Effects of Self-Directed Analogical Comparison and Generation of Factual Hypotheticals on Multi-Case Legal Reasoning

by

Moon Sam Sue

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6/6/2011	Barry J. Zimmerman
Date	Chair of Examining Committee
6/6/2011	Mario A. Kelly
Date	Executive Officer
	David Rindskopf
	Daisuke Akiba
	Supervisory Committee

The City University of New York

Abstract

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Moon Sam Sue

Advisor: Distinguished Professor Barry J. Zimmerman

Drawing on analogical reasoning theories, this study sought to determine whether learner-directed generation of factual hypotheticals coupled with the briefing of court decisions would be better than briefing alone in engaging in legal reasoning from two or more cases. Thirty-seven students and recent college graduates, who had been previously enrolled in pre-law programs that emphasized the reading of court decisions, were recruited. They were randomly assigned to two training groups—a structured hypotheticals training group, which used a grid to prompt the generation of factual hypotheticals from court cases—and a briefing group which summarized the court cases in response to questions regarding the parties, facts, issues and ruling/disposition of a court case. After training and reading of three court decision, both groups were required to provide a solution to a factual hypothetical --a transfer task. Measures on case comprehension, self-efficacy and self-evaluation beliefs regarding comprehension were also assessed to determine whether the intervention would interfere with comprehension and motivation. Univariate analyses showed that the hypotheticals group outperformed the briefing only training group in solving the factual hypothetical. Multivariate analysis also showed that the intervention did not interfere with comprehension, as both training groups did not significantly differ in comprehension subprocesses. Finally the two training groups did not differ

on self-efficacy and self-evaluation beliefs in connection with their perceived ability to comprehend court decisions.

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CHAPTER 1

STATEMENT OF THE PROBLEM

Purpose of the Study

The purpose of this study was to evaluate the effectiveness of self-directed case-comparison and generation of analogies as a means facilitating the legal reasoning regarding two or more court cases. To do this, I conducted a study in which students were given guided-instruction to brief and generate factual hypotheticals after reading one of three court decisions; their ability to reason and integrate knowledge from the cases was measured by their ability to solve a factual story based on the case readings.

This method for learning cases when coupled with case briefing was compared with only case briefing, which is, a writing a summary of the canonical parts of a case. This comparison helped determine whether the structured generation of factual hypotheticals boosts learning from cases compared to briefing alone.

Rationale of the Study

Pre-law and law students, especially in their first year, need all the help they can get. The demands of law study are famously furious. Every August, thousands of students enter law school for the very first time. For the coming year, they are expected to learn how to "think like lawyers" (Mertz, 2007; Sullivan, Colby, Wegner, Bond, & Shulman, 2007). They will learn legal lingo, parse the language of case law, read hundreds of pages of cases and extract legal doctrine from them. At semester's end, law students are tested on their ability to identify legal issues that arise from a hypothetical set of facts, match them up with previously read cases that are analogically relevant, and apply the rules from those cases to the hypothetical facts (Neuman, 2001; McKinney, 2005; Mertz, 2007; Sullivan, et al., 2007).

Analogical reasoning is the essence of what legal practitioners and students do (Levi, 1949; Llewellyn, 1960; Sunstein, 1993; Ellsworth, 2005; Mertz, 2007; Minow, 2007; Sullivan, et al., 2007). We all use analogies in our daily life, but in the law, analogies are used in a way that does not come naturally to most laypersons. In fact, legal reasoning is a special formalized version of analogical reasoning that is bound by constraints –such as precedent and the authority of courts—that don't exist for analogies in other domains (Holyoak, 2005, p. 117). Analogical reasoning is almost the exclusive method by which practitioners and students use to make and deconstruct arguments (Levi, 1949; Llewellyn 1960; Sunstein, 1993; and Weinreb, 2005). Analogical reasoning is used to show contours of legal doctrine and the fault lines of ambiguities found in legal categories and rules. Any form of instruction--to hasten students' abilities to notice the relationship of cases that don't seem related and to see how legal categories can be interpreted in wildly different ways – can help many students make the cut in the first year of law school. This study shows the effectiveness of a form of self-instruction by which pre-law as well law students can take charge of their own learning from cases.

This study sheds further light on the cognitive processes by which students learn from cases. With one exception, all previous studies by Lundberg (1987) and Deegan (1995) have examined the reading of a single legal case, and the only previous study on multiple legal texts (Stratman and Evenson, 2006) did not directly examine the analogical reasoning process involved in reading across cases. Moreover the vast body of research on analogical reasoning processes has largely ignored the legal reasoning processes. The only article on legal reasoning was by Ellsworth (2005). It described the historical and jurisprudential aspects of legal analogical reasoning but did not examine the cognitive aspects of legal analogical reasoning. This study brings these related lines of research together so that the process of learning from

legal cases can be more fully explained by prevailing analogical theories.

Analogical theorists such as Holyoak and Thagard (1989) as well as Gentner and Gunn (2001) have emphasized the mapping of structural components of matching analogs. Moreover, Gentner and Gunn, (2001) and Holyoak and Thagard (1989) have both emphasized the importance of getting students to perceive the problem structure of an analog or example. Gick and Holyoak (1983) call this problem structure – a "problem-type schema" or "problem schema," which is an abstract structure that represents a generalization of mappings across analogs to facilitate transfer. These theorists have borrowed the term "problem schema" from earlier expert-novice research of Chi, Feltovich, and Glasser (1981) who have defined this type of schemata as mental representations of problems. For experts, these representations contain substantive domain-related information organized on the basis of problem-related categories, and they also contain procedural information on solving problems in the domain in question. Chi, et al., (1981) have demonstrated that these aspects of problem schemata separate expert from novice problem solvers in the domains of algebraic word problems, physics problems, medical diagnostic problems—and, as this paper will demonstrate, legal problems.

Theorists such as Ross (1987) have argued that the examples from whence the schema is derived also play an important role in analogical learning, and they also emphasize the role of the problem structure in analogical learning (Ross and Kilbane, 1997). These studies suggest that comparing analogies as well as analogizing --generating analogies from worked out examples—show promise in inducing the identification of problem structure of analogs. People are more likely to see the important elements of a problem when they are forced to compare like and (sometimes) different examples. Surprisingly there is very little explicit instruction for law students to learn how to notice the problem structure of legal problems.

Much of law school instruction strives to focus students' attention to the problem structure of cases. First-year Socratic styled dialogues have the effect of highlighting the relevant aspects of a case that constitute its problem structure (Mertz, 2007). Law instructors during the first year typically pose factual hypotheticals to help students understand the outer boundaries of a rule and to discern the possible ambiguities in a rule (McKinney, 2005; Mertz, 2007). Yet posing hypotheticals is not the same thing as teaching students how to formulate their own hypotheticals. Socratic dialogues point to what are the components of a given case; yet instructors don't show the methods by which they came to formulate the hypotheticals they pose. Hypotheticals help students see where the ambiguities or fringes of a case exist, but students themselves don't see the way in which the hypotheticals were constructed. Getting students to perceive the problem structure of cases is critical, but doing this through classroom dialogues can be a hit or miss proposition. Some students may be able to ascertain the structure through these dialogues, but many will not without great effort. A more systematic approach is needed. Because instructors routinely fail to model the steps by which hypotheticals are made and case comparison is carried out, novice and near-novice students become more, not less, dependent on the instructor, when the goal should to help students achieve greater independence in their learning.

