMD capabilities: The IC [intelligence community] had no direct

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"> <li>● Tangible evidence</li> <li>● Authoritative evidence</li> <li>● Testimonial evidence (primary source)</li> </ul>	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"> <li>● Testimonial evidence (secondary source)</li> <li>● Circumstantial evidence</li> <li>● Negative/Missing evidence</li> </ul>	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"> <li>● Verified/Non-falsified evidence</li> </ul>	Primarily perception & memory (observation & collation of test result); reason (link between test result & truth claim); testimony, introspection/emotion & intuition <i>only as</i> basis to form hypothesis for testing

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 US 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 an informant named Curveball. The Commission on the Intelligence Capacities of the United States Regarding Weapons of Mass Destruction (2005) reported that the intelligence community had a near-total reliance on Curveball for its biological weapons judgements but Curveball was later exposed as a fabricator.

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 possessed WMD capabilities.

Instead, what NIE had relied on to establish the claim that Iraq possessed WMD capabilities was the coherence theory of truth based on the following types of justification: reason (including fallacious reasoning), testimony, memory, faith and emotion. 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. There are two areas to take note of when one relies on the coherence theory of truth for the claim that Iraq possessed WMD. First, one should be careful 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 conclusions based purely on the coherence theory of truth led 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)

Second, while the coherence theory of truth is an acceptable theory for one to establish the truth of a proposition, there is a need to ensure that there is a *high probability* of support before concluding 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, it is necessary to ensure that a proposition fulfils the two conditions mentioned earlier: the proposition is not inconsistent with any other propositions in

a system of beliefs, and all the propositions mutually support one another by adding some probability to the others in the system.

However, the propositions in NIE's system of beliefs, although not inconsistent with 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 (2008a) noted 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) summarised 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; also note that BW stands for 'biological weapons' and CW stands for 'chemical weapons'):

The 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, CW, 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)

It follows that NIE had not fulfilled all the three conditions for knowledge. While S (i.e. NIE) strongly believes that p (i.e. Saddam Hussein's Iraq possessed fairly significant WMD capabilities across a broad spectrum of prohibited weapons), p is not true, and S is not sufficiently justified in believing that p, given its weak justification. Rather than closing one's mind to alternative explanations, neglecting contrary evidence and being influenced by policy bias as illustrated in this case study, analysts should be open-minded, whole-hearted and intellectually responsible to review and revise their conclusion and the consequences that follow. In short, reflective thinking comes in handy to remind analysts to engage in a more rigorous and in-depth analysis of the available evidence, the relationships between evidence, belief and justification, and belief and action.

## Conclusion

This paper has argued that reflective thinking enables analysts to avoid the potential pitfalls of intelligence analytical errors by basing their conclusions on evidence actively, persistently and carefully. Well-grounded conclusions are obtained when analysts ask fundamental epistemological questions, dig for missing information, consider contradictory evidence and alternative hypotheses, relate the available evidence to plausible conclusions, and consider the implications of their judgements

made. Thinking reflectively further helps analysts to avoid ‘confirmation bias’ – the inherent human mental condition to see more vividly information that supports one’s mindset and discount the significance of information that contradicts what one judges the forces at work are likely to produce (Davis, 2008; Moore, 2007). The prevalence of confirmation bias is linked to policy bias and politicisation that hinder analysts from examining the available information and evidence rationally and objectively. It is therefore necessary for analysts to eschew possessing outdated or flawed mental mindsets and falling back on rote recapitulation of previous ‘official’ positions by becoming reflective thinkers. This entails them being open-minded (free from the prejudice, partisanship and other such habits that close the mind and willing to consider multiple or novel ideas), whole-hearted (channel their mental, emotional, and physical resources to resolve problems) and intellectually responsible (consider the consequences of any proposed plan and the willingness to adopt these consequences).

Of course, reflective thinking alone cannot avoid all the potential pitfalls and problems confronting intelligence analysts. This is especially so for the challenge of policy bias and politicisation where the source of the bias and political decisions lies ultimately not with the analysts but with the policy makers. It is beyond the scope of this paper to give a detailed discussion of the importance of reflective thinking for policy makers to overcome policy bias and politicisation. Suffice to say that Dewey’s concept of reflective thinking is also salutary for decision makers to examine the evidence (or the lack of) that support their conclusions. Decisions that are made solely or predominantly on the basis of policy bias and politicisation cannot be decisions that are well grounded in evidence and rationality. Hence policy makers, like the analysts, would benefit from reflective thinking by challenging the constraints of habituated thoughts and practices that contribute towards intelligence pitfalls and failures.

### Notes

1. Space does not permit me to examine each type of justification in detail. For further reading, see Hospers (1995), Audi (2003), and Tan and Crawford (2006).
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 possessed fairly significant WMD capabilities across a broad spectrum of prohibited weapons’. This does not mean that NIE does not have any direct evidence that supports. For example, NIE has direct evidence that Iraq had been found to have missiles whose range exceeded permissible limits under UN sanctions, based on authoritative records from the UN. However, this evidence, although relevant to  $p$ , is not a direct evidence for  $p$ .

