

ANALYTIC-HOLISTIC THINKING INFLUENCE ON INFORMATION USE DURING SENSEMAKING

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ABSTRACT

The present study looks at how cultural differences in cognition pose a challenge to the management of information. Analytic-Holistic (AH) thinking, in particular, appears to influence information selection, attribution, and ultimately, sensemaking. This study, conducted in the United States, used 47 Americans and 47 Malaysian students studying in the U.S. The participants completed the Holism Scale; read a scenario and responded to a recognition test and an attribution assessment, developed for this study. First, Malaysians were found to be higher than the Americans in a scale of holistic thinking. Second, they also remembered more situational information. Thirdly, no differences were found between the two groups in situational attribution. Finally, proposed mediations with recognition of information as a mediator of AH thinking and Attribution were not significant. Differences in cognition affected types of information remembered. Implications of results on information management, sensemaking, and barriers to multinational teamwork are discussed.

Keywords: Analytic-Holistic Thinking, Culture, Cognition, Attribution, Information Management, Sensemaking

INTRODUCTION

The advent of the Internet has made a massive amount of information available on every conceivable subject. As organisations are able to make sense out of information, they should be able to make better decisions at every level of management (O'Reilly, 1983). However, the nature of the information, decision makers, team demands, and national differences can create complications. Two key processes are important for organisations: Information management and sensemaking and this study examines national differences in these areas. Information management is crucial for sensemaking in organisations (Choo, 1998a). A person's cognition can affect his or her attention to information and subsequently his or her own sensemaking of a situation. The purpose of this study is 1) to compare two national groups on cultural differences in cognition, 2) to investigate how these cognitive differences influence the use of information and sensemaking and 3) to explain the mechanism by which these influences work. Understanding differences in how national groups use information can help in multinational interactions and information sharing in multinational teamwork.

THEORETICAL CONCEPTS

Information Management

Information management is defined as the process of acquiring, organizing, processing, and using data. This process allows organisations to adapt to the continual changes and developments of business environments. While information is available, *sensemaking* ensures that information is interpreted for *creation of knowledge* and for *decision making* (Choo, 1998a; O'Reilly, 1983). Information management and sensemaking are crucial processes for organisations, as well as for each other. They are intertwined, bidirectional, and affect each other dynamically. Effectiveness of one depends on the effectiveness of the other. In this study, one aspect of information management was the main focus: the use or information attended to while a person makes sense of a situation.

Information management is important and has high stakes. In domains such as military, transportation, and business, it is crucial to know which information is reliable and accurate, which is erroneous, and most importantly, how to make sense of the information (O'Reilly, 1983). A blunder in any of these processes can complicate judgement, inference, and decision making (Choo, 1998a) but managed effectively, organisations may prosper.

Information management is vulnerable for a number of reasons. Because of information overload, data from the external environment needs to be selected, organised, and interpreted with care (O'Reilly, 1980). Information reliability (Choo, 1998b) and the way individuals obtain, store, and retrieve information can be flawed. For example, searching for information in familiar places, using information in satisficing modes, and relying on personal memory to organize and store information can all create vulnerability in information management (Choo, 1998b). While information management is susceptible to these complexity and vulnerability, sensemaking helps to select, interpret, and make sense of incoming data and determine future information management activities.

Sensemaking

Sensemaking is important as a gateway for information handling, wherein data from the external environment is interpreted (Weick, Sutcliffe, & Obstfeld, 2005). It involves identification of changes or problems, gathering and placement of information into frameworks, interpreting of information, and constructing meaning, that leads to actions or decisions (Klein, Phillips, Rall, & Peluso, 2007; Weick, 1995). To identify problems, individuals must attend to relevant information, form possible explanations from past experience, and exchange and negotiate views in order to arrive at a common interpretation (Klein et al., 2007). This interpretation allows for competent decisions to be taken in an adaptive, efficient, and timely manner (Weick, 1995). In this study, sensemaking is defined as problem identification in a given situation.

Sensemaking has its vulnerabilities. First, sources may give conflicting and unreliable information (O'Reilly, 1983). Under time pressures and evolving environment, the way conflicting information is handled can lead to different kinds of decision making (Davenport & Prusak, 1998). Second, differing cognitive schemas can support or interfere with sensemaking (Weick, 1995). This includes a person's ability to effectively monitor, integrate, and absorb newly acquired knowledge within his or her existing knowledge base

(Cohen & Levinthal, 1990; Hansen, Nohria, & Tierney, 1999). Finally, complications can arise with national differences in cognition. In multinational team settings, consensus must emerge about the meaning of information so that effective decisions are made. Although teams are crucial for complex tasks, misunderstanding of information can weaken sensemaking and further degrade team decision making.