The purpose of this study is to adapt current law school instructional approaches in order to give pre-law and novice law students a self-directed learning intervention. This study recasts these old methods into new wineskins. Guided case comparison—an instructional approach used in the analogical reasoning literature -- offers a structured approach. Through guided generation of hypotheticals, students can more systematically learn methods or strategies to discern the relevant common features between cases and thus be able to see the problem structure of cases.

Moreover, creating hypotheticals in the hands of students, can serve as an important tool that pre-law and law students can use to gain further insight into the problem structure of cases. Lundeberg (1987) found that the spontaneous generation of analogies, called "synthesis," separated expert legal readers from novices (*see also* Christiansen, 2006). (For purposes of this study, synthesis is re-labeled "generating factual hypotheticals.") There is strong evidence that people are more able see the structural similarities in cases when they are exposed to a greater number of examples. Blanchette and Dunbar (2000) found that using a production paradigm enables people to grasp the structural properties of a source analogy.

There is of course nothing new about solving hypotheticals—law students routinely do this throughout their three years of law study. What is new is using and adapting current instructional methods to empower students with strategies that permit them to take more control of their learning from cases. Guided analogical problem construction gives students the ability to be more proactive in their learning and test their own understanding of cases they have read. The generation of factual hypotheticals is a strategy that prompts students to interact with the text, and this in turn may stimulate greater metacognitive awareness of reading strategies and awareness of what may be working and not working.

Definition of Terms

Analogical bootstrapping. The process coined by Kurtz, Miao, and Gentner (2001) in which a learner uses structural similarities shared by two or more partially understood, but related analogies in order to solve the problems posed by those same analogies.

Analogical reasoning. This is reasoning by example in which a person projects the conclusion about what is known upon another thing or occurrence because of its similarities to the known example. Holyoak (2005).

Cases. This refers to written decisions rendered by a court. They usually are appellate divisions but are on occasion trial courts, where the legal action was brought. Cases also refer to the proceeding or action brought by a party, but for purposes here, cases in this study is a term that refers to court decisions. (Lundeberg, 1987; Deegan, 1995).

Case-based method. This refers to the method by which law students are taught the law. Legal doctrine is taught from specific cases and from the specific cases, students are taught to induce the legal principles and rules and the different circumstances that may lead to different interpretations by which legal rules apply. (Ellsworth, 2005, pp. 687-694).

Generation of factual hypotheticals. This is a process by which a student constructs new fact patterns to extend the rule and reasoning of a prior case or cases. Blanchette and Dunbar (2000) speak of generating analogies in the context of a production paradigm, and Bernardo (2001) calls this "problem construction."

Legal reasoning. Reasoning by case example is a circumstance in which a legal practitioner or student argues that a set of facts presented by a situation are argued to be the same or different from a prior decided case (Ellsworth, 2005, p. 687).

Stare decisis. Refers to the legal principle that courts are bound by prior decided cases precedent. *U.S. Internal Service v. Osborne*, 76 F.3d 306, 309 (9th Cir., 1996).

Problem schema. An abstract knowledge structure that contains slots or variables for information on the type and configuration of the problem as well as information on the procedural and method by which a problem type can be solved. Problem schemata represent mappings that generalize the specific relevant characteristics of two or more analog (Chi, Feltovich, & Glasser, 1981; Cummins, 1992; and Pearson & Anderson (1984).

Analogical problem solving. Gick and Holyoak (1983, p. 5) describe this as a process in

which “one problem and its solution is already known” and the “analogist notes correspondences between the known problem and a new unsolved one, and on that basis derives an analogous potential solution.”

Problem structure. Refers to the constituent elements of a problem and how these constituent parts are related to each other in coming up with a solution to a problem, Cummins (1991).

CHAPTER 2

LITERATURE REVIEW

Analogy as Defined in Formal Logic

In terms of formal logic, an analogy refers a relationship between two things that possess shared characteristics (Copi, 1953). Analogies are useful in life as well as in study because they allow us to draw conclusions about something we don't know based on what we already know about a particular thing. I go to the local supermarket and buy cream cheese from Horizons Farms because I had a prior good experience with the Horizon Farm's eggs purchased on many other occasions. Analogies are used in political discourse, selling things, imaginative thought, and research. Analogies can be the engine for flashes of genius. Analogies are also the centerpiece of how lawyers and law students learn the law and make arguments (Levi, 1949; Sunstein, 1993; Mertz, 2007; Sullivan, Colby, Wegner, Bond & Shulman, 2007). Lawyers from opposing sides present competing analogies to a judge, who, in turn, makes a decision based on analogy to previous authority (Levi, 1949). Analogies can be used for different purpose. For example, analogies can be used to draw a similarity in order to make a complex topic more understandable or to show how a solution in one domain can be used to solve a problem in an entirely different domain (Levi, 1949; Holyoak, 2005).

Also people use analogies to make an argument---this is known as an argument by analogy (Copi, 1953, pp. 311-316). Crocodiles and alligators are very similar to each other and thus if crocodiles lay their eggs in the water, then we can draw the inference that alligators do the same thing (Goldstone & Son, 2005, p. 13). Or, in another example, my neighbor drives a particular model of car and gets 30 miles to a gallon, and I can infer that if I purchase that same car that I will get the same mileage.

The conclusions made from analogical inference are probabilistic and not necessarily true based on satisfaction of the premises (Copi, 1953, p. 311). Analogies are a form of inductive logic rather than deductive logic; specifically they are a form of similarity-based induction in which conclusions about something that is known are projected upon other things are similar (Sloman. & Lagnado, 2005). The truth of their conclusions do not necessarily follow from the premises from which they flow (Copi, 1953, pp. 31-36); rather the conclusion that we draw from what is known is made more probable, but the conclusion is not necessarily true.

The basic pattern for an analogy is the following set forth by Copi (1953, p. 314):

a, b, c and d have property P and Q

a, b and c have property R

Therefore d has property R

Copi (1953) notes that the strength of an analogy is determined by a number of factors—namely, the number of instances in which the analogy is true, the number of similarities shared by the known analogy and the target, the strength of the conclusion that is drawn from the premises, the number of points of differences in instances that lead to a different conclusion and the degree to which these disanalogies (which are analogies that are similar to the source analogy but differ from the source analogy's conclusion) are similar to the base analogy. But the most important factor is the relevance of the properties of a and b to c. I may get a red Honda Civic and my neighbor may get a red Prius, but the strength of an inference about gas mileage would be weak if it were based on the car's color, which bears no relevance to the issue of gas mileage. "One property or circumstance is relevant to another, for purposes of analogical argument, if the first affects the second, that is, if it has a causal or determining effect on the other." (Copi, 1953, p. 322) What is relevant or causative and not is not always that easy to determine. It is this

indeterminacy that philosophers have struggled to answer to answer and lawyers seek to exploit. In sum, the basic pattern of analogical reasoning is that there are source analogs A and B of which there is things are known, and the known characteristics of these analogs are used to infer a quality about target analog C. This inference is based on known characteristics of A, B and C that are shared, and the inference is made that C has a characteristic (not previously known) based on the shared known characteristics of A, B and C. Finally the strength of the inference will depend on the relationship between the known characteristics and the inferred characteristics. Cognitive theories about the process of analogical reasoning are based upon this same pattern of logic.

