INFORMATION CRITICAL FOR SOCIAL WORK PRACTITIONERS IN THE DECISION MAKING PROCESS: AN EMPIRICAL STUDY OF IMPLICIT KNOWLEDGE USING NATURALISTIC DECISION MAKING PERSPECTIVE

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Kai-Shyang Hsu, M.S.W.

*****

The Ohio State University

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Dissertation Committee:
Professor Mo Yee Lee, Advisor
Professor Denise Bronson
Professor Tom Gregoire

Approved by

Advisor
Graduate Program in Social Work
ABSTRACT

Knowledge derives from practice, or practice wisdom, is as important as formal knowledge in the clinical decision making process of social work practitioners. A number of theoretical studies of clinical decision making recognize the importance of this implicit way of knowing but there is a lack of empirical research that examines how implicit knowledge affects clinical decision making in social work treatment. The purpose of this study is to examine the existence of implicit knowledge from a cognitive science perspective and explore how it influences the clinical decision making process in social work practice.

This study involves both deductive and inductive reasoning. Deductive reasoning derives a set of hypotheses from Naturalistic Decision Making (NDM) theory and uses experimental design to examine the relationships between implicit knowledge, experience and decision making. Inductive reasoning analyzes the participants’ retention, diagnosis, reasoning, and clarification of the case scenarios as well as in-depth interview and utilizes content analysis to explore the nature of clinical decision making process by comparing the differences between experienced and inexperienced practitioners. The validity of the study was established through face validity and content validity as well as the application of various experimental designs. The reliability of the study was established through inter-coder correlation (with $r = .96$ in Scenario A and with $r = .98$ in Scenario B) in retention coding and inter-coder agreement (with Kappa = .95) in interview coding. The
verification of the study was established through triangulation, member check, and peer examination. The suitability of the experiment instrument was established through fox index (with FI = 5.6 in Scenario A and FI = 4.4 in Scenario B).

Findings from deductive reasoning support the usage of implicit knowledge but do not support the assumption that experienced participants have a better understanding of the client’s situation than inexperienced practitioners. Findings from inductive reasoning conclude that making diagnosis is a continuing and ongoing process of understanding clients’ situation. Findings pertaining to the structure of information retained by research participants reflect how practitioners understand a case scenario and that practice knowledge can also be explained by a similar conceptual framework. It is not the content of the memory but the structure of practitioners’ memory that affects how they perceive a client’s situation. Implicit knowledge that helps practitioners to make a decision can be understood as a memory framework for organizing information.

The study presents a viable approach to study the use of implicit knowledge in social work practice. Findings are useful for developing a Decision Support System that can potentially help inexperienced practitioners formulate useful diagnoses based practice experiences of other social work practitioners.
Dedicated to My Family
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VITA

July 17, 1972............................................. Born – Taipei, Taiwan

1995...................................................... B.A. Social Work, Soochow University

1997...................................................... M.S.W. Social Work, Chi-Nan University

2002-2006.............................................. Graduate Assistant Associate, Research

Associate, The Ohio State University

2003...................................................... Professional Enhancement of Graduate

Studies Grant, Graduate School and College

of Social Work, The Ohio State University

2006...................................................... The Arthur Meier Schlesinger, Sr. Graduate

Tuition Fellowship, The Ohio State University

2006...................................................... The Merriss Cornell Distinguished Researcher

Award, College of Social Work, The Ohio

State University

PUBLICATION

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**FIELDS OF STUDY**

Major field: Social Work

Minor field: Research Methods in Human Resources Development
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CHAPTER 1

INTRODUCTION

Problem Statement

“We know more than we can tell.”

Michael Polanyi (1967: 4)

Studies have found that formal knowledge may not play as important a role in real-life decision-making as people have previously thought when analyzing the validity and reliability of practice judgment. Professionals utilize experience as well as (if not more than) formal knowledge to make their decisions (Bright, 1996; Simon, 1997) and there is much discussion about this phenomenon (e.g., Kondrat, 1992; DeRoos, 1990). Even though it is highly debatable whether experience could be the foundation of practice decision-making and whether it constitutes the professional knowledge in social work, the fact that the decision making process of social work practitioners is influenced by practice experience is without dispute (Gibbons & Gray, 2002).

Intuition, values, and common sense are factors other than experience that could influence the judgment of practitioners (Rosen, 1994; Simon, 1997). Polanyi has labeled this type of knowledge implicit knowledge (tacit knowing in his terminology), and has used formal knowledge (articulate knowledge in his terminology) to refer to the knowledge that can be described clearly in formal and systematic language. He
elucidated that there is a different style of knowledge besides formal knowledge that plays an important role in our daily life in areas such as skill performance and meaning assignment.

Research relating to implicit knowledge in the social work domain can be divided into two types. The first type is advocacy study, which includes (a) emphasizing the values of attitude, involvement, and reflection (e.g., Sellick, Delaney, & Brownlee, 2002); (b) proclaiming a new paradigm applying both formal knowledge and heuristic reasoning (e.g., Heineman-Pieper, Tyson, & Pieper, 2002); and (c) representing the voice of oppressed groups (e.g., Gowdy, 1994). The other type is empirical study, which includes (a) using in vivo research (typology) for heuristic reasoning (e.g., Murdach, 1995); (b) using qualitative analysis (classification) as the rationale for decision-making (e.g., Rosen, 1994); (c) using qualitative and quantitative methods (classification, chi-square test) to map the relationship between outcomes and interventions (e.g., Zeira & Rosen, 2000).

People use different terminology (e.g., practice wisdom, knowledge used in practice, tacit knowledge, heuristic reasoning, heuristic paradigm, reflective practice, and reflective thinking) which is indicative of a low level of consensus among social workers regarding the nature of implicit knowledge. Also, the use of qualitative methods shows the complexity of implicit knowledge. These are important and complex issues that worthy of study.

Purpose of the Study

Rather than discussing the comprehensive content of implicit knowledge, the purpose of this study is to explore a potential method for identifying the usage of implicit
knowledge in social work practice. Facing the ongoing difficulty of researching implicit knowledge, this study suggests an experimental method to ascertain the existence of implicit knowledge, for it is only after the existence of implicit knowledge is assured that we can further discuss its content. This research will examine the effectiveness of using a Naturalistic Decision Making (NDM) (Zsambok & Klein, 1997) perspective in social work practice to explore the existence of implicit knowledge and examine how implicit knowledge affects the decision making process in social work practice.

NDM studies how people actually make decisions in their natural environment from a cognitive science standpoint. Compared to the traditional research approach, NDM assumes a different attitude towards the premise of environment settings. Unlike the traditional research approach, NDM does not assume that the environment is static, has sufficient time, is value-free and has clear goals; it assumes that the decision making environment is always dynamic, time pressured, value-based and contains ambiguous goals (Zsambok & Klein, 1997), which is more like the settings where social workers practice. It would be appropriate to describe the decision making process used by practitioners by applying the NDM perspective.

Two important concepts of NDM, the Recognition-Primed Decision (RPD) model (Klein, 1997) and the Situation Awareness (SA) (Endsley, 2000), will be used to explain the concept of decision making in social work practice. RPD model explains why practitioners can make judgments rapidly, and SA clarifies how practitioners can perceive the situation and reach a decision rapidly. This research will utilize empirical data collected from the experiment to explore how appropriate the adaptation from NDM is. In order to do so, this study will (a) examine the hypothesis that experience is a major factor
in processing information received and making decisions in the time constraint situations in social work practice; (b) compare the differences of retention and decision between experienced social work practitioners and inexperienced practitioners after participants read case records in various time constraints; and (c) discuss the potential content of implicit knowledge. Information critical for implicit knowledge will be examined via content analysis and this will provide suggestions for future research. To conclude, the purpose of the research is to (a) examine that the role of implicit knowledge in the decision-making process by social work practice, (b) explore the relationship between implicit knowledge and experience, and (c) examine the possible content of social work implicit knowledge.

Readers might note that this study avoids giving definition for implicit knowledge in the very beginning, but might wonder how implicit knowledge can be examined without a clear definition. Owing to a lack of a consensus of opinion, this study suggests starting from scratch. First, knowledge presentation must be based on information. In general, people have two different perspectives of defining knowledge. One perspective is that knowledge is a kind of information people retain. Another perspective is that knowledge is the ability to utilize information. Knowledge is strongly related to information in both definitions. Secondly, information selection can be reflected by memory and different people may perceive different information under the same environment. Even people perceiving the same information may generate different understandings. However, since individuals must make decisions based on what they can remember, the information practitioners use to make useful decision can therefore be identified. Thirdly, implicit memory should be the best indicator of studying implicit knowledge. Since the
knowledge presentation is based on information and information can be reflected by memory, studying the retention of memory should be the best approach to exploring the composition of knowledge. At the same time, although implicit knowledge might be explained by information offered by explicit memory, implicit memory is more related to implicit knowledge and has more common characteristics.

The following clarifies the position of the researcher in conducting this study: Firstly, although this research focuses on implicit knowledge, it does not intend to degrade the importance of explicit knowledge. Secondly, the method applied in this research is only one of the various methods used to investigate implicit knowledge. Accordingly, the content depicted in this research is only one of the various dimensions to describe implicit knowledge. Thus, this study does not intend to generalize different opinions by different interpreters. Finally, this research is an exploratory study. The definitions of implicit and explicit knowledge are descriptive concepts, and do not necessarily refer to the existence of two independent knowledge systems (Schacter, 1987).

Outline

Chapter 2 first introduces terminology and concepts of cognitive science, presents the theory background of this study, Naturalistic Decision Making (NDM,) an explanation of how experts can reach their conclusions without deliberately thinking; discuss on existing literature about social work practice knowledge; and illustrate several relevant ideas of how to make social work practice knowledge measurable. This study heavily relies on knowledge of cognitive science from theory adaptation and study rationale to experiment design.
Based on the foundation of the literature review, Chapter 3 proposes a research design that has the potential to examine the existence of implicit knowledge as well as to explore the content of implicit knowledge. It was written in the format of an experimental design and explicates the study rationale. It is worth reminding the reader once again that this study was an exploratory study. Although the experimental design format was used, it was used for better validity and was unnecessary for explanatory study.

Chapter 4 reports the demographic information of the participants and the experiment results. Various indicators are used to assess how well the participants understand the situation. Differences between the inexperienced group and the experienced group are compared. Chapter 5 reports the findings of descriptive analysis. Content analysis will be used to process participants’ retention, diagnosis, intervention, clarification, and reasoning. Both the semi-structure interview and the in-depth interview provide more information in how they reach their understanding and decision. Finally, Chapter 6 summarizes key issues discussed in the study. Limitations and suggestions are provided for future research.

The study has the potential to make useful contributions to social work practice knowledge and clinical decision-making process. Implicit knowledge social work literature discussed mostly on a philosophic level. An empirical study of implicit knowledge will bring a new perspective and provide ideas regarding how social work practice knowledge is constituted. The information practitioners use for decision making depicts their process of understanding a client situation. The key information that can help practitioners make a diagnosis can be highlighted in the future decision support system (DSS) thus making clinical decision making more accessible.
CHAPTER 2
LITERATURE REVIEW

This chapter discusses literature associated with the decision making process of social work practitioners. The first part of this chapter describes the conceptual framework of cognitive science, including the process of how an individual perceives and processes information as well as the relationships between information, memory and knowledge. The second part of this chapter presents the theory background of Naturalistic Decision Making (NDM) (Zsambok & Klein, 1997). In the discussion, I describe the limitations of rationality in the human decision making process, and introduce two models that are most relevant to social work—Recognition-Primed Decision (RPD) Model (Klein, 1997) and Situation Awareness (SA) (Endsley, 2000). The third part of this chapter covers the literature on social work knowledge primarily focusing on social work practice knowledge. Due to a lack of literature regarding measuring practice knowledge in social work, I describe several studies in cognitive science that provide ideas of constructing a research design for measuring social work practice knowledge.

Framework

Cognitive science studies the acquisition and usage of knowledge, which relates to perception, thought, and memory (Bruning, Schraw, & Ronning, 1999). Cognitive study mainly focuses on mental structure and mental processes. Studies of mental structure
discuss the storage and content of knowledge, while studies of mental process discuss the usage of knowledge. Although each of them have a different focus, a study without overlapping is nearly impossible since cognition is a comprehensive process. In this section, the discussion focuses more on mental processes owing to the research question.

*The Information Processing Model*

The information processing model is the framework of cognitive psychology. Three stages of memory system—sensory storage (SS), short term memory (STM) and long term memory (LTM)—and three phases of memory process—encoding, storage and retrieval—can explain its functionality (Bruning, Schraw, & Ronning, 1999). (See Figure 2.1.)

![Information Processing Model Diagram]

*Figure 2.1. The Information Processing Model.*

Sensory Storage (SS): Sensory memory refers to the ability to retain impressions from a stimulus. Usually, SS can retain the impression for half of a second to a second. This is the first step to processing information. The stimulus must be high enough to be perceived by the individual. Information not perceived will decay quickly and individuals will start encoding after they receive information. In sensory storage, the coding mainly relies on iconic storage and echoic storage which is formed automatically without any attention or interpretation (Solso, 2001).

Short Term Memory (STM): If the information in SS does not decay or is misplaced, it will be delivered to STM. Information in STM can last for a few seconds (roughly 15 to 30 seconds), and rehearsal is required if individual wants to maintain information longer than that (Peterson & Peterson, 1988; as cited in Reed, 1988). Information in STM is processed consciously by the individual. STM can contain around seven (plus or minus two) memory units, or chunks. Each chunk contains an item or a set of items (Miller, 1951). In STM, the coding mainly relies on semantic, acoustic and visual coding. Baddeley & Hitch (1974, as cited in Baddeley, 1986) proposed the concept of working memory (WM), arguing that the function of this memory is not only storage but also information processing. For example, working memory offers space for tasks like language comprehension and inference to operate.

Long Term Memory (LTM): Information transferred from STM will be stored in LTM. Information in LTM can last for more than one minute and can be retained up to several years. Theoretically, the capacity of LTM is unlimited and information is restored systematically.
Figure 2.1 presents a diagram of the information processing model which illustrates how information is sensed from SS, transferred to STM/WM for encoding, and stored systematically in LTM. Also, it represents how information is retrieved from LTM to STM/WM when individuals need old information. However, such an explanation is too simplistic for illustrating the cognitive process in an individual. There are several details that might affect how an individual perceives information. For example, individuals must pay attention to information after receiving a stimulus. Then, pattern recognition is required to distinguish the meaning and nature of the information. Following that, selection will be applied to the information and only the chosen information will enter the STM for further processing. At the same time, WM seems to be able to learn experience from knowledge already acquired. WM does not receive information from SS passively but has the ability to direct the selection of information (Logie, 1999; as cited in Gray, 2002).

The Modal Model of the Mind (Waugh & Norman, 1965; Atkinson & Shiffrin, 1968; as cited in Gray, 2002) proposed by Waugh & Norman has a more specific explanation of this process (see Figure 2.2). Limited by the study interest, only a few important concepts will be reviewed in the next section. However, the disadvantages of the modal model require the multiple memory system to be discussed in order to illustrate how a mental task is accomplished (Gray, 2002).
**Figure 2.2. Modal Model of the Mind.**


**Attention, Pattern Recognition, and Selection**

*Attention*

As mentioned above, sensory storage can receive unlimited information, while the processing ability of STM is limited. Therefore, how attention is allocated will affect an individual’s perception. There are two types of theories relating to attention: bottleneck theories and capacity theories (Best, 1999). Bottleneck theories describe attention as a filter which only lets very limited information pass through (see Table 2.1). Capacity theories describe attention as a limited mental resource which is consumable (see Table 2.2).
### Theory Description

<table>
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<td>Filter Theory (Broadbent, 1959)</td>
<td>Attention acts as a filter. Information irrelevant to the current task will not get processed.</td>
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<tr>
<td>Attenuation Theory (Treisman, 1960)</td>
<td>Attention acts as a filter. Information irrelevant to the current task will be weakened instead of filtered out.</td>
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<tr>
<td>Late-Selection Theory (Deutsch &amp; Deutsch, 1963)</td>
<td>Conscious selection takes place after information is processed at a certain basic level.</td>
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Table 2.1 Bottleneck Theories

Theory Description

Capacity model (Kahneman, 1973)

Ability to do mental work is limited, difficult tasks need more resources than easy ones, but individuals have certain control over how to allocate their mental capacity.

Multimode Theory (Johnston & Heinz, 1978)

Combine bottleneck theories and capacity theory. Attention is a flexible system and individuals have the ability to allocate the filter. Late-selection costs more capacity than early filter.

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<td>1978)</td>
<td>selection costs more capacity than early filter.</td>
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Table 2.2 Capacity Theory & Multimode Theory


Capacity theory highlights the fact that attention is limited (Just & Carpenter, 1987; as cited in Bruning, Schraw & Ronning, 1999), and bottleneck theories illustrate the fact that pattern recognition, selection, and attention cannot be discussed separately. Whether recognition takes place before or after filtering still is a point of contention between the two theories.

*Pattern Recognition*

Individuals will automatically assign meaning once a stimulus is received. This process takes place quickly and is not easy to be conscious. According to Marr (1985; as cit
cited in Bruning, Schraw & Ronning, 1999), an individual’s background knowledge and the context of the environment has a larger influence on the assigned meaning than the nature of the stimulus.

Pattern recognition is the process where individuals identify a stimulus from its environment. When stimuli enter the sensory storage (SS), an individual seldom perceives these stimuli separately. Instead, people will refer to their memories, group together relevant information, and assign a meaning to the stimuli (Goldstein, 1988; as cited in Bruning, Schraw, & Ronning, 1999). That is to say, the perception of events and the ability of awareness will be influenced by the knowledge people have previously acquired. Although there are some arguments over the recognizing process, many researchers suggest it can be explained using templates, prototypes, feature analysis, and structural descriptions (Gibson & Spelke, 1983; as cited in Bruning, Schraw, & Ronning, 1999).

Selection

After a stimulus is transformed into meaningful information through pattern recognition, an individual still must decide which information should enter into working memory for further processing. Not all recognized information is beneficial for the individual at that moment, and the individual must consciously select information which is useful for the current task and transfer it to the precious STM space.

Note that the process of attention, pattern recognition, and selection is not merely transferring information passively from the bottom-up. The individual can also decide which information is needed for the task and select information actively from the
top-down (Best, 1999). More importantly, how individuals perceive information is based on previous knowledge. Experiences about previous tasks directly affect to what degree individuals are aware of the information next time.

Retrieval

Besides encoding and storage, information retrieval is also an important area in cognitive science. Retrieval refers to acquiring information from LTM, but information stored in LTM does not guarantee its accessibility. When people claim they forget, first, it might be due to an encoding error; information did not enter into LTM at all. Secondly, it might have been caused by a storage error; information decays in LTM. Finally, it might be because of a retrieval error; information is still stored in LTM but individual cannot locate it. Because of the varying causes why people forget, retrieval research is difficult to study. There are three theories that explain the reason people will forget: decay theories, interference theories, and retrieval cue theories (Reed, 1988). (See Table 2.3.)
Decay theories    Memory will decay through time. Retrieval ability decreases once information is encoded.

Interference theories   Forgetting is not only caused by time, but also by the competition between different memories; new and old memories will interfere with each other.

Retrieval cue theory   Information retrieval mainly relies on cues. Forgetting due to usage of inappropriate cues.

Table 2.3 Retrieval Failure Theories


Among the three theories, the retrieval cue theory contains the most relevant reflection on the understanding of memory. The encoding specificity principle (ESP) suggests that information retrieval can be best achieved when it is matched with the original manner of encoding (Tulving & Osler, 1968; as cited in Bruning, Schraw, & Ronning, 1999). This not only relates to the method of encoding, but also to the environment (context-dependent effects) and the individual’s physical or mental situation (state-dependent effects). Similar situations can increase the possibility of retrieving information.
The other concept similar to ESP, transfer-appropriate processing (TAP), comes from the dissonant results caused by different measurement methods. The original emphasis on measurement should be consistent with the testament goal (Morris, Bransford and Franks, 1977; as cited in Best, 1999) which means that the retrieval method should be consistent with the encoding methods. Research design that utilizes a different manner of measurement might jeopardize the outcome of study. Moreover, this concept leads to later discussion about the possibility of different memories.

For example, Warrington & Weiskrantz (1970; as cited in Roediger, 1990) found that people with Amnesia perform worse in recall and recognition tests (explicit tests as they are known today) than normal people, while in word-fragment identification and word-stem completion (implicit tests as they are known today) have no significant difference (Roediger, 1990). The existence of TAP seems to imply human brains have different memory processes for different information.

Multiple Memory System

Many researchers propose the possibility of different memory systems in the human brain. Although they might use different names and hierarchies, most researchers agree that memory can be divided into explicit memory (declarative memory) and implicit memory (non-declarative memory, also known as procedural memory). (See Figure 2.3 & Table 2.4.) Traditional researchers focus more on explicit memory, which can be explained by the modal model of the mind. People took interest in implicit memory only after studies on Amnesia, which brought new viewpoints about human memory in the field of cognitive science.
Figure 2.3. Multiple Memory System.

Memory Description

Explicit Memory Memory involving conscious recollection or encoding
Implicit Memory Memory involving unconscious recollection or encoding
Declarative Memory Memory (“knowing that” memory). Related to explicit memory.
Procedural Memory “Knowing how” memory. Related to implicit memory.
Semantic Memory Type of memory not associated with specific events or episodes. Memory of facts.
Episodic Memory A type of memory associated with “time stamped” events and episodes, e.g., autobiographical memory.

Table 2.4 Comparison between different memory systems


Encoding process of implicit memory is difficult to study directly due to lack of awareness. Although the retrieval process can be identified by performance, trying to describe the meaning of an action involves the variation of decoding and translation. Normally the acquisition of implicit memory is by repetition of practice. The existence of implicit memory can be demonstrated if one repeats a previous performance in a situation similar to the original situation.
Generally speaking, most things that are considered as knowledge to people should be classified in declarative memory, especially in semantic memory. Many of the methods used to examine knowledge like the recall test also use the declarative memory. Being aware of this phenomenon, this study wishes to discuss the question regarding what knowledge is. More precisely, what is social work knowledge? This question will be explored later in section three. First, the following section will describe the application of cognitive science in recent years.

Theory Background

Besides exploring human perception, cognitive science also emphasizes the application of knowledge—how people make decisions based on information they acquire. This domain can be divided into the normative model of decision making and the descriptive model of decision making. The normative model describes how rational people make decisions in certain situations, while the descriptive model explores how people make decisions in real life. This study focuses on the descriptive model because the primary objective is to understand practitioners’ decision making process. This chapter also discusses the limitations of normative model.

Rational Choice Strategy and Bounded Rationality

Rational Choice Strategy

Although it may have some differences regarding the methods of selection, traditionally, the decision making theory hypothesizes that the decision-maker is a rational person. Expected value (EV) was frequently used as decision criteria. The
rationale of the model is (a) transforming each decision or elements within a decision into values; (b) calculating the sum value of each decision; and (c) choosing the largest sum. Earlier studies use money as value unit but were quickly met with challenges. For example, according to the “St. Petersburg Paradox” proposed by Nicolas Bernoulli (1713; cite from Plous, 1993:79), although the expected value may be unlimited in theory, few people want to spend more than a few dollars on this game.1

Daniel Bernoulli (1738, cite from Plous, 1993:80) provided an explanation of this and it became the seeds of the noted expected utility theory. He suggested that the problem is the value of money, which has different utility to people with different wealth. The utility of money declines as people get richer (see Figure 2.4). This viewpoint made latter studies use expected utility (EU), a psychological reward unit, to evaluate the utility of each alternative choice. At the same time, it became the cornerstone of contemporary economic theory.

1 St. Petersburg Paradox is a game with following two rules: (1) An unbiased coin is tossed until it lands on Tails, and (2) the player is paid two dollars if Tails comes up on the opening toss, four dollars if Tails first appears on the second toss, eight dollars if Tails first appears on the third toss, and so forth. Bernoulli is interested in how much money people would pay to play this game. Most people are willing to pay no more than a few dollars to play this game although the expected value (EV) in this game is infinite. The expect value (EV) of this game can be presented as the following equation: (Plous, 1993: 79)
EV(game) = (1/2)($2) + (1/4)($4) + (1/8)($8) + ...... + (1/2)^k($2)^k
= $1 + $1 + $1 + ...... + $1
= an infinite amount of money
The expected utility theory proposed by Von Neumann & Morgenstern (1947; as cited in Plous, 1993) is a normative theory, which means it does not intend to describe how people make decisions in reality. Instead, it illustrates what decisions people should make based on the premise of rational choice. The ability to make a list of considerable information and offer an equation as a solution is the advantage of the normative theory. Using expected utility theory as an example, one first determines the utility of the money or reward to the individual. Then, one uses equations to calculate the expected reward of each alternative selection. Finally, one offers a price or makes a decision according to the expected utility. The disadvantage of normative theory, according to supporters of descriptive theory, is assuming that people are always rational when making a decision.

Bounded Rationality

It is easy to understand why most researchers assume people make decisions rationally. Usually people expect themselves to be rational. However, the “rational”
emphasized by rational choice theory has higher standards than people thought. Rational choice theory usually hypothesize that decision makers know all information that will influence decision making, including the probability of each selection, the possible result, the expectable reward, the ability to list influential factors, having time and ability to calculate reward and payment, and having the ability to select the highest utility rationally (Plous, 1993; Frantz, 2003). Obviously, this assumption is hard to achieve in the real world.

Herbert Simon (1956) challenged this assumption and won a Nobel Prize. He led economics, psychology, cognitive science, and decision making study down a new path. He argued that people do not pursue maximum utility nor optimize it when making a decision, but reach a satisfying level. He named this concept satisficing, arguing that an individual in real life is not an economic person (EP) as Adam Smith proposed. People will not have sufficient information, nor will they collect and compare information as much as possible. For most people, they usually just pick up several important criteria and estimate the result. Once an option reaches a satisfying level, satisficing, they will make a choice and stop comparing other possible options.

Although Simon disagreed with the assumptions of rational choice theory, he did not suggest that people are irrational. Instead, he used bounded rationality to describe the characteristics of the decision maker. Contrasted with EP, the environment a bounded rational person (BRP) faced is intricate and information is limited. They do not have excellent computation abilities either. Facing the various possibilities and unable to verify each option, the best strategy BRP can have is to find a satisfactory solution (Frantz, 2003).
Besides the insight of bounded rationality, the other contribution is the affirmation of intuition. In his early study of decision making, Simon already confirmed the value of experience and habit in decision making. He maintained that whether people are in conscious or subconscious, decision makers identify cues from information based on their previous experiences or habits. These cues can enhance their understanding of the situation and improve the ability of decision making (Simon, 1965; Frantz, 2003). At the same time, experience and habit can produce a similar reaction by similar stimulants without conscious thinking. This might utilize exiguous calculating ability more efficiently. In his later study, Simon plainly attributed this improving phenomenon to intuition (Simon, 1997; Frantz, 2003).

Simon elucidated on the importance of intuition in decision making. In contrast with public opinion, he maintained that intuition is a kind of subconscious pattern recognition instead of an irrational bias. More specifically, intuition is a kind of analytical reasoning that manifests itself in habit and rapid reaction by identifying similar situations and acting upon them based on previous patterns. In his understanding, intuition, along with analysis, is an indispensable element to decision making. Simon pointed out that restricted by human cognitive ability, more than 99% of the information was filtered out before arriving in our consciousness (Frantz, 2003). Human behavior was restricted to satisficing behavior. In order to improve the situation with regards to the lack of information and to enhance the allocation of restricted cognitive resources, it is crucial to utilize intuition in the decision making process.

Under the influence of Simon, some researchers take interest in decision making in real life and the potential of implicit knowledge utilization. Naturalistic decision making
(NDM) is one of them. NDM, as explained by the name, explores how people make decisions in real environments. It focused on how experienced people are able to make good decisions in context-rich environments and develop feasible suggestions from their observations. In the NDM conference in 1989, they claimed that their areas of interest were contexts with: (Orasanu & Connolly, 1993; as cited in Zsambok & Klein, 1997:5)

1. Ill-structured problems (not artificial, well-structured problems).
2. Uncertain, dynamic environments (not static, simulated situations).
3. Shifting, ill-defined, or competing goals (not clear and stable goals).
4. Action/feedback loops (not one-shot decisions).
5. Time stress (as opposed to ample time for tasks).
6. High stakes (not situations devoid of true consequences for the decision maker).
7. Multiple players (as opposed to individual decision making).
8. Organizational goals and norms (as opposed to decision making in a vacuum).

The contextual factors NDM identified are similar to the environment social work practitioners face. Although there is not any research related to social work practitioners, adopting the concept and research method of NDM may provide insights for social work. NDM relates to different concepts and research. Specific theories that are most relevant to social work, Recognition-Primed Decision Model and Situation Awareness, will be discussed in the following sections.

**Recognition-Primed Decision Model**

The recognition-primed decision (RPD) model was proposed by Klein in 1985 (Klein, Calderwood, & Clinton-Cirocco, 1985; as cited in Klein, 1997). “The function of
the RPD model is to describe how people can use their experience to arrive at good
decisions without having to compare the strengths and weaknesses of alternative courses
of action” (Zsambok & Klein, 1997:287). Traditionally people assume a naïve worker
will try the first option in their mind, while an experienced worker will consider various
possibilities and pick the best option. However, Klein realized the situation is exactly the
opposite when he conducted his study. Experienced workers will start from the first
option in their mind and the naïve worker needs to compare various options (1998). The
participants he studied did not consider courses of action carefully or were unable to
decide in a two-option strategy. Klein was confused by this observation and proposed two
questions: (a) How could these experts make good decision consistently if they do not
compare the advantage and disadvantage in each possibility, and (b) how could
evaluation proceed if there is no comparison?

After careful data analysis, Klein concludes, it is not because they do not want to use
comparison strategy. It is because they only have one option. Therefore he proposed the
RPD model to illustrate this process. RPD model consists of two processes: how a
decision maker identifies the action and how to use imagination to evaluate action. First,
decision makers will recognize whether or not the situation is typical. At the same time,
they will know what goals are appropriate, what cues are more important, what situations
will be present in next step, and what typical actions can be used to react to the situation.
Therefore, they know the action to be taken (see Figure 2.5). He emphasized the priority of
recognition, which means that the recognition process, including expectancies, relevant
cues, plausible goals and typical action, is a unit. The decision maker did not understand
the situation from any part of them, but from the whole of them (Klein, 1998).
Diagnose the Situation

Figure 2.5. Recognition-Primed Decision Model.


This perspective is similar to Simon’s insight. Simon (1987) emphasized the importance of intuition, a kind of pattern-recognition, in decision making, and this was explicated by Klein more specifically. Klein (1997) argued that when experiencing a situation, an individual can recognize if it is typical from various data, such as goals, cues, expectancies, and actions; meanwhile, the person can generate a course of action matching with the typical situation. This explains the first question above: they do not compare the advantage and disadvantage in each possibility is because they only have
one option. As for the second question, a simple answer was given by Klein: it is because of experience. Experts can utilize experience efficiently because of the recognizing ability. Although he also offers a concept like story telling to supply the model of how to retrieve experience, situation awareness (SA) has a more detailed explanation.

**Situation Awareness**

The situation awareness (SA) proposed by Endsley in 1988 (Zsambok & Klein, 1997) describes the requirement of effective task performing. SA refers to “an internal conceptualization of the current situation,” including “the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning and the projection of their status in the near future” (Zsambok & Klein, 1997, p.270-271). (See Table 2.5 Three level of SA.)

<table>
<thead>
<tr>
<th>Theory</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 SA</td>
<td><strong>Perception of the Elements in the Environment</strong></td>
</tr>
<tr>
<td></td>
<td>The first step in achieving SA is to perceive the status, attribute and the dynamics of the relevant elements in the environment.</td>
</tr>
</tbody>
</table>

Table 2.5 Three level of SA
Table 2.5 (continued).

<table>
<thead>
<tr>
<th>Theory</th>
<th>Description</th>
</tr>
</thead>
</table>
| Level 2 SA| **Comprehension of the current situation**  
Comprehension of the situation is based on a synthesis of disjointed level 1 elements. Level 2 goes beyond simply being aware of the elements which are present, to include an understanding of the significance of those element in light of one's goals. The decision maker puts level 1 data together to form a holistic picture of the environment, including a comprehension of the significance of objects and events. |
| Level 3 SA| **Project of future status**  
Performers will have ability to project the future actions of the elements in the environment, at least in the very near term, that forms the third and highest level of situation awareness. This is achieved through knowledge of the status and dynamic of the elements and a comprehension of the situation. This gives them the knowledge and time necessary to decide on the most favorable course of action to meet their objectives. |

Besides giving a detailed description of SA, Endsley also explained the role of SA in the decision-making process and other important decision making factors systematically (see Figure 2.6). Several of these characteristics together with previous cognitive science concepts are discussed in the Table 2.6.