### Notes on contributor

Charlene Tan is an associate professor at the Policy and Leadership Studies Academic Group, National Institute of Education, Nanyang Technological University. A philosopher by training, she teaches reflective thinking and epistemology, and is the author (with Lachlan Crawford) of *Knowledge and Inquiry: An Introduction to Epistemology* (Prentice Hall, 2006).

### References

Audi, R. (2003). *Epistemology* (2nd ed.). New York: Routledge.

- Bruce, J. B. (2008a). Making analysis more reliable: Why epistemology matters to intelligence. In R. Z. George, & J. B. Bruce (Eds.), *Analysing intelligence: Origins, obstacles and innovations* (pp. 171–190). Washington DC: Georgetown University Press.
- Bruce, J. B. (2008b). The missing link: The analyst-collector relationship. In R. Z. George, & J. B. Bruce (Eds.), *Analysing intelligence: Origins, obstacles and innovations* (pp. 191–210). Washington DC: Georgetown University Press.
- Bruce, J. B., & George, R. Z. (2008). Introduction: Intelligence analysis – the emergence of a discipline. In R. Z. George, & J. B. Bruce (Eds.), *Analysing intelligence: Origins, obstacles and innovations* (pp. 1–15). Washington DC: Georgetown University Press.
- Commission on the Intelligence Capacities of the United States Regarding Weapons of Mass Destruction (2005). *Report to the President of the United States, March 31*. Washington DC: US Government Printing Office.
- Davis, J. (2008). Why bad things happen to good analysts. In R. Z. George, & J. B. Bruce (Eds.), *Analysing intelligence: Origins, obstacles and innovations* (pp. 157–170). Washington DC: Georgetown University Press.
- Dewey, J. (1933). *How we think: A restatement of the relation of reflective thinking to the educative process*. Lexington, MA: Heath.
- Hart, D., & Simon, S. (2006). Thinking straight and talking straight: Problems of intelligence analysis. *Survival*, 48, 35–60.
- Hendrickson, N. (2008). Critical thinking in intelligence analysis. *International Journal of Intelligence and Counterintelligence*, 21, 679–693.
- Hospers, J. (1995). *An introduction to philosophical analysis* (3rd ed.). London: Routledge.
- Johnston, R. (2005). *Analytic culture in the US intelligence community: An ethnographic study*. Washington DC: The Central Intelligence Agency.
- Kreber, C. (2001). Learning experientially through case studies? A conceptual analysis. *Teaching in Higher Education*, 6, 217–218.
- Lehrer, K. (1990). *Theory of knowledge*. Colorado: Westview Press.
- Lowenthal, M. M. (2008). Intelligence in transition: Analysis after September 11 and Iraq. In R. Z. George, & J. B. Bruce (Eds.), *Analysing intelligence: Origins, obstacles and innovations* (pp. 226–237). Washington DC: Georgetown University Press.
- McDade, S. A. (1995). Case study pedagogy to advance critical thinking. *Teaching of Psychology*, 22, 9–10.
- Moore, D. T., & Krizan, L. (2003). Core competencies for intelligence analysis at the national security agency. In R.G.Swenson (Ed.), *Bringing intelligence about: Practitioners reflect on best practitioners* (pp. 95–132). Retrieved April 26, 2013 from [http://ni-u.edu/ni\\_press/pdf/Bringing\\_Intelligence\\_About.pdf#page=104](http://ni-u.edu/ni_press/pdf/Bringing_Intelligence_About.pdf#page=104)
- Moore, D. T. (2007). *Critical thinking and intelligence analysis* (2nd ed.). Washington DC: National Defense Intelligence College.
- Pherson, K. H., & Pherson, R. H. (2013). *Critical thinking for strategic intelligence*. Thousand Oaks, CA: Sage & CQ Press.
- Risen, J. (2006). *State of war*. New York: Free Press.
- Rønn, K. V., & Høffding, S. (2013). The epistemic status of intelligence: An epistemological contribution to the understanding of intelligence. *Intelligence and National Security*, 28, 694–716 .
- Schum, D. A. (2001). *The evidential foundations of probabilistic reasoning*. Evanston, IL: Northwestern University Press.
- Smith, T. J. (2008). Predictive warning: Teams, networks, and scientific method. In R. Z. George, & J. B. Bruce (Eds.), *Analysing intelligence: Origins, obstacles and innovations* (pp. 266–280). Washington DC: Georgetown University Press.
- Stewart, J. P., & Dougherty, T. W. (1993). Using case studies in teaching accounting: A quasi-experimental study. *Accounting Education*, 2, 1–10.
- Tan, C. (2006). Philosophical reflections from the silver screen: Using films to promote reflection in pre-service teachers. *Reflective Practice*, 7, 483–497.
- Tan, C. (2008). Improving schools through reflection for teachers. *School Effectiveness and School Improvement*, 19, 225–238.
- Tan, C., & Crawford, L. (2006). *Knowledge and Inquiry: An Introduction to Epistemology*. Singapore: Prentice Hall.