Based on these three points, the study focused on two mechanisms influencing sensemaking. The first mechanism, attention, focuses on information. The second mechanism, attribution, is important for identifying causes during sensemaking. However, these two mechanisms are influenced by a broader concept of Analytic-Holistic (AH) thinking (Nisbett, 2003). AH thinking focuses attention in the face of too much information. Thus, only certain information receives attention and is recalled. AH thinking also influences attribution by selecting relevant information for the process of attribution.

LITERATURE REVIEW

Research describing Analytic-Holistic differences found that people from Western nations (mainly the U.S.) differ from those of Eastern Asia in analytic versus holistic modes of thinking (i.e. Choi, Koo, & Choi, 2007; Nisbett, Choi, Peng, & Norenzayan, 2001). Analytic-Holistic thinking is differentiated by the importance of context. Westerners exhibit analytic thought. They detach objects from their context (Kitayama, Duffy, Kawamura, & Larsen, 2003; Masuda & Nisbett, 2001), focus on attributes of objects and attribute dispositionally (Choi, Nisbett, & Norenzayan, 1999), avoid contradictions (Peng & Nisbett, 1999) and use rules to explain and predict behaviour (Norenzayan, Smith, Kim, & Nisbett, 2002).

In contrast, East Asians show holistic thought. They orient to the context or field as a whole, attend to relationships between focal object and the field, and also explain and predict events based on such relationships (Nisbett et al., 2001). Holistic thinkers prefer to use experience-based knowledge rather than abstract logic (Norenzayan et al., 2002), reason dialectically (Peng & Nisbett, 1999), and make situational attribution (Choi et al., 1999). This study explores AH thinking differences between two national groups.

Analytic-Holistic Thinking and Attention

Analytic-Holistic thinking explains cultural differences in attention (Kitayama et al., 2003; Masuda & Nisbett, 2001). Cognitive psychologists have looked at perceptual differences in national groups. They found differences in field dependency (Ji, Peng, & Nisbett, 2000; Witkin, Lewis, Hertzman, Machover, Meissner, & Karp, 1954) and attention (Masuda & Nisbett, 2001). Field dependency is defined as the extent to which people can differentiate object from the context (Witkin et al., 1954). Holistic people who are field dependent have difficulty in separating an object from its context but not analytic people who are field independent (Ji et al., 2000).

This attentional difference has implications on recall. Masuda and Nisbett (2001) found that Japanese participants (holistic thinkers) were able to recall contextual information (i.e. background stimuli), and relationships among objects more than American participants (analytical thinkers). Their ability to respond faster when shown previously

seen objects with original backgrounds than when objects were shown with novel backgrounds suggests that the holistic process judges objects and background simultaneously. In other studies, East Asians were also found to be more context or field dependent than Westerners (i.e. Kitayama et al., 2003). The present study focused on AH thinking influence on attention to information during sensemaking.

Analytic-Holistic Thinking and Attribution

Analytic-Holistic thinking explains cultural differences in attribution (Choi, Dalal, Kim-Prieto, & Park, 2003; Nisbett et al., 2001). Attribution is defined as the process by which people describe causes in their world (Heider, 1958). Dispositional attribution identifies internal causes such as competence, personality, and beliefs as most explanatory. Situational attribution looks also to external causal factors such as task demands, environment barriers, and surrounding people. Many researchers using Western samples found a tendency towards dispositional attribution while ignoring situational causes (Fiske & Taylor, 1984; Gilbert, Pelham, & Krull, 1988; Ross, Amabile, & Steinmetz, 1977). This error is posited in attribution theory (see Jones & Davis, 1965; Kelley, 1967 for details).

The pattern of attributing to dispositional causes is not universal. Cross-cultural psychologists found Westerners are more likely to locate responsibility in the unique characteristics of the person or object whereas East Asians favor attributing causes to the broader context and implement holistic solutions (i.e. Miller, 1984; Morris & Peng, 1994).

In addition, these two groups also use information differently to predict and explain behaviours (Choi et al., 1999; Choi & Nisbett, 1998; Ji, Nisbett, & Su, 2001). Choi and Nisbett (1998) found when given base rates (i.e. situational information - how frequent an event happened in the past), Koreans tend to use them more than Americans in making predictions about others' behaviour. Choi and colleagues (1999) found that when situational information is weak, both Koreans and Americans make dispositional attribution. However, when situational information is salient, Koreans make situational attributions while the Americans' stayed with dispositional attribution. These differences were also found in explanations of behaviours. East Asians favour situational explanations, whereas Americans see dispositional factors as driving forces for behaviour and events (Morris, Nisbett, & Peng, 1995; Morris & Peng, 1994). The present study focused on the influence of AH thinking on the dispositional or situational oriented problem identification during sensemaking.