**Figure 2.6.** Model of Situation Awareness.

Individuals need to direct one’s attention when perceiving situations and use resources in working memory when processing information, especially in dynamic environments or while doing complicated tasks. Since attention and working memory are very limited, good performance in dynamic environments relies on other mental mechanisms.

An experienced decision maker can utilize schemata or mental models in LTM to bypass the limit of processing complicated information. These mechanisms integrate information as a unit and project future actions in the environment. It is worth noticing that these mechanisms do not need to be activated by identical information since humans have very good categorization mapping abilities—abilities that best fit the characteristics of the situation to characteristics of known categories. Even if the environment did not offer complete information, the decision-maker can refer to schema in LTM and use minimum attention to make the best decision. That is to say, the decision maker will use pattern matching to refer to schema in LTM according to the critical cues observed from environment. A good LTM store will have

<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited Attention and Working Memory</td>
<td>Individuals need to direct one’s attention when perceiving situations and use resources in working memory when processing information, especially in dynamic environments or while doing complicated tasks. Since attention and working memory are very limited, good performance in dynamic environments relies on other mental mechanisms.</td>
</tr>
<tr>
<td>Mental Models and Schemata</td>
<td>An experienced decision maker can utilize schemata or mental models in LTM to bypass the limit of processing complicated information. These mechanisms integrate information as a unit and project future actions in the environment. It is worth noticing that these mechanisms do not need to be activated by identical information since humans have very good categorization mapping abilities—abilities that best fit the characteristics of the situation to characteristics of known categories. Even if the environment did not offer complete information, the decision-maker can refer to schema in LTM and use minimum attention to make the best decision. That is to say, the decision maker will use pattern matching to refer to schema in LTM according to the critical cues observed from environment. A good LTM store will have</td>
</tr>
</tbody>
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Table 2.6 Cognitive science concepts related to Situation Awareness
Table 2.6 (continued)

<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Automatic Action Selection</td>
<td>The process—decision makers utilize important cues from the environment and activate a serial movement, including applying pattern matching, utilizing schema in LTM, and adopting corresponding action—can be called “automatic action selection”. As mentioned above, applying automatic action selection can decrease the requirement of attention or working memory while maintaining good performance. However, applying automatic action selection usually represents a potential crisis: individuals cannot accurately report how mental models were operated and cannot explain what environment cues were used. Therefore, individuals might miss novel information from the environment, which causes them to make a wrong decision.</td>
</tr>
<tr>
<td>Data-Driven and Goal-Driven Processing</td>
<td>There are two ways of information processing: data-driven processing and goal-driven processing. In data-driven processing, information is processed through sensory stores (SS) and provides cues for further attention. In addition, people can use goal-driven processing</td>
</tr>
</tbody>
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Continued
Table 2.6 (continued)

<table>
<thead>
<tr>
<th>Concept</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectations and Dynamic Goal Selection</td>
<td>processing to manipulate information. Based on existing goals and expectations, information perceiving and encoding is different when individuals receive the information. That is to say, individuals have more possibilities to be aware of information they want to acquire.</td>
</tr>
</tbody>
</table>

In reality, two types of information processing interchange continuously. Individuals need to discover new awareness models, evaluate goals, and modify expectations. At the same time, goals and expectations will direct how individuals perceive information and locate awareness. Correct expectation can accelerate the speed and accuracy of information perception and processing; on the contrary, wrong expectation might lead to biased observations and decelerate information processing. Situated in a dynamic environment, it is an ongoing process to modify goals according to information perceived and change the allocation of attention to acquire more effective information. Therefore, adopting static goals or processing information directionally is not a good strategy in understanding situations.

The concept automatic action selection proposed by Endsley (1997) is similar to the RPD model proposed by Klein (1998). In Endsley’s terminology, a script will be generated and applied to actions when a prototypical situation is encountered. Nevertheless, Endsley noticed the problem of automaticity (see Figure 2.7). He restated that although automaticity can help us reduce the usage of SA so that we can have better performance in a familiar environment with low attention, it might decrease the possibility of receiving novel information. Too much dependence on automaticity will impair one’s ability of responding to new information from the environment. A lower SA will decrease the effectiveness and appropriateness of the decision making (Endsley & Garland, 2000:22; Endsley, 1997:279).

![Figure 2.7. Automaticity in Cognitive Processes.](image)

*Figure 2.7. Automaticity in Cognitive Processes.*


The decision making process described by Simon, Klein, and Endsley explains how experience might influence people’s understanding of a situation. The cues and patterns from information can help decision makers recognize the situation and generate a course
of action. The question is if social work practice can benefit by this viewpoint. In the section that follows, social work knowledge will be reviewed to examine if NDM can provide a new perspective.

Social Work Practice Knowledge

What is social work knowledge?

“According to the Standards for the Classification of Social Work Practice, social work requires knowledge in some or all of the following areas: social casework and group work theory and techniques; community resources and services;.....social welfare trends and policies; and local, state, and federal laws and regulations affecting social and health services.” (The Social Work Dictionary, 1999)

The Nature of Social Work Knowledge

While this kind of definition seems clear, it actually leaves a lot of space for debate. For example, it did not explain the nature of knowledge. Giving the definition by enumerating categories does not answer the question about which kind of information qualifies as knowledge. Strictly speaking, it only refers to the category of social work practice but does not answer the fundamental questions about knowledge itself. On the other hand, the nature of knowledge might be illustrated from some opposing argumentation such as Gomory (2001a; 2001b) and Thyer (2001a; 2001b); and Heineman-pieper, Tyson, & Pieper (2002) and Bolland & Atherton (2002).

Kondrat (1992) gives a good demonstration of how to manipulate the debate on the nature of social work knowledge. She invokes Habermas’s (1971) concept that different domains of human interest will generate different forms of knowledge, and transforms the
question from the nature of knowledge into tendencies of different human interest. From this perspective, the debate arises from a loose definition of human interest.

Habermas is one of the foremost social thinkers in the critical theory tradition. According to his observations, modern society is the product of scientific paradigms. The language and signs are the generation of logical empiricism. In this environment, the meaning and the value of the living world is decreasing. His solution is communicative action, based on the foundation of intersubjectivity, reviewing the relationship between subject and object.

Whether or not to allow the possibility of subjective understanding creates the debate about social work knowledge. Scholars close to logical empiricism emphasize that knowledge should be the truth that can be identified by scientific method, while scholars on the other side emphasize the importance of subjective experience, which means knowledge might change through people. For example, Gambrill (1997) suggested knowledge should be able to be examined and falsified. Tradition, experience, authority, popularity and numbers, what make sense, emotional appeals, case examples and intuition might be questionable.

Other scholars have a higher tolerance of different ways of knowing, and use a different name to describe its profuse character, such as practice wisdom (Scott, 1990), participating consciousness (Gowdy, 1994), reflective and dialogic engagement (Sellick, Delaney, and Brownlee, 2002), and tacit knowledge (Zeira, & Rosen, 2000).

Following this perspective, if the argument comes from the loose definition of human interest, should there be a conclusion if the research domain is well defined? For example, what is social work practice knowledge? As noticed by Kondrat (1992), the
problem is not a matter of the quantity or quality of information, nor is the observation
made by the insider or outsider. The concern is that people have different cognitive
interests. For a researcher, social work practice is a phenomenon to be investigated; but
for a practitioner it is a lived experience they face everyday.

The discussion can be continued further, but it still has to face a dilemma: if the
debate is caused by different perspectives, although it seems to quell the fire, it does not
give us a better understanding about social work knowledge unless two groups of people
can show that their viewpoint is more appropriate than the others in a certain domain.

Many scholars began their discussion about the characteristic of practice knowledge
under this understanding. However, they encountered similar questions: (a) It is hard to
explain what practice knowledge is; (b) it is hard to explain where they learned practice
knowledge; and (c) it is hard to explain how they apply practice knowledge. These
characteristics cause the difficulty in researching practice but also bring new research
perspectives and methods.

Social Work Practice Knowledge

Social work practice knowledge, though it can be explained as knowledge used in
practice (e.g., Rosen, 1994), more commonly refers to a kind of knowledge that is
different from formal knowledge such as research-based knowledge and theory (e.g.,
Gowdy, 1994; Murdach, 1995; Klein, & Bloom; 1995; Heineman-pieper et al., 2002;
Sellick et al., 2002). Previous studies in this field do not have a consensus of opinion.
Different people used different terminology (e.g., practice wisdom, knowledge used in
practice, tacit knowledge, heuristic reasoning, heuristic paradigm, reflective practice, and
reflective thinking) to emphasize their focus—a knowledge system, a knowing approach or problem solving rules.

Scott (1990) distinguishes practice wisdom from practice knowledge but still understands practice wisdom as a format of knowledge. She suggests that practice wisdom is a tacit form of practice knowledge. Intuition and “feeling” associated with certain cases is equivalent to the practice wisdom in her definition.

“...Scott (1990) distinguishes practice wisdom from practice knowledge but still understands practice wisdom as a format of knowledge. She suggests that practice wisdom is a tacit form of practice knowledge. Intuition and “feeling” associated with certain cases is equivalent to the practice wisdom in her definition.

The tacit form of practice knowledge, or what social workers traditionally have called practice wisdom, often is expressed in anecdotal form and experienced by the practitioner and witnessed by colleagues as intuition rather than as explicit principles of practice. The practitioner ‘has a feeling’ about a particular case and its likely causes or outcome. Such feelings can be understood as the function of ‘incipient induction,’ or lengthy exposure to similar situations through which unconscious associations are established between certain features of cases.” (p. 565)

Gowdy (1994) emphasizes the unique knowing process of practice knowledge. She suggests that vicarious experiences, learning from observing similar others succeeding in the desired actions, are better approaches to enhance professional performance.

“Participating consciousness recognizes that the universe and all that is in it is alive and interrelated and that people come to know their world through full immersion, participation, and identification with the world.” (p. 365)

DeRoos (1990) describes practice wisdom as an ability of decision making or problem solving developed outside one’s conscious awareness. People actually have a model of a reality in their mind and they decide how to react to the real world according to that model.
“It helps explain our effective functioning in the world even though we operate ... from our model of reality, not from reality itself. .... By their effective performance, whether in regard to knowledge gained or problems resolved, such habits are shown to have validity, that is, that their effectiveness shows that they are grounded in a subjective world model that has a high correspondence with objective reality.” (p. 281-2)

Although a clear definition is hard to give due to various dimensions on which different studies were focused, most of the scholars in the social work domain did not ignore Schon’s (1983) achievements when discussing practice knowledge. Schon’s (1983) work on reflective practice is an important concept that is frequently cited in the study about practice knowledge or practice wisdom. He suggested that knowing-in-action has three important properties: (a) The actor does not have to think prior or during the action; (b) the actor is unaware of the learning process; (c) the actor may be unable to describe the understanding which her actions reveal. This statement describes the awkward question of practice knowledge.

In order to solve this problem, most of the discussion in practice knowledge goes toward either practice knowledge as a different knowledge style (e.g., Gowdy, 1994) or practice knowledge as a decision making strategy (e.g., DeRoos, 1990). These two routes can be traced back to the insight of two people: Michael Polanyi and Herbert Simon.

Polanyi (1967) proposed the possibility of different kinds of knowledge dimensions. He divided the knowledge into explicit knowledge (articulate knowledge) and implicit knowledge (tacit knowledge). Explicit knowledge refers to the knowledge people can be aware of and describe, in other words, formal knowledge. The abilities that can be revealed by action but can be difficult to describe, such as face recognition, are called implicit knowledge.
Polanyi (1967) noticed that the implicit way of knowing (tacit knowing) usually directed people’s action even though most of the time people were not aware of the knowledge applied in the design of that action. The implicit knowledge can be revealed by people’s action and is not necessary to be articulated. From this viewpoint, implicit knowledge and practice knowledge are very alike. If social work practice knowledge did include or belong to implicit knowledge, the inability to describe the knowledge or the knowing is no longer a deficiency, but a feature. (Bright [1996] uses a similar argument in his study.) The remaining question is why implicit knowledge is superior to explicit knowledge in social work practice.

Bounded rationality proposed by Simon (1956) is the best explanation of why implicit knowledge is more suitable than explicit knowledge in social work practice. Since the available information and computation ability are very limited, people cannot make decisions in algorithmic fashion. On the contrary, people use intuition, a kind of pattern recognition, to cope with situations they face in daily life. Also, the concept of satisficing explains why people are not interested in receiving maximum utility in problem solving and decision making. (DeRoos [1990] uses a similar argument in his study.)

If Simon's observation can be accepted as a logical premise of the discussion, there should be no dispute regarding whether or not subjective understanding is a valid basis of developing social work knowledge. Study on social work practice knowledge will have to include subjective understanding or else it will not be practical at all. As Rosen (1994) stated, the ability and preference of the practitioner should be considered when the knowledge used in direct practice is discussed. Practice knowledge should strongly relate
to daily practice. A feasible knowledge might benefit practitioners more than a normative knowledge.

Schon (1983) stated that explicit knowledge (technical rationality) has limitations when applied to divergent practice because actual practice environment is complex, uncertain, unstable, unique, and full of value conflict. At the same time, NDM explores how people make decisions in real environments that might just fit the phenomena. Adopting the concept of NDM should be a feasible approach to study social work practice.

**Measurement of Practice Knowledge**

Knowledge is an abstract concept. A set of appropriate indicators must be defined in order to measure the knowledge. Knowledge offered by a course is much easier to measure. As long as the important elements in a certain topic can be listed, how well a student comprehends can be evaluated by a recall test (e.g. small essay) or recognition test (e.g. multiple choice questions). In other words, explicit memory or declarative memory is the key to demonstrate this kind of knowledge. Obviously, this is not the area to which practice knowledge would like to address.

Practice knowledge is more like the knowledge that is revealed in the process of action, hard to be aware of, and hard to describe (Schon, 1983). The existence of practice knowledge can be revealed by repetitive behavior, but to measure it will be difficult. In other words, implicit memory or non-declarative memory is the key of demonstrating this kind of knowledge.
Implicit memory, as it was named, is implicit and hard to comprehend. However, it is measurable. The saving method proposed by Ebbinghaus (1885/1964, see also Roediger III, 1990) is a great example of measuring the implicit memory. He maintained that although some memory can not be recalled, it is possible to measure it through the time saved from relearning the same topics that have been forgotten. In order to design an experiment that can measure practice knowledge in social work, several studies in cognitive science need to be addressed. Although some of them do not focus on implicit memory, these studies explain how explicit memory works and illustrate a potential method to study implicit memory.

Retention Curve

Hermann Ebbinghaus (1885/1964) uses systematic experimental investigations to study human learning and memory and this has become the model of contemporary cognitive study. The most well known study of Ebbinghaus is memorizing a list of nonsense syllables (consonant-vowel-consonant trigrams such as VOK) everyday, and observing the process of learning and forgetting. Retention curves and serial position curves are some of his famous achievements.

Although the speed of forgetting is influenced by the length and meaning of study material, basically an individual starts forgetting after the information was encoded. For example, the retention rate of the nonsense syllables Ebbinghaus studied will reduce to 60% after twenty minutes and to 45% after one hour (see Figure 2.8).
**Figure 2.8.** The Retention Curve.


**Serial Position Curve**

Besides decreasing tendency, Ebbinghaus found words in some positions are more likely to be forgotten than words in other position. For example, words in middle portion of the list are more likely to be forgotten than words in two opposite ends of the list. He called this phenomenon the serial position effect (see Figure 2.9). Although Ebbinghaus tried to explain the phenomenon by remote associations, it is more likely due to the use of memorization strategies. Because individuals have more time to rehearse the word presented in the beginning, the accuracy rate is relatively high (also called the primacy effect). However, as more words appear there is little time for rehearsal, and so the accuracy rate decreases. Near the end of the list, since individuals can use retention in STM, the accuracy rate will increase again (also called the recency effect). More detailed reviews can be found in Glanzer and Dolinsky (1965).
This kind of research looks very peculiar to be applied in social science empirical studies. It is very hard to imagine the relationship between memory of nonsense syllables and implicit memory of practitioners.

However, Ebbinghaus’ experiment illustrates several important ideas.

1. The purpose of the experiment is to measure explicit memory.

2. The purpose of using nonsense syllables is to exclude the potential influence of old information stored in LTM on new information that is studied in the experiment. Since the researcher has no idea about whether some word is more meaningful than others, he or she cannot distinguish whether the memory is from old information or from the experiment. For example, in a list of fruit names, participants are more likely to remember the fruits they like or dislike more than other fruits for which they have no preference.
3. Rehearsal is fundamental to memorizing.

These ideas can be organized into the premises of this study:

1. Participants have a greater chance to remember words or the concepts that have meaning for them, because the information stored in LTM enhances the access of new information.

2. The function of explicit memory can be inhibited. Reducing the time of rehearsal can decrease the ability to memorize new information. As long as the primacy effects and recency effects can be eliminated, the function of explicit memory is greatly decreased when the time for rehearsal is limited.

A research hypothesis can be further generated from these two premises. If participants are still able to retain some information while the function of explicit memory is impaired, that information might be easier to remember than other information. The information might be words or concepts that are meaningful to them, which is information or schema stored in LTM.

*TAP (Transfer-Appropriate Process) in Amnesia Subjects*

Studies on amnesia performed by Warrington and Weiskrantz (1970; as cited in Roediger III, 1990) present further evidence of implicit knowledge. They use four kinds of test to compare the difference between amnesiacs and normal people (see Figure 2.10).
In the free-recall test, participants were asked to write down as many words presented in the study phase as possible. In the recognition test, the studied words were intermingled with other words and participants were asked to identify the studied ones. These two tests involve conscious recollection of prior experience and are classified as tests of explicit memory.

The other two tests, the word-fragment identification test and the word-stem completion test, were presented as word guessing games. Participants were asked to identify the defaced word without deliberate thinking and the result will be compared.
between studied words and unstudied words. These two tests measure the priming and transfer retention indirectly and are classified as tests of implicit memory.

Results show that the controlled group performs better than amnesic patients in explicit memory tests while there was no significant different in implicit memory tests. In the word-fragment identification test, amnesic patients even performed better than the control group (but it was not statistically significant). This result indicates that although they are not able to describe what they have learned, learning did occur.

This phenomenon is explained by the transfer-appropriate process (TAP), which means that people will attain better in test when they are tested using the same mode of knowing as they learn the particular task. Both implicit memory and explicit memory receive information when studying. Amnesic patients performed more poorly than normal people in explicit retention tests due to the malfunction of explicit memory, while their implicit memory remained intact so they had equivalent performance as normal people in implicit retention tests. That is to say, amnesiacs might learn more than they are aware of.

This study points out the existence of different memory systems. Amnesic patients might not “remember” much of what they have learned, but they do have the ability to perform actions that require memory. However, can this phenomenon also be identified in normal people or is it just a special case of amnesiacs?

TAP in Normal Subjects

The dissociations between implicit memory and explicit memory can also be found in normal subjects, but usually not as dramatic as in amnesic patients. Jacoby (1983) has provided several demonstrations of implicit retention in normal subjects. In most of his
experiments the participants practiced a long list of words and were divided into one of the two tests. In the group testing explicit memory, participants got a list intermixed with old and new words and were asked to identify the studied words. In the implicit memory group, participants were shown the same list as the explicit memory group has while the list was presented at very fast rate and the participants were asked to read each word aloud.

The group testing explicit memory involved a recognition test to evaluate the memory; the group testing implicit memory involved perception identification superficially, but actually interested in whether or not previous study can improve the identification rate—whether prior study of the words is transferred or generate a priming effect to later study. He found that using different methods of studying will provide different results in these two tests (see Figure 2.11). For example, studying a word by simply reading it aloud, by reading it in a meaningful context, or by generating it in a context will have dissonant results in the recognition test and the perception identification test (Roediger, 1990; Anderson, 2000).
This experiment concludes that: (a) Whether or not a participant was aware of their learning in the previous study period, learning did happen. Prior studying improves the possibility of receiving information. That is to say, although sometimes information stored in human brain is too weak to be expressed by explicit memory, it can manifest in implicit memory. (b) Implicit memory has TAP phenomena. Whether or not implicit memory can be identified was influenced by the approach of encoding and retrieving information.

**Generation Effect and TAP**

Smith and Branscombe (1988, as cited in Roediger, 1990) preceded a similar experiment to explore the priming effect to personal perception. In the study phase, one group merely read a trait, while the other group was given context clues as a hint and the
word’s initial letter to generate that trait. The result was similar to Jacoby’s experiment (see Figure 2.12). The two groups showed dissociation results in the different testing approaches.

![Graph showing Free recall and Word Fragment Identification for Read and Generate for both Proportion Correct and Proportion Correct](image)

**Figure 2.12.** Generation Effect and TAP.


This experiment shows that even if there is no direct information input except that presented by conceptual context, individuals are still able to learn information. Again, TAP phenomena shows that whether the learning process can be distinguished relies on the consistency of encoding and retrieving approach. It is applicable to the discussion of social work practice knowledge—if the knowledge is encoded in an approach consistent with implicit memory, it is possible that the knowledge can only be distinguished when retrieved in a similar approach.
Summary

To conclude, literature shows various dimensions of the social work practice knowledge. This study uses the term implicit knowledge to represent the implicit dimension of knowledge/knowing/decision making process of social work practice. Previous studies focused on the theoretical discussion and tried to establish the argument that knowledge for social work practice is different than formal knowledge that it is more frequently used in research. Few empirical studies have been done through observation and interviews. No study has been done from the perspective of cognitive science.

One obstacle in conducting an empirical study of social work practice knowledge that focuses on implicit knowledge is to find adequate indicators that can represent this concept in a way that is observable and measurable. This study attempted to use implicit memory as an indicator for the phenomenon that happened at an implicit level when social work practitioner is making decision related to treatment. Although the reviewed literature in cognitive science was not directly related to social work practice knowledge, several studies offer a framework of creating a feasible research design to examine social work practice knowledge. For example, utilizing the concept of TAP, as long as the function of explicit memory can be inhibited when participants read the information, the function of implicit memory can be identified by their learning accomplishments. Chapter 3 will elucidate more on this research design.

Studies of social work practice knowledge on a philosophical level claim that practitioners may use knowledge outside formal knowledge to perform daily practice. However, the questions pertaining to what kind of information practitioners use and how they acquire such abilities still remain unanswered. This study uses retention (explicit
memory) as a proxy for implicit memory as an indicator of social work practice knowledge. The explicit, retained information is only a small part of a practitioner’s total practice knowledge. However, information is the basic unit of knowledge. Studying how practitioners reach a professional judgment and what information they might use allows us to examine and understand the structure of social work practice knowledge.
CHAPTER 3

METHODS OF STUDY

This chapter presents the methodology employed to explore the use of implicit knowledge in social work practice. The first part of this chapter describes the focus, objectives, and rationales of the study. I explain how the design of the research experiment, based on Naturalistic Decision Making (NDM) theory, can be used to investigate implicit knowledge. In addition, I define the terminology to be used in this research. The second part of this chapter discusses research methods that involve both deductive reasoning and inductive reasoning. The discussion of research procedures based on inductive reasoning describes the research questions, research design, sampling methods, data collection procedures, and method of data analyses. The discussion of research procedures based on deductive reasoning presents the research questions, research methods, data collection process, and methods of data analyses. Each set of research procedures based on deductive reasoning and inductive reasoning are distinctively different and independent of each other although they allow a triangulation of data that will enrich our understanding of the use of implicit knowledge in social work practice.
Introduction

Social work practitioners decide on their intervention for a client based on information collected from a client’s assessment. However, there are still two questions remained to be answered: (a) What kinds of information have critical value in the decision making process, and (b) what types of information remain and become the foundation of experiences for future decision making processes?

The current interest in decision making comes from two areas of investigation. One area the current research is derived from is model building. Researchers decide possible factors based on existing literature, personal judgment, and environmental limitation, using a statistical method to calculate explainable variance. However, there are two problems with this kind of research. One is that each factor may have very limited explainability and the sum of all factors in the model sometimes might not have sufficient explainability. The other problem relates to application. Although the model can present the significance of each factor, practitioners do not evaluate their clients by calculating an equation, and so practitioners may not find such research beneficial.

The second type of research adopts an interviewing or self-reporting method. These studies describe how social work practitioners review and examine important factors when making their decisions. Through this method practitioners can easily be inspired by an expert’s solution process. However, systems built on expert professional opinion may not capture the idiosyncratic decision making process of an individual practitioner. This situation might imply either the limitation of technology or the irrelevance of expert solutions.
The primary purpose of this study was to explore the information practitioners pay attention to when working with their clients. According to cognitive science, whether or not information can enter into the working memory from sensory storage and become the foundation of their decision-making is based on the scripts or schema in long term memory that directs attention distribution.

Potential factors that might affect the practitioner’s intervention were tremendous. Even if the research setting was confined into a single task and an identical environment, practitioners might have various characteristics that would affect the analysis. Therefore, this research also focused on examining whether or not the viewpoint of cognitive science is suitable for explaining the decision making process in social work practice.

Besides, due to the unique feature of the topic, this study applied multiple methods of research design. It applied methods of survey design and experiment design that might be categorized as quantitative methods. It also applied methods of content analysis that might be categorized as qualitative method. The chapter will provide a detailed description of how the research was constructed after a systematic discussion of the multiple research methods that are included in the study.

Theoretical Perspective / Rationale of the Research

Cognitive science offers insight regarding how social work practitioners are aware of information when providing intervention. Compared to other viewpoints, cognitive science puts more emphasis on the precondition of a human being as the knowledge user. In this study, the researcher explored how practitioners arrive at an intervention based on Natural Decision Making (NDM). NDM is “a study related to how experienced people
actually make decisions in their natural environments or in simulations that preserve key aspects of their environments” (Zsambok, 1985, p. 4; as cited in Zsambok & Klein, 1997).

NDM is not a coherent theory, nor do researchers apply the same methods. However, a common theme of NDM is that experience is the main factor that affects decision making in natural circumstances. At the same time, researchers use experimental studies to illustrate how experience can be a significant asset in the decision-making process. In this study, two models will be used to investigate how implicit knowledge affects the practitioner’s decision making.

Recognition-Primed Decision (RPD) Model, proposed by Klein (1985; as cited in Klein, 1997), explains how experienced people “use their expertise to identify and carry out a course of action without having to generate analyses of options for purposes of comparison” (Klein, 1997, p. 285). Applied in this study, Klein demonstrates that recognition of the environment will prime their experience; therefore, people are able to make good reactions in a very short time.

Situation awareness (SA), proposed by Endsley (1988; as cited in Endsley, 1997), refers to “an internal conceptualization of the current situation” (Endsley, 1997, p.269). The model illustrates how people can perceive their environment correctly and the importance of having a good understanding. This model supplemented the concept of RPD model by explaining that discriminative information is strongly related to long term memory (LTM). Applied in this study, Endsley indicates a direction to find out the discriminative information.
RPD model and SA, along with the interference method\(^2\), constitute the rationale of this study, which can explain the utilization of implicit knowledge and the potential critical information that influences practitioner’s decision making (see Figure 3.1).

Figure 3.1. Study Rationale.

The researcher did not use the traditional interview method, which included detailed interviews, focus groups, and brainstorming when exploring implicit knowledge because these techniques require individual interpretation. The process of externalizing from implicit knowledge (e.g. knowing how) to explicit knowledge (e.g. describing the meaning of action) is hard to manage, and can easily cause lost or distort information.

\(^2\) The interference method refers to an experimental process that illustrates the importance of one mechanism by blocking the function of other mechanisms. A detailed definition will be given in next section.
However, adopting the interference method could eliminate the function of explicit memory, thus illustrating the role of implicit memory in the recognition process.

Based on the recognition-primed decision (RPD) model, recognizing an environment is primed, which means it is related to implicit memory. According to situation awareness (SA), a person can recognize the situation immediately because schema and scripts in the long term memory (LTM) offer effective allocation for limited attention. Based on such a premise, we can conclude that if an individual is able to remember information while under interference, it must be influenced by previous knowledge, experience and/or schema. Information received in an implicit way is able to trigger information, concept, or schema stored in long-term memory.

**Terminology**

*Implicit Knowledge/ Memory*

In the context of this study implicit knowledge and implicit memory were interchangeable in most cases. Both relate to an implicit way of knowing and the implicit knowledge was assumed to be stored in the implicit memory. Since rehearsal is the most important method used to acknowledge and present personal knowledge, it might have an apparent distinction in philosophy but in cognitive science knowledge must be represented by memory. Therefore, the term implicit memory was used in the experimental phase while the term implicit knowledge was used elsewhere.

Implicit knowledge commonly refers to a knowledge which is difficult to describe with language. It is a product of trying to classify the source of knowledge. The opposite concept is explicit knowledge. Due to being hard to describe, scholars have different
opinions about implicit knowledge. As a result, three perspectives were referred to in this study.

1. While the term implicit knowledge is used today, it still embraces the same concept, *tacit knowledge* that was referred to by Polanyi in 1958. Implicit knowledge refers to knowledge that cannot be communicated through language or other formats (Polanyi, 1958). Notably, Polanyi is the first person to discuss knowledge typology, and he studied implicit knowledge from the perspective of epistemology.

2. Naturalistic decision making (NDM) scholars like Klein or Endsley did not define implicit knowledge. Rather, they used *experience* as the term. From their research orientation, they showed more interest in the experience that can not be easily stated. At the same time, although this kind of experience is hard to recall, it is identifiable. More importantly, this kind of experience guides individual’s judgment.

3. Implicit knowledge, or implicit memory in Ebbinghaus’ (1964) terminology, is a non-conscious recollection. However, he categorized involuntary recollection (e.g., recognition) as explicit knowledge.

In this study, the NDM perspective is used in probing to understand if a practitioner’s perception is influenced by experience. The notion of implicit knowledge depicted by Polanyi (1958) is much more relaxed than the NDM perspective. While the viewpoint of Ebbinghaus (1964) is that recognition belongs to explicit memory. For the purpose of this study, Ebbinghaus’ viewpoint is problematic because he does not take into consideration the memory that we have already stored. Therefore, the question remains whether the interference method will hamper the function of recognition, or in Ebbinghaus' terms, involuntary recollection.
Classification of categories is an artificial and a rational exercise for the purpose of achieving a better understanding of the debate and meaningful discussion. The reaction of the human brain will not be affected by the classification. Indeed, using an interference method might screen out more information and get a more streamlined result. However, Ebbinghaus’ research design does not consider the function of existing memory; instead, he uses a series of nonsense syllables as input. In reality, the distinction between involuntary recollection and non-conscious recollection will not be so clear. Therefore, this researcher assumes that memory will still be restored when individuals have background knowledge.

The Interference Method

The interference method is an experimental process. By asking a participant doing another task to inhibit some necessary elements of learning, part of the learning will be interfered with so that the learning mechanism can be further discerned. This method can be used in studies that examine implicit memory.

In this particular implementation of the interference method, the participants only had a very short time to read case records. Because participants only had restricted time to skim through the record without rehearsing, the role of explicit memory would be greatly eliminated or even prohibited. On the other hand, even though implicit memory might get a certain amount of inference, learning still happened.
Case Records

Case recording, from Hamilton's viewpoint, is a tool for professional communication, a process of reflection, and an assurance of service performance (1946). The content of case records varies depending on the purpose of the record, the individual practice orientation, service delivery and agency policy. There is no single method that can satisfy all requirements and it is not necessary (Kagle, 1984). Most of the case records include four elements: exploration, formulation, implication and termination (Kagle, 1984).

This study intended to explore the type of information that social work practitioners focus on when they acquire client information and the practitioner’s ability to make an effective intervention within a short period of time. Therefore, this study only presented the content of exploration for record reviewing; meanwhile, the test following the record reviewing will discuss the plan of services in formulation (see Figure 3.2).
Figure 3.2. Elements of Case Records.

The Research Methods

Because this study utilizes different research methods to unveil the topic of implicit knowledge, it will be helpful to explain how the research method is allocated in this study (see Table 3.1).

<table>
<thead>
<tr>
<th>The Purpose of the Research</th>
<th>Exploratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical System of Knowing</td>
<td>Deductive</td>
</tr>
<tr>
<td>Research Design</td>
<td>Experimental Design</td>
</tr>
<tr>
<td>Types of Data to Collect</td>
<td>(Experiment result)</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td>Raw Data Format</td>
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<td>Data Processing</td>
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<tr>
<td>Data Analysis Approach</td>
<td>Inferential Statistics</td>
</tr>
</tbody>
</table>

Table 3.1 Multiple Research Methods

*Note: This table gives an overview of how several ideas and approaches were intertwined in the study. It is neither a comprehensive list of all used ideas and approaches, nor the set of questions to be answered by this study. Detailed descriptions are provided in following sections.