Cognitive Descriptions of the Analogical Reasoning Process

Psychological definitions of analogies start from the definitions set forth in formal logic. Theories are derived from the idea of shared characteristics between the source and target analogs, and the mapping of these shared characteristics is the basis for inferences to be drawn about characteristics of the target analog. There are several major theories that describe the analogical reasoning process, and Reeves and Weisberg (1994) subdivided them into two major groups: One major group of theories--Gentner's (1989) structure mapping theory and Holyoak's (2005) multi-constraint theory--stress the abstraction of details from exemplars. Another group-Ross's (1987) reminding theory-- emphasize the role of exemplars in the retrieval and application of schemas to newly encountered problems.

The dominant theory of analogical reasoning is Gentner's (1994, p. 152) structural mapping theory, which proposes that analogical reasoning involves the process of finding the "structural alignment between two mental representations." This process strives to find the maximal structural match between the two representations. Under Gentner's (1989, 1994) theory, the

match made between the source or base analog is primarily based on the deep structure rather than surface characteristics. “Analogy is a way of focusing on relational commonalities independently of the objects in which those relations are imbedded.” (Gentner, 1989, p. 201). Structure refers to first order relationships as well as higher order relationships. To see these relationships take the following two examples or analogs from Gick (1989, 1994) and Holyoak’s classic studies (1980, 1983) entitled, “The General.” In this scenario with a worked out solution, a rebel general and his army faced the problem of overtaking a fortress from which a dictator rules. An entire army was needed to take the fortress but the entire army could not mass on any one of the single roads leading to the fortress. The roads were littered with bombs that would explode only if a large group of soldiers walked on them. The general’s solution was to divide his large army and send smaller groups of men over the road. These smaller groups would then join together as one large army after they each passed through their assigned roads. The “target” story needing a solution was set forth as follows:

The Tumor

> Suppose you are a doctor faced with a patient who has a malignant tumor in his stomach. It is impossible to operate on the patient, but unless the Tumor is destroyed the patient will die. There is a kind of ray that can be used to destroy the tumor. If the rays reach the tumor all at once at a sufficiently high intensity, the tumor will be destroyed. Unfortunately, at this intensity the healthy tissue that the rays pass through on the way to the tumor will also be destroyed. At lower intensities the rays are harmless to healthy tissue, but they will not affect the tumor either. What type of procedure might be used to destroy the tumor with the rays, and at the same time avoid destroying the healthy tissue? (Gick & Holyoak, p. 3)

From the above narrative, first order relationships are arguments or propositions such as CONVERGE (army, fortress) – that an army converges from many different points at a single point to attack a fortress while higher order predicates refer to causes, implications or dependencies (Gentner, 1983; Gentner & Medina, 1998). CAUSE [CONVERGE (army, fortress), CONQUER (army, fortress) stands for the argument: "because an army converged at a fortress they were able to conquer it " (Gick & Holyoak, 1980). By contrast, surface elements are objects or actors and the attributes of the objects (for example, red is an attribute of a fire truck) (Gentner, 1983; Gentner & Medina, 1998).

For a structurally consistent match to be made between two analogs, the process must satisfy three constraints (Gentner & Markman, 1994; Gentner & Gunn, 2001): parallel connectivity, one-to-one connectivity and systematicity. *Parallel connectivity* means that when two predicates are matched, there must be matching arguments (Gentner & Markman, 1994, p. 152). From the two analogs above take the following two arguments: 1) An army converging to attack a fortress and 2) Radiation converging to attack a tumor. And this would be expressed formally by the following formulas: CONVERGE (army, fortress) and CONVERGE (radiation, tumor). In the above formulas there are matching convergence arguments as well as subjects and objects of the action, thus satisfying the constraint of parallel connectivity. Moreover, *one-to-one connectivity* (Gentner, et al., p. 152) is shown through the mapping of army to radiation and fortress to tumor. Finally, *systematicity* (Gentner & Markman, p. 152) is demonstrated by the preference for the deepest structurally mapping when there is more than one possible mapping configuration between two analogs.

Structural elements are the focus of the mapping process; surface elements such as attributes or objects are irrelevant to the mapping process, though surface as well as structural factors in

the earlier process of retrieving a relevant previously acquired analog, Once the mapping between the source and target analogs is made, a solution from the source analog is transferred to the target analog. How the solution from the base analog is reinterpreted to solve the target analog is unclear, although Gentner does acknowledge that schematic structures play a role in the process of transfer (Reeves & Weisberg, 1994). Structure-mapping theory focuses on the mapping between a single base analog—that is usually understood well-- and a target—an analog that needs resolution. However Gentner argues that learning can take place between a pair of analogs that are both little understood through a process called "analogical bootstrapping" (Gentner & Markham, 1984).

Another major theory is the multi-constraint theory proposed by Gick and Holyoak (1980, 1983), which emphasizes the pragmatics of the mapping process. They propose that mapping or interpretation must satisfy three factors—similarity, structural parallelism and purpose (Spellman & Holyoak, 1992; Holyoak, 2005). Not all of these factors will necessarily be fully satisfied, and in many instances, convergence will mean that all three factors will only be partially satisfied. As there is a coalescing of these three factors, a schema—an abstract, interpretative generalization -- will be generated. Gick and Holyoak (1983) call this a "convergence schema."

Structural consistency in multi-constrain theory refers to whether the mapped relations are isomorphic (Holyoak &Thagard, 1989). To see this point take the following example of two pairs of analogs:

Analog 1: John is taller than Bill, and Bill is taller than Sam.

Analog 2: Communism is more radical than socialism; and socialism is more radical than capitalism.

In the above example, there is isomorphism in the type of relationships; whether or not the objects of the analogs are similar to each other is irrelevant, for the concern of structural consistency is the isomorphism of the relationships (Holyoak, et al., 1989, p. 299). This isomorphism would be severely compromised if the second analog read: Communism is more radical than socialism, and socialism is less radical than authoritarianism. In that case the first half of the argument is isomorphic with the first half of the first analog, but the second half of the analog does not match the pattern of the relationship in the source analog. The focus of this factor is the relationships rather than the objects or attributes of the objects. Instead objects and their attributes are the focus of the second factor—similarity.

In multi-constraint theory, similarity refers to semantic similarity of the objects and predicates among two or more analogs (Holyoak et al., 1989, pp. 301-302). Take the example of object and predicates that are similar to the above base analogy: Mary is heavier than Ghita, and Ghita is heavier than Elizabeth is semantically similar to the earlier analog: John is taller than Bill, and Bill is taller than Sam. Holyoak has demonstrated that people are more prone to retrieve prior analogs based on their similarity to the target analog rather than retrieve a prior analog that is distant to the target but more structurally similar.