Mechanism between AH Thinking and Attribution

Recent cross-cultural research in causal attribution suggests that AH thinking is the underlying explanation for differences found in causal attribution between cultures (i.e. Nisbett et al., 2001). As an extension to this, some researchers have examined conditions where cultural differences in causal attributions are likely to emerge or disappear. Researchers in these studies looked at cognitive variables that influence attribution such as 'the need for cognitive closure' (Chiu, Morris, Hong, & Menon, 2000), 'accessibility' (Hong, Morris, Chiu, & Veronica, 2000), and 'amount of relevant information' (Choi et al., 2003).

Chiu and colleagues (2000) found that Americans with high need for closure made attributions to individual dispositions while Chinese with the same need made attributions to the dispositional properties of a group. People with lower need for closure leaned towards situational attributions. Hong and colleagues (2000) found temporary accessibility influences attribution through frame switching. Bicultural Chinese generated less situational explanations when primed with American objects than when primed with Chinese objects. Priming of related constructs (i.e. American priming) created a temporary accessibility of a construct (i.e. dispositional attribution). Choi and colleagues (2003) examined the amount of relevant information as a mechanism of attribution. Koreans selected more information as relevant than Americans did when explaining a situation. They found higher holistic thinking considered a larger amount of information to be relevant and it mediates the relationship between culture and external attribution but not internal attribution. This suggests that analytic and holistic people's attention to different amount of information affects attribution outcomes.

These three studies suggest that the link between AH thinking and attribution may be more complex. The present study uses recall of information as a mediating variable to explore the link between AH thinking and attribution. Given the assumption that people differ in their attention towards certain kinds of information, they will recall different information and this will influence their attribution.

HYPOTHESES

This study is concerned with the process by which individuals interpret news and messages from the environment in sensemaking. Four hypotheses were proposed and tested to understand this process.

First, this study compares two national groups, the United States (U.S.) and Malaysia, which are very different in the Individualism-Collectivism (I-C) paradigm (Hofstede, 1980; 1997). Malaysia's culture is collectivistic while the U.S. is individualistic. As Malaysia's geographic proximity and ranking similarity on Hofstede's I-C scale (IDV = 26) is much closer to Japan (IDV = 46), Korea (IDV = 18), and Taiwan (IDV = 17) than to the U.S. (IDV = 91), it is possible that the Malaysian sample will reflect holistic thinking style. Hence, the Malaysian sample will be higher in holistic thinking than the U.S. sample.

H1: The Malaysian sample will have higher holistic scores than the U.S. sample.

Second, this study examines the role of AH thinking on the attention process (i.e. attention to information). Attention to types of information is measured by information types remembered using a recognition test. Because holistic people attend to a wider scope of information (Choi et al., 2003) and have the tendency for situational attribution, they will remember more situational information than analytic people. Hence, it is hypothesised that the Malaysian sample will remember more situational information than the U.S. group. As holistic people also attend to dispositional information, no hypothesis was made for attention to dispositional information between the national groups.

H2a: The Malaysian sample will remember more situational information than the U.S. sample.

Third, this study investigates the relationship between AH thinking and attribution. Past studies have pitted dispositional attribution and situational attribution against each other. The present study enables participants to attribute both dispositionally and situationally. The study hypothesised that Malaysians will attribute causes to situation more than the U.S. participants. As holistic people also focus on dispositional aspect of causes, no hypothesis was made for dispositional attribution between the national groups.

H3a: The Malaysian sample will be higher in their situational attribution than the U.S. sample.

The final objective concerns the link between AH thinking and attribution. Previous studies have shown that information recall is related to the visual attention of analytic thinkers and holistic thinkers (Masuda & Nisbett, 2001). People recall information to which they have attended. Choi and colleagues (2003) linked AH thinking to situational attribution through the amount of relevant information. This present study explores the link between AH thinking, attention process, and attribution. Specifically, the attention process (measured by information recognition) is assumed to be the mediating cognitive variable. Thus, the hypotheses are as follows:

H4a: The recognition of dispositional information mediates between AH thinking and dispositional attribution.

H4b: The recognition of situational information mediates the relationship between AH thinking and situational attribution.