* Documents refer to the text information provided by the participants in the experiment.
This is primarily an exploratory study. Social research can serve many purposes, of which exploration, description, and explanation are the three most common purposes. Although most of the exploratory studies use interviews in the setting of focus group, this study used interviews and content analysis in the setting of an experiment for exploration due to the unique characteristics of this topic. Even if the study involved some description about the phenomena and some explanation about the cause, this study can not provide definitive answers due to lack of the representativeness. Therefore, the nature of this study was primarily explorative, and the purpose of conducting the study was for better understanding about the topic and to develop methods to be employed in subsequent studies.

This study involved both deductive and inductive reasoning. Deductive reasoning derives a set of hypotheses from theory, observes the actual situation, and makes a decision to accept or reject the hypotheses based on observations. Inductive reasoning starts from field observation, searches for the common pattern, and reaches a tentative conclusion.

This study began with adapting Naturalistic Decision Making (NDM) theory from cognitive science to explain decision making process in social work practice. The assumption that experienced practitioners should be able to make a reasonable judgment under the situation of interfering explicit memory was derived from NDM theory. An experiment was developed to decide whether the usage of implicit knowledge could be interpreted from a NDM perspective. The purpose of this research phase was to test whether a logical explanation could be supported by empirical evidence in the practice context.
This study then examined the content of participants’ retention. The study searched for common patterns and identified characteristics based on participant’s retention of case information. These patterns and the content might provide a framework regarding how information was utilized in the decision making process of social work practitioners. The purpose of this research phase was to offer possible insights regarding the decision making process of social work practitioners in real life practice context.

Due to the use of implicit knowledge that exists independently of individual consciousness, this study intended to explore evidence of implicit knowledge usage via an experimental procedure. An advantage of this design was some internal validity problem could be controlled by an experimental design. Moreover, some ideas were also incorporated into this study. For example, the technique of data collecting and data processing was closer to an interview research technique when discussing participants’ retention of the case scenarios. The observation principle was also applied to describe the participant’s reactions during the research.

The data format of the decision making (diagnosis and intervention) is numerical. Inferential statistics were applied to present the differences between the two groups. However, the data format of the retention and the reasoning was textual. The data involved different ways of analysis.

Part of the retention information was treated as quantitative data when the information could be categorized by certain principles. For example, the percentage of information that participants remembered from original case scenarios; the information that was frequently recalled by the participants. More over, the pattern of the retention
information could also be described quantitatively. Descriptive statistics was applied to present the frequency of each identified item or category.

Part of the retention information will be treated as qualitative data when the information could not be categorized easily, such as descriptions regarding the role of a concept in the participant’s retention played in facilitating the participant’s understanding of the client’s situation. Besides, the information regarding the reasoning of decision making and participants’ reaction to the study was processed in a similar manner. How did participants explain their reasoning of decision making and how they reacted to the study might vary, and such information that can not be easily quantified. Therefore, content analysis was applied to interpret these data.

As proposed by Walter Wallace (1971), although researchers might start from different positions—some depart from theory and pursue deductive reasoning and some depart from observation and pursue inductive reasoning, all of them share a common goal: to examine all levels of social life (see Figure 3.3). This study demonstrated a collaboration that utilizes two logical systems of knowing to discuss the influence of implicit knowledge on practice decision making. The following section discusses the research design and process by inductive reasoning and deductive reasoning.

*Figure 3.3. The Wheel of Science.*

Modified from *The Logic of Science in Sociology* (p. 18), by W. Wallace, 1971.
Deductive Reasoning

Research Questions

This study examined the following research questions:

1. Could we identify the use of implicit knowledge in the practitioners’ process of perceiving a client’s situation?
2. Did experience affect the use of implicit knowledge in decision making?
   Hypothesis 1 The experienced group was more likely to use implicit knowledge in making their decision than the inexperienced group.
3. Did time-constraint affect the use of implicit knowledge in decision making?
   Hypothesis 2 The time for making decisions is less important in the experienced group than the inexperienced group.

Regarding the first question, although it is hard to distinguish the function of the retention, the usage of implicit knowledge (implicit way of knowing) can be identified as long as the retention is observed. The deductive reasoning of this study focused on the second and third question, discussing how experience and time-constraint affect the decision making of the practitioners.

Method

An experiment was conducted to compare the difference of implicit memory usage between inexperienced practitioners and experienced practitioners. Although this study used methods of experimental research, it was basically descriptive research. More precisely, this research was an Ex Post Facto Study. The main purpose of this research is to probe whether the decision making process of a social work practitioner was
influenced by experience. However, the independent variable, experience, could not be controlled by the researcher. Therefore, this study was a descriptive research. In the terminology of Campbell and Stanley (1963), this design was a static-group comparison, which was one of the weaker research designs. However, some potential limitations could be addressed by the combined usage of other designs.

In this study, although it was one experiment on the surface, the concept of two research designs was included. The first concept of the research design was using experience as X (intervention), a static group comparison, comparing the decision-making difference. The second concept of the research design was using interference method as X, a double one-group pretest and posttest design, comparing the decision-making difference (see Figure 3.4).

![Design 1](image1)

![Design 2](image2)

*Figure 3.4. Research Design.*

3 Although we can define the experiment as the input of information and define the influence as the retention by the way of giving operational definition, this kind of definition might be workable but is too arbitrary in concept referral. We can agree that the experience is gained by the input of information; however, how experience accumulates, what information will be encoded/filtered and retained/forgotten is not clear until now. It is very unrealistic to expect all people in the experimental group to have similar experiences. Further, it is unlikely that all people in the control group did not have any experiences, especially when the experiences we are discussing refer not only to the exposure of some events but the establishment of knowledge.
This research design aimed to address the weakness of the *static-group comparison* that might cause selection and mortality concerns. Since the group participants were not randomly assigned, the two groups might be different without the occurrence of X. However, because one of the research purposes was to illustrate the differences between the two groups, the argument that they were not equivalent was diminished. The only problem was that we do not know if the difference was caused by experience. Therefore, this study adopted an interference method in order to overcome this problem. In this research design, we could conclude that the difference within the individual should be caused by experience instead of knowledge.  

What about factors external to the individual? Is it possible that the difference was caused by other factors, such as social status or working environment? Although it is possible, our answer is that it is not our main concern. Firstly, the question of how much information can be perceived was primarily discussed at the level of individual perception. Factors external to the individual such as the working environment should have less influence on perception. Second, even though the individual was influenced by habits caused by external factors like the working environment, it could be attributed to experience and still did not violate our definition.

In addition, this research used a double *one-group pretest and posttest design*, using the interference method as X, which could probe whether a practitioner can receive information and make good interventions in limited time frames. This could demonstrate the proposition that the information perceiving and decision making skills of a social work practitioner was not affected by time, but was dependent on the recognition of

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4 Please refer to the rationale of the theoretical perspective. (See Figure 3.1)
experience. At the same time, under the *nonequivalent (pretest and posttest) control-group design*, the selection and mortality problem can be controlled.

**Participants**

Participants in this study included two groups. The first group had limited experience (less than three years), and was composed of MSW students. The second group had more experience (more than four years), and was composed of social work practitioners.

This study planned to recruit forty participants. Twenty of them were MSW students at a midwestern research-oriented university; and twenty practitioners in a midwestern mental health center. Two groups participated in the same experimental procedure and the results were analyzed. Participants received an incentive less than one dollar for their engagement in the study.

**Materials**

**Case Records**

Participants read two case records provided by the researcher. These two records were written based on the principle of *exploration* as described by Kagle (1984). In addition, two experts with practice experience reviewed and revised the case examples. The content and format was no different than a typical case record. At the same time, case records contained enough information for a trained practitioner or student to make a diagnosis or an intervention on the later test.
Test

Besides the participants writing down all of the information retained after reading case records, participants were also required to answer some basic assessment questions by a multiple choice format test. The questions included the diagnosis of a client’s situation/problem and a proper intervention.

Procedures

The experiment asked participants to review the case record under different time constraints and wrote down any information they retained about the case. After the written portion, two multiple choice questions were asked about their diagnosis and intervention.

The experiment was divided into two phases: practice and formal phase.\(^5\) There were two case records. One record was used in the practice phase (Stage I, a time-sufficient situation) and the other in the formal phase (Stage II, a time-sufficient situation). The purpose of the practice phase was to inform participants of the experimental procedure and administer the pretest for knowledge regarding the status of retention and decision making. It was important to note that the participant could take as much time as they need to review the case record and answer the questions. During the Stage I, participants: (a) were notified about the experimental procedure; (b) read the case record under the time-constraint situation\(^6\); (c) had two opportunities to review the case record. During the first review participants could use as much time as they need.

---

\(^5\) Participants will be informed of exercise one and exercise two to prevent biased attitude toward either phases.

\(^6\) The screen will show two to four words at a time for 0.33 seconds. The total record is around 250 words and is presented in approximately 25 seconds.
(time-sufficient situation) to read the case record. The second review participants would read the case record again under the time-constraint situation; (d) took a mathematics quiz; (e) were asked to recall the content of the case record and write down word for word the case; (f) answered the questions. (Original instruction of the procedure can be found in Appendix A.)

The other case record was used during the formal phase (Stage II). Participants: (a) were notified about the experimental procedure; (b) read the case record under the time-constraint situation; (c) took a mathematics quiz; (d) were asked to recall the content of the case record and write down word for word the case; (e) answered the questions.

Participants in the different groups had an equal chance of being assigned to read either of the records for the practice phase (Stage I) and for the formal phase (Stage II). The outcome of the two groups was compared.

Data Analysis

The research designs of this study aimed to answer the following questions (see Figure 3.5; also refer to Figure 3.4).

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7 The purpose of the second review is letting participants familiar with the time-constraint situation again as well as the procedure of the formal test, which is read in the time-constraint situation, take a math quiz, recall the content, and answer to the questions.

8 The purpose of taking a mathematics quiz is to eliminate the retention in short term memory (STM). According to the discussion of recency effect in serial position curve, STM has significant influence on the result of study-test experiment. (More explanation can be found in the study conducted by Glanzer and Dolinsky in 1965). Therefore, the elimination of STM is necessary for exploring the function of long term memory (LTM).
Figure 3.5. The Analysis of Two Research Design.

Note: E (Experienced group) / I (Inexperienced group); A (Scenario A) / B (Scenario B); S (Time-Sufficient situation) / C (Time-Constraint situation).

Double “One-Group Pretest and Posttest Design”

1. Will participants understand the client’s situation better under the time-sufficient situation than under the time-constraint situation?

Figure 3.6. The Diagnosis and Intervention under Different Time Constraints.

Note: X = time constrains

According to cognitive science theory, time is an important factor for diagnosis and intervention. Therefore, this research expected that the judgment in the same record
would be more appropriate\(^9\) in a time-sufficient situation than in a time-constraint situation (EAS > EAC; IAS > IAC; EBS > EBC; IBS > IBC).

*Static Group Comparison*

2. Will the experienced group have better understanding of client situation than the inexperienced group when the case record is read under the time-constraint situation?

\[
\begin{array}{c|c}
\text{Result (EAC)} & \text{Result (IAC)} \\
\hline
X & - \\
\end{array}
\]

\[
\begin{array}{c|c}
\text{Result (EBC)} & \text{Result (IBC)} \\
\hline
X & - \\
\end{array}
\]

*Figure 3.7. The Diagnosis and Intervention under the Time-constraints Situation.*

According to cognitive science theory, experience can offer background knowledge to be used for decision making when an observation is deficient. Therefore, this research hypothesized that the decision made by participants in the experienced group would be more appropriate than decisions made by participants in the inexperienced group (EAC > IAC; EBC > IBC).

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\(^9\) Although the scenario has assumptions on what is happening in the family, people focusing on different information might have different understanding. Since the information contained in the scenario is limited and participants do not have opportunity to make further inquiry, it is very hard to judge which diagnosis or intervention is better than the other. However, some items in the multiple choice answer are totally irrelevant to the scenario. It is unlikely to have this diagnosis or intervention based on the information offered in the scenario. Therefore, these items will be “inappropriate” if it is chosen by the participants. Chapter 4 has a detailed scoring explanation.
The analysis above should be able to answer research questions about whether the diagnosis and intervention would differ by experience and by time constraints. However, it was still possible that the difference already existed before the intervention happened. Therefore, further examination of whether the two groups were equivalent was necessary for assertion.

**Combination of two research designs**

3. Will the understanding of client situation be influenced by the experience when the case record is read under the time-sufficient situation?

<table>
<thead>
<tr>
<th>Result (EAS)</th>
<th>Result (EBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result (IAS)</td>
<td>Result (IBS)</td>
</tr>
</tbody>
</table>

*Figure 3.8. The Diagnosis and Intervention under the Time-sufficient Situation.*

According to the research setting, both the experienced and inexperienced groups could reach an appropriate decision under the time-sufficient situation. There should not be any significant difference in the accuracy rate between the two groups (EAS = IAS; EBS = IBS).
4. Will the experienced group have a better understanding of the client’s situation than the inexperienced group when the case record is read under different time constraints?

<table>
<thead>
<tr>
<th>Result (EAS)</th>
<th>X</th>
<th>Result (EAC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result (IAS)</td>
<td>X</td>
<td>Result (IAC)</td>
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<table>
<thead>
<tr>
<th>Result (EBS)</th>
<th>X</th>
<th>Result (EBC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Result (IBS)</td>
<td>X</td>
<td>Result (IBC)</td>
</tr>
</tbody>
</table>

Figure 3.9. The Diagnosis and Intervention under Different Time Constraints.

According to cognitive science theory, time is an important factor for perception and intervention. The effects were minor if the individual is an experienced practitioner. Therefore, this researcher hypothesized that the difference of appropriate decision making between the practice phase (Stage I) and formal phase (Stage II) should be fewer in the experienced group than in the inexperienced group ([EAS-EAC] < [IAS-IAC]; [EBS-EBC] < [IBS-IBC]). The purpose of this comparison was to prevent bias that might happen in the research setting. If the assumption “both experienced and inexperienced groups can reach an appropriate decision under the time-sufficient situation” was wrong, the comparison of difference between the practice and formal phases could eliminate the selection effect and demonstrate the true difference between the experienced and inexperienced groups.
Inductive Reasoning

Research Questions

This study examined the following research questions:

1. In social work practice what kinds of information does the implicit knowledge mechanism take into consideration?

2. How can the information be structured and provide meaning for social work practitioners?

This study intended to explore the kind of information that was able to pass through the filter, mostly affected by individual’s schema, in the decision making process. Although it is difficult to know exactly how much information passed through the filter, part of the information can be identified through the retention of the schema that was primed by the stimulus information. After identifying the information, the second step was to solve the puzzle of how the information was composed and led the individual to a schema that can help them understand the situation. In short, what is the relationship between retained information and the diagnosis/intervention? Also, this study collected participants’ reactions and their feedbacks. Although it was not a research question to be answered, the information would be useful for better understanding the phenomenon.

Method

Because of the nature of the research topic, different research methods were modified to suit our needs. In dealing with the textual information, the most useful methods were content analysis and narrative analysis. Content analysis is “a systematic, replicable technique for compressing many words of text into fewer content categories
based on explicit rules of coding” (Stemler, 2001). Narrative analysis is the “analysis of a chronologically told story, investigating the way elements are sequenced, why some elements are evaluated differently from others, how the past shapes perceptions of the present, how the present shapes perceptions of the past, and how both shape perceptions of the future” (Suurmond, 2005:9). This study used skills and concepts in both methods to examine and explain the textual information.

*Data Collection Process*

As was described in a previous section, in this study the participants were asked to: (a) write down their retention about the case scenario as much as possible; (b) identify their diagnosis and intervention according to their understanding about the case with the cue of multiple choices; (c) write down the reasoning of their choices and the questions they would like to clarify for better decision making. Information mentioned above, together with their practice background and their feedback to the study, were collected in the experiment in a written format and provided the material for data analysis.

*Data Analysis*

The purpose of the study was to understand the information a participant remembers about the case scenario and the structure of the information. Since the content is concise and short, each meaningful word was coded as the unit of analysis when related to retention (See Appendix B for detail coding). At the same time, no extra sampling strategy was needed in content analysis. All textual information collected from the participants was analyzed.
The textual information was briefly divided into three portions, but since the characteristic of each portion varied widely, different coding methods and analysis approaches will be used.

The first part of textual information was the participant’s retention of the scenario. The retention was described according to the content and structure of their descriptions and how accurate their description was. This study also focused on matching their retention with their diagnosis and intervention.

Study on retention might be able to provide a description of the linkage between the implicit memory and the diagnosis/intervention, but this approach has limitation on explaining how the participants interpret the information. Overall, a description of how participants reached a decision would help bridge the gap.

The second part of the textual data is the participant’s reasoning of their decision making. It was a key to solving question about how information leads individuals to a schema that can help them understand the situation. The reasoning could identify certain information that was relevant to recognizing the schema among various retained information. It might provide a more interesting perspective on how people fill the gap (missing information, or the information they were unable to recall) to support their decision when information is extremely limited.

The third part of textual information was participant’s response to the research. Their feeling about the study and whether the study is reasonable to them was addressed. Meanwhile, several themes about decision making were developed from previous interviews.
The coding principle of the first part of the information was a semi-close coding process. Since the participant was retelling the narratives, the content was very close to the original narratives. Therefore, the case scenario was the model of original coding. Each meaningful word was coded and grouped by different documentary sentence. Meaningful words include actors, actions, and the characteristics of actors and actions (semantic triplet) in the scenario. Documentary sentence refers to the section that describes an action or an event and can be differentiated from other sections. The participants’ retention was coded according to the code of original scenario. Each code has a tag that indicates the attribute of the code, including (a) exactly the same word, (b) a synonym, (c) similar meaning, (d) similar concept, and (e) opposite meaning.

Two people independently coded, categorized, and tabulated the retention information. To estimate the consistency of the analyses, the percentage of agreement will be computed by (a) tabulating the number of word attribute of agreement and disagreement, (b) dividing the number of word of agreement by the total number of coding word, and (c) multiplying that quotient by 100.

The coding principle of the second and the third part of the information was the open coding process. Information relevant to the scenario in the reasoning will be coded as prior stage. Among the rest of the information, each idea or concept was identified and was assigned to a code. Codes that address similar themes were organized under same tree nodes. The process was continued until all the information was coded and well structured in a systematic way.

Nvivo, a qualitative inquiry software, was used in the data analysis process. However, it is not because the analysis tool nor even the textual data make this portion of
study more qualitative oriented. Actually, the first part of the information was presented in bar graphs and tables, which might be identified as a quantitative study by most of the people. The reason this study is more qualitative oriented is because the purpose of the study as well as the attitude of the researcher. The researcher holds the attitude that the process from information receiving to decision making eventually cannot be detached from the individual. Meanwhile, the study is not intended to explain the cause of the relationship between retention and decision, but more to reveal the participants’ viewpoint of how a decision was made.
CHAPTER 4

FINDING AND DISCUSSION: DEDUCTIVE REASONING

This chapter presents the demographics, the findings and a discussion of research procedures based on deductive reasoning. The data was based on written responses of the participants that were collected when they completed the procedures of the experiment, which included the diagnosis, the retention, and the reasoning for the diagnosis.

The first part of this chapter presents the demographic information of the participants, including their age, gender, years of experience, fields of practice, Reading Span Test (RST) scores, and reading speed. The second part of this chapter introduces the coding system, initiates different approaches used to estimate participants’ understanding of the client’s situation and presents the findings of the research questions: (a) Whether participants understood the client’s situation better during the time-sufficient situation than the time-constraint situation; (b) whether the experienced group had a better understanding of the client’s situation than the inexperienced group when the case records were read under the time constraints; (c) whether the understanding of the client’s situation was influenced by experience when the case record was read under sufficient time; and (d) whether the experienced group had a better understanding of the client’s situation than the inexperienced group when the case record was read under different time constraints. The third part of this chapter discusses the basic assumptions of this research,
the meaning of the different estimating approaches, and limitations of the sampling and measuring procedures.

**Demographics**

The study included 40 participants, composed of twenty participants in two groups that were recruited based on their years of working experience. The inexperienced group participants were students with less than three years of working experience (including field placement) in a social service agency. The experienced group participants were practitioners with more than five years of working experience. Table 4.1 presents the profiles of the participants. In the inexperienced group, 5% (n=1) of the participants were male and 95% (n=19) were female. Participants ages ranged from 21 to 28 with a mean age of 23.4 (SD=1.79). All of the inexperienced group participants came from a MSW program in a Midwest University. Four of them were in the second year of MSW program and 16 of them were in their first year of ASAP (Advanced Standing Alternative Plan) which is equivalent to the previous education level.

Inexperienced group participants on average had 1.1 (SD=.77) years of working experience including some field placement time and also part-time working experience. Fifteen percent of the inexperienced group participants had experience working in aging, sixty percent in child welfare and family, five percent in mental health, ten percent in medical social work, and ten percent in school social work. The Median score in the Reading Span Test (RST)\(^\text{10}\) is 3.1. Most participants were able to retain three words in

\(^\text{10}\) RST (Daneman & Carpenter, 1980) is one of the most widely used tests for measuring individuals’ Working Memory capacity. The participant of the RST will be asked to read a single line sentence in an index card. The arrangement is five sets of two, three, four, and five sentences. The researcher presents one
the test. The average time of reading a five page instruction (260 words) was 51.9 seconds.

In the experienced group, 5% (n=1) of the participants were male and 95% (n=19) were female. Participants ages ranged from 28 to 58 with a mean age of 44 (SD=10.24). All of the experienced group participants had at least a MSW degree. The experienced group participants on average had 17.5 (SD=9.83) years of working experience including the field placement and part-time working experience. Five percent of the experienced group participants had experience working in child welfare and family, five percent in substance abuse, forty percent in mental health, thirty percent in medical social work, and twenty percent in school social work. The Median score in RST is 3.15. Most participants were able to retain three words from the test. The average time in reading a five pages instruction is 64.1 seconds.
<table>
<thead>
<tr>
<th>Variables</th>
<th>Freq. (%)</th>
<th>Mean</th>
<th>S.D.</th>
<th>Med</th>
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</tr>
<tr>
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<td></td>
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</tr>
<tr>
<td>Male</td>
<td>1 (5%)</td>
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</tr>
<tr>
<td>Female</td>
<td>19 (95%)</td>
<td></td>
<td></td>
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<td></td>
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<td>Years of Experience</td>
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<td>.77</td>
<td></td>
<td>.25-3</td>
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<td>Field</td>
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<td></td>
</tr>
<tr>
<td>Aging</td>
<td>3 (15%)</td>
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<td></td>
<td></td>
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<td>Child Welfare / Family</td>
<td>12 (60%)</td>
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</tr>
<tr>
<td>Substance Abuse</td>
<td>0 (0%)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental Health</td>
<td>1 (5%)</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical Social Work</td>
<td>2 (10%)</td>
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<tr>
<td>School Social Work</td>
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<td>2.1-5.4</td>
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<tr>
<td>Reading Speed</td>
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<td>38-80</td>
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<td>Age</td>
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<td>Gender</td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>6 (30%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Female</td>
<td>14 (70%)</td>
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<tr>
<td>Years of Experience</td>
<td>16.92</td>
<td>9.71</td>
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<td>5-34</td>
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Continued

Table 4.1 Demographic Characteristic
Table 4.1 (continued)

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<th>Variables</th>
<th>Freq. (%)</th>
<th>Mean</th>
<th>S.D.</th>
<th>Med</th>
<th>Range</th>
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<td>Experienced</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Field</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Aging</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Child Welfare / Family</td>
<td>1 (5%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substance Abuse</td>
<td>1 (5%)</td>
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<tr>
<td>Mental Health</td>
<td>8 (40%)</td>
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<tr>
<td>Medical Social Work</td>
<td>6 (30%)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>School Social Work</td>
<td>4 (20%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RST</td>
<td>3.15</td>
<td>2.4-4.2</td>
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<td></td>
</tr>
<tr>
<td>Reading Speed</td>
<td>64.05</td>
<td>17.03</td>
<td></td>
<td>40-98</td>
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</tr>
</tbody>
</table>

Findings

Coding

Coding was based on the principle mentioned in the previous chapter. Each meaningful word is coded and grouped by different documentary sentences. A documentary topic is composed of one or more documentary sentences. The retention and the diagnosis are triangulated by the scores based on word, sentence, topic, reasoning sentence, and reasoning topic. An example of coding is given below: (Details of coding can be found in Appendix B.)

Original description:

“According to his school teacher, Tommy is a slim boy and he is shorter than other boys of his age. He has peer relationship problems in that he often isolates himself from other students.”
Coding:

- SC1 According to his school teacher (C1),

**Topic-Body Status**

- SC2 Tommy (A7-7) is a slim boy (C2)
- SC3 He (A7-8) is shorter (C3) than other boys of his age. (C4)

**Topic-Peer Relationship**

- SC4 He (A7-9) has peer relationship problems (B7-2)
- SC5 He (A7-10) often (C5) isolates himself (C6) from other students (B8-2).

Explanation:

Meaningful words include actors, actions, and the characteristics of actors and actions (semantic triplet) are identified as the basic unit of coding. Tommy (A7-7) and He (A7-8) are the examples of actors. Shorter (C3) and peer relationship problems (B7-2) are the examples of characteristics. Isolates himself (C6) is the example of characteristics of action.

Each documentary sentence must be a simplified sentence. The original sentence that contains more than one meaning, e.g., “he has peer relationship problems in that he often isolates himself from other students,” will be split into two simplified sentences, e.g.,

SC4 11“he (A7-9) has peer relationship problems (B7-2)” and SC5 “he (A7-10) often (C5) isolates himself (C6) from other students (B8-2).”

Topic is composed of documentary sentences. For example, SC2 “Tommy (A7-7) is a slim boy (C2)” and SC3 “he (A7-8) is shorter (C3) than other boys of his age. (C4)” form a topic about the body status of the actor, Tommy.

11 SC4 is the abbreviation of the 4th Documentary Sentence of the Section C. SC5 is the abbreviation of the 5th Documentary Sentences of the Section C.
Scoring

How well the participants understood the client’s situation was measured by using two methods. The first approach used the amount of retention as a criterion for understanding. The second approach is based on participants’ diagnosis and reasoning.

Retention by Documentary Sentence

The scores in Table 4.2 are based on the number of documentary sentences displayed during the retention task. (Detailed coding can be found in Appendix B.) Due to the fact that some participants did not write whole sentences, the criterion for scoring a documentary sentence is based on the presence of the action, or the characteristics of actors and actions. For example, the sentences “Tommy is skinny and isolates himself” will be divided into two sentences: “Tommy (A7-7) is skinny (C2)” and “Tommy (A7-10) isolates himself (C6).” Therefore, SC2 and SC5 will be indicated in the retention. Each of them will get one point if they appear.

<table>
<thead>
<tr>
<th>Time</th>
<th>Scenario A Inexperienced</th>
<th>Scenario A Experienced</th>
<th>Scenario B Inexperienced</th>
<th>Scenario B Experienced</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sufficient</td>
<td>150</td>
<td>162</td>
<td>108</td>
<td>85</td>
</tr>
<tr>
<td>Constraint</td>
<td>94</td>
<td>71</td>
<td>50</td>
<td>57</td>
</tr>
</tbody>
</table>

Table 4.2 The Accumulative Score of Retention by Sentence (S_Score)
Scenario A contains 37 documentary sentences. Scenario B contains 27 documentary sentences. Each group has 10 people and the sum of their retention sentences is the accumulative score of retention by sentence. The score of each group in Scenario A ranges from 0 to 370. The accumulative score of each group in Scenario B ranges from 0 to 270. The advantage of this method is that it could display how well the participants acquired information from the scenario. However, it is hard to code a sentence to a specific documentary sentence if the participant uses a general description such as “Jenny’s problem.”

Retention by Word

The score presented in Table 4.3 was based on the accuracy of the wording in the retention task. Each meaningful word was coded and an attribute was assigned according to how accurate the word compared to the original word in the scenario. (Detailed coding can be found in Appendix B.) The attributes have 5 levels: (a) exactly the same word, (b) synonym, (c) similar meaning, (d) similar concept and (e) opposite meaning (see Table 4.4). Attribute (a) was assigned to the same word as the original wording, and got 5 points. Attribute (b) was the synonym of the original wording, and got 4 points. Attribute (c) was assigned to the retention missing the adjective (e.g., relationship problems – problem) or missing part of the meaning (e.g., lay off – lost job), and got 3 points. Attribute (d) was assigned to a word that was in the same cognitive dimension as the original wording, and got 2 points. Attribute (e) was assigned to a description that has the opposite meaning, but got 1 point. Due to the fact that the distance of semantic meaning
of each word is hard to measure, the score was assigned based on the order of closeness to the original word that functions as a summated scale.

The exception in coding attributes was that family members only had three levels: (c) exactly the same name, (d) same person, and (e) wrong name. Attribute (c) got 3 points; Attribute (d) got 2 points; and Attribute (e) got 1 point. For example, the description “Tommy is skinny and isolates himself” will be coded as “Tommy (A7-7c) is skinny (C2b)” and “Tommy (A7-10c) isolates himself (C6a).” The score of this sentence is 3 + 5 + 3 + 5 = 16.

<table>
<thead>
<tr>
<th></th>
<th>Scenario A</th>
<th>Scenario B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
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<td>Experienced</td>
</tr>
<tr>
<td>Sufficient</td>
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<td>1391</td>
</tr>
<tr>
<td>Constraint</td>
<td>802</td>
<td>505</td>
</tr>
</tbody>
</table>

Table 4.3 The Accumulative Score of Retention by Word (W_Score)

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Meaning</th>
<th>Example (Original – Retention)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Exactly the same</td>
<td>Refers – refer</td>
<td>5</td>
</tr>
<tr>
<td>b</td>
<td>Synonym</td>
<td>Problem – issue</td>
<td>4</td>
</tr>
<tr>
<td>c</td>
<td>Similar meaning</td>
<td>Relationship problem – problem</td>
<td>3</td>
</tr>
<tr>
<td>d</td>
<td>Similar concept</td>
<td>Aggressive – problem</td>
<td>2</td>
</tr>
<tr>
<td>e</td>
<td>Opposite meaning</td>
<td>Is not a role model – is a role model</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4.4 Attribute of Meaningful Words
Scenario A contains 107 meaningful words (one of the semantic triplet). Scenario B contains 75 meaningful words. The accumulative score of each group in Scenario A ranges from 0 to 4670. The score of each group in Scenario B ranges from 0 to 3750. The advantage of this method was that one can explore exactly how the information was captured. The disadvantage was that it was unable to reflect the phenomena that people use concepts to perceive a situation instead of memorize the detailed wording.

Reasoning by Documentary Sentence

The score presented in Table 4.5 is based on the number of the sentences in the reasoning task. Information used in rationalizing a participant’s diagnosis was coded in the same principle as documentary sentence. (Detailed coding can be found in Appendix B.) The criterion for scoring a unit in a reasoning sentence is the presentation of the actions, or the characteristics of actors and actions. For example, the description “because Tommy is skinny and short” was coded as RSC2 12 (“Tommy is skinny”) and as RSC3 (“Tommy is short”). Each of them got one point of their appearance.

<table>
<thead>
<tr>
<th></th>
<th>Scenario A</th>
<th></th>
<th>Scenario B</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inexperienced</td>
<td>Experienced</td>
<td>Inexperienced</td>
<td>Experienced</td>
</tr>
<tr>
<td>Time</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Sufficient</td>
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<td>32</td>
<td>25</td>
<td>18</td>
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<tr>
<td>Constraint</td>
<td>29</td>
<td>29</td>
<td>17</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 4.5 The Accumulative Score of Reasoning by Sentence

12 RSC2 is the abbreviation of the 2nd Documentary Sentence of the Section C in the Reasoning task. RSC3 is the abbreviation of the 3rd Documentary Sentence of the Section C in the Reasoning task.
Scenario A potentially contains 37 reasoning sentences. Scenario B potentially contains 27 reasoning sentences. The accumulative score of each group in Scenario A ranges from 0 to 370. The score of each group in Scenario B ranges from 0 to 270. The advantage of this method is that it can display the actual information used in the reasoning process, which might be closest to the information used for decision-making. However, it is hard to assign a reason to a specific reasoning sentence since some people use general concepts to describe their reasoning. Therefore, this score will not be considered as an indicator.

*Diagnosis along with Reasoning Topic*

The score in Table 4.6 is based on the diagnosis participants chose and the relevancy of the information displayed in the reasoning task. The criteria for assigning a unit of reasoning topic is based on the presence of any reasoning sentence categorized in that topic. For example, the description “Tommy is skinny” was coded as the second documentary sentence in Section C in the reasoning task (RSC2), which is part of the information in the Topic-Body.