Pragmatic considerations—namely, the learner's goals or purposes in using the analogy—are of central concern in the analogically mapping process (Holyoak, et al., 1989, pp. 301-304). Unlike Gentner, Holyoak (1989) believes that the learner's purpose or goals play a role not only in the retrieval stage, but the mapping process as well. Holyoak explained this position in the following:

When the analogist is trying to make a particular type of inference or

To answer a specific question, a more goal-directed form of transfer

> is possible. In particular, if the target representation contains variables representing missing knowledge that the analog is intended to provide, then the analogist may selectively favor possible correspondences that would allow these variable to be appropriately instantiated. For example, if a person is trying to answer the question, "What was the likely cause of the stock market crash of 1987?" by mapping the circumstances of that year to those involved in the crash of 1929, then it would be useful to favor correspondences that allow instantiation of the unknown cause of the crucial event in the target over correspondences that could not do so. Mappings guided by such questions will in effect generate goal-relevant candidate inferences directly, rather than depending upon the unconstrained generation and assessment of all possible inferences in the aftermath of mapping. (Holyoak, 1989, p. 303)

Multi-constraint theory was proposed to explain how a mapping is arrived at when there are two or more plausible but mutually incompatible mappings between scenarios. This was one question posed by Holyoak involving an interpretation of a prior historical event with a more recent event to which the President George Bush used to justify the American involvement in the Gulf War (Spellman & Holyoak, 1992). The WWII situation involved the countries (Germany, Great Britain, the United States and Czechoslovakia (which had been invaded by Germany) and the world leaders Hitler, Churchill, and Franklin Roosevelt. The Gulf War situation involved Iraq, Kuwait, Saudi Arabia, and the United States and the world leaders, Saddam Hussein, and President Bush. In this situation there are clearly two plausible alternative mappings between

these two scenarios. George Bush could be mapped to the FDR—on the basis of their both being American Presidents but alternatively, George Bush could be mapped to Winston Churchill as Bush as did Churchill did not wait for an attack on their respective countries; by contrast, FDR did not push for American involvement in WWII until after the Japanese attack at Pearl Harbor (Spellman & Holyoak, 1992).

Another aspect of the multi-constraint theory is the concept of a schema. A schema is Holyoak's solution as to what drives the process by which transfer of a specific solution to a prior analog is made to solve an analog that is not remotely similar to the source analog (Gick & Holyoak, 1980, 1983). For such a transfer to take place, there must be a copy with substitution and generalization, such as The General and The Tumor stories noted above. The military solution to the problem in The General story is too specific to be employed to solve the medical problem and it must be interpreted more broadly to fit the medical problem. As will be explained in detail in the next section of this paper, schemata are mental representations that contain abstract variables intended to cover two or more fact-specific examples.

Gick and Holyoak (1980, 1983) have found that schemata are best induced after exposures to multiple source analogs. As a person gains further experience with more analogs that are distant from the source, the abstraction begins to take the shape of a generalization in which irrelevant details drop out. Gick and Holyoak (1980, pp. 313-314) believe that the best schema is one that falls in the middle between being too general and too specific. In other words, a schema should be general enough to a variety of situations, but not too general, lest too many mismatches occur. Gick and Holyoak (1980, 1983) make the distinction between learning from an analog and learning from a schema and argue that learning from a schema is preferable. It is harder to retain an abstract schema that is a generalization of hundreds of examples than to retain

a memory of every single one of the hundreds of examples. Moreover, once abstracted a schema can cover situations that go beyond what was originally encountered. Gick and Holyoak (1983, pp. 9-10) believe that a schema and the examples from which it grew are ultimately separate representations. Irrelevant details drop out of a schema through a process call "eliminative induction."

Reminding theory is more contextual and incorporates the role of the specific exemplars in instantiating abstract schema (Reeves & Weisberg, 1994). Reminding theorists disagree that schemata are independent of the examples upon which they are based (Ross, 1987; Ross & Kennedy, 1990; Ross & Kilbane, 1997). These theorists point out the finding that learning can't come from schema by itself—a schema needs an example. Gick and Holyoak (1983) found this out when people failed to come up with a solution to a target when given the schema but no example. Reminding theories take this a step further and conclude that schema and the examples from which the schema arose are bound together. By itself the schema doesn't have the procedural information by which to instantiate the variables contained the schema.[1] Novices need examples so that they can know how to use the schema when they encounter a new situation, and they need schema as shorthand to encapsulate numerous examples. In their view, there is "conservative induction." In other words, in the early stages of learning a domain with which one is unfamiliar, learners will tend to retain in their schema more irrelevant details from examples, in order to avoid throwing out the details that may prove to be relevant; as greater experience is learned fewer irrelevant details are kept in the schema. This runs counter to Gick and Holyoak's (1983) proposal that there is a semantic memory of the abstract elements (the

[1] The alternative view set forth by Chi, Feltovich, and Glasser (1981) is that a schema consists of both procedural and declaration information.

schema) and there is separately an episodic memory of the transpired event (Pressley & McCormick, 1995, p. 71).

Reminding theorists differ from the structural and pragmatic theories of analogical reasoning in that they argue that schemata are necessarily derived from separate processes of comparing worked out examples. Ross and Kennedy (1990) argue that a schema may be derived from applying a worked out example (a source analog) to a target problem that requires a solution. In their view, a schema is not the vehicle that the analogist uses to solve the problem; it is the by-product or consequence of figuring out how the worked-out example can be used to solve the target analogy (Ross & Kennedy, 1990, p. 143). By contrast, structural-mapping as well as pragmatic theorists propose that a schema is induced by comparing at least two base analogs (worked-out examples); the schema plays the role of facilitating a solution to a problem.

Although theorists may differ on the details of the various components of the analogical process, they do agree that an analogy refers to a relationship in which two or situations share a common pattern of relationship among their respective constituent elements even though those elements differ across the situations (Holyoak, p.117). In the most common scenario, there is a target analogy—the circumstance that poses a problem requiring a solution, and it is the presence of the target analogy that triggers retrieval of source or base analogies that bear some similarity to the target analogy. Second, these theorists agree that mapping of elements or structure do occur, and deep structure and similarity all play roles in the mapping process. However, structure-mapping and multi-constraint theorists differ on the role of the learner's purpose. Structure-mapping theorists locate purpose in the retrieval stage while multi-constraint theorists assign it a pivotal role in the mapping process.

Third, the conclusion rendered in the source analogy is then transferred or used to render a solution to the problem posed in the target analogy. Fourth, a schema is generated and can be used interpret narratives that require a solution. As noted above, structure-mapping and pragmatic theorists propose that a schema results from comparing two or more prior examples that have been solved while reminding theorists emphasize the role of prior worked-out examples being applied to solve a narrative and argue that a schema may also be generated as a by-product of comparing the worked-out example with the target analog. Fifth, there seems to be some consensus that a schema is an abstraction of the prior worked-out examples and that a schema is being used to transfer a solution from a prior example to a new problem. Pragmatic theorists argue that the generation of a schema involves deleting or dropping off irrelevant details while reminding theorists seem to think that with novices, there is greater conservative deletion of details from the prior example. Sixth, there can be breakdowns at various stages of the analogical learning process. Assuming that they have understood the prior analogy, people fail to retrieve a prior relevant analogy, then map an irrelevant analogy and generate wrong inferences. Yet people usually fail to notice that a source analogy that matches problem before them, especially when the source analogy differs in surface features from the target analogy. This is especially true when the source and target analogies are from different domains. In their classic experiment, Gick and Holyoak (1983) subjects read a The General story. Later after reading this and two irrelevant distractor stories, the college students were instructed to solve a problem involving a tumor in which too strong a dose at a single spot near the tumor would hurt the patient. The majority of students failed to use the prior analogy without a hint. In short, source analogs that appear on the surface to be different from the target analogs are notoriously

difficult to retrieve without a cue or direction that would help students discern the problem structure of both the target and source analogs.