METHODOLOGY

Design

This study focuses on AH thinking influence on information use during sensemaking. To ensure variability of AH thinking, this study included two groups of participants from different nations. Hence, this between groups study compares a student sample from the U.S. and a student sample from Malaysia studying in the U.S on AH thinking. To explore differences in AH thinking, nation of origin of the students is the independent variable while holistic tendency is the dependent variable. To investigate the relationship between AH thinking and information use, attribution assessments, and information recognition are the dependent variables. For the mediation hypotheses, holistic tendency is a predictor, information recognition is the mediator, and dispositional and situational attributions are the outcomes.

Participants

This study used a convenience sampling of participants who are studying in an Introductory Psychology course (U.S. students) and participants who are acquaintances of the author (Malaysian students). This initial study involved 94 participants (46.8% males; 53.2% females; $M = 20.43$ years old; $SD = 4.04$), 47 participants¹ were U.S. undergraduates from an Introductory Psychology course at a Midwestern U.S. university fulfilling a course requirement and received course credit for participation and 47 were Malaysian students studying in two Midwestern U.S. universities who participated voluntarily with no compensation. The U.S. sample has 31.9% males and 68.1% females with an average age of 20.55 years ($SD = 4.04$). Most identified themselves as Caucasian American. The Malaysian sample has 61.7% males and 38.3% females with an average age of 23.74 years ($SD = 4.65$). About 13% were of Malay ethnicity and 87% were of Chinese ethnicity. Most of the Malaysian participants had been in the U.S. between two to three years. All participants were of age 18 and above. Data of international students in the U.S. sample and incomplete data was excluded from analyses. The limitation of using a convenience sample is discussed later.

Measurements

In this study, participants read a scenario. Then for the scenario, they completed a recognition test to measure attention and an attribution assessment to measure attribution. They also completed the Holism Scale (Choi et al., 2003), a measure of AH thinking, and a demographic sheet. All materials except the Holism Scale were developed specifically for this study.

Scenario. To test the hypotheses, a scenario that reflected both situational and dispositional attributions was developed as a stimulus. While previous study relies on graphical materials to test attribution (i.e. Morris & Peng, 1994), the present study uses text-based scenario. This is important as information in organisations is most often transferred in text format, thus, more relevant for an organisation. The scenario, titled Financial Mess, was set in complex business environment involving interactions among organisational members, and the environment surrounding the organisation. It was presented such that a single or multiple reasons could explain the problematic financial situation the organisation faces. Some information pinpoints the problem to a new inexperienced young hire (i.e. Kevin does not like to take risks) while others pinpoint to the changing environment surrounding the person and the organisation (i.e. the retirement of the Marketing Manager, the economy, the lack of leadership etc.).

The scenario was developed to provide a contrast between dispositional and situational information to create contrast between different causes. Dispositional information was operationalised as information that pinpoints the problems to be caused by an individual. For example, “Kevin Bentley does not like to take risks.” Situational information was

¹ Forty seven participants were selected from 198 participants from the U.S. sample using randomized selection option in SPSS to match the Malaysian sample size.

operationalised as information that pinpoints the problems to be caused by the changing environment surrounding the person and the organisation as a whole. For example, “There were many changes in the department.” The scenario presented dilemmas and allowed participants to attribute cause(s). The amount of information was balanced in the scenario with 21 pieces of dispositional information and 21 pieces of situational information. In the scenario participants were asked to play a role of a consultant to try to understand, analyze, and identify the causes of the problematic situations.

Recognition test. A recognition test was developed to measure participants’ attention. There were four types of items: dispositional, situational, foil dispositional, and foil situational. Situational and dispositional items were extracted from scenarios. The foil items, developed separately, were items that have similar information content as those in the scenarios but were not present in the scenario. For example, ‘Kevin Bentley does not like to take risks’ has a corresponding foil item ‘Kevin Bentley is hardworking’ and ‘The advertising industry has been down for almost a year’ has a corresponding foil item ‘The advertising industry has been stagnant for almost a year’. The recognition test has 48 items: 16 dispositional, 16 situational, 8 dispositional foil, and 8 situational foil. Participants were asked to respond to each item by rating ‘1’ if the information was not present in the scenario and ‘2’ if the information was present in the scenario. Percentage correct scores were obtained for dispositional items recalled and situational items recalled.

Attribution assessment. An attribution assessment was created to measure participants’ attributional tendency. Dispositional attribution is operationalised as finding causal factor(s) as internal to a person (i.e. personality, feelings, and values). For example, ‘Kevin Bentley does not socialize enough with his subordinates.’ Situational attribution is operationalised as finding causal factor(s) as external to a person (i.e. economy, leadership, competitors and etc.). For example, ‘The industry has been unpredictable for almost a year.’ The attribution assessment contained 14 items (7 dispositional items and 7 situational items) with a 7-point rating scale from ‘1’ (Strongly Disagree) to ‘7’ (Strongly Agree). Attribution scores were obtained for dispositional attribution and situational attribution.