The scoring principle was different in Scenario A and Scenario B due to the different natures of the case scenarios. Scenario A consists of 10 topics based on the documentary sentences as well as participants’ response. If an individual focuses on any information among Topic-Body (RSC2, RSC3), Topic-Hungry (RSC7, RSC10, RSC11) and Topic-Hygiene (RSC9), with either Topic-Father Careless (RSD3, RSD4, RSD5, RSD6, RSD7, RSE7, RSE8) or Topic-Mother Busy (RSE2, RSE3), the diagnosis tends to be child neglect. If individual focuses on Topic-Father Unemployed (RSD2) and
Topic-Mother Working Part Time (RTE2, RTE3), the diagnosis tends to be financial issues. If an individual focuses on Topic-Mother Complaining (RSE4, RSE5, RSE6, RSE7, RSE8), the diagnosis tends to be marital issues. If an individual focuses on Topic-Father Drinking (RSD5, RSD6), the diagnosis tends to be substance abuse. If an individual focuses on Topic-Relationship Problem (RSB4, RSC4, RSC5, RSC8), the diagnosis tends to be emotional disturbance issues or depression issues.

A good understanding in Scenario A was estimated by how well the explanation of the cause and effect is presented. Marital issues, financial issues, substance abuse issues or child neglect issues could be a sound diagnosis based on the case scenario information. Therefore, participants who chose one of the four issues got 6 points (if they use 5 or more pieces of information from the documentary sentences in their reasoning task) or 5 points (if they use 4 or less pieces of information from the documentary sentences in their reasoning task). Participants who chose either emotional disturbance issues or depression issues got 4 points (if they use 5 or more pieces of information from the documentary sentences in their reasoning task) or 3 points (if they use 4 or less pieces of information from the documentary sentences in their reasoning task). Participants who chose the other item got 2 points (if they use 5 or more pieces of information from the documentary sentences in their reasoning task) or 1 point (if they use 4 or less pieces of information from the documentary sentences in their reasoning task).

Scenario B consists of 7 topics that can be formulated by the documentary sentences. In order to make a sound diagnosis, participants have to not only focus on individual information but also focus on environmental information as well as the timeframe of each event. In this study two topics should be addressed: T-Behavior Change Timeframe (SH6,
SH8, SI4, and SI9) and T-Family Structure Change (SI2, SI3). Diagnosis choices can be divided into three levels. Participants who chose either blended family issues or sexual abuse issues got 6 points (if they use information from both Topics) or 5 points (if they use information from one of the Topics). Participants that chose either emotional disturbance issues or depression issues got 4 points (if they use information from both Topics) or 3 points (if they use information from one of the Topics). Participants who chose the other item got 2 points (if they use information from both Topics) or 1 point (if they use information from one of the Topics).

<table>
<thead>
<tr>
<th>Time</th>
<th>Scenario A</th>
<th>Scenario B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inexperienced</td>
<td>Experienced</td>
</tr>
<tr>
<td>Sufficient</td>
<td>51</td>
<td>50</td>
</tr>
<tr>
<td>Constraint</td>
<td>46</td>
<td>47</td>
</tr>
</tbody>
</table>

Table 4.6 The Accumulative Score of Diagnosis along with Reasoning Topic (DR_Score)

The score of each group in Scenario A and Scenario B ranges from 10 to 60. The advantage of this method was that it considered how the participant defines the problem and considered the amount of information used in decision making. The disadvantage was the low variation due to the fact that there are three levels of diagnosis.
Analysis

1. Did participants understand the client’s situation better under the time-sufficient situation than time-constraint situation?

Reading under different time constraints was significantly different in both Scenario A and Scenario B. Table 4.7 and Table 4.8 present the t-test results of the difference. Participants who read under the time-sufficient situation score higher on the Score of Retention by Sentence (S_Score) and the Score of Retention by Word (W_Score) than those who read under the time-constraint situation in both the Scenario A and Scenario B environments. There was no significant difference between the two groups for Score of Diagnosis along with Reasoning Topic (DR_Score).
<table>
<thead>
<tr>
<th>Score</th>
<th>Time-Sufficient</th>
<th>Time-Constraint</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inexperienced</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S_Score</td>
<td>15.0 (SD=5.56)</td>
<td>9.4 (SD=3.78)</td>
<td>2.63</td>
<td>18</td>
<td>.009</td>
</tr>
<tr>
<td>W_Score</td>
<td>127.9 (SD=52.63)</td>
<td>80.2 (SD=37.26)</td>
<td>2.34</td>
<td>18</td>
<td>.016</td>
</tr>
<tr>
<td>DR_Score</td>
<td>5.1 (SD=.57)</td>
<td>4.6 (SD=1.17)</td>
<td>1.21</td>
<td>18</td>
<td>.121</td>
</tr>
<tr>
<td>Experienced</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S_Score</td>
<td>16.2 (SD=3.52)</td>
<td>7.1 (SD=3.28)</td>
<td>5.98</td>
<td>18</td>
<td>.000</td>
</tr>
<tr>
<td>W_Score</td>
<td>139.1 (SD=42.69)</td>
<td>50.5 (SD=27.29)</td>
<td>5.53</td>
<td>18</td>
<td>.000</td>
</tr>
<tr>
<td>DR_Score</td>
<td>5.0 (SD=.82)</td>
<td>4.7 (SD=1.57)</td>
<td>.54</td>
<td>18</td>
<td>.299</td>
</tr>
</tbody>
</table>

Table 4.7 Independent-sample t-tests of Scores at Time-sufficient and Time-constraint Situation in Scenario A
<table>
<thead>
<tr>
<th></th>
<th>Time-Sufficient</th>
<th>Time-Constraint</th>
<th>$t$</th>
<th>$df$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inexperienced</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S_Score</td>
<td>10.8 (SD=2.39)</td>
<td>5.0 (SD=3.16)</td>
<td>4.62</td>
<td>18</td>
<td>.000</td>
</tr>
<tr>
<td>W_Score</td>
<td>107.7 (SD=23.22)</td>
<td>45.5 (SD=34.40)</td>
<td>4.74</td>
<td>18</td>
<td>.000</td>
</tr>
<tr>
<td>DR_Score</td>
<td>5.2 (SD=1.03)</td>
<td>4.0 (SD=1.16)</td>
<td>2.45</td>
<td>18</td>
<td>.013</td>
</tr>
<tr>
<td><strong>Experienced</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S_Score</td>
<td>8.5 (SD=2.27)</td>
<td>5.7 (SD=2.31)</td>
<td>2.73</td>
<td>18</td>
<td>.007</td>
</tr>
<tr>
<td>W_Score</td>
<td>75.0 (SD=26.90)</td>
<td>42.3 (SD=19.69)</td>
<td>3.10</td>
<td>18</td>
<td>.003</td>
</tr>
<tr>
<td>DR_Score</td>
<td>4.5 (SD=1.43)</td>
<td>4.5 (SD=1.27)</td>
<td>.00</td>
<td>18</td>
<td>1.000</td>
</tr>
</tbody>
</table>

Table 4.8 Independent-sample $t$-tests of Scores at Time-sufficient and Time-constraint Situation in Scenario B
2. Did the experienced group have better understanding of the client's situation than the inexperienced group when the case record was read under the time constraints?

The scores for reading case scenario under the time-constraint situation did not show significant difference in either Scenario A or Scenario B. Table 4.9 present the t-test results of the difference. The experienced group did not have a better understanding of the client’s situation compared to the inexperienced group in both Scenario A and Scenario B.

<table>
<thead>
<tr>
<th></th>
<th>Inexperienced</th>
<th>Experienced</th>
<th>t</th>
<th>df</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scenario A</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S_Score</td>
<td>9.4 (SD=3.78)</td>
<td>7.1 (SD=3.28)</td>
<td>1.45</td>
<td>18</td>
<td>.082</td>
</tr>
<tr>
<td>W_Score</td>
<td>80.2 (SD=37.26)</td>
<td>50.5 (SD=27.29)</td>
<td>2.03</td>
<td>18</td>
<td>.029</td>
</tr>
<tr>
<td>DR_Score</td>
<td>4.6 (SD=1.17)</td>
<td>4.7 (SD=1.57)</td>
<td>-.162</td>
<td>18</td>
<td>.437</td>
</tr>
<tr>
<td><strong>Scenario B</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S_Score</td>
<td>5.0 (SD=3.16)</td>
<td>5.7 (SD=2.31)</td>
<td>-.57</td>
<td>18</td>
<td>.290</td>
</tr>
<tr>
<td>W_Score</td>
<td>45.5 (SD=34.40)</td>
<td>42.3 (SD=19.69)</td>
<td>.25</td>
<td>18</td>
<td>.041</td>
</tr>
<tr>
<td>DR_Score</td>
<td>4.0 (SD=1.16)</td>
<td>4.5 (SD=1.27)</td>
<td>-.92</td>
<td>18</td>
<td>.185</td>
</tr>
</tbody>
</table>

Table 4.9 Independent-sample t-tests of Scores for Different Groups under the time-constraint Situation

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Note: The level of significance was based on one-tailed test. However, finding shows an opposite direction of the hypothesis. The Score of Retention by Word (W_Score) should be examined by a two-tailed test. Therefore, the p value of the W_Score should be .057 in Scenario A and .081 in Scenario B. Experienced group and inexperienced group do not have significant difference in terms of W_Score.
3. Was the understanding of the client’s situation influenced by experience when the case record was read under sufficient time?

The scores for the reading case scenario under a time-sufficient situation showed significant difference in Scenario B but not Scenario A. Table 4.10 presents the $t$-test results of the difference. The inexperienced group had better understanding of the client’s situation compared to the experienced group in Scenario B in terms of Score of Retention by Sentence (S_Score) and Score of Retention by Word (W_Score), but both groups performed similarly in Scenario A.

<table>
<thead>
<tr>
<th></th>
<th>Inexperienced</th>
<th>Experienced</th>
<th>$t$</th>
<th>$df$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scenario A</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S_Score</td>
<td>15.0 (SD=5.56)</td>
<td>16.2 (SD=3.52)</td>
<td>-.58</td>
<td>18</td>
<td>.571</td>
</tr>
<tr>
<td>W_Score</td>
<td>127.9 (SD=52.63)</td>
<td>139.1 (SD=42.69)</td>
<td>-.52</td>
<td>18</td>
<td>.608</td>
</tr>
<tr>
<td>DR_Score</td>
<td>5.1 (SD=.57)</td>
<td>5.0 (SD=.82)</td>
<td>.32</td>
<td>18</td>
<td>.754</td>
</tr>
<tr>
<td><strong>Scenario B</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S_Score</td>
<td>10.8 (SD=2.39)</td>
<td>8.5 (SD=2.27)</td>
<td>2.20</td>
<td>18</td>
<td>.041</td>
</tr>
<tr>
<td>W_Score</td>
<td>107.7 (SD=23.22)</td>
<td>75.0 (SD=26.90)</td>
<td>2.91</td>
<td>18</td>
<td>.009</td>
</tr>
<tr>
<td>DR_Score</td>
<td>5.2 (SD=1.03)</td>
<td>4.5 (SD=1.43)</td>
<td>1.25</td>
<td>18</td>
<td>.228</td>
</tr>
</tbody>
</table>

Table 4.10 Independent-sample $t$-tests of Scores at Different Group under the time-sufficient Situation
4. Did the experienced group have a better understanding of the client’s situation than the inexperienced group when the case record was read under different time constraints?

The scores for reading case scenario under different time constraints by experience showed ambiguous results (see Table 4.11). Table 4.12 presents the difference between the time-sufficient and the time-constraint which has contradictory results for Scenario A and Scenario B for Score of Retention by Sentence (S_Score) and Score of Retention by Word (W_Score). However, the experienced group showed a smaller difference between the time-sufficient situation and the time-constraint situation than the inexperienced group on the Score of Diagnosis and Reasoning Topic (DR_Score), although the difference was not statistical significant.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Inexp. (Sufficient)</th>
<th>Inexp. (Constraint)</th>
<th>Exp. (Sufficient)</th>
<th>Exp. (Constraint)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario A</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S_Score</td>
<td>15.0 (SD=5.56)</td>
<td>9.4 (SD=3.78)</td>
<td>16.2 (SD=3.52)</td>
<td>7.1 (SD=3.28)</td>
</tr>
<tr>
<td>W_Score</td>
<td>127.9 (SD=52.63)</td>
<td>80.2 (SD=37.26)</td>
<td>139.1 (SD=42.69)</td>
<td>50.5 (SD=27.29)</td>
</tr>
<tr>
<td>DR_Score</td>
<td>5.1 (SD=.57)</td>
<td>4.6 (SD=1.17)</td>
<td>5.0 (SD=.82)</td>
<td>4.7 (SD=1.57)</td>
</tr>
<tr>
<td>Scenario B</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S_Score</td>
<td>10.8 (SD=2.39)</td>
<td>5.0 (SD=3.16)</td>
<td>8.5 (SD=2.27)</td>
<td>5.7 (SD=2.31)</td>
</tr>
<tr>
<td>W_Score</td>
<td>107.7 (SD=23.22)</td>
<td>45.5 (SD=34.40)</td>
<td>75.0 (SD=26.90)</td>
<td>42.3 (SD=19.69)</td>
</tr>
<tr>
<td>DR_Score</td>
<td>5.2 (SD=1.03)</td>
<td>4.0 (SD=1.16)</td>
<td>4.5 (SD=1.43)</td>
<td>4.5 (SD=1.27)</td>
</tr>
</tbody>
</table>

Table 4.11 Scores at Different Time Constraints by Experience
<table>
<thead>
<tr>
<th></th>
<th>Value of Contrast</th>
<th>$t$</th>
<th>$df$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scenario A</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S_Score</td>
<td>3.5 (SE=2.61)</td>
<td>1.34</td>
<td>36</td>
<td>.095</td>
</tr>
<tr>
<td>W_Score</td>
<td>40.9 (SE=25.93)</td>
<td>1.58</td>
<td>36</td>
<td>.062</td>
</tr>
<tr>
<td>DR_Score</td>
<td>-.20 (SE=.694)</td>
<td>-.29</td>
<td>36</td>
<td>.388</td>
</tr>
<tr>
<td><strong>Scenario B</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>S_Score</td>
<td>-3.0 (SE=1.62)</td>
<td>-1.85</td>
<td>36</td>
<td>.036</td>
</tr>
<tr>
<td>W_Score</td>
<td>-29.5 (SE=16.83)</td>
<td>-1.75</td>
<td>36</td>
<td>.021</td>
</tr>
<tr>
<td>DR_Score</td>
<td>-1.2 (SE=.78)</td>
<td>-1.54</td>
<td>36</td>
<td>.066</td>
</tr>
</tbody>
</table>

Table 4.12 Planned Contrasts of Scores at Different Time Constraints between Inexperienced Group and Experienced Group
Discussion

How much understanding an individual had was estimated by three different scores. Each of them has a different focus. Score of Retention by Sentence (S_Score) showed the extent the information of the scenario was used in perceiving the client’s situation. Score of Retention by Word (W_Score) showed how accurate the retention was compared to the original description. Score of diagnosis along with reasoning (DR_Score) showed how sound the diagnosis was as well as the information used to support the reasoning.

From the data in the previous section, it can be concluded that implicit knowledge does affect understanding. Time constraint also affected the use of implicit knowledge in decision making. However, the experienced group did not do better than the inexperienced group under the time-constraint situation. The results of comparing the difference between various time-constraint situations contradicted each other. Further discussion is necessary for clarification of the meaning of the finding.

Rival Hypothesis

One limitation of this study was that comparisons had to be accomplished by two different groups. The same group of participants cannot be measured twice under the same situation in order to prevent the testing effect identified by Campbell & Stanley (1963). For example, the participant who has a test on Scenario A under the time-sufficient situation will not have a test on Scenario A under the time-constraint situation nor have a test on Scenario B under the time-sufficient situation. The participant must have another test on Scenario B under the time-constraint situation. A random assignment was introduced in this study to assure the balance between two sub-groups.
No significant difference was found between the two sub-groups in the experienced group and the two sub-groups in the inexperienced group from the demographic information. The two sub-groups in the experienced group and in the inexperienced group are equivalent in age, gender, years of experience and working field. Also, studies (Friedman & Miyake, 2004; Jackson & McClelland, 1979) show that working memory and reading speed are possible factors that might influence the outcome. The Reading Span Test (RST) was used\textsuperscript{14} and the participants’ reading speed was measured and no significant difference between the two sub-groups in the experienced group and in the inexperienced group was found (see Table 4.13). Therefore, the rival hypothesis about the difference between two sub-groups should not be considered.

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
<th>(t)</th>
<th>(df)</th>
<th>(p)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inexperienced</td>
<td>50.00 (SD=9.74)</td>
<td>53.80 (SD=12.182)</td>
<td>-.77</td>
<td>18</td>
<td>.451</td>
</tr>
<tr>
<td>Experienced</td>
<td>63.20 (SD=16.51)</td>
<td>64.90 (SD=18.38)</td>
<td>-.218</td>
<td>18</td>
<td>.830</td>
</tr>
</tbody>
</table>

Table 4.13 Independent-sample \(t\)-tests of Two Sub-groups in Reading Speed

Topics Related to Research Assumptions

This study assumed that the understanding of the experienced group was as good as the inexperienced group under the time sufficient situation. However, the finding did not support this assumption. The inexperienced group showed higher scores in Scenario B.

\textsuperscript{14} No significant difference between the two sub-groups in the inexperienced group was found, \(\chi^2 (3, N=20) = 4.08, p = .253\). No significant difference between the two sub-groups in the experienced group was found, \(\chi^2 (2, N=20) = 2.93, p = .231\).
under the time sufficient situation than the experienced groups (see Table 4.10). While in Scenario A there is no significant difference between the two groups.

This study also assumed the experienced group could acquire better scores under the time-constraint situation. Again, the finding did not support this assumption. The inexperienced group showed higher scores in Scenario A under the time-constraint situation than the experienced group (see Table 4.9) while in Scenario B there was no significant difference between the two groups.

Participants in the inexperienced group had better scores perhaps reflecting their superior memory (LTM). The idea that students had better skill, more practice, and greater ability to memorize information is a very persuasive explanation. The average age of the experienced group was 21 years older than the inexperienced group. Besides memory, the reading habits might cause differences between these two groups. Reading is a basic requirement of students, while people working might not read as often as students. Also, the experience of reading from a monitor and reading from a paper was already identified as a factor. Although no difference between paper and monitors was found (Dillon, 1992) in accuracy, comprehension, and fatigue, silent reading from paper is faster (20-30%) than reading from monitors. Students nowadays use monitors to read information in an unprecedented manner. Intensive Internet browsing (Horton, Taylor, Ignacio & Hoft, 1996) might also have helped students develop the skills needed to acquire information better under the time-constraint situations.

The difference between Scenario A and Scenario B might also have influenced the outcome. Two scenarios cannot be equal by the nature of the case. The known differences between the two scenarios used in this study included: (a) Scenario A was longer than
Scenario B, (b) the problem was clearly stated in Scenario A but needed to be inferred in Scenario B, and (c) Scenario A presented a multiple problem family but Scenario B focused on a child. It is possible that the understanding and/or diagnostic skill requirements of the two scenarios were different.

Although the reason for the inexperienced group acquiring a higher score in Scenario A under the time-constraint situation and also in Scenario B under the time-sufficient situation is unclear, but it is very possible that the skills applied in the two situations were different from each other. If the assumption was that memory was the main variable affecting the score under the time-sufficient situation, it is likely the variable that contributed to the score under the time-constraint situation is something else.

There is a weak relationship between scores under the time-sufficient situation and under a time-constraint situation. The product-moment correlation coefficient (with coefficient of determination of scores in parentheses) between the time-constraint situations and the time-sufficient situations for the S_Score is .094 (.009), .242 (.059) for W_Score, and .176 (.030) for DR_Score. However, this is only one of the possible explanations of the phenomena. Other factors like the differences between the nature of the two scenarios might also contribute to the situation.

**Scoring**

This study uses three different scores to estimate how well the participants understand a case. The first two scores, Score of Retention by Sentence (S_Score) and Score of Retention by Word (W_Score), is based on retention. Using retention, a kind of
explicit memory, to estimate the understanding of a situation, more likely related to implicit memory, might be inadequate. Comparing the results with the third score, Score of Diagnosis and Reasoning (DR_Score), can provide more information about the situation.

Score of Retention by Word (W_Score) relied more on memory than score of retention by sentence (S_Score). As shown in Table 4.9, the inexperienced group had higher scores in both W_Score and S_Score. But there is no significant difference in Score of Diagnosis and Reasoning (DR_Score). This means the inexperienced group was doing better than the experienced group in terms of their retention but not their judgment. Table 4.10 presents a similar situation; the inexperienced group is doing better than the experienced group in terms of their retention but not their judgment. When considering the fact that the experienced group and the inexperienced group might have different memorization abilities, the experienced group showed fewer difference (see Table 4.11) than the inexperienced group in score of diagnosis along with reasoning (DR_Score), which means that the experienced group was less influenced by the time-constraint situation than the inexperienced group.

It is important to think again whether a good understanding of the situation should be defined as a practitioner’s ability to remember more of a clients’ detailed information or a practitioner’s ability to match a situation with an appropriate diagnosis. From the study results it was clear that the inexperienced group had better memory than the experienced group, different scenarios might also had influence on their retention, although the difference was not significant in this study.
Sampling and Measuring

In this study the experienced group was composed of practitioners who have worked more than five years. The average working experience of the experienced group participants in this study was 17.5 years. However, whether these practitioners have developed characteristic abilities of an expert that Klein (1983) described is questionable. On the contrary, the inexperienced group was composed of students who have worked less than three years. The average working experience in this study was 1.1 years. It is also debatable if some of the inexperienced group participants are developing some of the characteristics and abilities of an expert. Whether or not a practitioner is an expert might not only be defined by years of experience. Therefore, study results might be different than what theory suggests because of the different definition.

Input-output inconsistencies might also affect the study result. Practitioners gather information from face to face interviews most of the time, while in this study the information was provided by written format. Using a different format of information input to measure might cause the TAP (Transfer Appropriate Process) effect as was discussed in chapter 2. Also, practitioners were not offered a chance to clarify detailed information or to observe body language, and this kind of information is very important for practitioners to understand a client’s situation in a realistic way. Moreover, retention consists of not only the amount of information an individual can remember but also the structure of information one can remember. Quantitative data analysis has its limitations when trying to describe this dimension.
Conclusion

Recognition-Primed Decision (RPD) Model and Situation Awareness (SA) can explain the decision making process in social work practice. The reason practitioners can make an appropriate decision in no time is because they are using schemas to understand the situation. However, four hypotheses derived from the NDM theory does not fully support the assumption that experienced practitioners have a better understanding of the client’s situation than inexperienced practitioners. As the results show: (a) Reading under different time constraints shows significant difference in both Scenario A and Scenario B. (b) The scores for reading case scenario under the time-constraint situation did not show significant difference in either Scenario A or Scenario B. (c) The scores for reading case scenario under a time-sufficient situation show significant difference in Scenario B but not Scenario A. (d) The scores for reading case scenario under different time-constraint situations by experience show ambiguous result, but the study outcome might be caused by how the definition of “expert” was given.

One obstacle of this study is finding an appropriate approach to measure the understanding of a client’s situation or the situation awareness (SA) as described by Endsley (1997). The study is only able to estimate their understanding by their retention and their diagnosis. Readers might suggest using their diagnosis and their intervention is more valid to estimate the understanding or situation awareness than retention. However, quantitative data can offer very limited help if the meaning of the diagnosis and intervention cannot be differentiated. For example, one of the intervention items “Individual / Family Therapy” was designed to be a treatment when the questions were formed. However, many participants chose that answer because of the purpose of the data
collection. The meaning of their choice can not be revealed if it is not accompanied with their explanation.

The purpose of the research design is not to determine whether or not practitioners can make an “accurate” diagnosis, but to study how a narrative will be developed from the scenario and how practitioners evaluate the information they received. Inquiring whether practitioners with experience perform better might satisfy some of our curiosity, but the contribution is far less than inquiring about the schema and the reasoning process of diagnosis. Therefore, the next chapter will focus on textual information and try to describe the other part of understanding not covered by the methods described in this chapter.
CHAPTER 5

FINDING AND DISCUSSION: INDUCTIVE REASONING

This chapter presents the process, the findings, and a discussion of research procedures based on inductive reasoning. The data was based on two sources: (a) written responses of participants that were collected when they completed the procedures of the experiment that included the retention, the diagnosis, the suggested intervention, the reasoning for the diagnosis, and the clarification of the case scenarios, and (b) data collected from the interview with participants.

The first part of this chapter describes the research process, participants’ feedback about the research and the quality of the research, including validity, reliability, verification and suitability. The second part of this chapter presents quantitative content analysis and qualitative content analysis of research findings, which included (a) analyses of individual retention, information retained by most of the participants, information recalled most infrequently of the participants, the documentary sentences that one most often retained, and the structure of the retention; (b) analyses of selected diagnoses of both scenarios and selected interventions of both scenarios; (c) analyses of the most frequently used reasoning information, the reasoning style, the diagnosis preferences and reasoning styles, a concept map, and differences between the two groups; (d) analyses of the clarification information used by participants; (e) interview questions included whether participants receive most of the information under the time-constraint situation,
whether multiple-choice question stimulate participants’ retention, confidence about participants’ retention and diagnosis, the method practitioners use to understand their client, the approach participants use to understand the client’s situation, the role of case records, and the opinion of the difference between experienced practitioners and inexperienced practitioners.

The third part of this chapter discusses the findings in the following areas. First is a discussion about issues regarding retention. This includes examining the importance of rehearsal, whether information is equivalent, the inaccessibility of the information, the priming effect, and misplaced information. Then there is a discussion of the issues related to diagnosis, which include the nature of the diagnosis, information required for a diagnosis, the usefulness of the diagnosis, the relationship between what the participants retained and the diagnosis. The third section discusses the connection between the participants’ reasoning style and their diagnosis. Section four presents issues regarding diagnosis and intervention strategies which illustrate opposing perspectives. Finally, section five discusses the nature of practice knowledge.

Introduction

How an experienced practitioner understands the client’s situation better than an inexperienced practitioner is the main focus of this study. The purpose of having participants read the scenarios under the time constraints was to decrease the function of explicit memory in order to reveal the function of implicit memory and schema. Theoretically, individuals reading under the time constraint should have more difficulties memorizing information. However, implicit memory mechanisms such as pattern
recognition and automaticity are influenced less by such situations. Individuals should
have had the opportunity to receive a certain level of stimulus, which would be
information related to schemata and concepts they acquired previously. If individuals
were able to pick up information in such situations, they still would have to decide how
to use their limited time for rehearsing important information. This decision also relates
to schema. In short, the design of the research procedure aimed to distinguish the
information to which the participants paid attention, especially in an implicit way, when
they did not have adequate time to process information.

The researcher was more interested in schema than memory, as memory was only a
variable which needed to be controlled in this study. However, the schema that
participants needed was partly revealed through what they retained from reading the
scenarios. Of course not all the information they were able to recall had to be an element
of a schema, but information necessary for a schema should have had a greater chance to
be discerned and memorized. Therefore, the reasoning for participants’ decision was
analyzed in conjunction with their retention. The clarification questions that were asked
at post-experiment time provided information about how participants constructed their
schema.

The purpose of the study was to analyze the information participants needed and to
probe how they used information to construct a more complete picture of the situation.
All the diagnoses were “real”. It is part of a practitioner’s life experience and professional
practice. Their perceptions informed them of how the story will continue. Because of this,
there was no “correct answer” for the scenarios.
Research Process

Both the experienced group and the inexperienced group were divided into two sub-groups. One group read Scenario A at stage I (time-sufficient situation) and then Scenario B at stage II (time-constraint situation). The other group read Scenario B first then Scenario A. During stage I, participants read the scenario three times. The first time was under the time-constraint situation; the second time was under the time-sufficient situation; the third time was also under the time-constraint situation. The purpose of the first presentation was to understand how they reacted under the time-constraint situation; the second presentation was to make sure they received all of the pertinent information; the third presentation was for them to become used to the speed and be ready for next stage. Then, they would write down what they recalled from the scenarios, make a diagnosis and an intervention, and write down their reasoning for their decision.

After they completed all the tasks in stage I, participants were allowed to take a break (if they chose to) before stage II, and then they proceeded to read the second scenario once under the time-constraint situation. Afterward they would do the same tasks as they did in the previous stage.

Semi-structured Interview and Developed Questions

After participants completed both stages of the exercise, they were asked to answer five questions related to the priming effect, their confidence about retention, their confidence of their diagnosis, feedback regarding the study, and their perception of the purpose of the research design. More questions specifically asked if their responses needed to be explored further. These discussions formed five themes in the later period of
the study. However, the developed questions were only given to some of the participants from the experienced group. This was because the inexperienced group finished before the themes were developed.

*Feedback of the Study*

Although the participants were informed how fast the presentation speed would be, most of them were surprised by the first presentation. Among the 40 participants, three of them showed a slightly negative reaction and two of the three did not think they could make a diagnosis based on the presented information. Several reasons for this action included not being able to catch information and “that hurts my eyes”. However, they all agreed to continue the study after the researcher explained specifically the purpose of the research regarding how practitioners deal with missing information. All of them were experienced practitioners. No significant differences of their retention or diagnosis were found compared to other participants.

Among the 36 participants who shared their feelings about the study, 25 of them held positive attitudes, with remarks like “it is interesting”, “fascinating”, and “it’s an important study”. Three of them were neutral, and had comments like “OK” and “I guess not [having feedback]”. Three of them were negative; they said “I wasn't prepared”, “I don't really understand”, and “I don't understand what sense it makes”. Five of the participants expressed that participating in the study was difficult, with remarks “it took a lot of energy”, “it was very hard”, “anxiety producing having to read the information fast”, and “it's very difficult to do it in a very short amount of time”.

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Reading under the Time-constraint Situation

After participants finished reading a case scenario under the time-sufficient situation (second time presentation) in stage I, they were asked whether they received most of the information under the time-constraint situation (first time presentation). Responses were divided into five categories. No (9 participants); No, only some pieces (8 participants); Yes, roughly (6 participants); Yes, main idea (6 participants); and Yes (11 participants). Unable to retain much information was typical in the time-constraint situation. One participant said, “I can read it, but as soon as I read next thing, I forgot the last thing I read before” (NB2). Four participants (two in each group) could not retain any specific information from the scenario.

Validity

The validity of the study was established through face validity and content validity. Content validity refers to “how much a measure covers the range of meanings included within a concept” (Babbie, 2001). A panel of experts, consisting of a linguist, a practitioner, and a social work faculty member, judged the appropriateness, clarity and presentation speed of the instrument. Their experience offers valuable opinions to both the content and the procedure.

Face validity refers to “how a measure appears on the surface” (Fink, 2003). The face validity was established through not only the researcher but also the participants. Most of the participants (29 out of 40) were able to perceive the purpose of research design after they finished the two stage exercise. Three of the participants had a very limited understanding of the research purpose; four of the participants could not make
sense of the study; four of the participants did not comment directly to this question. Besides the positive feedback of most participants, some of them were asked to comment on the research design and hypothesis after it was explained to them. Most of them (six out of eight) considered the research design as useful and appropriate. Two participants voiced their concerns. One was worried about the biases that could be triggered. “I think that will trigger your biases, which might not be correct. So for example, if you are really big on child sexual abuse, there is enough inferences to the potential that sort of things, that a person might immediately jump into that conclusion” (EB1). The other one suggested that older social workers might have worse memory. “The older, more experienced person... we all complained that we cannot remember anything” (EA9). These two concerns would not negatively influence the validity because a primary purpose of the study was to explore schema need by participants in making clinical decision. In addition, this research design could address differential memory abilities in participants.

Reliability

The reliability of the study was established through inter-coder correlation and inter-coder agreement (Hodson, 1999). The inter-coder correlation was used in the coding of the retention part. A sample of one fourth of the participants’ retention was coded by a research partner and the correlation of the two scores (r) were .96 in Scenario A and .98 in Scenario B. The inter-coder agreement was used in the interview questions. The percentage of inter-coder agreement between two coders was calculated by
cross-tabulating the coding and counting agreements versus disagreements. The agreement of the two coder in the five themes (kappa) was .95.

**Verification**

The verification of the study was established through triangulation, member check, and peer examination. Triangulation refers to using multiple sources to make claims about a phenomenon (Cresswell, 1998). Member check refers to sending observations and transcripts to participants and researcher partners for accuracy (Lincoln & Guba, 1985). Peer examination refers to submitting early drafts to peers for review (Merriam, 1998). In this study, data from retention, diagnosis, intervention, and interview were triangulated to explore the research questions. The whole interview process was audio-taped with participants’ consent. The accuracy of the transcripts was accomplished by research partners. Early drafts were reviewed by two social work faculty members and one social work practitioner.

**Suitability**

Suitability refers to the ease with which a document can be read. Suitability of the case scenarios was accessed by the “Fog Index” (Gunning, 1952): (a) take a sample of 100 words. Divide the total number of words in the sample by the total number of sentences to equal the average sentence length (SL). (b) Count the number of words with three or more syllables in the sample and divide by the total number of words to find the percentage of difficult words (DW). (c) The Fog Index (FI) is the total of these two figures multiplied by 0.4 (FI = [SL + DW%] * 0.4), and it is the years of education.
needed to understand a document. The Fog Index is 5.6 in Scenario A and 4.4 in Scenario B. Both the experienced group and the inexperienced group have at least 16 years of education. The education that participants have is adequate enough for reading the scenarios.