Seventh, there is a disagreement among theorists as to whether analogists need two or more worked-out analogies to apply what they have learned to a target problem. However, Gick and Holyoak (1980, 1983), Kurtz, Miao, and Gentner (2001) and Ross and Kennedy (1990) have shown that learners can use what they have learned from just one worked-out example. But two or more analogs are usually better than one, especially when the worked out examples are different from each other. Different worked-out examples allow the learner to generalize more broadly than extrapolating a solution pattern.[2]

Schemata

Schemata refer to abstract structures that allow people to organize knowledge (Cummins, 1992; Bernardo, 2001; and Anderson, 2004). Various types of schemata exist. Schemata are used to remember sequences of events (script for eating in a restaurant); they are used to comprehend text (Anderson, 2004) and, most relevantly are used for problem solving. Schemata provide a way to organize information, and different ways to organize information refer to a perspective or point of view and to ambiguous facts, there may be more than one perspective or interpretation of the facts. The notion of schemata is widely accepted, and this can be seen in various instructional strategies to prompt the retrieval and instantiation of schemata. Readers are told to use their prior knowledge to activate schema, and some have constructed prior knowledge to be

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[2] There is some evidence that one source analog is enough. Kurtz, Miao, and Gentner (2001) and Ross (1987) for different reasons have proposed that students can, use two poorly understood analogs to derive a solution to problems through a process of "analogical bootstrapping."

synonymous with prior knowledge. In her guide to beginning law students, McKinney (2005) exhorts students to use their schemata when reading cases. This exhortation amounts to a plea to use a popular cognitive reading strategy of activating prior knowledge (see e.g. Symons & Richards, 1995).

However when analogical theorists or problem-based theorists talk about schemata, they are referring to something more specific than activating just any schemata. These theorists are really referring to "problem-type schemata" or simply "problem schemata" (Chi, Feltovich, & Glasser, 1981). Pearson and Anderson (1984) write that a "schema is abstract in the sense that it summarizes what is known about a variety of cases that differ in many particulars…A schema is structured in the sense that it represents the relationships among its component parts." A problem-type schema is a generalization of mappings across analogs; it is an abstract expression of these mappings—an abstraction, which in turn can be applied to new target analogs. In their early study of analogical reasoning, Gick and Holyoak (1983, p. 7) described a problem-type schema as:

> [E]ach of two analogs is an instance of a very general "problem schema," which is organized hierarchically into an initial state (goals, available resources, and constraints), a solution plan, and an actual or anticipated conditions, of which the solution plan and outcome are consequences. These problem components thus have a natural interpretation as problem components, thus have a natural procedural interpretation as "situation-action" rules. . . The task of the analogist is to construct a partial mapping between the two initial states, which can be used to construct the analogous solution plan and expected outcome for the . . . problem. (see also Gick & Holyoak,1980)

In describing their conception of problem schema, Gick and Holyoak (1980, p. 311) draw parallels between it and Kintsch's (1998) notion of a macro-structure in reading comprehension. For Holyoak, problem schemata is a generalization of the mapping between the source and target analog. For instance, the problem schemata that ties both the fortress and the medical story together is that "If you need a large force to accomplish some purpose, but are prevented from applying such a force directly, many smaller forces applied simultaneously from different directions may work as well." (Gick & Holyoak, 1983, p. 16). All that has to be deduced from the example-specific solution in The General story in which an army was divided into small groups and dispatched on many different roads to capture a fortress and overthrow the dictator.

Gick and Holyoak's (1983) notion of problem schema is also drawn from expert-novice literature where researchers who have found that problem solving in the fields of chess, physics, medical diagnoses, and mathematics. These researchers have the focused on the systematicity of schemata.

It is one thing to come up with ad hoc inter-domain schema to solve the type of problem encountered in The General and The Tumor, but it is quite another thing for learners to use problem schemata within semantically rich and established domains of medical, physics, chess and mathematical problem-solving. (Chi, Feltovich, & Glasser, 1981). Chi, et al., (1981, p. 135) have theorized that problem schemata as a very specialized form of schemata to solve certain categories of problems within a given domain. Chi, et al. (1981) propose that solvers first read a problem; they then form initial hypotheses of the category of problem this fall into. After this initial categorization occurs, a representation of the problem will take form. "A category and its associated knowledge within the knowledge base constitute 'schema,' in Rumelhart's sense for a

particular problem type." In their comparative study of novice and expert students of physics, Chi, et al., (1981) found that physics experts organized their schemata around principles—e.g., conservation of energy—and that their schemata were more geared toward possible solutions to a problem. Their representations were more refined and were more "if….then" conditional production statements. By contrast the novices' representations were based more on the surface characteristics of problems, and there were far fewer, if any, "explicit solution procedures." (Chi, et al., 1981, p. 140).

Building on the work of Chi et al. (1981), Cummins (1992) and Bernardo (1994) have found that the grouping or categorization of schemata is key to expertise. Bernardo has defined problem-schemata as coherent bodies of knowledge regarding problem-solving experiences that "include information about the relevant underlying principles, concepts, relation, procedures, rules, operations. . . about problem categories." Cummins (1992) considers problem schemata to be "problem classes, or *categories*." Problem schemata amount to being mental representations or problems, which at their best, are organized as superordinate categories based on the deep structures of two or more cases or examples.

Problem schemata are useful because they allow people to classify a new problem they encounter with a prior class of problems that they previously worked out; once a learner retrieves and matches up a schema, they can rely on what they understood from prior problems to key in or focus on relevant features of the new problem. Categorizing a newly encountered problem seems to be key to solving it. For example, experts in physics were found to categorize problems by the principles of physics (Chi, Feltovich, & Glaser, 1981); university students with intermediate experience with mathematics are able to efficiently solve math problems because of their ability to recognize problem structures. In math, a problem structure is not merely knowing

what the formula is, but being able to discern and match up the variables in a narrative with the mathematical formula. Recognition of the problem structure (schema) is the key advantage that experts have over novices. Expert problem schemata are based on deep structural features of problems while novice problem schemata tend to be based on more superficial characteristics of problems. Both experts and novices both try to make hypotheses on what the nature of the problem issue; but experts are better at picking up cues or key words and making inferences from them regarding the solution and experts begin to form initial hypotheses on possible solutions based on their initial hunches about what the nature of the problem is. Although novices tended to pick up the same keywords as experts, they were less adept at making inferences from the keywords and they were more engaged with constructing a representation of the problem than hypothesizing possible solutions.

A problem schema consists of both declarative as well as procedural knowledge (Chi, et al., pp.150-151). Declarative knowledge consists of knowledge about the subject matter – specifically, the different configurations by which the problem type appears (Chi, et al., p. 150). The procedural knowledge of a schema consists of the methods by which all potential solutions to the problem typed can by generated (Chi, et al., p. 150).

Experts have, of course, greater experience. They are exposed to hundreds of instances of prior examples, and from these examples, they are able to abstract features or variables (Gentner & Medina, 1998). By contrast, novices by definition have had relatively fewer exposures to examples in the relevant domain and have a more inchoate idea on what to focus when analyzing a problem.