Holism Scale. The Holism Scale (HS; Choi et al., 2003) measures holistic tendency. This scale has 10 items on a 7-point rating scale from ‘1’ (Strongly disagree) to ‘7’ (Strongly agree). The scale was tested using U.S. ($\alpha = .68$) and Korean ($\alpha = .71$) samples. Example items are ‘It is not possible to understand the pieces without considering the whole picture’ and ‘Even a small change in any element in the universe can lead to substantial alterations in others.’ A higher holism score reflected higher holistic thinking.

Demographic information Participant’s demographic information such as nationality, gender, age, ethnicity, and level of education were collected.

Procedure

Each session included groups of three to eight people and took approximately 40 to 45 minutes to complete. First, participants were asked to give their consent to participate. Then, each participant was given the package of testing materials. The package consisted of the

scenario, the recognition test, the attribution assessment, the Holism Scale, and a participant's demographic information sheet. Participants were told to complete the materials in the order given and follow the instructions. At the end of the session, participants were debriefed and questions were answered.

RESULTS

Demographic Differences

The U.S. and Malaysian samples differed in gender composition and age. The U.S. sample consists primarily of females while the Malaysian sample was majority males, $\chi^2(1) = 8.36$, $p < .01$. The Malaysian sample were significantly older than the U.S. sample, $t(92) = -3.55$, $p < .01$. See Table 1. These differences were due to limitations of a convenience sample.

Hypotheses Testing

The first research hypothesis examined if the national groups were different in their AH thinking. The mean of holism scores of the Malaysian sample ($M = 53.43$; $SD = 8.11$) is significantly higher than the U.S. sample ($M = 50.49$; $SD = 5.77$), $t(92) = -2.02$, $p < .05$. The Malaysian sample is more holistic in their cognition than the U.S. sample. Hypothesis 1 is supported. See Table 1.

The second research hypothesis examined if the national groups attended differently to situational information. The percentage correct scores on situational information recognition showed that Malaysians ($M = .78$; $SD = .12$) remembered more situational information than the U.S. sample ($M = .72$; $SD = .15$), $t(92) = -2.08$, $p < .05$. The Malaysians attend to more situational information than the U.S. sample. Hypothesis 2 is supported. See Table 1.

The third research hypothesis proposed a difference between the national groups in their situational attribution. Table 1 shows that the scores of situational attribution for the Malaysian sample ($M = 36.47$; $SD = 5.04$) are not significantly different than those of the U.S. sample ($M = 36.81$; $SD = 3.79$), $t(92) = .37$, $p > .05$. Hypothesis 3 is not supported.

Table 1. National Differences

Variable	U.S.		Malaysia		<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Age	20.43	3.63	23.74	4.65	-4.57*
Holism score	50.49	5.77	53.43	8.11	-2.02*
% Correct Situational	.72	.15	.78	.12	-2.08*
% Correct Dispositional	.73	.14	.81	.12	-2.92**
Situational Attribution	36.81	3.79	36.47	5.04	.37
Dispositional Attribution	28.89	5.66	30.60	5.82	-1.44

* $p < .05$, ** $p < .01$

The fourth research hypothesis was that the recognition of dispositional information mediates holistic scores and dispositional attribution; and the recognition of situational information mediates between holistic scores and situational attribution. The criteria for mediation analysis as suggested by Baron and Kenny (1986) were used.

In Hypothesis 4a the criteria would mean that the holistic scores and dispositional attribution; holistic scores and the recognition of dispositional information; and the recognition of dispositional information and dispositional attribution, must all be significant before the mediation analysis. There would be a full mediation if a previous significant relationship between holistic scores and dispositional attribution were no longer significant when the link between holistic scores and recognition of dispositional information and the link between recognition of dispositional information and dispositional attribution are controlled. The correlation between holistic scores and dispositional attribution as well as the correlation between holistic scores and recognition of dispositional information were not significant. However, the correlation between recognition of dispositional information and dispositional attribution was significant, $r = .25$, $p < .01$. The higher the recognition of dispositional information the more likely dispositional causes. Nevertheless, the two non significant relationships prevented further mediation analysis. Hypothesis 4a is not supported. See Table 2.

Hypothesis 4b followed the steps in Hypothesis 4a. The holistic scores and situational attribution; holistic scores and the recognition of situational information; the recognition of situational information and situational attribution, must be significant before the mediation analysis. All three correlations are not significant. The non significant relationships prevent further mediation analysis. Hypothesis 4b is not supported. See Table 2.