Findings

Retention

The coding of the scenario followed the same rules described in chapter three. Each meaningful word was coded and grouped by documentary sentence. Appendix B presents the original scenarios and coding.

Individual Retention

The average number of documentary sentences a participant could retain from Scenario A and Scenario B was 18.95 sentences. The average for Scenario A was 11.80 sentences and the average for Scenario B was 7.15 sentences (see Figure 5.1). Participants had a tendency to retain more documentary sentences from Scenario A than from Scenario B. Participants also retained more documentary sentences under the time-sufficient situation than under the time-constraint situation (see Figure 5.2).
**Figure 5.1.** Frequency of Retention in Scenario A and Scenario B (Based on Scenario).

*Note:* There were ten people in each group. Each person has his or her own abbreviation. The first letter is the abbreviation denotes the group the person belonged to, with ‘N’ represent the inexperienced group and ‘E’ denotes the experienced group. The second letter is the scenario that the person read in stage I and the number is the number of the person in their group. Therefore, IA1 is the abbreviation of the 1st person in the Inexperienced group read Scenario A in Stage I. EB2 is the abbreviation of the 2nd person in the Experienced group read Scenario B in Stage I.
\textbf{Figure 5.2.} Frequency of Retention in Scenario A and Scenario B (Based on Presentation Speed).

\textit{Note:} The upper figure represents the number of documentary sentences the participants who read Scenario A under the time-sufficient situation (Stage I) and read Scenario B under the time-constraint situation (Stage II) could retain. The lower figure represents the number of documentary sentences the participants who read Scenario B under the time-sufficient situation (Stage I) and read Scenario B under the time-constraint situation (Stage II) could retain. The key to the abbreviations can be found under Figure 5.1.
Scenario A

In Scenario A, the average number of documentary sentences retained by the inexperienced group participants (with the time-sufficient and time-constraint situation) was 15 and 9.4; the average number of documentary sentences retained by the experienced group participants was 15.8 and 7. Figure 5.3 shows the distribution of the documentary sentences.

The documentary sentences retained by the experienced group and the inexperienced group showed a similar pattern. The experienced group and the inexperienced group performed similarly under the time-sufficient situation, but the inexperienced group performed a little better than the experienced group under the time-constraint situation.

Information retained by most of the participants

Three sentences were retained by at least nine participants in at least one of the four groups. They are: Tommy stinks (SC9), Mr. F was laid off for several months (SD2), and Mr. F drinks beer all day (SD5).

Three sentences were retained by eight participants in at least one of the four groups: Mrs. F is currently working part-time (SE2), Mrs. F is a waitress in a restaurant (SE3), and Mrs. F is thinking about divorce (SE6).

Three sentences were retained by seven participants in at least one of the four groups except family composition (names and their age) (SA3): Tommy seemed to have relationship problems with his classmates (SB4), Mr. F stayed at home most of the time (SD3), and Mr. F is a negative role model to the children (SE8).
Figure 5.3. Frequency of Documentary Sentence of Scenario A.

Note: ISA is the abbreviation for the Inexperienced group that read Scenario A under the time-Sufficient situation (Stage I). ECA is the abbreviation for the Experienced group that read Scenario A under the time-Constraint situation (Stage II). SA1 is the abbreviation of the 1st Documentary Sentence of the Section A in the Scenario A. SD3 is the abbreviation of the 3rd Documentary Sentences of the Section D in the Scenario A. Detailed coding can be found in Appendix B.
Information recalled most infrequently by the participants

Two sentences were retained by one participant or less in all four groups: Tommy enrolled in a regular elementary school (SB6) and There were several incidents (SC6).

Four sentences were retained by two participants or less in all four groups: Date: Nov. 23, 2004 (SA1), Mr. F changed jobs several times (SD8), Mr. F has difficulty staying in the same job (SD9), and Because of the financial difficulty at home (SE1).

Six sentences were retained by three participants or less in all four groups: Mrs. F was concerned about Tommy (SB3), According to his school teacher (SC1), Tommy has peer relationship problems (SC4), Tommy often isolates himself from other students (SC5), According to Mrs. F (SD1), and Mrs. F complains that Mr. F is not helping around the house (SE7).

Documentary sentences most often retained

Mr. F was laid off for several months (SD2) and Tommy stinks (SC9) were both ranked one of the top three most frequently recalled documentary sentences in all four groups. Mrs. F is currently working part-time (SE2) and Mrs. F is a waitress in a restaurant (SE3) ranked 4th or 5th. Mr. F drinks beer all day (SD5) was ranked 3rd to 5th in all four groups. Mrs. F is thinking about divorce (SE6) only ranked high in the experienced group. Tommy is a slim boy (SC2), Tommy is shorter than other boys of his age (SC3), Tommy always asks for a second meal during lunch (SC11) were recalled only by the experienced participants and only under the time-sufficient situation (see Table 5.1).
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<thead>
<tr>
<th>Rank</th>
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<td>SC11 (6, 1)</td>
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Table 5.1 List of Documentary Sentence Most Often Retained in Scenario A

*Note:* The first number in the parentheses indicates how many participants retained this documentary sentence in that group. The second number indicates how many times the particular documentary sentence appeared among the four groups.
Structure of the Retention

How participants retell the scenario was an important indicator of how they perceived the case scenario. Although most of the participants (29 out of 40) roughly followed the original flow of the scenario, the focus of their retelling was different. They also had the tendency to choose a certain diagnosis based on the pattern of their retention. For example, participants (6 out of 13) who paid attention to Tommy’s problem first before describing the family situation were more likely choose child neglect issues as the diagnosis.

“This is an elementary age boy who lives at home with mother /father /brother /sister. Currently experiencing social difficulties at school- a result of:
- Small size / slight build
- Poor hygiene
- Behaviors such as taking food
Father unemployed alcoholic, mother works part time as a waitress. Much conflict between mom/dad- primarily over finances, mother considering divorce.” (EA1 in the time-sufficient situation)

The diagnoses chosen by other participants whose pattern of the retention followed the same sequence (first Tommy, then family situation) included financial issues (3), substance abuse issues (2), marital issues (1), and emotional disturbance (1). Although the descriptions shared similar sequence, the information retained by the participants was different and showed a tendency to a certain diagnosis. Also, all of them were read in the time-constraint situation.

“Mr. and Mrs. F are having trouble with their son. Their son is shorter than the other kids in his classroom. He is teased at school because he stinks. He looks up to his dad as a role model. Mr. F has a hard time keeping a job. Mrs. F works as a waitress.” “The reason why I choose financial issues as a problem with the family because it affects the whole family that Mr. F does not have a job.” (NB5 in the time-constraint situation)
“Family came to therapist. Two or three children. One little boy is having problems at school getting along with other kids. He doesn't seem to be accepted-- Other children have told him he stinks. The family is having several problems. Dad is drinking, and out of work. Mom is working as a waitress and has considered divorce.” “I think there are several, but for primary, I will take substance abuse issues.” (EB8 in the time-constraint situation)

On the contrary, all people (3 out of 3) who paid attention to the family situation and then Tommy’s problem chose marital issues as the proper diagnosis.

“Family of 5 (mom, dad, 3 children) came into therapy. Dad is laid off; mom has taken a part time job. Marital relationship isn't very good at this time. Mom considering divorce, dad alcohol use in question. Tommy identified as the client. He was having behavior problems at school (fighting).” “Marital issues because of the alcohol consumption and unemployment can present stressors on any relationship which may lead to a feeling that you may need to divorce someone. The kid’s reaction (behavior) could be an outlet showing dysfunction within the family unit.” (EA6 in the time-constraint situation)

The other situation that people (2 out of 2) chose marital issues as the selected diagnosis was a mother-centered description. For example,

“The mother was concerned about her son Tommy 7 years old. He was having problems in school. The other students isolated him saying he ‘stinks.’ Her husband has been laid off from his job and stays home and drinks and has no motivation. She has gotten a part-time job as a waitress. She is thinking about getting a divorce.” (EA4 in the time-sufficient situation)

People who start the description from the father’s status are more likely end up with substance abuse issues (3 out of 4) or financial issues (1 out of 4). For example,

“Father unemployed may have substance abuse problem. Mother working as waitress. Considering divorce. Child having school difficulties. Shorter than other children. Stealing food. Children think he stinks. Father not helping at home at all. Poor role model per mother.” (EB5 in the time-constraint situation)
**Scenario B**

In Scenario B, the average number of documentary sentences retained by the inexperienced group participant (with the time-sufficient situation and the time-constraint situation) was 10.8 and 5.0; the average number of documentary sentences retained by the experienced group participant was 8.2 and 5.7. Figure 5.4 presents the distribution of the documentary sentences.

In Scenario B, the experienced group only sometimes did better than the inexperienced group under the time-sufficient situation. The same situation was found for the time-constraint situation. The differences between the experienced group and the inexperienced group in Scenario B were more significant than the difference in Scenario A.
Figure 5.4. Frequency of Documentary Sentence of Scenario B.

Note: ISB is the abbreviation for the Inexperienced group that read Scenario B under the time-Sufficient situation (Stage I). ECB is the abbreviation of the Experienced group read Scenario B under the time-Constraint situation (Stage II). SF1 indicated the 1st Documentary Sentence of the Section F in the Scenario B. SH3 is the abbreviation of the 3rd Documentary Sentences of the Section H in the Scenario B. Detailed coding can be found in Appendix B.
Information retained by most of the participants

Three sentences were retained by eight participants in at least one of the four groups. They are: Miss R., a single mother adopted Jenny (SG3), Jenny is verbally aggressive with other students (SH4), and Jenny withdraws from male staff and teachers recently (SH6).

Five sentences were retained by seven participants in at least one of the four groups: When she was 5 (SG4), Miss R worries about Jenny’s symptoms of depression (SG5), Miss R’s fiancé moved in with this family three month ago (SI2), Jenny often stays inside her room (SI5), and Jenny refuses to go out with them for dinner or any activities (SI7).

Information recalled most infrequently by the participants

Five sentences were retained by one participant or less in all four groups: Therapist: P. Jackson (SF2), Jenny enrolls in a regular elementary school (SG7), Jenny lies (SH3), Jenny don’t like to talk (SI6), and Generally Jenny is doing fine at home (SI8).

Three sentences were retained by two participants or less in all four groups: Date: Oct. 21, 2004 (SF2), Although it did not happen all the time (SH5), and Miss R noticed that Jenny has been very quiet lately (SI4).

Documentary sentences most often retained

Jenny withdraws from male staff and teachers recently (SH6) was the most frequently recalled documentary sentence although it only was recalled by the inexperienced group and only under the time-sufficient situation. Jenny is verbally aggressive with other students (SH4) was ranked in the first three most frequently
recalled documentary sentences in all four groups. Miss R’s fiancé moved in with this family three month ago (SI2) was only recalled under the time-sufficient situation. Miss R., a single mother adopted Jenny (SG3) was ranked in the first four most frequently recalled documentary sentences in all four groups. Jenny often stays inside her room (SI5) and Miss R worries about Jenny’s symptoms of depression (SG5) were only retained under the time-constraint situation. The couple plans to get married next year (SI3) only appeared in the experienced group’s recollection of the scenarios and only under the time-constraint situation (see Table 5.2).
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<td>SI7 (7, 1)</td>
<td>SI3 (4, 1)</td>
</tr>
<tr>
<td>8&lt;sup&gt;th&lt;/sup&gt;</td>
<td></td>
<td>SG1 (4, 1)</td>
</tr>
</tbody>
</table>

Table 5.2 List of Documentary Sentence Most Often Retained in Scenario B

*Note:* The first number in the parentheses indicates how many participants retained this documentary sentence in that group. The second number indicates how many times that documentary sentence appeared among the four groups.
Structure of the retention

As mentioned earlier, most people retold the scenario following the original flow in the presented case scenario. Participants tended to state information one topic at a time. After they finished expressing one topic, they would attend to another topic. Scenario A is a great example of this pattern since it describes a multi-problem family. It is easy for the participant to state the problem of one family member first and then the others. On the other hand, the girl is the only identifiable client in Scenario B. All of the information demonstrates examples of her problem behavior. Therefore, the structure of the retention did not show significant patterns. However, their description still reveals their tendency for choosing a certain diagnosis. For example,

“Jenny, 10, is having trouble in school; her mother (30’s) made a self-referral because she is concerned. At home she seems fine but has recently been withdrawn. Her mother's fiancé has moved in 3 months ago and they plan on marrying soon. Jenny is verbally abusive to other students and teachers but not all the time. Jenny was adopted at age 5.”

“Blended family issues. ... At first glance there is not apparent reason for Jenny's reactions other than the most obvious introduction of a new family member and a disruption in homeostasis.” (NB10 in the time-sufficient situation)

However, a slightly different description might lead to a different diagnosis. For example,

“Jenny is 10 years old. She is in the fourth grade. She was adopted at age 5. Her adoptive mother is 32. She is engaged and about to be married. Jenny has had an increase in anger this semester. She has been avoiding men. Her teacher brought this to her mother's attention and also identified that she has been lying. Jenny has withdrawn from the family and refuses to go out to dinner and other family activities.”

“Sexual abuse issues. ... Signs of withdrawal from males, anger outbursts, the behavior seems to have increased since mom's boyfriend has been coming around.” (NB3 in the time-constraint situation)
In Scenario B, even though participants retained very similar content and gave similar reasons for their diagnosis, the diagnoses were not necessarily the same. The following example can be compared to example above (NB3).

“Jenny is in the fourth grade and is having problems in class and at home. Her mother sought out therapy. Jenny has been withdrawn and has not participated in activities with her family. Jenny has been withdrawing from male adults as well. Jenny occasionally acts out in class. She also has been having nightmares. Her mom is a secretary and has recently moved in with her boyfriend. The date of therapy was October 21.” “I would diagnose depression because she has been withdrawing from activities, occasionally acting out, and having nightmares. Though she does not meet the criteria per say in the DSM, I would tackle this issue first. (NB8 in the time-sufficient situation)

Some people were more focused on the problem at the individual level. The following example can be compared to the first one (NB10) who also considered the family environment in his or her diagnosis.

“Mrs. R is a single mother and a university professor. She adopted her daughter when she was five years old, and she came seeking help for her daughter about possible depressive symptoms. Mrs. R recently got engaged and her fiancé has moved into the house. Since this time, teachers at school have reported the child has been acting aggressive in class and refuses to follow instructions from male teachers and staff members. Mrs. R states that her daughter has recently started staying in her room more often and refuses to go out with her and her fiancé. She also reports that the daughter has had more nightmares recently.” “Mrs. R and the teachers both reported that these problems occurred recently, seemingly around the same time that Mrs. R's fiancé moved into the home. The daughter may be feeling some anxiety around the change in her home life since all she has ever known in this family is her mother.” (NB6 in the time-sufficient situation)
Diagnosis and Intervention

Selected diagnosis: Scenario A

In the inexperienced group, four participants chose child neglect issues and three participants chose financial issues as the selected diagnosis under the time-sufficient situation. The pattern did not change much under the time-constraint situation. However, in the experienced group, four participants chose substance abuse issues and three participants chose child neglect issues as the selected diagnosis under the time-sufficient situation. But, under the time-constraint situation, four participants chose marital issues and three participants chose substance abuse issues as the selected diagnosis. None of them chose child neglect issues under the time-constraint situation (see Figure 5.5).

![Diagram of Diagnosis of Scenario A](image)

**Figure 5.5.** Diagnosis of Scenario A.

*Note: ISA is the abbreviation for the Inexperienced group that read Scenario A under the time-Sufficient situation (Stage I). ECA is the abbreviation for the Experienced group that read Scenario A under the time-Constraint situation (Stage II).*
**Selected intervention: Scenario A**

In the inexperienced group, five participants chose *clarify facts of neglect* and three participants chose *make a referral to an employment services agency* as their intervention under the time-sufficient situation. There was no significant change in the pattern under the time-constraint situation. However, in the experienced group, five participants chose *individual and/or family therapy* and four participants chose *clarify facts of neglect* as their intervention under the time-sufficient situation. But under the time-constraint situation, eight participants chose *conduct individual and/or family therapy* and the other two participants chose *make a referral to an employment services agency*” as their intervention (see Figure 5.6).

![Figure 5.6. Intervention of Scenario A.](image-url)
Selected diagnosis: Scenario B

Participants were asked to select a diagnosis from eight possible diagnoses. In the inexperienced group, three participants chose *emotional disturbance issues*; three participants chose *blended family issues*; and three chose *sexual abuse issues* as the selected diagnosis under the time-sufficient situation. However, four participants chose *emotional disturbance issues*; four participants chose *depression issues*; and two participants chose *sexual abuse issues* as the selected diagnosis under the time-constraint situation. None of them chose *blended family issues*. On the contrary, in the experienced group, four participants chose *blended family issues*; three participants chose *emotional disturbance issues*; and two chose *sexual abuse issues* as the selected diagnosis under the time-sufficient situation. But under the time-constraint situation, three participants chose *emotional disturbance issues* and five participants chose *blended family issues*. None of them chose *sexual abuse issues* as the selected diagnosis (see Figure 5.7).
Figure 5.7. Diagnosis of Scenario B.

Note: ISB is the abbreviation for the Inexperienced group that read Scenario B under the time-Sufficient situation (Stage I). ECB is the abbreviation of the Experienced group read Scenario B under the time-Constraint situation (Stage II).
**Selected intervention: Scenario B**

In the inexperienced group, six participants chose *individual and/or family therapy* and three participants chose *psycho/physical examination* as their intervention under the time-sufficient situation. Under the time-constraint situation, four participants chose *individual and/or family therapy*, three participants chose *psycho/physical examination*, and three participants chose *conduct play therapy* as their intervention under the time-constraint situation. However, in the experienced group, six participants chose *individual and/or family therapy* and four participants chose *psycho/physical examination* as their intervention under the time-sufficient situation. Under the time-constrained situation, seven participants chose *individual and/or family therapy* and three participants chose *psycho/physical examination* as their intervention (see Figure 5.8).

![Scenario B](image)

*Figure 5.8. Intervention of Scenario B.*
Reasoning

Comparing the differences between participants’ reasoning would be more useful than just focusing on their retention. Retention is affected by their memory, while reasoning is related to their judgment. In Scenario A both the experienced group and the inexperienced group had similar patterns in reasoning. For both the time-constraint situation and the time-sufficient situation, participants all used three documentary sentences to support their reasoning. In Scenario B, differential patterns of reasoning were observed. Participants generally used two documentary sentences to support their reasoning (see Table 4.5 for detail).

This coding approach has its limitations. Because the coding of participants’ reasoning relies on the matching of original documentary sentences, it is not a very precise coding. Some of them might use different words but were related to the same code. Also, a general term might not be coded consistently or cannot be coded. People that use the same general term might be coded differently because their retention is different. If their retention has more than one documentary sentence related to the general term, assigning that particular general term to any documentary sentence will be problematic.

Top list of reasoning information

Table 5.3 presents the ranking of information used in participants’ reasoning in Scenario A. Two reasons were used by five participants in at least one of the four groups: Mr. F was laid off for several months (SD2), and Mr. F often gets drunk (SD6). Six reasons were used by four people in at least one of the four groups; Mr. F drinks beer all
day (SD5); Tommy stinks (SC9); Tommy took food from other students (SC7); Because of financial difficulty at home (SE1); Mrs. F has constant conflicts with Mr. F (SE4); and Tommy always asks for a second meal during lunch (SC11). Two reasons were used by three people in at least one of the four groups: Mrs. F is currently working part-time (SE2) and Mrs. F is thinking about divorce (SE6).
<table>
<thead>
<tr>
<th>Rank</th>
<th>Sufficient-Time Situation</th>
<th>Time-Constraint Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inexperienced</td>
<td>Experienced</td>
</tr>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt;</td>
<td>RSC7 (4, 2)</td>
<td>RSC9 (4, 3)</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt;</td>
<td>RSC11 (4, 1)</td>
<td>RSD2 (4, 3)</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>RSE2 (3, 2)</td>
<td>RSD5 (3, 4)</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>RSC9 (3, 3)</td>
<td>RSE1 (3, 3)</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>RSD5 (2, 4)</td>
<td>RSC3 (2, 3)</td>
</tr>
<tr>
<td>6&lt;sup&gt;th&lt;/sup&gt;</td>
<td>RSD2 (2, 3)</td>
<td>RSC7 (2, 2)</td>
</tr>
<tr>
<td>7&lt;sup&gt;th&lt;/sup&gt;</td>
<td>RSC3 (2, 3)</td>
<td>RSC10 (2, 2)</td>
</tr>
<tr>
<td>8&lt;sup&gt;th&lt;/sup&gt;</td>
<td>RSE1 (2, 3)</td>
<td>RSE2 (2, 2)</td>
</tr>
<tr>
<td>9&lt;sup&gt;th&lt;/sup&gt;</td>
<td>RSE5 (2, 2)</td>
<td>RSE5 (2, 2)</td>
</tr>
<tr>
<td>10&lt;sup&gt;th&lt;/sup&gt;</td>
<td>RSD7 (2, 1)</td>
<td></td>
</tr>
</tbody>
</table>

Table 5.3 Top List of Reasoning Information in Scenario A

*Note:* The first number in parentheses indicates how many participants retained this documentary sentence in that group. The second number indicates how many times that documentary sentence appears among four groups.

RSC7 is the abbreviation for the Reasoning included information from the 7<sup>th</sup> Documentary Sentence of the Section A in the Scenario C. RSD5 is the abbreviation for the 5<sup>th</sup> Documentary Sentences of the Section D in the Scenario A. A detailed explanation of the system coding can be found in Appendix B.
Table 5.4 presents the ranking of information used in participants’ reasoning for Scenario B. Two reasons were used by more than five people in at least one of the four groups: *The couple plans to get married next year* (SI3); and *Miss R’s fiancé moved in with this family three month ago* (SI2). Two reasons were used by more than four people in at least one of the four groups: *Jenny is verbally aggressive with other students* (SH4); *Her temper outbursts increased compared to last semester* (SH8); *Jenny withdraws from male staff and teachers recently* (SH6); and *Jenny refuses to go out with them for dinner or any activities* (SI7).

Did the information they retained more frequently in the retention task allow for the same information to be used in the reasoning task? Compared to Table 5.1 and Table 5.2, it is clear that most of the reasoning information was also listed in the retention information, but in a different order. Among the retention documentary sentences, for example, *Mr. F was laid off for several months* (SD2) was ranked first in the time-sufficient situation and ranked second in the time-constraint situation in both the inexperienced group and the experienced group, but it was not ranked as high in the reasoning list as in the retention list. At the same time, the experienced group participants used this information more often than the inexperienced group participants. A similar situation could be found in Scenario B. For example, *Jenny withdraws from male staff and teachers recently* (SH6) was ranked the highest but only appeared in the inexperienced group under the time-sufficient situation. However, it was also the only information that was mentioned by four groups in the list of reasoning information.

Indeed, reasoning information is a better indicator than retained information. It reveals what kind of information is being used in decision making. However, because
different diagnoses were involved, the list only presents a general idea of the weight of the information. The framework of how the information was constructed is not shown.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Time-Sufficient Situation</th>
<th>Time-Constraint Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inexperienced</td>
<td>Experienced</td>
</tr>
<tr>
<td>1\textsuperscript{st}</td>
<td>RSI3 (6, 2)</td>
<td>RSI2 (5, 2)</td>
</tr>
<tr>
<td>2\textsuperscript{nd}</td>
<td>RSH4 (3, 3)</td>
<td>RSG5 (4, 3)</td>
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<tr>
<td>3\textsuperscript{rd}</td>
<td>RSH6 (3, 4)</td>
<td>RSH6 (3, 4)</td>
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<td>4\textsuperscript{th}</td>
<td>RSI7 (3, 1)</td>
<td>RSH4 (2, 3)</td>
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<td>5\textsuperscript{th}</td>
<td>RSH8 (2, 2)</td>
<td>RSI5 (2, 2)</td>
</tr>
<tr>
<td>6\textsuperscript{th}</td>
<td>RSI9 (2, 2)</td>
<td>RSI9 (2, 1)</td>
</tr>
</tbody>
</table>

Table 5.4 Top List of Reasoning Information in Scenario B

\textit{Note:} The first number in parentheses indicates how many participants retained this documentary sentence in that group. The second number indicates how many times that documentary sentence appears among the four groups.
Reasoning style

The biggest difference between the inexperienced group and the experienced group might be the way they explained their reasoning. The inexperienced group used more evidence-support style while the experienced group used more cause-effect style. The following examples demonstrate two cases of evidence-support style, two cases of cause-effect style, and one case of mixed style.

Evidence-support style:

“Tommy appears to be neglected due to his stealing food and the report of his 'stinking' from the other children. This combined with the family dynamic at home makes neglect a possibility”  (NA1 in the time-sufficient situation)

“I think that this family has some financial stressors. Tommy has been regarded as small and he has been taking food from other children at school, as well as, asking for seconds. This leads me to believe that he is not eating enough or properly. A family of five is living off of a part-time waitress' salary. That makes me believe that that is not enough money to support a family of five. Dad seems to lack motivation to get a job. Perhaps he does not know where to look for a job at. Plus, the parents are fighting over financial issues. Lack of money can be very stressful on a family and between the parents. I think that if the father got a job then he would add to the family income, the family could afford more food, Tommy would not steal food, and dad would not be regarded as lazy by the mother. Plus it might alleviate financial disputes between the parents.”  (NA3 in the time-sufficient situation)

Cause-effect style

“Most likely the father's substance abuse is negatively affecting the child's behavior at school, is the source of marital conflicts, and is preventing him from seeking employment. Additionally, there is financial strain on the family. The mother's absence from the home may be contributing to the children going to school with poor hygiene and the father is not helping the mother with proper care of the children.”  (EA9 in the time-sufficient situation)
“It seems like Tommy didn't start having problems until the husband was laid off and his wife had to get a job. This was a change in the family structure and functioning. It added financial stress to the family. Both the parents seemed to be overwhelmed and do not have much time and energy for each other and for parenting. The husband/father probably is depressed and his drinking is self-medicating and isolating himself from his wife and the rest of the family. If the parents starting communicating together and working more as a team to solve their problems then things would probably improve for Tommy. Tommy’s problems can be viewed as a symptom of a family system that is not functioning well. It could be viewed that the problems he is having is a way of stabilizing a family system whose homeostasis has been upset and also as a way of mobilizing the parents, at least the mother, to get the professional help the family needs.” (EA4 in the time-sufficient situation)

*Mixed style:*

“I believe the main issue with this family would be that of the substance abuse by dad. I feel that because he is drinking all day (as reported by mom) and is unmotivated to find employment. This is contributing to the other issues within this family. It contributes to the financial issues that mom and dad fight about. The financial issues could also be the reason we see neglect, in terms of the odor the other children report and the fact that he eats so much at school. If the family does not have the means to properly take care of the children, they are going to appear neglected, even if this isn't intentionally being done by the parents. I feel that if dad was able to stop drinking and find a job, many of the other family issues would disappear or at least improve.” (EA2 in the time-sufficient situation)

In Scenario A the inexperienced group had 11 cases that were explained using evidence-support style, 8 cases that were explained using cause-effect style, and 1 case that was explained using mixed style. While the experienced group had 5 cases that were explained using evidence-support style, 8 cases that were explained using cause-effect style, and 7 cases that were explained using mixed style. However, the difference between the inexperienced group and the experienced group is not as significant in Scenario B. The inexperienced group had 13 cases that were explained using evidence-support style, 5 cases that were explained using cause-effect style, and 2 cases
that were explained using mixed style. The experienced group had 13 cases that were explained using evidence-support style, 3 cases that were explained using cause-effect style, and 4 cases that were explained using mixed style (see Table 5.5).

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Inexperienced Group</th>
<th>Experienced Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E-S</td>
<td>C-E/M</td>
</tr>
<tr>
<td>A</td>
<td>11</td>
<td>9</td>
</tr>
<tr>
<td>B</td>
<td>13</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 5.5 Reasoning Styles

*Note:* E-S is the abbreviation for Evidence-Support style. C-E/M is the abbreviation for Cause-Effect style and Mixed style.

*Diagnosis preference and reasoning style*

Diagnosis preference might be another explanation of this phenomenon. In Scenario A the experienced group had more diagnoses of substance abuse (7 vs. 1) and marital issues (6 vs. 3), and participants tended to use the cause-effect style or mixed style, while the inexperienced group had a higher number of diagnoses of child neglect (8 vs. 3), and participants tended to use more of the evidence-support style (see Table 5.6).
In Scenario B, most people (13 out of 14) who used cause-effect style or mixed style chose the diagnosis of *emotional disturbance* or *blended family*. On one hand, six out of nine people in the experienced group who chose the diagnosis of blended family used cause-effect style or mixed style but only one out of six people chose the diagnosis of emotional disturbance use cause-effect style or mixed style. On the other hand, all the people (3 out of 3) in the inexperienced group who chose the diagnosis of blended family; three out of seven people chose the diagnosis of *emotional disturbance*; and one out of five who chose the diagnosis of depression used the cause-effect style or mixed style. The total number of these diagnoses evened out the difference between the inexperienced group and the experienced group (see Table 5.7).

### Table 5.6 Diagnosis Preference and Reasoning Style in Scenario A

<table>
<thead>
<tr>
<th>Diagnosis</th>
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<th>Experienced Group</th>
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</thead>
<tbody>
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<td></td>
<td>E-S</td>
<td>C-E/M</td>
</tr>
<tr>
<td>Substance Abuse</td>
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<td>1</td>
</tr>
<tr>
<td>Child Neglect</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Marital Issues</td>
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<td>2</td>
</tr>
<tr>
<td>Others</td>
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<td>5</td>
</tr>
<tr>
<td>Total</td>
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<td>9</td>
</tr>
</tbody>
</table>

*Note: E-S is the abbreviation for Evidence-Support style. C-E/M is the abbreviation for Cause-Effect style and Mixed style.*
<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Inexperienced Group</th>
<th>Experienced Group</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>E-S</td>
<td>C-E/M</td>
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<tr>
<td>Emotional Issues</td>
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<tr>
<td>Blended Family</td>
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<td>Depression</td>
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</tr>
<tr>
<td><strong>Total</strong></td>
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<td>20</td>
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</tbody>
</table>

Table 5.7 Diagnosis Preference and Reasoning Style in Scenario B

*Note:* E-S is the abbreviation for Evidence-Support style. C-E/M is the abbreviation for Cause-Effect style and Mixed style.

**Concept map**

Focusing on a single diagnosis one at a time might be helpful for understanding how participants constructed the case from the information provided. Two concept maps were constructed for each case scenarios base on the participants’ reasoning for their diagnosis. Figure 5.9 presents a concept map based on the reasoning process of participants who chose *child neglect issues* as the selected diagnosis in Scenario A. Four groups of participants, including both the inexperienced group and the experienced group in both the time-constraint situation and the time-sufficient situation, were analyzed together. Most of the participants provided direct information by using evidence-support style reasoning to support their diagnosis. Some of them used two or three concepts to
establish their diagnosis, where one or two pieces of information were used as evidence to support that concept. *Taking Food* (SC7) and *Stink* (SC0) were the most frequently recalled information used by the participants, but these themes also appeared with other information such as physical development (e.g. *Slim* SC2; *Short*, SC3) or family situation (e.g. *Father Drinking*, SD5, SD6; *Mother Working Part-time*, SE2). Some participants clearly stated that multiple problems were found in this family and they prioritized their decision according to a principle such as “in the best interests of the child”.

Figure 5.10 is a concept map based on the justification provided by participants who chose *substance abuse issues* as the selected diagnosis of the Scenario A. Most participants used cause-effect style reasoning to support their diagnosis. Although *Drinking all day* (SD3) or *Drunk* (SD5) were the core information provided, the effects of the father’s drinking problem such as *Tommy’s Problem* (SB4), *Unemployment* (SD2), *Financial Difficulty* (SE1) and *Marital Conflict* (SE4) were also important information used to support their diagnosis. No one diagnosed the substance abuse issues based solely on information about drinking.
Figure 5.9. Concept Map of Child Neglect Issues.
Figure 5.10. Concept Map of Substance Abuse Issues.
Figure 5.11 presents the concept map based on the reasoning of participants who chose blended family as the selected diagnosis in Scenario B. Most research participants used cause-effect style or mixed style reasoning to support their diagnosis. Many of the participants noticed that Jenny’s Behavior Change Recently (SH6, SH8, and/or SI9) and Fiancé Moved in Three Months Ago (SI2) occurred at the same time. Two participants considered the problem as adjustment issues caused either by Jenny’s original family or by the new family member. Two participants who read under the time-constraint situation only focused on information about Adopted Child (SG3) and formulated the diagnosis as blended family issues.