Based on the previous studies of problem solving by experts and novices, we can reasonably speculate that expert legal problem solvers share the same characteristics of experts in other

semantically rich domains. Lundeberg's study of expert and novice readers of the law, Lundberg (1987) provides indirect evidence that expert legal readers are using problem schemata and classification of legal issues to their advantage over novice readers. Lundeberg (1987, p. 414) (emphasis added) concludes:

> *These experts and novices behaved like the ones Berliner (1986) observed in his study on expert and novice teachers. He reported that experts classified problems at a higher level than did the novices, who were more likely to classify problems to be solved by the surface characteristics given in the problems.* Here, in discussing the cases, experts could pull together the underlying threads, tying together the facts, issue, rule, and rationale into a cohesive whole. The novices tended to focus more narrowly on one element of the case, demonstrating less connectedness in their discussion of the case.

Legal problem solvers who are experts rely upon a rich database of schemata from which they can solve unresolved problems and unlock their understanding of worked out problems (court decisions). If schemata are organized around categories, what might these categories look like? Although we don't know exactly since there has been no previous research on legal problem schemata, we would think that they would be organized around legal issues and it is these legal issues that serve as categories for schemata. Take for example the case of *Valot*. This case relates the legal issue of minimum level of conduct is required for a finding of culpability for a completed criminal offense. This is usually the case when there is some ambiguity in the language of a criminal statute as to the conduct that is required to make one culpable for a crime

(Low, Jeffries, & Bonnie, 1986). In Low, et al. (1986), the suggested category is the class of relatively minor offenses in which there is ambiguity as to the minimum level of conduct required for a conviction. They cite the crime of burglary[3] in which the ambiguity lies as to the level of conduct needed to evince intent to commit a felony within a dwelling. Likewise, the authors cite other low-level crimes where the ambiguity as to the level of required conduct arises are noted such as cases involving possession and control of controlled substances as well as loitering and vagrancy statutes. Case notes or edited case decisions are used to illustrate how court decisions or notes on cases from different state jurisdictions handle the ambiguity differently.

Thus the outline of these categories might look like the following:

Minimum conduct requirements in completed offenses

1. Types of offenses
    a. Burglary – low level of evidence required v. high level of intent required
    b. Possession and control of illegal drugs
        i. Possession inferred from circumstances (*Valot* reluctance to infer possession (*Valot*'s dissent says legislature should explicitly require culpability)
    c. Loitering and vagrancy statutes—inherent vagueness from language of suspicious

Based on research on problem schemata in other fields, an expert, when reading a case involving an ambiguous definition of required conduct, would be more likely to retrieve this from her store

[3] Burglary is traditionally defined as breaking and entering of a dwelling of another at nighttime with the intent to commit a felony therein (Low, et al., 1986) while a lesser offense of breaking and entering is almost the same without the requirement of intent.

of schemata on the basis of the above categories and subcategories of offenses and to use the associated substantive knowledge organized around these categories to propose various alternative solutions to a hypothetical set of facts. In Lundeberg's study, expert legal readers relied upon various cues in the text to help them discern what legal issue was at hand in the case and connect that with problem schemata to resolve the issue. In Lundeberg's (1987) study, the experts relied on various cues to help them categorize the problem schemata they could employ. They used the headings of the court decision; for instance one expert remarked, "Oh---a contracts case. On agency," after looking at the chapter heading (Lundeberg, 1987, p. 412).

Interestingly enough law students are taught to put together detailed outlines to help them organize the doctrine---cases and the legal rules and alternative renditions of the legal rules. And typically the outlines are in part based on the outlines of legal doctrine set forth in the cases books as well as in the faculty member's syllabi. These outlines can be understood as written forms of legal problem schemata—the better outlines being those that contain legal propositions as well as procedural information on situations where rules or their alternative formulations can be used.

As noted in the earlier section, problem schemata are proposed to be the mediators of transfer in the analogical process (Gick & Holyoak, 1980, 1983) although other theorists such as Ross propose that schemata are byproducts of comparing multiple worked-out examples. There is some evidence that schemata are byproducts where the learner has no available problem schema, and the learner uses both the base and target analogies to solve each other—a process that Kurtz, Miao, and Gentner (2001) called "analogical bootstrapping."

Schemata themselves are organized based on a classification reflecting the characteristics of the examples from which they were derived. A schema contains of slots of variables with default values. Thus, a problem schema is a product of the process in which the commonalities between the analogies are saved while the differences between the two analogies are deleted through a process called eliminative induction (Gick & Holyoak, 1983). The analogical reasoning process sets natural limits to the degree of abstraction. Ideally there should be a moderate level of abstraction—to little abstraction may not be enough to cover the constituent elements of the analogies, but too much abstraction is overly broad and is more likely subject to false mappings between the analogies and error Individual cases are the basis upon which problem-type schema are formed.

Ross (1987) has theorized that for novices to learn a domain, they must engage in "conservative induction." In the early stages of learning an unfamiliar domain, there is a tendency of learners to retain in their schema more irrelevant details from examples to avoid throwing out the details that may prove to be relevant; as greater experience is learned fewer irrelevant details are kept in the schema. This does runs counter to the view derived from Tulving (1972) that a schema contains only abstract elements derived from specific examples because example-specific details are stored in episodic memory and while abstracted elements are kept in a separate storage system for semantic memory.

In summary, problem type schemata are critical because they are in other rich domains of mathematical problem solving, chess, physics, and medical diagnosis. As will be demonstrated in the next sections, legal problem solving requires students and practitioners to identify each of the problem structures embedded in a unresolved case; by doing this, they are able to apply their knowledge about the sets of cases that fall within their method of classification. Lundberg's

(1987) think-aloud study of expert and novice legal readers demonstrated that novice legal readers focused on superficial aspects case and utterly failed to attend to the features that were key to problem structure of the case they were reading. Expert legal readers, by contrast, tended to focus on what can be understood to constitute the problem structure of a case. "Experts previewed the decision, the length of the case, the actions taken, and the facts more consistently than did the novices…" (Lundberg, 1987, p. 414)

In the next section, I will show how the legal reasoning across cases fit within analogical reasoning theory. I will discuss how the law is a formalized analogical reasoning that has special constraints.

Analogical Reasoning in the Law

Analogical reasoning needs scenarios or analogs that can be mapped onto problem scenarios and court cases are the scenarios from which students learn. Court cases are the staple of the first year diet of coursework. In any given first year class, students will read hundreds of cases and case summaries; moreover court cases are the basis upon which lawyers and legal students construct legal arguments to assert rights of the parties they represent.

Cases are products of American jurisprudence whose logic is governed and constrained by certain requirements (Levi, 1949; McKinney, 2005; Mertz, 2007). These requirements are unique to the law. These constraints don't apply in other domains where analogical reasoning is constrained by only the rules of logic and the extent of a person's ingenuity. A person may use analogical reasoning to construct an argument concerning why a method of attacking a fortress from many different directions is a basis for an approach toward administering radiation to treat a tumor. It is important to examine these special constraints in the formal system of analogical reasoning that is called the law.

First, there is a requirement of a “case or controversy” and ripeness. For a judge to determine the rights of parties, there must be an actual dispute at hand between the parties. Courts are prohibited from rendering advisory decisions in hypothetical or theoretical cases. Moreover, actual disputes must be ripe for review, and there cannot be a dispute that has already been resolved –moot--by the time it reaches a judge.