Table 2. Correlations Matrix for Study's Variables

	<i>M</i>	<i>SD</i>	HS	%CSR	%CDR	SA	DA
HS	51.96	7.15	1				
%CSR	.75	.13	.10	1			
%CDR	.77	.14	-.04	.55**	1		
SA	36.64	4.44	.15	.01	-.03	1	
DA	29.75	5.77	.14	.15	.25**	.15	1

* $p < .05$, ** $p < .01$. Key: HS = Holism Score, %CSR = percentage correct situational recognition, %CDR = percentage correct dispositional recognition, SA = Situational Attribution, DA = Dispositional Attribution

DISCUSSION

As international business increases in importance, it is crucial to understand the special demands placed by national differences in cognition. Given cognitive differences between national groups, different information needs may arise. This study looked at one way cognition can influence the use of information and problem identification.

Hypothesis 1 showed that Malaysians attained higher scores in their holistic thinking than the U.S. participants. The result suggests a supportive link between Individualism-Collectivism (I-C) and AH thinking between Malaysians and Americans. This suggests the possibility that researchers and practitioners can go beyond Hofstede's (1980) concept of I-C, a social concept, to map it on cognitive style differences. In addition, the results support the notion of philosophic traditions of AH thinking illustrated in Nisbett (2003).

Hypothesis 2 investigated information remembered between two national groups. Malaysians remembered more situational information than the U.S. participants. This suggests that when national groups differ in AH thinking, they look for different information in assessing a situation. In addition, Malaysians also tend to focus on a wider scope of information including both dispositional and situational information. They also recalled more dispositional information (see Table 1). This is consistent with Choi and colleagues (2003) who found that higher holistic thinking needed more relevant information during attribution.

Hypothesis 3 examined causal attribution between two national groups. No differences were found in situational causal attribution. This did not replicate previous research using U.S. samples. Two reasons are possible. First, as Choi et al. (1999) suggests strong situational cues could facilitate situational attribution. The presentation of direct situational information in this study may have provided a stronger situational cue for the Americans, thus, influencing situational attribution. In a naturalistic search for information, they may not have focused on situational information, hence a weaker situational attribution. Second, previous research typically used simple scenarios coupled with forced choice attribution (i.e. Morris & Peng, 1994). Attribution may differ when the problem is complex. The scenario in this study illustrated complexities of an event where participants were able to indicate both dispositional and situational factors as influencing the outcome of events. Because organisational environments are typically very complex and because a multinational environment may foster broader inclusion of information, this paradigm may be more accurate than past research.

Hypotheses 4a and 4b investigated whether recognition of information is a mechanism that leads AH thinking to attribution. Specifically, does having a certain cognitive style influence an individual's focus to specific types of information and thus lead to certain attributions? Both hypotheses were not supported. These hypotheses were important because if information recognition matters more than AH thinking in affecting attribution, manipulation of information can be used to influence attribution. The non significant mediations could have been limited by the sample size in this study. Perhaps, other mechanisms such as the amount of relevant information as suggested by Choi and colleagues (2003) could be a better mediator.

Limitations

The first two limitations involve sample demographics. Although the two national groups consisted mainly of students, the composition of the samples differs in potential confound such as age and gender compositions. Compared to the U.S. sample, the Malaysians were older. The present study did not find age to be related to holistic tendencies so there is no evidence of age confounded holistic tendencies. The Malaysian sample consisted of more males than females compared to the U.S. sample. However, no gender differences were

found in this study with holistic scores, when males were compared to females. There is no evidence of gender confounded holistic tendencies.

The sample of Malaysians students differed in several potentially important ways from population in Malaysia. Hence, care should be taken in generalizing the result to whole population of Malaysia. A more representative and larger sample might have provided a better estimate of Malaysians' cognition. While the composition of the Malaysians in this study limits the generalization of the results, it also means that using a Malaysian sample from Malaysia may enhance the difference between the national groups, as the Malaysian sample in the U.S. may be influenced by the Western culture.

The third limitation was related to the scenarios in this study. The presentation of dispositional and situational information may not represent how national groups seek information. In natural environments they might focus on their preferred kind of information. In this study, participants read information that they may not have naturally 'searched for'. Allowing participants to choose the types of information they can view instead of presenting all kinds of information may reflect natural tendencies in information management.

Implications

With the changing economy, understanding the cognitive differences of new and emerging nations is important. This study has several implications. First, this study suggested that the relationship between Hofstede's (1980) I-C and cognition may provide a powerful tool for understanding and improving international interaction. A consistent socio-cognitive conceptual link would allow organisations to use readily available data to predict the cognition of their international counterparts and structure their exchanges so that multinational interaction can be more predictable and effective.