Figure 5.12 presents the concept map of participants who chose emotional disturbance as the selected diagnosis in Scenario B. More than two-thirds of the participants used evidence-support style reasoning to support their diagnosis. Participants tended to use concepts such as Acting Out or Anxiety to support their reasoning instead of using detailed information. The relationship between the cause and the effect was not assured. Several possible causes were proposed to explain the problem (e.g., “Jenny could either be responding to the new family composition and its effects on the family relationships, or there is the possibility of sexual abuse.” [NA5]) Another interesting phenomenon was that the information participants used for justifying their diagnosis was very diverse. Only three themes were used by more than one participant. At the same time, many participants only used very limited information to claim their diagnosis. Participants who could only remember information such as Aggressive (SH4) or Acting Out (SH8) probably chose emotional disturbance issue as their selected diagnosis.
Figure 5.11. Concept Map of Blended Family Issues.
Figure 5.12. Concept Map of Emotional Disturbance Issues.
Differences between the two groups

In general, based on participants’ reasoning of their diagnosis, it seemed that the experienced group participants included the broader context in their reasoning while the inexperienced group participants focused more on the individual. Although the information used to support their reasoning was equal in terms of the number of documentary sentences, the experienced group participants used twice as many words than the inexperienced group participants to explain their reasoning, especially during a verbal explanation.

The experienced group focused more on the timeline of the behavior change. For example:

“It is tough because I thought that did mention mom being remarried. So if the child is acting out, that I can imagine... because the problem haven't been presented before, it will be directly related to that. So I said maybe blended family issues.” (EA2 in the time-constraint situation)

In addition, it was harder to match the experienced group participants’ reasoning with the document sentences because they tended to use general concepts to explain instead of using information directly from the original scenario. For example:

“Mr. F drinks to the point of intoxication daily. His substance use may be impacting his ability to function in all relationships, spousal, parental and as an employee. His use may be a symptom of depression, inability to find work etc. Counseling for individual, marital and family is indicated since this could be affecting Tommy at school also.” (EA6 in the time-sufficient situation)

General concepts usually contain a lot of information, but practitioners usually will not enumerate the content unless people request them to do so. They prefer using concepts to communicate and may not offer specific information when the listener
understands the situation. That is to say, participants in the experienced group appeared to pay attention to broader information then the coding suggested based on documentary sentences. For example,

“I need to clarify more about the family dynamics, such as Jenny's siblings, mom's boyfriend move into their home, Jenny's behavior at home, relationships between the children and mom's boyfriend, Jenny's academic status at school.” (EA6 in the time-constraint situation)

The researcher asked, “What do you mean mom's boyfriends move into their home?”

“Well, I want to find out how long ago he moves into the home? Where he is prior to coming to live with them? Did he have any family? Did he have any children? Do they come to visit? Boyfriend is working (or not).”

Then the researcher asked, “How is the academic status matter?”

“Well, I would suspect if she... How did she doing last year? How did she doing this year? Is this a change? If there is a change, what happening with Jenny that take her focus out of school? Could it be that her boyfriend moving into the household impacted her relationship with her mother? Could there be some other things going on her house, boyfriend moving into the house impacted her relationship with her mother?”

On the contrary, the inexperienced group usually focused more on the client. Although the information they retained was similar to the information retained by the experienced group, they assigned the meaning of the information to the client instead of relating to the information from a broader environment. In the following cases, three participants described very similar information in response to the retention task, but assigned different meaning to the recalled information, which in turn led to the formation
of different diagnosis. In addition, the inexperienced group participants used more item specific information in their reasoning than the experienced group. The following examples demonstrates the retention and the reasoning of three participants, including two inexperienced group participants and one experienced group participant.

“Ms. R. brought her adopted daughter Jenny in to the therapist, sometime in October, because she is recently having bad dreams. Jenny has been very aggressive at school recently. Jenny usually stays in her room and does not want to go out with the family or do any other activities. Ms. R is engaged to be married within the next year.” “I chose this diagnosis [sexual abuse] because of her acting out aggressively in school as well as having bad dreams recently. Also the withdrawal from participating in activities with her family.” (NB1 in the time-sufficient situation)

“Jenny is 10 years old. She is in the fourth grade. She was adopted at age 5. Her adoptive mother is 32. She is engaged and about to be married. Jenny has had an increase in anger this semester she has been avoiding men. Her teacher brought this to her mother's attention and also identified that she has been lying. Jenny has withdrawn from the family and refuses to go out to dinner and other family activities.” “Sexual abuse issues. Signs of withdrawal from males, anger outbursts, the behavior seems to have increased since mom's boyfriend has been coming around.” (NB3 in the time-sufficient situation)

“In October Mrs. R brought her 5 year old adoptive daughter to a mental health therapist because of a change in her behavior at home and in school. Jenny (daughter) has been having nightmares at home. Teachers have reported that she is self-isolating, aggressive towards her peers. Mom's fiancé has moved into the home (approx. 4 months prior).” “Blended family issues. Mom's fiancé has moved into the home. Jenny’s behavior may be a result of a change in the family dynamic/structure.” (EB6 in the time-sufficient situation)

Summary

The list of reasoning information suggests the importance of certain information. The information that was recalled most often in retention task was not necessarily the information used in reasoning. In addition, the reasoning style was different between the
two groups. The inexperienced group participants tended to use evidence-support style but the experienced group participants tended to use cause-effect style or mixed style. However, this phenomenon might relate to their diagnosis preference since the reasoning style was highly consistent with the diagnosis they made. The concept maps show different possibilities of reaching a diagnosis based on the same information but different pathways of reasoning. Only the diagnosis of child neglect issues presented a common pattern of using information. Other diagnoses such as substance abuse issues, blended family issues and emotional disturbance issues suggested people might use different information to form their diagnosis. The most significant difference found in the reasoning task is that the experienced group participants tended to use concepts that take into considering the broader environment to describe their reasoning, but the inexperienced group participants tended to use detailed information focused on the individual client for their reasoning.

Clarification

The scenario might not have offered the kind of information that is important for people to make a diagnosis. Inquiring about the kind of information they needed to know in order to make a better diagnosis was central to the study. After participants offered their reasoning, the researcher asked: “Is this case clear for you?”, and “What kind of information would you need in order to make a better diagnosis? Two people in the experienced group actually presented an agency form and chart listing all information that needed to be collected in a session. Most people just asked some questions related to the situation described in the scenario.
Analyses of the clarification information used by participants in Scenario A

Six people thought the case was clear to them in Scenario A. The most common questions participants asked for clarification purposes include:

**Other siblings (8 cases)**

“Some additional questions I would want to know are about the other children and their behaviors.” (EA7 in the time-sufficient situation)

“Maybe I would ask about the two siblings, and if they were experiencing the same issues as Tommy, related to stinks, hungry, short.” (NA7 in the time-sufficient situation).

**Drinking (5 cases)**

“How much alcohol does the father drink on a daily basis?” (NB4 in the time-constraint situation)

“Did he use substances previously?” (NA5 in the time-sufficient situation).

**Environmental safety (5 cases)**

“I need to know more about the environmental safety of the home. I need to know about Dad's habits when he is drunk.” (NA2 in the time-sufficient situation)

“Is there any domestic violence in the home?” (NB6 in the time-constraint situation).

**Hygiene problem (3 cases)**

“What is the reasoning for him smelling?” (NA4 in the time-sufficient situation)

“Why has the family not been bathing Tommy?” (NA3 in the time-sufficient situation).
Physical development (3 cases)

“If the reason he is small [is] due to a medical issue and not poor diet.”  (NA3 in the time-sufficient situation)

“Is Tommy developing normal?”  (NSA4 in the time-sufficient situation)

Analyses of the clarification information used by participants in Scenario B

Only two people thought the case was clear to them in Scenario B. The most common questions include:

About fiancé (14 cases)

“I would like to verify how long fiancé has been involved with Miss R and his relationship with Jenny prior to moving into the house. Also, I would like to verify who disciplines Jenny and if the fiancé has started to take over this role after he moved in, which Jenny may not be accustomed to. Are there more or less restrictions since fiancé moved into the house? I would like to see if Miss R and Jenny have changed in regard to their relationship since fiancé moved into the house, such as ‘does Miss R spend more time with fiancé, and Jenny feels left out?’ I would verify exactly when Miss R first noticed the changes in Jenny.”  (EB2 in the time-sufficient situation)

“Exactly when the behavior started. I guess I would like to know if it was time to introduce the fiancé into the family. And sort of conscious with her, you know, have her think through how that connected. And at some point may want to bring up the idea of sexual abuse, you know, has she considered sexual abuse.”  (EB7 in the time-constraint situation)

Adoptive information (12 cases)

“She adopts her from a child protective service agency? [How is] the family she adopted? How long did she have her? What kind of problems, I mean, when did the problems begin what are you noticing. I just need to know everything.”  (EA7 in the time-constraint situation)
“Other questions I would have is what kind of childhood did Jenny have when she was growing up outside this family. Where are her parents now? Does she have any siblings?” (NB1 in the time-sufficient situation).

**Timeline** (5 cases)

“When did the child start acting out in school? When did the boyfriend move in? How much time is he with the child when other adults are not present?” (NA2 in the time-constraint situation)

“I would want to clarify [the] time frame for the behavior” (NB3 in the time-sufficient situation).

**Client’s perspective** (3 cases)

“I would want to know more about Jenny’s affective state, such has how she states she feels, I would want to know more about her social life at school and her perception of the problem.” (EA3 in the time-constraint situation)

“Well, sometimes with kids they do act in more aggressive ways and they are more agitated when they were depressed. I think probably we want to find out more about, you know, the girl perceived herself to be having problem at school. So her perception of what those are, that would often times help us to know whether something is happening there that is disturbing or she may be having difficulty with her grades or with her class, something like that.” (EB1 in the time-sufficient situation).

**Mental health history** (3 cases)

“Any mental health issues in biological family? Also, [it is] very important to evaluate any possible medical concern that could be causing outbursts, withdrawal. I would recommend an evaluation by physician.” (EA1 in the time-constraint situation)

“I would like to know more about life at home and her interactions with family and any family history of depression or mood disorders.” (EA3 in the time-constraint situation)
The clarification questions asked by the participants were limited by the framework of the scenario. Participants tended to ask questions inside the context of the scenario. The only exception would be a question asked by an experienced group participant. “I need to clarify more about ... Jenny’s academic status at school” (EA6 in the time-constraint situation). The understanding about the client situation appeared to be built from the content and/or structure of the scenario.

**Interview Questions**

*Did you receive most of the information in the time-constraint situation?*

Participants read the first case three times in the stage I. First, they read it under the time-constraint situation, then time-sufficient situation, then time-constraint situation again. After they finished the time-sufficient situation, they were asked if they received most of the information from the time-constraint situation. Nine people had a negative answer, nine people had a slightly negative answer, ten people had a slightly positive answer, and twelve people had a positive answer. In general, slightly more than half of the participants felt that they were able to receive information. The other half had trouble receiving information.

*Did the multiple-choice questions help you recall better?*

Most of the participants (29 out of 40) thought the multiple-choice questions aided their ability to remember information presented in the scenarios. Only four participants thought the multiple-choice questions were not helpful. Three participants held a neutral position, and the other people did not comment on the question correctly.

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15 This quotation is the same quotation as discussed in the topic of *Differences between the two groups*. 

**How much confidence do you think your retention and diagnosis is?**

Although the researcher already specified that a five point scale (from 1 to 5, 1 indicates lowest and 5 indicates highest) was used, some of the participants did not follow the rule and used a half point as their basic unit. Both the inexperienced group and the experienced group participants felt slightly unsure of their retention and diagnosis (see Table 5.8; Table 5.9). Most participants felt more confident about their diagnosis than about their retention. The experienced group had more confidence than the inexperienced group in both retention and diagnosis.

<table>
<thead>
<tr>
<th>Confidence Level</th>
<th>Scenario A</th>
<th>Scenario B</th>
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<tbody>
<tr>
<td></td>
<td>Inexperienced</td>
<td>Experienced</td>
</tr>
<tr>
<td>Retention</td>
<td>2.16</td>
<td>2.66</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>2.38</td>
<td>3.05</td>
</tr>
</tbody>
</table>

Table 5.8 Confidence Level regarding the Retention and Diagnosis in Stage II (Average Scores)
<table>
<thead>
<tr>
<th>Confidence Level</th>
<th>Retention Scenario A</th>
<th>Retention Scenario B</th>
<th>Diagnosis Scenario A</th>
<th>Diagnosis Scenario B</th>
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</tbody>
</table>

Table 5.9 Confidence Level regarding the Retention and Diagnosis in Stage II (Distribution)

A very interesting phenomenon was found based on participants’ answer to this question. Some experienced group participants felt that they had a lower confidence level regarding their retention, but they had a higher level of confidence about their diagnosis. Most of them chose less restrictive diagnoses and intervention. For example, participant EB1 chose “1” in retention but chose “4” in diagnosis. He (EB1) said, “It’s very general
Another participant who chose “2” in retention and chose “4” in diagnosis had another perspective.

“At the same time I feel very confident because of the ... not so much about the fact of specific facts of the case, but just kind of knowing the nature of presenting the problem that the presenting, in the way I think about practice ... is that the identified patient in both cases was a child in a school setting. So as a general rule, whenever a child is presenting a problem, both of the school setting or not, and the child is living with parents, be they biological, stepparents or adopted, I say usually this is a family system problem, not individual child problem.” (EA4)

The experienced group participants appeared to be more confident in their retention and diagnosis than the inexperienced group participants. However, the experienced group participants did not retain more than the inexperienced group participants based on their Score of Retention by Word (W_Score) and their Score of Retention by Sentence (S_Score) presented in Table 4.4 and Table 4.5. One experienced group participant’s feedback might be able to explain this phenomenon. “So the more experience you have, I think, the easier it is to have more confidence in yourself on what you are doing. ... Because you had either heard some form or version of something like that in the past, so it’s familiar to you” (EB2). The experienced group participants’ confidence about the retention might not merely rely on their memory about the case scenario but also relied on their experiences from similar cases.

How can practitioners understand their client?

Information gathering is always the first step in understanding clients. The experienced practitioners try to acquire information as much as possible. Talking to them
directly and getting information from related people is both important for understanding their client. One practitioner notes,

“I try to get as much information from them as I can. **What's their perspective of what the problem is?** How long has it been going on and why is it going on that kind of ... just get as much information as I can from each of the participants. And trying to find some... from strengths perspective of something they can do. What they have been done in the past or something that they can use” “It's good to get information from people **outside the family**, from other people's perspective of what's going on.” (EB2)

In real practice, information from different sources is not always consistent. Every information provider has his or her viewpoint. They might even offer wrong information in order to protect themselves. How to reconstruct the fact of client situation is not a simple task. One practitioner suggests verifying information by finding existing patterns.

“You know, one student maybe have five teachers. So if the student is having a problem in five places, then I have all the information. How did you summarize for that?” **“I look for trends.** If we have a meeting with five teachers, and all of them say the student has trouble with reading. Then we can assume there is a problem with reading. But if there is one teacher that has a problem with reading, and everybody else is ok, we just ignore. .... Because the teachers all have such different personalities. ... **So we take all of the information into account. The source and what they are saying.**” (EA1)

Most of the experienced practitioners reported the importance of experience in the interview. With more and more practice, they are able to connect information quicker, and they are more sensitive to information and know what to say. For example,

“I think just as years go by, and you have a base of knowledge. **You can very quickly sort your things. And know if it's something that needs attention right now.** Because many times we will pick up things the reporter doesn’t even realize, something maybe important. We can also hear, observe students their behaviors, their appearance, the way they are talking to us or looking at us. We can sort
through all of that too, if something is very different, something has happened.”  
(EA1)

Another practitioner shares the same opinion.

“I think a lot of clinicians I met over these years have that experience as well. It’s just your able to make those connections and remember lots of information about different cases. **When you’re seeing clients over time, over periods of sessions, you know, the same information comes up again,** like information and history things like that.”  (EA4)

Sometimes, the experienced practitioners might not even be aware of how they process the information. Information collecting and organizing happens naturally without a lot of effort.

“How is that processing? I think ... **I am saying these answers off the top of my head. I am not spending a lot of time thinking.** But back to what you said about schema, I think there are sort of ways of organizing information. And then whatever that information is, certain kinds of information will organize in the associate of other information. I don't know what else exactly to say about that though.”  (EB8)

When the researcher shared the idea about the procedure for computer processing information through a decision tree in an expert system, a practitioner suggested that a different way of reaching a decision was used by practitioners. Unlike an expert system that asks questions and reaches a conclusion based on logic, practitioners recognize a situation according to its components.

“I think it's more complicated than just the decision tree. You’d have... you know, in this case, you have this this this, but if you add this, it might be this this. It can really... the introduction just one other factor completely change the decision tree.”  (EB8)
One practitioner had a wonderful explanation about the understanding process. She suggested that experience from both personal and professional backgrounds created a language practitioners use to communicate with each other.

“I think it's the hearing of story and in our mind we categorize similar kinds of things. I kind of make little boxes for this stuff. I think when we talk to our colleagues and share cases. You know that we take this to something similar we had either personal experience or that we have dealt with professionally. We kind of categorize that together. I notice that when we have team meeting. We ever have like people work with children, people work with seriously mentally disabled adults They don't always speak the same languages. And they will say I don't even know what you are talking about, because they don't have the experiences, they don't have a box. But I think it's that similarity that we have either from a personal experience or from our own cases we are able to categorize it. And quickly understand what we are talking about.”  (EA9)

In conclusion, a category or schema is developed after years of practice. This ability not only helps them process information quicker than beginning practitioners, but also becomes the basis of effective communication. Having experience in dealing with one situation increases a practitioner’s ability to understand another similar situation. It also functions as a language to communicate with clients and other professionals.

*Approaches to understanding the client’s situation*

Responses to the interview questions revealed two approaches to understanding among research participants. Some participants quickly made choices while other participants took more time to come up with their answers. Their reflection provided clues of how a practitioner may understand a case. The first example is of a practitioner who is able to recognize a case and make a decision quickly.
“I make a fast [decision]. I think I formulate in my head with what’s probably happening. I have had an example. I could share with you a teenage student who is pregnant. Who came in with a story, many many layers to the story about family problems, drug use and abuse, and split up feelings. And very quickly there will be inconsistencies in the story. So that's what I picked up on and involved other people, to help me verify her story and create facts. So even though... because I don't want to be impulsive and jump make it wrong. I try to have a ballpark idea. Is this a crisis we have to deal with it right now, or is this drama we can deal with later. With little kids in elementary school, it's a lot of different. It's much slower pace. You have to get to know the kids. Then pull little pieces of information and give everybody to trust. This is much more fast pace environment. I fit well in this environment. I have more about... Ok! What's going on here? Let's figure out what's going on. Then move on to the next thing.”  (EA1)

The second example involved a practitioner going through an in-depth thinking process prior to developing a diagnosis.

“I will say that when you initially get information about a case, you know there is a lot of unanswered questions. And some of the questions that you do get your answers to... turn out to be wrong later on. Whether, you know, a parent isn't reporting accurately or just flat out lying about something, and you find that out later on. So what I’ve stated diagnosing or figuring out what the true causes and problems. This is ongoing process that you have to be open to change. I mean you can’t state this is the problem and this is how we gonna attack it. We think, but you know lets getting into a little more to see if that changes or see if we change our view on it. Because there’s been plenty of times where originally think it is one thing and it turns out to be something totally different. So you know, I don't know how to answer your question. I think diagnosing anything, anywhere is an ongoing process. So you... I mean until you come to the end where you know that nothing else about that.”  (EA2)

Another explanation is that two approaches may happen together just in different stages. Practitioners can recognize a situation quickly and then slow down to develop a more specific diagnosis. One participant reported:

“I usually put something into a category pretty quickly, just by a small amount of information. After that, is where I start, ya know try to think about little more, ask more question, kind of to nail down a specific diagnosis. If we are talking
about a specific mental health diagnosis, we’re talking more like a broad category of a family problem more, it's a school related issues. Some things like those broad categories seem (participant snapped fingers) pretty quick.” (EA9)

Role of case records

The basic function of a case record is to retain information about the services practitioners provided. It helps practitioners remember important information about their client as well as what to do and what they have done. Practitioners usually have a tremendous caseload. Without the assistance of case records it is easy to lose track of some important information.

“Oh! Well, I take notes. Always. Because I don't remember things well. I did as I was younger. So I always take notes. And I try to type my progress notes right away after a session. So I retain that. And I tend to document... I learned in graduate school but I do quite a bit about key statements or key words that they used... or I can use back with them that they have used. So I try to put in quotes, put in my progress notes any statements that I feel will be essential to have in next session.” (EA5)

The case notes serve as an external memory for them. Practitioners might have one hundred cases opened at the same time. They need to have an ability to quickly pick up a case and set it aside once the session is finished.

“You know, I done this case for today and I set it aside. And then I take back off the shelf next time. I think you set it aside. And but no, once I see the chart, once I see the person, then it all sort of, you know, you start, you know, I remember what they said and the details of the case.” (EA5)

However, sometimes case records might not be able to reflect a client situation because of several reasons. Protecting a client’s privacy or avoiding auditing is the main
reason for this. Information usually is vague and the recording is only to meet agency requirements. For example, I asked a practitioner what kind of information she might write down in the records. She replied, “I do not leave a lot of detail on my case notes. I focus on the behavior at school ... and objectives. I wouldn't have a lot of parental information in my notes” (EB4). I followed by asking the question about the possibility of using case records to communicate. She notes,

“Yeah, I think having that parent information is useful. ... If I were getting a consultation from my supervisor ... just show my case notes. I would want to write more information down in my case notes. I would like to write more down about the family. What's going on, at home or at school. Yeah, the whole thing. I would want to write down, you know, child and environment. So definitely I want to include that. If I were showing that for consultation, I would want to have as much information as I could. But I guess it's the protective thing, I just don't record that. Sometimes we are called to the board office and we're asked for a review on a kid. So it's just a little bit... while we understand confidentiality, I don't know that when you are in a different setting if that's understood. So I guess that's protecting cases.” (EB4)

Information that is very important for understanding a client situation may not be written down. One other experienced practitioner also stated the same attitude. The environment actually discourages practitioners from using case records to retain important information. Many times the function of the case records is for billing. Detailed recording might cause problems in the future.

“I will say at least 50% and I am thinking more like 70% of the case records don't accurately reflect what really happen. I think the documentation is vague and vast. And I think people have been taught to be vague because that way they don't get pinned down. By an audit, or we are documenting for the payer source and not... There are too many other things that... just not contribute to good documentation. .... So we may not be accurately reflecting on what really went on in the session. Because if you did that way, there is a good chance that you have a pay back for an audit. So this is not gonna happen.” (EA9)
Using case records as an external memory is a very positive application in social work practice. It can help practitioners keep track of client’s improvement and goal achievement. But preventing record keeping from just being used “for the billing and it also to cover yourself in case of some legal action” (EA9) will be an issue for us to work on.

Difference between experienced practitioners and inexperienced practitioners

Most experienced practitioners have a very succinct answer: “Experience.” “They haven't been through the number of cases, have experiences how to evaluate people” (EA5).

“Experience. You don't learn a lot until you are practicing and get that experience. I think it's more valuable than the course you take. And then when you start realizing what you don't know and seeking knowledge in that area, that's what I think where the real growth occurs. Somewhere you first got you don't know you don't know.” (EB10)

“Experience. I think maybe two things. One having seen a lot of different situations and experienced it… so they know what works or doesn’t. And too, maybe the shock factor is gone. So they are not go an: Oh! My gosh! You know, think about whatever they have seen and maybe a little more freed up just pay attention to what is going on.” (EB8)

She (EB8) gave a more detailed explanation in this topic.

“I think a more experienced worker might be more relaxed in their approach or making decisions and gathering information and not be so... Not operate a lot of urgency unless urgency is demanded. A younger worker might feel more urgent and that urgency might take away from their thoughtfulness, from their reflectiveness into the situation. ... For example, I work in an emergency room. Somebody came in that was suicidal and they had maybe caused physical harm to themselves in a gruesome way or something. An experienced worker might just not be really emotionally disturbed by that. I’d be concerned but they will sort of begin to work.
A young worker might be like, you know, so over tone with that situation would be difficult for them to sort of relax and begin to think through thoughtfully what might be the best interest of the client. So the more experienced practitioner may be able to be more relaxed and less rushed or less urgent about making decisions, and that could be helpful to them.” (EB8)

One other practitioner shared the same viewpoint. This participant (EB2) suggested that experience can create confidence in you because you have seen the event before.

“I think there is mainly... there’s not as much fear there to do some things. Because either through, one you probably have more confidence from [what] you’ve seen and heard... a lot of things. So things aren't as scary to you as, say, when you were first out of the school. So the more experience you have, I think, the easier it is to have more confidence in yourself on what you are doing. And not as scary to get into areas maybe things are as scary to you. Because you had either heard some form or version of something like that in the past, so it's familiar to you. With experience comes the confidence. And confidence somewhat, in some form, equates into doing a better job.” (EB2)

Another practitioner uses working knowledge to describe the difference between the two groups. She shared a story about how experience makes a difference.

“There is a very multiple problematic family that moved into our district this year. Many teenage kids, a mentally ill mother. And we have been working with high school age kids. And the children services is involved. They put a first year worker with family. And she is a lovely person. She is a bright girl. But it's too big for her. She can't... We can go in, the psychologist and I have been working together. We can go in and interview mom and sort of few things, or prioritize the kids. But she's having a very hard time trying to decide where to start. She doesn't know where to start. She doesn't know how to prioritize it, or move forward she's just very overwhelmed.” (EA1)

Experience might not always come from successful intervention. Learning from mistakes is required to become an experienced practitioner.

“I think the experienced people know what points are important and can pick up on quicker because they have been through [similar] experiences like it already. So just
basically having the experience already been through certain cases. You know what
direction to take. You know what obstacles you solved before, maybe you know
you’re not make the same mistake again kind of things. Whereas you know the
novices have to make those mistakes sometimes in order not make it again. ... I
think just the having more trial-and-error experiences make big difference. ...
Things like that really help you be more conscious to what to look for and what not
to do, what needs to be done, what questions to ask specifically.”  (EA2)

Nevertheless, a practitioner discussed that experience might lead to biases if

practitioners put all their confidence on experience without checking all possibilities.

I will say one other thing though. At times though, the older or more experienced
worker may be at risk to not ask all the questions. Because they think we have
already figured out. A less experienced worker may actually go in there and dig for
more information and not think they have all the answers. On one hand, if both
work toward middle I think it will be better. I think that, be the differences. I think
the younger worker might be more inclined to try to get more information. The
more experienced person would probably have a quicker understanding of or has
similar information, kind of put all together to understand the whole picture.
(EA9)

Discussion

Retention

The importance of rehearsal

Rehearsing information is critical for retention. This statement was verified in this
study. Stage I was composed of a time-constraint situation, a time-sufficient situation, and
a time-constraint situation. More than half (23 out of 40) of the participants experienced
an illusion—they thought they got the main idea of the scenario. The wording was not
very accurate when they made this declaration. Most of the information they thought they
remembered may not be retrievable if they had not seen it a second time in the
time-sufficient situation.
Notice that I do not mean that their declaration about the retention is wrong. Participants indeed can recall a lot of information at the particular moment. However, it is mainly because they have more time to read in the time-sufficient situation and finish the encoding process required for retention. The low retention rate of Stage II supports this argument. The amount of information participants retained in the Stage II is significantly lower than Stage I. Some of them almost cannot remember any content of the scenario. The main difference is the time for rehearsal.

As discussed in chapter two, information needs a rehearsal process to be remembered or to be stored in LTM, according to cognitive science. During the time-constraint situation, the participants do not have enough time to rehearse; therefore, they have less of a chance to remember the scenario. After reading again under the time-sufficient situation, participants have enough time to rehearse information while they read. Therefore, they can have a better performance in the retention task.

However, the feeling of comprehending most of the important information is not totally a mirage. The information participants thought they “remembered” or felt familiar with was actually caused by reading under the time-constraint situation. The reason participants cannot remember (most of) the information is not because they did not receive information, it is because they did not have a chance to rehearse the information. Participants were caught in a dilemma under the pressure of time and information: they can either choose to rehearse some information and lose the opportunity of receiving following information, or they can choose to keep on receiving information and forget previous information because they had no time for rehearsal.
The tricky part in this dilemma is that not all information needs the same processing time for rehearsal. Some information might need less time to process than other information, which makes it possible that participants are able to finish the rehearsal process in a very limited time. This is the reason why most of the participants can remembered or felt like they remembered part of the information. This is also the primary mechanism used in this research design.

*Is information equivalent?*

People tend to assume that we can pay equal attention to all incoming information. For example, we can pay equal attention to a sentence from the first word to the last word if we want to. The weighing of the information happens after we deliberate upon the information. Actually, the receiver processes incoming information differentially. From the analysis of the retention in this study, even though a participant can only remember pieces of information, rarely the retention is a set of meaningless words. That is to say, participants made choices of what to receive or how to store the information at the time they read the information.

As mentioned above, participants might use one of the two strategies to cope with reading under the time-constraint situation. The first strategy is to rehearse selective information. The potential cost of memorizing the information is the risk of losing subsequent information for a period of time. The other strategy is to keep on receiving information. People might have a different impression on different parts of the information based on their familiarity with each concept used in the scenario. The first strategy reveals what information the participant tries to rehearse. The second strategy
distinguishes what kind of information is more readable or easily received by the participant. Both results are valuable.

What kind of information is received more easily? Generally speaking, familiar information is more easily received than unfamiliar information. Meaningful information is easier than meaningless information. Information people have prior knowledge about is easier to retain than information people do not have prior knowledge about. Information having context is easier to receive than information that does not have context.

Consequently, practitioners are more likely to focus on information that they are familiar with, that is meaningful, that is relevant to what practitioners have learned, and that allow them to construct a meaningful event. The information, no matter if practitioners are aware of or not, is the foundation of making decision regarding diagnosis.

Sometimes receiving one specific message might influence how people understand the whole situation. For example, when I explained that the purpose of the reading under the time-constraint situation was to explore how practitioners understand a case, one practitioner said:

“I think so. As your point I am thinking there are certain words and concepts in the scenario that click and instantly that's where my mind when as far as the family problem. You know, watch TV all day and drinking beer all day, clearly affected how I saw that whole thing. That 's where my mind went immediately. The substance abuse issue with this family. The same as the other one. I think a couple of words really got my attention. Aggression and lying.” (EA9)

The word “depression”, retained by most of the participants, suggests the importance of this information; whether or not it is because people chose to rehearse this information and ignore others, or if it is because people have such schema and easily remember this information. At the same time, the word “depression” is frequently used in
the reasoning to support their diagnosis. This “primed” word carries more weight than other information in participants’ decision making process.

For example, whether they heard a parent mention her child was depressed or whether a parent said her child was sad has a different impact on the practitioner. Two messages may bring different perspectives of understanding to the situation. People might change their attitudes toward a particular situation just because they heard one word. These “primed” words are significant “signals” in one’s scheme or working model. Even though people know the information is not confirmed yet, their framework of constructing information might already have been changed. Many examples can be found in this study in which participants only retained the information related to the primed word “depressed” but lost most other information. Another situation is that some participants derived the diagnosis of emotional disturbance primarily based on the documentary sentences related to the word “depression”. The meanings of some pieces of information was distorted, especially information like withdraw and nightmare, which immediately became supporting evidence for depression and which lost its original meaning in the context.

Responding to some powerful “primed” word is hard to prevent. It is not necessarily a bad or incorrect reaction in practice, but practitioners should be aware of the fact that a single word may change how they perceive information. Avoiding this kind of information before validation and paying attention to the credibility of the information is very important for people to understand the real situation.
The Inaccessibility of information

Several participants reported a situation where they knew there was more information, but they could not remember it. “I thought I could remember. But I know there is a lot more” (EA4). A more interesting phenomenon is that some of them were able to recall the information they just forgot in the retention task when they tried to give a reasoning of their diagnosis. For example, a participant (EA10) remembered most of the information in the first half of the Scenario A about Tommy, but she could not remember any of the information in the second half of the scenario about the family dynamics.

“In November of 2004, a referral was made to therapist, Mr. Brown regarding a 7 yr. old boy, Jimmy. His parents are Mr. and Mrs. F and they are 31 and 29 years old. He has two siblings, Alex (5y) and Amy (4y). School reports that Jimmy is shorter in stature than his classmates and appears to be having difficulty with his peers. He has a healthy appetite and often desires second helpings. His peers have also commented that he ‘stinks’. ” (EA10)

After she wrote down the previous content in the retention task, she commented, “I know there are some more. I know that for a fact.” I asked her if that is something important. “Could be. I don't know”, she replied. Child neglect issue was the diagnosis she made for this scenario. When I ask her to write down her reasoning, she thought for a second and told me she remembered the rest of the information now.