Second, there is a constraint that cases unfold through an adversarial presentation before a judge. Attorneys for opposing sides present different interpretations of the law that favor the client they represent, and it is from these presentations that a court renders its determinations about the rights of parties. These presentations amount to dueling analogies—plausible but mutually incompatible arguments that interpret prior cases as well as the facts in the case at hand differently. Usually, the argument is over whether or not something falls within a category or not. For instance, is a doll a “toy” for purposes of a statute that imposes a tariff on “toys.”

Third, courts are bound by the past decisions of other courts and that constraint is expressed by the term *stare decisis*.

> *Stare decisis* is the policy of the court to stand by precedent; the term is but an abbreviation of *stare decisis et non quieta movere* — "to stand by and adhere to decisions and not disturb what is settled."… under the doctrine of stare decisis a case is important only for what it decides — for the "what," not for the "why," and not for the "how." Insofar as precedent is concerned, *stare decisis* is important only for the decision, for the detailed legal consequence following a detailed set of facts. *U.S. Internal Revenue Service v. Osborne*, 76 F.3d 306, 309 (9th Cir., 1996)

Courts are bound vertically by decisions of higher courts, and they are bound horizontally by decisions made by courts of the same jurisdiction.

Fourth, *stare decisis* requires that courts must ground their decision on prior decided cases, and the courts do this by drawing analogies between the facts of prior cases and the facts of the present case. If the analogy is being used to buttress legal authority, the analogy is not established to any type of similarity between the facts; rather the analogy is limited to what can be seen as a similarity that is relevant to the legal issue or legal category in the present case. By contrast, outside the law, analogies may be drawn from whatever can be perceived as being similar.

Fifth, courts implicitly or explicitly announce the relevant rules and employ a syllogism to show how the facts fit the rule in order to declare the rights of parties. Rules are expressed in an "if….then" format. This means that courts have to make the crucial decision as to whether something qualifies for the *if* part of the statement. If it does, the then, part follows. Though there may be nuances to the reasoning, there is in the vast majority of cases no nuance in the ultimate effect of a decision. After all, the role of a court is to make an ultimate decision (Ellsworth, 2005). Whether or not the facts make a person, object, or an act fall within a pertinent legal category or not, depends in turn its similarity or difference (Levi, 1949, p. 2). For example, a person is either "insane" or not, and a consequence may flow from whether a person can be found guilty for murder with an intent; a person either has a learning disability or doesn't and that categorization will determine whether or not a person is entitled to educational services. Society demands decisions in which there is some level of predictability, and that requirement strips away any subtlety of qualification that one finds in scientific endeavor (Ellsworth, 2005). In short, court decisions demand definitiveness in categorization. However, there are times in

which the court may not be explicit about the rule that it has to lead to its disposition of the case, and that requires the legal reader to discern the rule from the facts and the wording of the case. (Neuman, 2001, p. 37) That leaves a substantial room for interpretation and for various interpretative schemas to be employed.

Sixth, the law is a system of rules, but rule themselves are not self interpreting. Rules need cases, and cases need rules. Without rules, there is no systematic way by which cases can be resolved; however without cases, one will not be able to interpret their application in all but the easiest of instances. Goodman argues that similarity is too limited to account for rule based reasoning, and cites Wittengenstein's quote that "similarities without rules are empty." However Gentner and Medina, (1998, p. 288) argue against Goodman's interpretation and propose that similarity-based reasoning and rule-based reasoning fall within one single continuum. Gentner and Medina (1998) argue that Wittengenstein himself allowed for the role of case examples as a means of giving meaning to rules and paraphrasing Wittengenstein that "similarities without rules are empty," Gentner and Medina (1998) argue that "rules without similarities are blind." Rules themselves are not self-interpreting because the language of the rule itself is not unequivocal, but rather subject to many different interpretations (Llewellyn, 1960). The interpretation of a rule needs to be supplemented with standards of similarities for their application.

These constraints on legal reasoning lead Holyoak (2005, p. 117) to call the law a "formalized application of analogical reasoning." Outside the law, there are no such constraints on the range of similarities that can be made two or more situations. Outside the law, ingenuity is the only major constraint to what similarity that can be drawn between situations. A military analogy of distributed forces may be the genesis of the idea to treat a tumor with distributed

radiation treatment that converged at the single point of the tumor. Of course, some analogies in the legal writing are made for rhetorical purposes, and as such, they are not controlled by these constraints; however, analogies in service to rhetorical purposes are not by themselves sufficient to ground a decision or argument—there must be reliance upon authority based on an explicit or implicit analogy drawn between the facts of the precedent and the present case (Llewellyn, 1960; Schauer, 1987, p. 577; Sunstein, 1993; Weinreb, 2005; Minow, 2007). The legal theorist, Edward Levi (1949) wrote:

> The basic pattern of legal reasoning is reasoning by example. It is reasoning from case to case. It is a three-step process described by the doctrine of precedent in which a proposition descriptive of the first case is made into a rule of law and then applied to a next similar situation. The steps are these: similarity is seen between cases; next, the rule of law inherent in the first case is announced; then the rule of law is made applicable to the second case… (p.2).

The law is an instance of a formalized reasoning by example in which a court uses analogies to make the connection between facts of the present case and relevant prior cases in order to demonstrate their grounding in authority. To illustrate this, take the following example drawn from the case *People v. Valot*. . In this case, the majority and dissenting opinions represent competing or dueling schemas or interpretations of the facts. These competing schemas lead to very different conclusions about the categories under which the parties' actions fall.

People v. Valot, 33 Mich.App.49, 189 N.W.2nd 873 (Mich. Ct. of Appeals, 1971) is a case in which a criminal defendant appealed his conviction for possession of marijuana. In *Valot*, the police found marijuana and other related paraphernalia in a motel room where he and four people

were sleeping. The defendant three days before the arrest had registered the motel room under his name; he had paid one day's rent and a female had paid another day's rent one day before the arrest. The issue in *Valot* was this: What was the proper legal standard for the level of conduct from which control of marijuana could be imputed from the facts? In *Valot*, there was no direct evidence that the defendant was in control of marijuana, other than the fact that he and four others were in a marijuana-smelling room where marijuana was found. Specifically, could a judge or jury conclude these facts beyond a reasonable doubt that *Valot* was in control of marijuana?

The appeals court upheld the conviction based on a prior case, *People v. Eaves*, 4 Mich. App. 457, 145 N.W.2nd 260 (Mich. Ct. of Appeals, 1966) in which the same court had upheld a conviction for control of a narcotic even though there was no direct evidence that she had been in possession or control of a bag of narcotics. Police had been in pursuit of a car with one headlight at around 2:30 a.m. in the night; when the car in pursuit stopped, the police saw the door on the passenger door side open and heard a thud. They later found a bag of heroin on the sidewalk adjacent to the passenger door side. There was testimony that no other pedestrian or vehicular traffic in the area at the time the heroin bag was found. The court found that the jury could properly make the inference based on facts that had been proven. Of course, the competing analogies don't only occur in the written opinions. However, legal briefs presented by opposing sides in a court case do propose competing analogies or schemas on how the facts should be interpreted. The mapping of the two cases is described in Table 1.