Second, attention affects information selection and sensemaking. Holistic thinking can help when information expands or in complex contexts where both dispositional and situational information are essential. If holistic people need more information, this can limit their sensemaking when information is limited. Similarly, if analytic people are given more information than they would normally seek, it may alter their sensemaking, as shown in the U.S. participant situational attribution result of this study. This may mean that multinational teams can channel information appropriately to arrive at a common understanding (Lin, Klein, Radford, Choi, & Lien, 2007).

Third, different needs for information can influence the information management process for both kinds of thinkers. Holistic people may prefer an information management process that is rich with related or connected information whereas analytic people may prefer a focus and categorized information management process. In a multinational context, differences in AH thinking style can generate different goals in the kind of information different people seek. Understanding these nations' information needs may improve communication as well as collaboration.

Future Research

With the increased importance of emerging economies, there is a need to know about the cognitive differences of people from these nations. While this study found a relationship between I-C to AH thinking, further research should focus on systematically predicting a national group's analytic or holistic tendency using I-C. The next step to test this link would be to expand research to other nations and regions such as South Asia (i.e. India) and Middle East. This would provide information to the root of AH thinking.

Future research can improve on the paradigm by monitoring real time information search during sensemaking instead of presenting information to participants. This method would simulate how people actively search for information rather than passively attend to information. Monitoring information search would reveal differences in analytic and holistic thinkers' information need. Will analytic thinkers view one type of information first (i.e. dispositional) while holistic thinkers go back and forth between dispositional and situational information?

The real test of laboratory outcomes is the ability to predict real world behaviours (Dobbins, Lane, & Steiner, 1988). Future research could be undertaken in a naturalistic environment such as business organisations. Observations can be made of how managers search, manage, and use information while they are trying to make sense of an event. Managers' sensemaking can be compared with decisions and actions taken by them. AH thinking can also be measured to see if the results reported here would be replicated in an organisational setting.

CONCLUSION

Multinational collaborations are increasingly important as businesses are becoming more global. Also important is the understanding of how cognitive differences affect sensemaking. Knowing how these mechanisms function can further improve multinational interactions. As nations work together, cognitive differences can interfere with communication, planning, decision making and action. This study is a step towards understanding how cognitive differences, such as AH thinking, influence information management that is crucial for adapting and thriving in dynamic situations.

REFERENCES

- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality & Social Psychology*, 51, 1173–1182.
- Bhagat, R. S., Harveston, P. D., & Triandis, H. C. (2002). Cultural variations in the cross-border transfer of organisational knowledge: An integrative framework. *Academy of Management Review*, 27, 204–221.

- Chiu, C., Morris, M., Hong, Y., & Menon, T. (2000). Motivated cultural cognition: The impact of implicit cultural theories on dispositional attribution varies as a function of need for closure. *Journal of Personality and Social Psychology*, 78, 247–259.
- Choo, C. W. (1998a). *The Knowing Organisation: How organisations use information to construct meaning, create knowledge, and make decisions*. NY: Oxford University Press.
- Choo, C. W. (1998b). *Information Management for the Intelligent Organisation (2nd ed.)*. Medford, NJ: Information Today, Inc.
- Choi, I., Dalal, R., Kim-Prieto, C., & Park, H. (2003). Culture and judgement of causal relevance. *Journal of Personality and Social Psychology*, 84, 46–59.
- Choi, I., Koo, M., & Choi, J. (2007). Individual differences in analytic versus holistic thinking. *Personality and Social Psychology Bulletin*, 33, 691–705
- Choi, I., & Nisbett, R. E. (1998). Situational salience and cultural differences in the correspondence bias and actor-observer bias. *Personality and Social Psychology Bulletin*, 24, 949–960.
- Choi, I., Nisbett, R., & Norenzayan, A. (1999). Causal attribution across cultures: Variation and universality. *Psychological Bulletin*, 125, 47–63.
- Cohen, W. M., & Levinthal, D. A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly*, 35, 128–152.
- Davenport, T. H., & Prusak, L. (1998). *Working knowledge*. Boston: Harvard Business School Press.
- Dobbins, G. H., Lane, I. M., & Steiner, D. D. (1988). A note on the role of laboratory methodologies in applied behavioural research: Don't throw out the baby with the bath water. *Journal of Organisational Behaviour*, 9, 281–286.
- Fiske, S. T., & Taylor, S. E. (1984). *Social Cognition*. New York: Random House.
- Gilbert, D. T., Pelham, B. W., & Krull, D. S. (1988). On cognitive busyness: When person perceivers meet persons perceived. *Journal of Personality and Social Psychology*, 54, 733–740.
- Hansen, M. T., Nohria, N., & Tierney, T. (1999). What's your strategy for managing knowledge? *Harvard Business Review*, 77, 106–116.
- Heider, F. (1958). *The psychology of interpersonal relations*. NY: Wiley.
- Hong, Y.-Y., Morris, M. W., Chiu, C.-Y., & Veronica, B.-M. (2000). Multicultural minds: A dynamic constructivist approach to culture and cognition. *American Psychologist*, 55, 709–720.
- Hofstede, G. (1980). *Culture's consequences: International differences in work-related values*. Newbury Park, CA: Sage.
- Hofstede, G. (1997). *Cultures and organizations, Software of the mind: Intercultural cooperation and its importance for survival*. New York: McGraw Hill.