“Jimmy's father is unemployed (laid off) and reportedly drinks and watches TV all day. Jimmy's mother works part-time as a waitress and to help keep things afloat. Mrs. F states that she is thinking of divorcing Mr. F. There is concern that Jimmy does not have a good role model in his life.” (EA10)
Then she wrote down her reasoning for the diagnosis,

“The most important issue would be the child's ability to meet basic needs such as food and safety. After clarifying the facts, a referral to assess his psycho/physical status would be warranted. I would then want to work on issues relating to financial and substance abuse to help sustain the health of the child. Jimmy is showing signs of neglect due to observations that he is always hungry, has a body odor, and is short in stature (growth and development).” (EA10)

With the second half of her retention of the scenario, the diagnosis and reasoning is much more reasonable. However, the information is only recalled after the diagnosis. Whether or not she made the diagnosis based on this information is a hard question to answer.

Not all the information we want to use can be retrieved, but information is easier to access in certain situations. In a different situation we might not be able to remember some of the information that we actually retained or we might not think the information is important anymore. When an individual says “I cannot remember”, it usually refers to “I cannot recall the information now”. Although that person might not be able to access it or be aware of it, the information might have been received and stored in the LTM (Long Term Memory). When the right question is asked or a similar environment is presented, that person might be able to recall it again.

While this situation fits the phenomena “we can know more than we can tell” (Polanyi, 1966:4), it probably is not the main focus of what Polanyi tries to discuss regarding tacit knowledge. The tacit knowledge he maintained is better described as a process of knowing, not as the content of the knowledge (Polanyi, 1966). This situation is much closer to the idea of involuntary recollection or implicit memory (Ebbinghaus, 1964), where the learning is occurred but of which might not be aware. The decision
making process is influenced by the retained information, but the retained information can not be recalled in the retention task.

EA10 was not the only person who recalled more information in a later task. In this study nine people recalled more information during the reasoning task; and four people recalled more information during the diagnosis task. This situation happened in both scenarios, in both the experienced group and the inexperienced group, and in both the time-constraint situation and the time-sufficient situation. All the new information was related to their diagnosis.

It is clear that a good question can trigger more information than was accessible previously. But a more interesting question is whether practitioners have to recall all the relevant information before making a diagnosis. More specifically, do practitioners have to recall information explicitly and then make a decision, or could they reach a decision by retrieving information implicitly without consciously being aware of all the information?

From what has happened in those thirteen cases, it seems that not only do the multiple choice questions in the diagnosis task and/or thinking process in reasoning task trigger more retention, but the diagnosis that the participants came up with could be influenced by the information not recalled in the retention task. For example, a participant gave the following retention.

“Mom has three children. She was called in by the teacher to discuss her son Tommy. The teacher explained that Tommy is a good kid gets along with his classmates, but "stinks" and is skinnier than the rest of the boys in the class. Mom stated that she just recently lost her job and her husband/boyfriend sits around and gets drunk.” (NB1 in the time-constraint situation)
Several errors can be found in this retention, but the problems were still clearly depicted. Although the diagnosis (child neglect issues) she chose was a reasonable one, the retention did not offer enough support for this decision. Then, in the beginning of the reasoning task, she asked me, “Oh! I forgot something. Can I go back and make it up?” She wrote down the sentence “[t]he school teacher also explained that he has a good appetite at lunch and eats well” and started to write down her reasoning.

“I chose this diagnosis because of the current family situation and how the teacher presented Tommy in the meeting. She disclosed that he has a great appetite at lunch and sometimes "stinks". She also said that he is skinnier than the rest of the boys.” (NB1)

In a latter interview, I asked her if the multiple-choice question gave her any help on making the diagnosis. She said,

“I think so, yeah. I think so. Because then I can put back my mind like what... with the neglect I can think of the case things that... remind me of the neglect that came out in the story.” (NB1)

Then I asked her if the sentence she just inserted was triggered by the appearance of the multiple choice question. She replied,

“I don't know. It just popped in my head; just in my reason thinking about what, why I choose neglect and the so I was going back through my mind of why I did that and I am thinking all the reasons that popped in my head.” (NB1)

Hunger was one of the most important concepts for people who chose child neglect as their selected diagnosis (see Table 5.3; Figure 5.9). According to one participant’s (NB1) reasoning description, it is very likely that she thought about how to argue that Tommy’s physical development is the result of insufficient nutrition, not other reasons. It
is plausible that the diagnosis was influenced by “forgotten” information, which was retrieved in the reasoning task. It is very likely she reached this decision by retrieving information implicitly without her being consciously aware of the information.

**Priming effect**

Retention may also be triggered by some key information such as the multiple-choice questions in the diagnosis task. The interview revealed that most of the participants (29) perceived that the multiple-choice questions increased their retention of the scenario. Participants reported that it offered them a chance to review the information they had. It also helped them to revisit the case scenario and make a better diagnosis. For example, a participant has the following retention.

“Jenny is 10 years old in 4th grade. Mother (Miss R) adopted her when she was 5 years old--Miss R is a single parent. Miss R works as a secretary at a university and is engaged to be married. Jenny having difficulties in school--verbal outbursts/aggression. Withdrawn at home but doesn't become verbally abusive (at home). Having increased nightmares at home. Teacher reports that the verbal aggression has gotten worse since the last semester.” (EB9 in the time-sufficient situation)

When she (EB9) saw the multiple-choice questions, some more information was triggered. “Oh! Shoot. I forgot to put that one down.” “I forgot to put the depression.” Then she chose depression issues as her diagnosis. However, she changed her mind later during the reasoning task and chose blended family issues. “Why did you change your mind?” I asked. She answered,

“I do think that her behavior that she exhibiting the depression issue now by being withdrawn, certainly being aggressive with peers in the school. But I think because
of that her mother was single and she was five years old and now other man coming into her life.” (EB9)

In this case she was able to remember more information when she saw the multiple-choice item “depression issues”. Although we do not know the exact information she recalled, it might be related to the changing of family structure, as she stated in the description of her reasoning. Moreover, the triggered information affected how she thought and further changed her understanding of the situation.

*Misplaced information*

The information regarding who said what did not get too much attention in the study. Even in the time-sufficient situation, participants often misplaced the source of opinion. (e.g., NA1 took the teacher's information as Mother's.) Not having an accurate understanding of where an opinion comes from did not appear to affect negatively how participants understand a case. However, this situation might lead to a problematic decision making because of an overemphasis of the credibility of the source of opinion. (e.g., mother worried about Jenny’s symptoms of depression in Scenario B.)

Another example of misplaced information is remembering distorted information. When this happens, it can directly affect the diagnosis of the person. In her retention, a participant (NA6) misplaced the idea that Tommy “likes to eat many times a day”.

“Tommy is a 7-year-old boy and is in elementary school. He has a big appetite and likes to eat many times a day. His father is unemployed and according to the mother drinks beer all day and is not a good role model. The mother is currently working part-time at a restaurant. Tommy also has issues with body odor. His mother and father are contemplating a divorce.” (NA6 in the time-sufficient situation)
The retention shows that she covered information regarding Topic-Hungry, Topic-Hygiene, Topic-Father Careless and Topic-Mother Busy (see detail coding in Appendix B). It is easy for people to make a child neglect diagnosis in such a situation. However, the information “likes to eat many times a day” transforms the concept of hungry into the concept of greedy. Such distorted information significantly reduced the likelihood for the research participant to choose child neglect issues as the diagnosis.

One of the explanations is that the information was placed in the wrong category or was labeled with a wrong tag at the time of encoding. Information encoding is an automated process of which people are seldom aware of, but the mechanism actually “chooses” the information and assigns it a relevant category or tag. That is to say, at the time an individual receives the information, he or she unconsciously engages in an action similar to making a diagnosis. The other explanation is that the tag of the information might be replaced because of new coming information or in order to fit existing information. The individual might retrieve all relevant information to working memory and process/ re-label it again unconsciously. That is why human memory is not always reliable.

Diagnosis

The nature of diagnosis

The concept of diagnosis in social work started with the work of Mary Richmond. She defined the diagnosis as “the attempt to arrive at as exact a definition as possible of the situation and personality of a given client” (Richmond, 1917: 51). For Hamilton the diagnosis is a knowing through or recognizing process. She defined diagnosis as “the
thought process directed to the nature of the problem and its causes” (Hamilton, 1951: 214). The concept of diagnosis starts to co-identify with the DSM (Diagnostic and Statistical Manual of Mental Disorder) from the 1980s (Turner, 2002). The social work profession also developed its own classification system, PIE (Person-in-Environment), for social functioning problems in the late 80s (Karls & Wandrei, 1994).

The concept of diagnosis was at first used for understanding and assessment purposes but right now the meaning is more related to classification. Several participants in this study did not agree that they were making a diagnosis during the diagnosis task. Participants in the experienced group were reluctant to claim their judgment was a diagnosis. For example, one said, “I am honestly probably wouldn’t feel comfortable making any assessment, because I really didn’t do one. I didn’t have enough information” (EA7). “I mean I won't want to tell this as a diagnosis. You know what I mean. You have to ask a lot more questions but...” (EB8). Participants in the inexperienced group did not think the items in the multiple-choice questions were a kind of diagnosis. For example, a participant (NA2) said, “I think the most important thing is child neglect issue. But that's not a diagnosis.” I asked her, “What is a diagnosis in your concept?” She noted, “I was thinking more like anti-social personality ... like a DSM-V actually ... Yeah, I guess child neglect could be a diagnosis of a situation. But I was thinking more like psychological diagnosis.” (NA2)

Even though the definition of diagnosis for some was different, problem classification should directly relate to the understanding of the problem. However, whether participants have an awareness of the problem and the kind of terminology they
try to use to define the problem may not be consistent. For example, a participant shared the following retention and reasoning:

“Mrs. R is a single mother and a university professor. She adopted her daughter when she was five years old, and she came seeking help for her daughter about possible depressive symptoms. Mrs. R recently got engaged and her fiancé has moved into the house. Since this time, teachers at school have reported the child has been acting aggressive in class and refuses to follow instructions from male teachers and staff members. Mrs. R states that her daughter has recently started staying in her room more often and refuses to go out with her and her fiancé. She also reports that the daughter has had more nightmares recently.”

“Mrs. R and the teachers both reported that these problems occurred recently, seemingly around the same time that Mrs. R’s fiancé moved into the home. The daughter may be feeling some anxiety around the change in her home life since all she has ever known in this family is her mother. I think it would be most effective to conduct individual therapy with the child and then family therapy to address the child’s anxiety around the new living situation.” (NB6 in the time-sufficient situation)

The participant (NB6) diagnosed the problem as emotional disorder issues. However, all the other people who had a similar retention of the scenario and similar reasoning chose the diagnosis of blended family issues. The same understanding of the situation still might not guarantee how participants classify the situation, which is heavily influenced by their previous experience and scheme.

Information needed in diagnosis

How many messages is enough for people to make a diagnosis? The question may also relate to the strength of the message. If the message is providing a strong suggestion of a problem, sometimes people base their opinion on a single message. However, most of the time people need more than one message to support their judgment. Similar messages telling the same information may not appear at the same time. If practitioners
suspect a certain situation happened in a client family, they most likely will collect more information to verify or falsify that possibility. In this study, participants needed to be aware of most of the information at the same time in order to make a good diagnosis. Also, they needed to use their own experience to fill in the gaps in the information in order to formulate a diagnosis.

The information that helps practitioners discern the situation in a case should happen repeatedly in a complete case note. Practitioners seldom assess a situation from the presence of a single piece of evidence. Their understanding of the situation would be supported by different events or messages in most situations. When the indicators of a problem appear repeatedly, practitioners will have a vague impression about the problem, and the impression may become an assumption and form a diagnosis with the support of other evidence.

Important information indicating a problem should appear repeatedly. When practitioners only rely on a single message, it is easy to jump to conclusions and make mistake. A skillful practitioner can look for accompanying phenomena that should happen theoretically according to his/her observation of the client situation. If the information supports the assumption he/she made, the client’s problem can be verified and the diagnosis can be made.

This study explores what type of information can sufficiently explain the concepts or impressions formed by practitioners, but this approach has two limitations. On one hand, information might have a different meaning to individuals. For example, two practitioners may have different impressions of a particular case situation based on the same information. On the other hand, individuals might not be aware of all the information
they could take into consideration. For example, a practitioner might think his or her
description of a case situation is sufficient for making a particular diagnosis. However,
that practitioner might not agree there is sufficient information for making that diagnosis
if he or she only received that description without having any details of a particular
situation. Of course, practitioners may not recall all the information that relates to their
impression because the limitations of memory, but skillful practitioners should have the
ability to describe a client’s situation and provide supporting evidence of their diagnosis
when they communicate with other people. Therefore, analyzing the reasoning suggested
by practitioners should allow us to explore the relationship between concepts used in
diagnosis and related information.

What kind of information will make practitioners think of a case as a sexual abuse
case? (The information here refers to indirect messages or facts that can be acquired by
observation and communication.) Many situations might lead people to suspect a sexual
abuse case, but another case with similar information might be diagnosed differently.
However, with a case scenario, experienced practitioners could easily tell you how they
might judge and the different possibilities of the core issues if there is more than one.

The usefulness of the diagnosis

Is it possible to distinguish an incorrect diagnosis from a correct one? What is the
criterion for a useful diagnosis? Some people are able to recall more information to
support their diagnosis. Would that be a better diagnosis? Some people are able to make a
diagnosis with little information. Are they more able to make diagnoses? This study is not
aimed to answer these questions. The purpose of this study is to illustrate how people use
these concepts to make a diagnosis instead of judging which diagnosis is better than the other. Understanding how a diagnosis is developed can benefit professional education and supervision. As long as the information we collect is not randomly remembered by the participants, the meaningful information can be a guidance of how to locate certain types of client situations.

Findings of the study indicated cause-effect style and evidence-support style reasoning are necessary in the process of making diagnosis. Using concepts to explain dynamics is easier for people operating under a theoretical framework. Some people integrate two styles by proposing a concept first and then providing the evidence to support their concept later.

The approach one experienced practitioner (EA9) used is also a good example (as described in the Approach to understand client situation, in the finding section, interview questions). She usually uses a broad category to define a situation first. She will then collect more detailed information to decide and to confirm her diagnosis. The advantage of this approach is that using experience as an information searching guidance will quicken the process while at the same time detailed information collecting will not be hampered by experience and the practitioner will not make the error of jumping to conclusions.

The relationship between retention and diagnosis

Retention does contribute to diagnosis. The previous section (in the Structure of the Retention, in the findings section, Retention) discusses an interesting phenomenon pertaining to the structure of retention. Based on how a practitioner describes their
retention, one can tell what diagnosis she/he might choose. For example, the retention of a participant (EA5) is focused on the father, and her diagnosis is also related to father’s problem (substance abuse). The retention of another participant (EA7) is focused on the mother. Her diagnosis is related to the mother’s perspective (marital issues). The retention of another participant (EA8) is focused on the child. Her diagnosis is related to the child’s problem (emotional disturbance).

This phenomenon might imply that the process of diagnosis actually starts at the time of retelling the scenario, if not already finished by this time. It is very likely that diagnosing starts at the time of coding. In the retention task, participants are retrieving information from LTM. If information retrieved is organized in certain structure, it might suggest that information was reorganized at the time of retrieval and/or that information was stored in a systematic way at the time of encoding. Memory is likened to a tag system (Shank, 1999). Whether information can be retrieved depends on how well the tag is assigned to the information. Sometimes, one piece of information might be assigned to different tags, and sometimes one tag might link to other tags or might be a master tag for several minor tags.

The concept map discussed previously (in the finding section, Reasoning) is a good example of how the tag system might work. An individual might tag the information stink with several concepts like dirty, poor hygiene, and indicator of neglect. At the same time, the tag poor hygiene might also link to the tag indicator of neglect. If that person wants to describe the scenario and using the indicator of neglect as tag to retrieve information, she might able to recall the fact that Tommy stinks directly or through the tag poor hygiene.
Of course, if the information *stink* was only associated with the tag *peers make fun of him*, the practitioner might have very little chance to recall this information.

One might argue that the participants are not using a tag system to recall the case scenario, but treating the case scenario as an unbreakable piece of information. However, two reasons do not support this assumption. First, an individual’s working memory is very limited. It is unlikely to process so much information at the same time. Second, using preexisting tags is more efficient than creating a set of new tags, thereby suggesting that previous schemata or concepts help speed up the process.

If the practitioners stated their retention in a certain approach and their retention was highly related to their diagnosis, maybe we should consider the possibility of their retention as a format of their diagnosis. Most participants wrote down their retention and diagnosis immediately without any delay. Only few people acted like they were thinking about the task of diagnosis (e.g., EA2, what is not strategy); other people acted like they were in the retention task where they just retrieve information.

One possible explanation for this pertains to the similar cognitive process of thinking and recalling. Both the recalling and thinking processes need to transfer information from LTM to working memory. When they try to write down their retention, the action might be very similar to the process of thinking. Therefore, after the recalling process, the decision time is greatly decreased if they have not determined a diagnosis yet.

Several participants formulated their diagnosis before reading the multiple-choice questions. They had already diagnosed the client situation when they finished reading the scenario. For example, a participant (EA8) told me she already had a diagnosis but it did
not match with the items in the question. When I asked her to chose one that best fit her understanding, she started to use the “what’s not” strategy as another participant (EA4) did to find one. When participants were reading the scenarios, they had already begun the process of developing a diagnosis. This situation not only happened in the experienced group but also with the inexperienced group. A participant (NB10) who read the Scenario A under the time-constraint situation formed her diagnosis before the presentation was finished. “Neglect”, she said in the middle of the presentation.

“Neglect is the most obvious as Tommy goes to school hungry and uncared for aka smelly. His father's behavior is not supportive, in that he cannot care for himself how is he caring for Tommy. He is either not being fed at home or does not have access to food (due to either neglect to feed him or the resources within the family to care for one another) so he steals it. His growth suggests that this has been a reoccurring issue and needs immediate attention so that further health issues don't present themselves.” (NB10 in the time-constraint situation)

If the case was read under the time-sufficient situation, to argue that the participant had thought about the case is still possible. But if the case was read under the time-constraint situation where rehearsing is already be a problem, to maintain that the participant had thought about the case is hard to sustain. A reasonable explanation is that practitioners do not form their diagnosis using a thinking process, but using a recognition process.

The ability of memorization does not contribute to diagnosis. Even though it is plausible that retention is highly related to diagnosis, there is still the question about how significant this argument is. All the information an individual can recall is surely related to individual’s memory! However, this argument wants to bring to attention the possibility that what an individual can retrieve is determined by when the information is
received. The kind of tag the information is getting cannot be separated from the possibility of being retrieved next time. More specific, the retention here is not referring to the content of the memory or the ability of the memory, but the cognitive process of the memory.

Although participants cannot control how they tag the information, they had control over the process of making a professional diagnosis. People that have more experience seemed to have an easier time forming an idea about the situation. However, whether they can convince themselves that collecting more information can validate their idea and whether they consider alternative diagnoses without jumping to conclusions are criteria for making them better practitioners.

As for the inexperienced practitioners, most of the time, they already had the information. What they really needed is to know how to put information together and have a reasonable explanation. This is how a supervision system could help. By listening to their reports and clarifying some key information, a good supervisor can offer them a better understanding about their case although the supervisor does not have more information than the practitioners. Although essential when making diagnosis, the content and the ability of the memory are not the only criteria needed to make a diagnosis.

To sum up, the ongoing diagnosing process can be identified at four stages. The first stage is at the time of reading the scenario—receiving information (Recognition). NB10 in the time-constraint situation is an example. The second stage is at the time of retelling the scenario—retrieving information (Retention framework). EA 5 in the time-sufficient situation is an example. The third stage is when practitioners saw the multiple-choice items—receiving relevant information (Priming). NB1 in the time-constraint situation is
an example. The fourth stage is at the time of reasoning their decision—retrieving and interpreting information (Retention framework). EB9 in the time-sufficient situation is an example. The first and the third stage might not be visible in a normal diagnosis process, but all of them are as important as the traditional viewpoint, if not more.

The traditional viewpoint suggests the diagnosis happens when people analyze the information. Making a judgment is the nature of the diagnosis. However, observation in this study suggests that the diagnosis might have already happened when people receive the information in the very beginning, when people receive related information in the latter period, and when people retrieve the information. Recognition is the nature of the diagnosis. In this situation, the diagnosis described here is closer to an understanding process than to a classification process. Therefore, this perspective is consistent with the time-tested definitions given by Richmond (1917) and Hamilton (1951), that diagnosis is a continued process of understanding a client’s situation.

*Reasoning*

Most of the participants did not take much time to think about how to write their reasoning. Writing the reasoning for them was like part of their daily routine. Shank’s (1990) theory about memory might be able to offer an explanation. Shank suggests that people do not have to think because these answers were already available in their memory. People are not “thinking” when they try to answer a question, but matching information from their memory. The memory of prior events can help them to interpret the situation in which they find themselves.
This study finds that the reasoning styles used are different between the inexperienced group and the experienced group. At the same time, the diagnosis is highly related to their reasoning style. For example, the experienced group had more diagnoses of substance abuse where participants tended to use cause-effect style or mixed style, while the inexperienced group used the diagnosis of child neglect more often, where participants tended to use evidence-support style (see Figure 5.5). Did this phenomenon suggest that different reasoning styles were related to different diagnoses, or merely indicated a diagnosis would require certain kind of reasoning styles? More specifically, did the reasoning style determine the diagnosis, or did the diagnosis determine the reasoning style?

On the one hand, proponents of the argument that reasoning style determines diagnosis may argue that humans think before they diagnose. Reasoning reflects how they understand the situation. Diagnosis is just a phrase to describe that situation. On the other hand, proponents of the argument that diagnosis determines reasoning styles may argue that each situation requires utilizing different logic to establish its argument. Therefore, the diagnosis will limit how people justify themselves.

The problem can be solved if people can agree with the conclusion in the last section, — that diagnosis is an understanding process. If the diagnosis is a process of understanding and then reasoning style is the framework for understanding, perhaps the diagnosis and the reasoning style share similar fundamental qualities.

Following this question, I asked participants “what makes your job different when compared to a beginning practitioner?”
“Experience” was the response given by many experienced workers. Shank’s (1990) idea again offers insight to this question. Understanding is based on similar experiences that people have. The more experience they have, the more likely they can use past events to explain new situations. Since the scenario did not contain all of the needed information, the ability to retrieve similar situations from their memory would determine how well they understood the case. The experienced group had more past events to refer to; therefore, they had a more in-depth understanding of the case scenarios than the inexperienced group.

**Diagnosis and Intervention Strategy**

Analysis of the experienced group participants suggested that they utilized quite a wide range of strategies in making a diagnosis, as did the inexperienced group participants. Several opposing perspectives can be found in different dimensions. Some people focused on the symptoms and some focused on the causes. Some stayed with facts and some made inferences. Some made a diagnosis from “what is” right and others from “what is not” right.

*Cause Vs Symptom*

Some participants made their diagnosis according to the DSM-V standard. Because they only focused on the symptoms, most likely they chose depression or emotional disturbance as the selected diagnosis. It is not because they did not see other potential problems, but because the symptom appeared to fit the criteria for opening a case. Most of the time it refers to they are able to bill for a case. As long as they can open the case, the other problem will be clear and be taken care of. For example, one participant (EB4)
stated: “Yes, I think it is when the billing for insurance that we are making a diagnosis that we have to have in terms of pay out” (EB4).

“Yeah! I mean we have a psycho-social assessment. ... Also symptoms and in order for obviously to bill, to payer source for a patient we have to have a diagnosis so typically we’re also looking to see if there are some symptoms, anxiety, depression, you know schizophrenia symptoms they might be exhibiting.”  (EA5)

Some people chose the diagnosis based on the core issues of the problem, in other words, they tried to clarify the cause and effect of the relationship of the problem. Most of them understood the family as a system and the client was viewed as an outlet of their family problem. “Well, dad sitting around, drinking beer all day. That has to go to substance abuse issues because that keeps him from getting a job which is causing the financial issues, which could be causing the rest of it” (EA2).

“Tommy's problems can be viewed as a symptom of a family system that is not functioning well. It could be viewed that the problems he is having is a way of stabilizing a family system whose homeostasis has been upset and also as a way of mobilizing the parents, at least the mother, to get the professional help the family needs.”  (EA4)

*Fact Vs Inference*

Some people stayed with the information they had. They were reluctant to make a guess of what they did not know. “Because we don't know anything more then that” (EB5). They tried to make a vague diagnosis like emotional problem in order not to jump to conclusions. “Because you have to get information first. You can't do all of this with these information” (EB5).
“So the way I tend to work is the less information I have, the more general I am because I want to protect myself having a client from following what my usual bias might be because it could be wrong.” (EB1)

Some people inferred from what they already knew. They trusted their experience, which brought awareness to the situation with little information. “I could imagine ...” “I feel that the problem behavior we are currently seeing could be caused by this” (EA2).

“The daughter's aggressiveness could be considered acting out anger she has toward someone else and unexpressed anger of her parents and/or others in the family. Though the aggressiveness and expression of anger involves emotional issues, the emotional issues are relational in nature that involves unresolved issues/emotions in the family usually between the parents and/or a parent and grandparent.” (EA4)

*What is Vs What is not*

Most of the people chose their diagnosis from the “what is” approach. They found the multiple-choice item that most fits the situation. Some other people chose their diagnosis from “what is not” approach. They found the diagnosis by eliminating the multiple-choice items least likely to be the diagnosis and going with the remaining one.

“I guess the best way to determine would be just start with what it isn't. I wouldn't think it's emotional disturbance issues because there is a environment issues, you can't really determine emotional issues with those been present. Where the family doesn’t seem to be an issue. There are some marital issues but that could be caused by financial issues but definitely financial issues or there’s a possibility. There don't seem to be any depression issues stated. Don't seem to be any sexual abused issues stated. But there is substance abuse issues reported by mom. So 4) [Financial issues] 7) [Substance abuse issues] and 8) [Child neglect issues] are the possibilities. Or the ones that are... that you can see as present. Although 8) [Child neglect issues] isn't too present, that's more inferred because you know they’re saying he is a skinny or small child, and he is eating well at school, he is asking for second, so that might be the only food he is getting, but we don't know that for sure. Of course there is financial issues so there might not have a lot of food at home.” (EA2)
There was also a wide range of strategies for practitioners to make their intervention. Several opposing perspectives can be found in different dimensions. Some people worked on the core issue and some worked on the presented problem. This pair usually came along with the diagnosis pair of cause and symptom. People whose diagnosis focused on the cause of the problem usually chose the intervention focused on the core issues. People whose diagnosis focused on the symptom of the problems usually chose the intervention focused on the presented issues.

Pragmatic Vs Fundamental

Some people made their intervention based on how they could intervene. They might have been aware of other issues that were important for their client but they were not necessarily willing to directly intervene with providing services to address other problems. For example,

“But you know, I am not really... sometimes you get into neglect and abuse stuff like that, and it gets real... deep as far as... emotional part of it. But I try to stay with... find solution focused kind of strength they can use... solve the problems... kind of stay away from, dig into a lot of emotions bring up... even know that's big part... for them to heal. But to me, I just don't have a lot of time to get into all that. So I try to help them out more with service level... finding solution focused strength.”  (EB2)

Some people made their intervention based on the issue that would have the most influential outcome.

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Some people made their intervention based on the issue that would have the most influential outcome.

“First and foremost I evaluate the well-being and best interest of the child. "Tommy" is coming to school dirty "stink", hungry "taking food". This should be addressed first. This is a multi-problematic family. So I would prioritize- making any neglect issues a priority- by interviewing the child.”  (EA1)
Likelihood Vs Impact

Most of the people chose their intervention corresponding to what they thought was most likely the problem. Some others tried to rule out other possibilities that were influential although there was not enough information to support that possibility.

“Jenny's presenting problem seems to be depression, but we don't know enough yet to conclude reason for depression. I would make referral for more in-depth evaluation to work with Jenny towards identifying source of depression. Medical evaluation could be helpful in ruling out sexual abuse.”  (EB7)

“I think for now just give the information that you had, you might have to treat it as a blended family issue. That's the most obvious thing that stands out. But it could be some of other things. ... I probably will then... I might actually conduct play therapy in order to clarify facts of sexual abuse. I think just to talk with the child to make sure there are not sexual abuse issues. And I also will probably still stick with some individual or family therapy just depending on what are pulled out from assessment. But it could be sexual abuse.”  (EA7)

Sometimes it was easier to tell the difference between the inexperienced practitioners and the experienced practitioners by the intervention they chose rather than the diagnosis. For example, a participant (EA5) had a fair retention score as other people did and chose the substance abuse issue as her diagnosis. However, her intervention is not focusing on the father’s drinking problem.

“It appears the father has a drinking problem which is affecting the total household. I would like to see the parents together to further evaluate the presenting issues. I would see them on the basis of helping their son to improve his school interactions. This focus would lower their defenses and allow for establishing a relationship so that other issues could be addressed including: alcohol use, lack of employment, and sufficient resources such as food. Joining with the parents of the issue they are most interested in dealing with would be a way to gain the family's acceptance and would allow for further issues to be addressed. Further questioning would occur with the parents once a relationship is established around the father's drinking, assistance needed with employment issues, and to ascertain if basic resources are available to the family such as food.”  (EA5)
Recognizing a situation and knowing what to do might be taught in school, but how to do it and how to do it well are usually learned in practice. Several experienced practitioners urged that it must be learned in real practice, and they usually referred to it as practice knowledge.

**Practice Knowledge**

Practice knowledge, as indicated in last example, was not based on how much information he/she could remember, nor was it revealed in the diagnosis he/she made. Although the intervention he/she chose, individual/family therapy, may be the same as many others, his/her approach of applying the intervention is more subtle and in-depth than the inexperienced practitioners. For example, he/she knew how to lower client’s defense, how to build a relationship, and when to deal with the core issues. This kind of ability, derived from years of practice, can significantly change he/her practice without using time for planning. However, it might not be revealed in the case records because they do not have the extra time to note it down and because it was so natural for them to access once it was learned.

Although practice knowledge could be taught in the class setting, a new worker can hardly be aware of so many details when they try to apply it in the field. Humans have very limited information processing ability; therefore, people can only pay attention to certain information unless some other mechanisms, such as automaticity or pattern matching, are involved. This is also true for the experienced practitioners. Although they might be good in several ways, they still might make mistakes in some other places.
What is practice knowledge? If the client does not have a job, the intervention is to find a job. If the client has drinking problem, the intervention is to stop drinking. This kind of matching can be done by any layperson and by no means is practice knowledge. Practice knowledge in this study is demonstrated more like the ability to know how to adjust their intervention according to client’s situation. For example, a participant (EA2) explained why he does not refer the father to an employment agency in Scenario A. “Referral to an employment services agency, with that drinking so much, I don't think that will be helpful.” Another practitioner (EB6) also held the same viewpoint. “Employment services agency, referral? Puhh! He is not motivated to do those things.” Knowledge learned from practice is the main feature of practice knowledge.

There were several examples that the decision practitioners made was influenced by their experience from the past. For example, a practitioner (EB2) suggested, “if alcohol is involved there is a good chance of some type of abuse whether it be emotional or physical and this has an impact on the family.” One other practitioner (EA1) paid attention to the same issues but she was aware of the problem from looking at the family dynamics. “Very concerned that dad is home, drinking, caring for kids, while mom is working. High stress environment could present risk for physical abuse.” Another participant (EB1) was cautious about jumping to conclusion. “I had a lot of different internships over the years. One I had in undergraduate degree was very great because that was in a court system. And I learned the importance there of having lots of specific details before jumping to conclusions. .... I think it will be interesting to see how do people, how do clinicians... do they tend to go more toward your bias if they have little information; or do they take a step back and say I need to learn more before I can diagnose. I will recommend a generic treatment method until they find out more. So for instance with your menu, I didn't see that as mutually exclusive. If you start with family therapy, you
could always move towards specific sexual abuse counseling if it turned out to be that's what it was.” (EB1)

This kind of knowledge was obtained from the experience of actually working with the people who had similar problems. The situation this client had reminded practitioners of a similar experience they had before and affected how they understood the situation. Therefore, the nature of the practice knowledge maybe functions like a reminder which directs their understanding of a situation and directs how their intervention plan is made. Recalling the discussion of diagnosis in the previous section where memory is compared to a tag system, past experience is retrieved when the same tag was used for retention and diagnosis. For example, when the practitioner received information about the father drinking everyday, it not only triggered thoughts of substance abuse in diagnosis phase but also triggered past experience about drinking problems that cause various kinds of abuse. Therefore, the practitioner will pay more attention to any sign of abuse and confirm or reject her hypothesis. From this perspective, practice knowledge can be understood as an in-depth understanding about a specific situation that a practitioner has experienced.

Conclusion

This chapter explores the important information that is necessary for participants to make a diagnosis. The findings not only presented the information participants frequently retained, frequently used in their reasoning and frequently used in their clarification of the case scenario, but also suggested the structure of their memory might be more significant in the decision making process than the content of their memory.
Participants utilized different reasoning styles to describe their decision. The inexperienced group participants used more of the evidence-support style while the experienced group participants use more of the cause-effect style or mixed style. The reasoning style was highly related to the diagnosis preference and was likely precede the process of formulating diagnosis. The concept maps show that participants could have used different pathways to reach their diagnosis. The experienced group participants tended to use concepts that take into consideration the broader environment to describe their reasoning, but the inexperienced group participants tended to use detailed information that focused on the individual client to describe their reasoning.

Although the experienced group participants felt more confidence in retaining information from the case scenario, their retention is not better than inexperienced group participants based on the findings. Having experience with similar client families might help them understand the case situation and feel more confident about comprehending a case. The experience helps practitioners to develop categories or schema that not only helps them process information quicker but also becomes the basis for effective communication.

Information that is not accessible might still have an influence on how participants understand a client situation. Some information is more powerful than other information. A “primed” word might change how practitioners perceive the information. At the same time, memory might be an interface between experience and diagnosis. Experience can be useful if the memory can be appropriately triggered by new coming information. Based on the findings, the ability to memorize information is not significant; instead, a
well-developed tag system that is able to link the situation to proper experience is more important for practitioners to make useful diagnoses.
CHAPTER 6
SUMMARY AND CONCLUSIONS

Summary

This study involves both deductive and inductive reasoning. Deductive reasoning derives a set of hypotheses from Naturalistic Decision Making (NDM) theory, observes the actual situation, and makes a decision to accept or reject the hypotheses. Inductive reasoning starts from field observations, searches for a common pattern of retention and diagnosis, and reaches a tentative conclusion.

Deductive Reasoning

This study began with adapting NDM theory to explain the decision making process in social work practice. Four hypotheses derived from the NDM theory were examined in the study, including: (a) Did participants understand the client situation better under the time-sufficient situation than under the time-constraint situation? (b) Did the experienced group have a better understanding of the client situation than the inexperienced group when the case record was read under the time-constraint situation? (c) Was the understanding of the client situation influenced by experience when the case record was read during the time-sufficient situation? (d) Did the experienced group have a better understanding of the client’s situation than the inexperienced group when the case record was read under different time constraints? The first hypothesis is supported by the findings, the second and the third hypotheses are not supported by the findings, and the
fourth hypothesis is partially supported by the findings. This situation might be due to simplistic assumptions and an inappropriate operational definition.

Three scores were used to measure how well a practitioner understands the case situation: Score of Retention by Sentence (S_Score), Score of Retention by Word (W_Score), and Score of Diagnosis along with Reasoning Topic (DR_Score). In the study, (a) participants who read under the time-sufficient situation had a higher S_Score and W_Score than participants who read under the time-constraint situation in both the Scenario A and Scenario B environments. (b) The experienced group did not have a better understanding of the client situation under the time-constraint situation than the inexperienced group in either the Scenario A or Scenario B environments. (c) The inexperienced group had higher S_Score and W_Score in the time-sufficient situation than the experienced group in the Scenario B environment, but both groups performed similarly in Scenario A. (d) The difference between the time-sufficient situation and the time-constraint situation had contradictory results between Scenario A and Scenario B for S_Score and W_Score. However, the experienced group shows less of a difference between the time-sufficient situation and the time-constraint situation than the inexperienced group at DR_Score.

This study assumed that the only difference between the inexperienced group and the experienced group is experience, and that may be oversimplifying the actual situation. One possible explanation of the results regarding hypothesis 2 and hypothesis 3 is that the inexperienced group had superior memory which undermines the advantages of the experienced group under the time-constraint situation. Hypothesis 4 supported this explanation whereby the experienced group shows that they are less influenced by the
time-constraint situation than the inexperienced group. At the same time, findings based on Sentence (S_Score), Score of Retention by Word (W_Score), and Score of Diagnosis along with Reasoning Topic (DR_Score) suggest potential issues with how the operational definition should have been given. Score of Retention by Sentence (S_Score) and Score of Retention by Word (W_Score) are more related to the memory than to understanding; Score of Diagnosis and Reasoning Topic (DR_Score) are more related to understanding but the scores only have slight variations that might not illustrate how well the participants understood the situation.

To conclude, study findings provide initial evidence regarding the existence of implicit knowledge. However, it is less related to the capacity of the memory or the accuracy of the memory, but more related to the diagnosis and understanding (a general idea) of the situation. The study results suggest further analysis of the participants’ retention and reasoning in order to clarify the rationale behind their decisions and how they used information to reach that decision.

*Inductive Reasoning*

This study also analyzed the contents of the participants’ retention, clarification, reasoning, research interview and diagnosis. The differences between the experienced group and the inexperienced group were more significant in the structure of the memory compared to the content of the memory. A tentative conclusion reached is that the implicit knowledge is closely related to the structure of the memory which is based on the participants’ experience.
Several lists of frequently used information including retention, reasoning and clarification were created. There were differences between the inexperienced group and the experienced group in their retention but no other conclusion could be drawn except that the inexperienced group was more focused on individual information and the experienced group was more focused on environmental information. However, the diagnosis and intervention was very different between the two groups. The time-constraint situation also affected how participants made a decision.

The biggest difference between the two groups was the style used when participants stated their reasoning. The inexperienced group used more of the evidence-support style while the experienced group used more of the cause-effect style or mixed style. However, this phenomenon might be related to their diagnosis preference since the reasoning style is highly consistent with the diagnosis they made. The concept map shows different possibilities of reaching a diagnosis, and most of the diagnoses did not have a common pattern of using information except for the diagnosis of child neglect.

The analysis finds that the information does not have equivalent meaning among the participants. One message might change their perspective of understanding regarding other information instead of just changing their attitude in one dimension. The process of diagnosis was not only found in the diagnosis task, but also found in four other stages: at the time of receiving information in the very beginning, at the time of receiving relevant information in the latter period, at the time of retrieving information, and at the time of interpreting information. Several patterns imply that the retention might determine their diagnosis. The mechanism is recognition instead of consideration.
In sum, the study finds that making diagnosis is a continuing process of understanding the client’s situation. The structure of their retention reflects how people understand a case. Practice knowledge can also be explained by the same framework. The finding suggests that it is not the content of the memory but the structure of practitioners’ memory that affects how they perceive a client’s situation. Implicit knowledge that helps practitioners to make a decision can be understood as a memory framework for organizing information.

**Reflection of NDM in Social Work Practice**

Most of the actions social work practitioners do match descriptions of recognition-primed decision (RPD) model. Experience is the most important asset of a practitioner. Since the environment they face is complex, uncertain, unstable, unique, and value-conflicted (Schon, 1983), recognition is more feasible tool than rule-based procedures. That is to say, a practitioner will recognize whether the situation is typical when facing the problem and then react to the situation in a typical manner if it is a typical situation (Carlson, 1999). Therefore, the criterion for whether practitioners can make a good decision is their past experience.

According to situation awareness (SA), past experience is stored in a mental model. It can invoke a corresponding action by the cues provided by the environment. Besides past events, experience can also be stored in the format of schema or scripts. This might be the reason that practitioners do not remember why they are doing so (which is explicit memory) but are able to generate a fitting action (which is implicit memory).
Limitations of the Study

This study has several limitations. When making generalizations from this study, findings should be viewed cautiously because the purpose of the research is exploratory. The application of two research designs, a static group comparison and a double one-group pretest and posttest design, with random assignment could only secure the internal validity. Attempts to generalize the findings to general population may not be appropriate.

The experienced group and the inexperienced group were different in many aspects. Firstly, they had a significant difference in age. Experienced group participants were on average 21 years older than inexperienced group participants. Although the age difference was inevitable between the two groups, it must have had an influence on their performance and response. Secondly, although the proportion of male to female participants was similar between both groups, there were more female participants than male participants. This sampling might not reflect an unbiased viewpoint based on gender; however, it reflects the population of social work practitioners and social work students. Thirdly, more inexperienced group participants were in the filed of child and family welfare but more of the experienced group participants were in the mental health and medical social work fields. Although the working field could have influenced how the participants understood the clients’ situation, the categorization of this study might not have been able to reflect their experience from their working fields accurately. This was because the inexperienced group participants were required to have had at least two field placements and their working field was not necessarily in the same category. The categorization of the inexperienced group participants was based on the field placement.
they had been in the longest. Experienced group participants might also work in more
than one agency and the agencies could belong to different categories. The categorization
of the experienced group participants was based on their current position. Besides, two
groups of participants were not recruited from the same sampling frame. Differences
between the two groups were inevitable in the purposive sampling.

A limitation of this study is the content and the style of the scenarios. Different
contents and styles of the scenario might affect how people understand a case. Although
most of the participants’ feedback suggested that they were familiar with both the content
and the style of the scenarios in this study, it is possible that their response is only valid in
that particular scenario. As this study is exploratory in nature, certain patterns found in
this study might not be able to be transferred to other situations even in the same group of
participants.

Another limitation relates to a person’s ability to give detailed descriptions of their
thinking process. Although most of the important information can be identified by the
participants’ retention, participants’ reasoning of how they reached their decision is still
important for us to understand the comprehension process. In addition, the study can not
guarantee that all participants were doing their best to share all information. Therefore,
differential motivation and ability to verbally express among participants may also affect
the findings of the study.

Finally, the simulation of how practitioners received information was a limitation.
The study delivers information in written format, but most of the time practitioners
receive information through face-to-face communication in their daily practice. The
experienced practitioner may not have been able to reveal their advantage of understanding their clients well in this study.

Implications

The purpose of this study was to explore the nature of the implicit knowledge in the decision making process of the social work practitioner. This study has useful implications for social work knowledge, social work case records, social work clinical decision support system, social work research, social work practice, and social work education.

Social Work Knowledge

The study has useful implications for purposes of preserving and transmitting implicit knowledge. One primary characteristic of implicit knowledge is that individual is the creator, verifier, and user of the knowledge. The function of the knowledge is limited to the individual practitioner. No matter how useful it is, it is difficult for implicit knowledge to have significant impact on the social work profession because of difficulty in articulating and transmitting the knowledge. Without an effective approach to transmit, implicit knowledge cannot be preserved and validated.

The contribution of this study is proposing a research methodology that can potentially examine implicit knowledge used by social work practitioners. Although implicit knowledge is hard to articulate, practitioners can describe their understanding and action (decision). As long as their understanding of the client’s situation can be recorded in a proper way and link to their action and/or decision making process, implicit knowledge can be indirectly examined and preserved.
External Memory (EM) proposed by Newell and Simon (1972) can be an application of knowledge preservation. External memory refers to an information storage system outside the individual such as a memo pad or a computer system. External memory is helpful to decrease the workload of working memory (WM) when the information processing task needs to intensively retrieve or restore information from/to long term memory (LTM). For example, individuals usually feel it is easier to make a calculation if they are allowed to write the numbers on paper instead of processing the calculation in their heads. Using external memory can enhance the function of working memory and LTM when solving a complex problem.

For the social work profession, case records could function as an external memory. On one hand, the process of writing information on the records can help practitioners organize information and think through the meaning of the information in a broader context. A beginning practitioner could comprehend better because his/her working memory is used more efficiently. On the other hand, a beginning social work practitioner does not have previous experience to refer to the first time he/she conducts an intake of a particular client situation. Case records written by other experienced practitioners might contain useful information for them to understand the client’s situation and develop a treatment plan based on the provided practice wisdom. Beginning practitioners could acquire general ideas from reading case records that describe similar case situation even when the information is not available in their own LTM.
Social Work Decision Support System

Beginning practitioners usually have information about the case scenario but they may lack the ability to interpret the information to formulate diagnosis in a way that is helpful to inform treatment. This is where supervision can be helpful for beginning practitioners. Oftentimes, supervisors do not have more information than the practitioners but they can usually use the information provided by the practitioners to develop a helpful understanding of the case situation. This might be due to supervisors having more experience, which leads to a better framework to organize and understand the case information. If beginning practitioners can utilize keywords and/or concepts of the available information to search in a case records database, it is possible that they can find case records that contain similar case information. Beginning practitioners can learn from the “practice wisdom” contained in those case records. Such learning will also enhance their abilities to utilize similar framework in organizing case information provided by their clients.

This database can be applied in a Decision Support System (DSS) for social work practitioners. Similar pattern of how to structure information can be located through intensive analysis of case records in comparable situations. By highlighting key information and matching similar cases, such a database may help inexperienced social work practitioners formulate their diagnosis and intervention based on practice experience of other social work practitioners.

Social Work Research

This study establishes a new approach that can scrutinize implicit knowledge systematically and effectively. Prior studies mostly discussed implicit knowledge at a
theoretical but not empirical level. This study used efficient and simple research procedures to study implicit knowledge. Such an approach can be applied to studies in various fields without modifying the research procedure. Changing the scenario to a relevant topic is the only requirement. The results are easy to understand because of the use of natural language. No further interpretation is needed.

Based on the analysis of implicit knowledge in social work practice, we can develop a new model of practice decision making. Knowing that the content of information is not the only variable influencing the decision making process allows us to avoid building models on algorithmic or rule-based principles. A heuristic reasoning model or a case-based model might be more useful in developing decision making model in social work practice.

*Social Work Practice*

Study findings indicated that differences between experienced practitioners and inexperienced practitioners primarily pertained to their scope of perceived problems. Inexperienced practitioners tended to focus on problems at an individual level while experienced practitioners had a broader perspective of the problem, which included the context and the broader environment. Training of new practitioners should focus on how the environment and the broader context could shape the problem experienced by individual clients.

Agency should offer more opportunity for practitioners to have case reviews and discussions. In the process of preparing how to describe their clients, important characteristics of the client’s situation can be imprinted in the practitioners’ mind that may facilitate future information retrieval in similar situations. Teamwork, such as
apprentice system in the early history of social work development, can assist the learning process of beginning practitioners. Team members have to share client’s information constantly to each other. Such a process of restating client’s situation not only enhances their understanding but also verifies each other’s observations. Senior practitioners can demonstrate how to integrate case information into a framework for understanding so that beginning practitioners can learn based on their experiences.

Group supervision is also helpful for practitioners. Information ignored by one practitioner might be significant for other practitioners. Individuals can learn different perspectives of understanding the presenting information. Even the senior practitioners can benefit from such a learning process. By identifying missing information presented by others’ case description, senior practitioners can nurture their ability of conceptualizing information and understanding the dynamic of a particular situation.

Social Work Education

This study provides a framework regarding how practitioners understand their client’s situation. Study findings suggested that research participants derived their understanding of the case scenario by identifying different key information based on the retained information. Instructors should consider how to facilitate implicit learning in the classroom. It will be helpful for the lectures to move beyond didactic teaching and sharing of guidelines and rules to also includes providing case examples and exploring underlying framework of treatment decisions and strategies. Case examples usually contain more information and cues that can serve to remind students’ relevant knowledge when addressing similar case situations in their future practice.
Because implicit knowledge is usually learned subconsciously, implicit knowledge is difficult to be taught in a regular classroom setting. Implicit knowledge is usually acquired through practice and personal experiences (directly learning) although it can also be learned based on other's experience (indirectly learning). What professors can do is to provide a learning environment that contains rich, multi-layered, contextual information and nurture students’ learning by helping them to recognize and interpret key information, recognize what other alternative interpretations might exist, and develop criteria to discern case situations, utilize resources, and provide treatment.

Social work practice knowledge is implicit per se. We may be able to discover certain rules or patterns by extensively studying how practitioners make treatment decisions. However, this kind of rule-based knowledge may be helpful in building a theory of social work practice but may not be able to increase practitioners’ ability to make useful clinical judgment. Rule-based learning belongs to explicit knowledge instead of implicit knowledge. What make implicit knowledge important for social work practice is that it allows practitioners to quickly response to the situations based on preexisting framework of understanding similar situations instead of its accuracy in reflecting the fact. The verification of implicit knowledge in this study cannot replace the important role of explicit knowledge in learning social work practice; instead, it provides us an opportunity to better understand and utilize the explicit knowledge in our professional practice.

**Conclusion**

The purpose of this study is to explore how social work practitioners make decision in their practice and what types of information and/or knowledge they use in such a
process. Findings of this study show that the diagnoses practitioners made were highly related to the information they retained, but the structure of the information was more important than the content of the information. The process of making diagnosis is better to be understood as an ongoing process of understanding than a single classification. In addition, such a process happens in various stages.

This study provided initial evidences that support the recognition mechanisms proposed by NDM researchers. However, not all experienced participants showed the characteristics of an expert as described by NDM. The contribution of this study is to elucidate potential cognitive processes underlying decision making process of social work practitioners and provide a research approach that examines implicit knowledge.

Just like NDM theories that are descriptive models instead of normative models, this study focuses on describing how social work practitioners formulate their decisions rather than developing guidelines regarding useful decision in social work practice. However, if experience is found to be one fundamental criterion for practitioners to make useful diagnoses, ensuring the quality of practitioners’ experience may be a way to improve the abilities of social work practitioners to make useful diagnoses.

The approach used in this study is a prototype of studying practitioners’ implicit knowledge. No further report is available for the effectiveness of this approach. Reconstructing an appropriate schema of the social work practitioner might not be an easy process, but further study is encouraged to examine the knowledge used extensively in social work practice. Future studies will be needed to further examine the relationship between information processing and clinical decision making in social work practice.
LIST OF REFERENCES


Thank you for your participation in this study. This study is an attempt to understand how social work practitioners make decisions under the time constraint. This study includes a test, which will demand your full concentration. The whole procedure will take around twenty thirty minutes. By clicking the mouse, you agree to share your anonymous feedback. The results of the experiment will not contain any identifying information. If you have any questions, please ask the researcher now. When you are ready, click “continue” to start the explanation of experiment procedure.

In the experiment, case records will be presented very quickly. Following the presentation of the case study, write what you remember about the case. Then answer two simple questions and give reasons for your answers. The case record will be presented at a speed of approximately 10 words per second. You will need to remain focused in order to remember the content as much as possible. It is assumed that you cannot recall all information. However, please do your best to complete the exercise and answer the questions. Please click your mouse for a more detailed explanation.
You will be given two exercises to complete. The format of both exercises and the questions asked will be the same. However, the first exercise will allow for a review of the material presented at your pace, while the second exercise will not. Different cases will be presented for each exercise. Please complete the exercises to the best of your ability. Click for instructions on completing Exercise 1.

In Exercise 1, you will:

1. **Read the case record.** The information will be shown on one line in the middle of the screen. The screen will show two to four words at a time for 0.33 seconds. The total record is around 250 words and is presented in approximately 25 seconds.

2. **First review.** You can review the case record shown previously for as much time as you want until you fully understand the client/situation of the case record. (This phase will not appear in Exercise 2.)

3. **Second review.** You will re-read the case record in the time-constraint format.

(Exercise 2 will not include a timed *re-reading* of the case record.)

4. **Mathematics quiz.** You will be asked to calculate four double-digit addition problems.

5. **Retention.** Write down as much of the content of the case record as you can recall. There is no time limitation.

6. **Questions.** Answer two multiple-choice questions. The first question will ask you to select the most accurate diagnosis of the client/situation based on your assessment. The second question will ask you to select the most appropriate intervention for the
client/situation. Please note that this is not a test and there is no right or wrong answer.

We are only interested in your thinking regarding assessment and treatment of the case.

7. Reasoning. Write down the reasoning for your diagnosis and intervention.

If you have any questions, please ask the researcher now. Click your mouse to begin

Exercise 1.

Please write everything you remember about this case.

Please answer the following questions.

What is the most accurate diagnosis of this case?
1) Emotional disturbance issues.
2) Blended family issues.
3) Marital issues.
4) Financial issues.
5) Depression issues.
6) Sexual abuse issues.
7) Substance abuse issues.
8) Child neglect issues.

What intervention would you apply?
1) Conduct play therapy in order to clarify facts of sexual abuse.
2) Request an I.E.P. (Individual Education Plan) process.
3) Make a referral for a psycho/physical examination.
4) Clarify facts of neglect.
5) Make a referral to an employment services agency.
6) Conduct individual and/or family therapy.

Please write down the reasoning for your diagnosis. In addition, describe issues/problems in this family that you would like to clarify or verify during the next session.
Please write down the reasoning for your diagnosis. In addition, describe issues/problems in this family that you would like to clarify or verify during the next session.

Please click your mouse.

End of Exercise 1.

Please take a one-minute break. Click your mouse to begin the explanation of Exercise 2.

In Exercise 2, you will:

1. **Read the case record.** The information will be shown on one line in the middle of the screen. The screen will show two to four words at a time for 0.33 seconds. The total record is around 250 words and is presented in approximately 25 seconds.

2. **Mathematics quiz.** You will be asked to calculate four double-digit addition problems.

3. **Retention.** Write down as much of the content of the case record as you can recall. There is no time limitation.

4. **Questions.** Answer two multiple-choice questions. The first question will ask you to select the most accurate diagnosis of the client/situation. The second question will ask you to select the most appropriate intervention for the client/situation.

5. **Reasoning.** Write down the reasoning for your diagnosis and intervention.

If you have any questions, please ask the researcher now. Click your mouse to begin Exercise 2.
Please write everything you remember about this case.

Please answer the following questions.

What is the most accurate diagnosis of this case?
1) Emotional disturbance issues.
2) Blended family issues.
3) Marital issues.
4) Financial issues.
5) Depression issues.
6) Sexual abuse issues.
7) Substance abuse issues.
8) Child neglect issues.

What intervention would you apply?
1) Conduct play therapy in order to clarify facts of sexual abuse.
2) Request an I.E.P. (Individual Education Plan) process.
3) Make a referral for a psycho/physical examination.
4) Clarify facts of neglect.
5) Make a referral to an employment services agency.
6) Conduct individual and/or family therapy.

Please write down the reasoning for your diagnosis. In addition, describe issues/problems in this family that you would like to clarify or verify during the next session.

End of Exercise 2.

Thank you for your participation in this study. If you have questions about this study, you can ask the researcher now. If you are interested in the results of the study, leave your e-mail address or other contact information. We will be glad to share our findings with you once the study is completed. In order to maintain the accuracy of the study, please do not discuss this study with anyone employed at your agency, other social workers, other students or anyone likely to participate in the study.
APPENDIX B
DETAILS OF THE CODING

The coding of the participants’ retention and reasoning was based on the coding of the original scenarios. The coding included three levels of basic units: words, sentences, and topics. Each meaningful word was coded and grouped by the documentary sentence each code belongs to. Meaningful words included actors, actions, and characteristics of actors and actions (semantic triplet) in the scenario. A documentary sentence is the sentence that describes an action or an event and can be differentiated from other sentences. Several relevant documentary sentences compose a topic.

Coding of A Documentary Sentence

Scenario A can be divided into five sections according to the content. The first section (A) is the general information including the date of service, name of the therapist and the composition of the family. The second section (B) is the problem statement including how the case is opened and how the client (mother) perceives the problem. The third section (C) contains information collected from the school. The fourth section (D) relates to the father’s situation, and the fifth section (E) relates to the mother’s situation and the parents’ conflict.

Scenario B can be divided into four sections according to the content: the first section (F) is the general information, the second section (G) is the problem statement, the third section (H) contains information collected from school, and the fourth section (I)
relates to the family dynamics. Basically, Scenario A and Scenario B are written in the same format although Scenario A is longer than Scenario B due to the flow of the story.

The codes were assigned in alphabetical order and in numerical order. All the documentary sentences in the same section were assigned a number with the section code. For example, the first documentary sentence in Section A was coded SA1 and the third documentary sentence in Section D was coded SD3. Later, during scoring, each documentary sentence will get one point.

_Coding of meaningful words_

These codes were also assigned in alphabetical order and in numerical order. All the meaningful words in the same section were assigned a number with the section code. For example, the first meaningful word in Section F was coded as F1, and the third meaningful word in Section H was coded as F3. One exception is the repetition of a meaningful word. If a meaningful word has previously appeared, the old code will be used with a notation. For example, when Tommy first appears in SA3 (the third documentary sentence in Section A), the code A7 was assigned to it, but when Tommy appears again in SB1, a code A7-2 was assigned to it.

Each meaningful word had a tag that indicated the attributes of the code, including (a) exactly the same word, (b) synonym, (c) similar meaning, (d) similar concept, and (e) opposite meaning

Each meaningful word was assigned an attribute to indicate the accuracy of that meaningful word. Attributes included (a) exactly the same word, (b) synonym, (c) similar meaning, (d) similar concept, and (e) opposite meaning. The alphabetical order indicates
the order of how close the meaningful word related to the original word in the scenario. During scoring, each attribute was assigned with score from five to one\textsuperscript{16} and functioned as items of a summated scale. An exception is that family members only have three levels due to less meaning difference and frequent appearance: (c) exactly the same name, (d) same person, and (e) wrong name.

\textit{Coding of the Topic}

Scenario A consisted of 10 topics based on the documentary sentences as well as the response of the participants. Some documentary sentences appeared in more than one topic. Topics included Topic-Body (SC2, SC3), Topic-Hungry (SC7, SC10, SC11), Topic-Hygiene (SC9), Topic-Father Careless (SD3, SD4, SD5, SD6, SD7, SE7, SE8), Topic-Mother Busy (SE2, SE3), Topic- Father Unemployed (SD2), Topic-Mother Working Part Time (TE2, TE3), T-Mother Complaining (SE4, SE5, SE6, SE7, SE8), Topic-Father Drinking (SD5, SD6), and Topic-Relationship Problem (SB4, SC4, SC5, SC8).

Scenario B consisted of 7 topics based on the documentary sentences as well as the response of the participants. Topics included Topic-Behavior Change Timeframe (SH6, SH8, SI4, and SI9), Topic-Family Structure Change (SI2, SI3), Topic-Adoption (SG3, SG4), Topic-Mother worry (SG5), Topic-Behavior at School (SH2, SH3, SH4, SH8), Topic-Withdraw from male (SH6, SH7), and Topic-Behavior at home (SI4, SI5, SI6, SI7, SI9).

\textsuperscript{16} Although participants may remember a wrong direction of a meaningful word, attribute (e) was assigned 1 point. It is mainly because of the difference between the attributes is in ordinal level instead of interval level. The score just represent the difference between the attributes.
Coding of the participants’ retention and reasoning

The coding of the participants’ retention and reasoning was easy after the coding system was established. The participants were asked to write down what they remembered about the case scenarios and their reasoning for their diagnosis and intervention. The coding is based on the appearance of documentary sentences in their recollection of the case and their reasoning description. For example, if a participant wrote recollection “Tommy is slim” for the Scenario A it will be coded SC2. The participants’ reasoning of why “Tommy is slim” will be coded RSC2.

Detailed Coding of Scenario A

<table>
<thead>
<tr>
<th>Documentary Sentence</th>
<th>Scenario and Coding of Meaningful Word</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA1</td>
<td>Date: Nov 23, 2004. (A1)</td>
</tr>
<tr>
<td>SA2</td>
<td>Therapist: C. Brown. (A2)</td>
</tr>
<tr>
<td>SA3</td>
<td>Family Composition:</td>
</tr>
<tr>
<td></td>
<td>Mr. F (A3) (31) Mrs. F (A5) (29) (A6), Tommy (A7) (7) (A8), Amy (A9) (5)</td>
</tr>
<tr>
<td></td>
<td>Alex (A11) (4) (A12).</td>
</tr>
<tr>
<td>SB1</td>
<td>School (B1) referred (B2) Tommy (A7-2) to the agency (B3) and</td>
</tr>
<tr>
<td>SB2</td>
<td>Mrs. F (A5-2) had an intake interview (B4) today.</td>
</tr>
<tr>
<td>SB3</td>
<td>Mrs. F said that she (A5-3) was concerned (B5) about her son, Tommy (A7-3),</td>
</tr>
<tr>
<td>SB4</td>
<td>who (A7-4) seemed to (B6) have relationship problems (B7) with his classmates (B8).</td>
</tr>
<tr>
<td>SB5</td>
<td>Tommy (A7-5) was 7-year-old (B9)</td>
</tr>
<tr>
<td>SB6</td>
<td>and SB (A7-6) enrolled (B10) in a regular elementary school (B11).</td>
</tr>
</tbody>
</table>

Continued
According to his school teacher (C1), Tommy (A7-7) is a slim boy (C2) and he (A7-8) is shorter (C3) than other boys of his age (C4).

He (A7-9) has peer relationship problems (B7-2) in that he (A7-10) often (C5) isolates himself (C6) from other students (B8-2).

There were several (C7) incidents (C8) that he (A7-11) took food (C9) from other students (B8-3).

Students (B8-4) don’t like to play (C10) with him (A7-12) because he (A7-13) “stinks” (C11).

In addition, he (A7-14) seems to have a good appetite (C12) and SB (A7-15) always (C13) asks for (C14) a second meal (C15) during lunch (C16).

Family Dynamic

According to Mrs. F (D1), Mr. F (A3-2) was laid off (D2) for several months (D3) and he (A3-3) stayed at home (D4) most of the time (D5).

He (A3-4) watches TV (D6) and SB (A3-5) drinks beer (D7) all day (D8).

He (A3-6) often (D9) gets drunk (D10) and SB (A3-7) has little motivation (D11) to find jobs (D12).

He (A3-8) has changed jobs (D13) several times (D14) and SB (A3-9) has difficulty (D15) staying in the same job (D16).

Because of the financial difficulty (E1) at home, Mrs. F (A5-4) is currently (E2) working part-time (E3) as a waitress (E4) in a restaurant (E5).

She (A5-6) has constant (E6) conflicts (E7) with Mr. F (A3-10) regarding parenting (E8) and financial issues (E10).

She (A5-7) is thinking about (E11) divorce (E12).

She (A5-8) complains (E13) that Mr. F (A3-11) is not helping (E14) around the house (E15) and he (A3-12) is a negative role model (E16) to the children (E17).
### Detailed Coding of Scenario B

<table>
<thead>
<tr>
<th>Documentary Sentence</th>
<th>Scenario and Coding of Meaningful Word</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF1</td>
<td>Date: Oct. 21, 2004. (F1)</td>
</tr>
<tr>
<td>SF2</td>
<td>Therapist: P. Jackson. (F2)</td>
</tr>
<tr>
<td>SF3</td>
<td>Family Composition:</td>
</tr>
<tr>
<td></td>
<td>Miss R. (F3) (32) (F4) and Jenny (F5) (10) (F6).</td>
</tr>
<tr>
<td>SG1</td>
<td>Miss R. (F3-2) contacted (G1) a children mental health agency (G2) and</td>
</tr>
<tr>
<td>SG2</td>
<td>SB (F3-3) made a self-referral (G3).</td>
</tr>
<tr>
<td>SG3</td>
<td>Miss R. (F3-4), a single mother (G4) adopted (G5) Jenny (F5-2)</td>
</tr>
<tr>
<td>SG4</td>
<td>when she (F5-3) was 5 (G6).</td>
</tr>
<tr>
<td>SG5</td>
<td>She (F3-5) worries about (G7) Jenny’s (F5-4) Symptoms of depression (G8).</td>
</tr>
<tr>
<td>SG6</td>
<td>Jenny (F5-5) is a 4th grader (G5) and</td>
</tr>
<tr>
<td>SG7</td>
<td>SB (F5-6) enrolls (G10) in a regular elementary school (G11).</td>
</tr>
<tr>
<td>SH1</td>
<td>According to her school teacher (H1),</td>
</tr>
<tr>
<td>SH2</td>
<td>Jenny (F5-7) has some (H2) problems (H3) in the school (G11-2).</td>
</tr>
<tr>
<td>SH3</td>
<td>She (F5-8) lies (H4) and</td>
</tr>
<tr>
<td>SH4</td>
<td>SB (F5-9) is verbally aggressive (H5) with other students (H6)</td>
</tr>
<tr>
<td>SH5</td>
<td>although it (H7) did not happen all the time (H8).</td>
</tr>
<tr>
<td>SH6</td>
<td>Teacher also reports that</td>
</tr>
<tr>
<td>SH7</td>
<td>Jenny (F5-10) withdraws (H9) from male staff (H10) and teachers (H11)</td>
</tr>
<tr>
<td>SH8</td>
<td>recently (H12) and</td>
</tr>
<tr>
<td></td>
<td>SB (F5-11) often (H13) refuses (H14) to follow their instructions (H15).</td>
</tr>
<tr>
<td></td>
<td>Her (F5-12) temper outbursts (H16) increased (H17) compared to last semester (H18)</td>
</tr>
</tbody>
</table>

Continued
Family Dynamic

Miss R (F3-6) is a secretary (I1) at a university (I2).

Miss R’s fiancé (I3) moved in (I4) with this family three months ago (I5).

The couple (I6) plans (I7) to get married (I8) next year (I9).

Miss R (F3-7) noticed (I10) that Jenny (F5-13) has been very (I11) quiet (I12) lately (I13).

She (F5-14) often (I14) stays inside her room (I15),

SB (F5-15) doesn’t like to talk (I16),

SB (F5-16) refuses (I17) to go out with them (I18) for dinner (I19) or any (I20).

Generally (I21) she (F5-17) is doing fine at home (I22),

but SB (F5-18) seems to (I23) have more (I24) nightmares (I25) recently (I26).