- Ji, L., Peng, K., & Nisbett, R. E. (2000). Culture, control, and perception of relationships in the environment. *Journal of Personality and Social Psychology*, 78, 943–955.
- Ji, L., Nisbett, R. E., & Su, Y. (2001). Culture, change, and prediction. *Psychological Science*, 12, 450–456.
- Jones, E. E., & Davis, K. E. (1965). From acts to disposition: The attribution process in person perception. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 2, pp 219–266). New York: Academic Press.
- Kelley, H. H. (1967). Attribution theory in social psychology. *Nebraska Symposium on Motivation*, 15, 192–238.
- Kitayama, S., Duffy, S., Kawamura, T. & Larsen, J.T. (2003). Perceiving an objects and its context in different cultures: A cultural look at New Look. *Psychological Science*, 14, 201–206.
- Klein, G., Phillips, J. K., Rall, E. L., & Peluso, D. A. (2007). A data/frame theory of sensemaking. In R.R. Hoffman (ed.), *Expertise Out of Context* (pp. 113–155). Mahwah, NJ: Lawrence Erlbaum Associates.
- Lin, M., Klein, H. A., Radford, M. H. R, Choi, I., & Lien, Y-W. (April, 2007). *Cultural differences in information relevance: Implications for multinational teamwork*. Poster presented at the 22nd Annual Conference of The Society for Industrial and Organizational Psychology, New York, NY, April 2007.
- Masuda, T., & Nisbett, R.E. (2001). Attending holistically versus analytically: Comparing the context sensitivity of Japanese and Americans. *Journal of Personality and Social Psychology*, 81, 922–934.
- Miller, J. G. (1984). Culture and the development of everyday social explanation. *Journal of Personality and Social Psychology*, 46, 961–978.
- Morris, M. W., Nisbett, R. E., & Peng, K. (1995). Causal attribution across domains and cultures. In D. Sperber, D. Premack, & A.J. Premack (Eds), *Causal cognition: A multidisciplinary debate* (pp. 577–614). Clarendon Press, Oxford.
- Morris, M. W., & Peng, K. (1994). Culture and cause. *Journal of Personality and Social Psychology*, 67, 949–971.
- Nisbett, R. E. (2003). *The geography of thought: How Asians and Westerners think differently...and why*. New York: The Free Press.
- Nisbett, R.E., Choi, I., Peng, K., & Norenzayan, A. (2001). Culture and system of thoughts: Holistic versus analytic cognition. *Psychological Review*, 108, 291–310.
- Norenzayan, A., Smith, E. E., Kim, B. J., & Nisbett, R. E. (2002). Cultural preferences for formal versus intuitive reasoning. *Cognitive Science*, 26, 653–684.
- O'Reilly, C. A. (1980). Individuals and information overload in organizations: is more necessarily better? *Academy of Management Journal*, 23, 684–696.

- O'Reilly, C. A. (1983). The use of information in organizational decision making: A model and some propositions. *Research in Organizational Behavior*, 5, 103–139.
- Peng, K., & Nisbett, R. (1999). Culture, dialectics, and reasoning about contradiction. *American Psychologist*, 54, 741–754.
- Ross, L., Amabile, T. M., & Steinmetz, J. L. (1977). Social roles, social control, and biases on social-perception processes, *Journal of Personality and Social Psychology*, 35, 485–494.
- Weick, K. E. (1995). *Sensemaking in organisations*. Thousand Oaks, CA: Sage Publications.
- Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (2005). Organizing and the process of sensemaking. *Organization Science*, 16, 409–421.
- Witkin, H. A., Lewis, H. B., Hertzman, M., Machover, K., Meissner, P. B., & Karp, S. A. (1954). *Personality through perception*. New York: Harper.