TABLE 1

Mapping of Two Cases and a Dissenting Opinion

EAVES (source case)	VALOT (target)	VALOT DISSENT
Police	Police	Police
Bag of heroin	Marijuana cigarette butts, strong odor and paraphernalia	Marijuana cigarette butts, strong odor and paraphernalia
Found outdoor on sidewalk next to passenger door side of car	Found in motel room, drugs scattered throughout the room	Found in motel room, drugs scattered throughout the room
Police saw door open on passenger side and heard thud	Valot had registered room under his name, and had prior knowledge of drugs in room (admitted chasing drug using roommate out the day before)	
Passenger and driver in car		Valot and 4 others sleeping in room
Police saw car door open, heard thud, no other vehicular and later found heroin bag in sidewalk area on side where door opened or pedestrians nearby and this took place at odd hour of night (2 am)		There were 5 people found sleeping in the room; unclear as to who actually in possession or control of marijuana.
Rule: Trier of fact can make a reasonable inference where there proven facts. No need for prosecutors to rule all other possible reasonable alternative explanations	Rule: Trier of fact can make a reasonable inference where there proven facts. No need for prosecutors to rule all other possible reasonable alternative explanations	
Alt. Rule: Trier of fact can make reasonable inference where there are proven facts. However, burden on prosecution to eliminate other reasonable possible explanations.		Alt. Rule: Trier of fact can make reasonable inference where there are proven facts. However, burden on prosecution to eliminate other reasonable possible explanations.
Disposition: There were proved facts upon which an inference of criminal acts could be made and conviction upheld. Possession and control are understood in commonsense terms. It was reasonable for trier to make the inference from proven facts that Eaves had thrown out the bag and was therefore in control of heroin.	Disposition: There were proved facts upon which an inference of criminal acts could be made and conviction upheld. Possession and control are understood in commonsense terms. Valot knew about marijuana in a motel room with whom he was registered and had paid rent; and it is not credible to think that the registered owner wasn't aware of the marijuana existed in a room that reeked of it. Therefore it was reasonable for a trier of fact to conclude that the Valot was in control of the marijuana.	
Disposition based on alternative interpretation: Based on the facts all other reasonable possibilities of control were eliminated: early morning hours, and no evidence of others in the street and door opening and thud eliminate the possibility that any others could have been in control of heroin.		Disposition based on alternative interpretation: There were 5 people in the room. Prosecution hadn't presented evidence to eliminate the possibility that any one of the others were actually in control of marijuana. Not enough to impute control to Valot.

The above table is a demonstration of two possible mappings and conclusions that can be drawn from the source case. The majority decision in *Valot* focuses on ownership and awareness of the defendant as the basis for an inference of control of marijuana while the dissent focuses on the fact that there was direct evidence that *Valot* was in actual control of possession of the marijuana found in the motel room. The majority's interpretative schema is based on imputation of criminal responsibility based on an inference from the fact of ownership and pervasiveness of the marijuana's presence in the motel room.

By contrast, the dissent's interpretative schema is based on the absence of any direct evidence of control and the failure of the prosecution to rebut the possibility that any one of the four other people in the room was in control of the marijuana. In some ways the two opinions are imperfectly written because they fail to address the cases on which each side relies. Ideally, the majority decision should have made an effort to distinguish the cases cited in support of the dissenting opinion's arguments, and the dissent should have spoken directly to the cases upon which the majority decision rested.

Instructional Approaches to Facilitate Analogical Reasoning

There are several approaches to facilitate analogical reasoning. One approach looks for ways to induce schema. Teaching the schema by itself has proved to be an ineffective approach. In this approach, the schema is taught without an example from which schema was derived. In Gick and Holyoak (1983), participants were introduced to form a schema in either a verbal form or graphic form. An example of the verbal form is: "If you need a large force to accomplish some purpose, but are prevented from applying such a force directly, many smaller forces applied simultaneously from different directions may work just as well." An example of the graphic form

is a picture of one large line and then afterwards several small lines from several directions all converging at a single point (Gick & Holyoak, 1983, p. 18). They found that direct teaching of a schema alone, apart from an analog, does not promote learning among those who are novices. They also found that the percentage of subjects who noticed that the relevance of the verbal or graphic principle was not particularly high relative to those exposed to two analogs, and those who ultimately came up with the solution that was not exceptionally high. It would appear that learners benefit from the very process of inducing a schema from a case. Gick and Holyoak (1983) noted, people need examples, and teaching principles is too abstract for most novices to grasp. Students need concrete examples to apply abstract principles; seeing how a principle works out in practical terms helps them envision how the principle applies in real life. Thus, a verbal or graphic statement of the schema when coupled with an example was found to promote retrieval as well as application of a schema when they supplemented a worked-out example.

Gick and Holyoak (1983) also found that using "dissimilar" examples appeared to be more effective than using similar examples. Dissimilar examples share the same underlying structure as their counterparts, but they are dissimilar with respect to the objects and actors and are usually drawn from domains that are distant from the counterpart example (Gick & Holyoak, 1983, pp. 28-29). Dissimilar examples may help the learner focus on underlying commonalities between worked-out examples. Similar examples contain objects that are like the objects or actors in their counterparts and are from related or the same domain: for instance, the tumor problem and another medical problem involving, for example, a parasite. Similar problems may inhibit a learner's ability to discern the relevant underlying commonalities between two or more example and generalize from these commonalities.

Direct comparison of analogs is another means used to induce formation of the problem-type schema. In this procedure, subjects are asked to read each of the two analogs and then told to write down similarities between the two analogs (Gick & Holyoak, 1983). The purpose of this procedure is to encourage subjects to map common elements between the two analogs and promote formation of a problem-type schema. After this, a problem or target analog is presented to the participants and the subjects are asked to come up with a solution based on one or both of the two stories they read. Numerous studies have confirmed that comparison is effective in drawing attention to the underlying, but implicit problem structure. Catrambone and Holyoak (1989) report that subjects who were instructed to compare a target analog with multiple or a single base analog did substantially better than subjects who were instructed to summarize each story they read. They conducted a series of experiments involving The General and The Fire Chief. They found that subjects who compared the two problems was not great compared to subjects who summarized them when there was no delay between the comparison or summarization and the task of producing a convergence solution; however the advantages of comparing relative to summarization grew when there was either a 30-minute and 1-week delay in being asked to solve a target analog. Nevertheless, the absence of any significant difference in performance between the summarization and comparison groups is surprising. Cummins (1992) points out, there is a distinct possibility that those who were summarizing were also spontaneously comparing the two stories and that this diluted the difference between those who were explicitly comparing and those not comparing. In her study, participants in the non-comparison group were given a verification task that focused attention on the surface details of each story. By doing this, she hoped to minimize the possibility that any member of the non-comparison group would engage in making comparisons on their own.

Cummins' study (1992) sought to determine whether comparing algebraic problems led to later sorting of algebraic problems based on their problem structure. During a training phase, one group was oriented to the task of comparing the problem structure of two narratives that differed superficially in objects and context but were structurally similar. As an example consider the following problem posed by Cummins (1992):

> Jill, an aviation technician, is testing a model of an experimental jet plane in a wind tunnel. Flying against the air stream, it takes 10 minutes for the plane to travel the length of the tunnel. Flying with the air stream, it can travel the length in 6 minutes. Jill is amazed at how fast the plane can fly, especially since she knows that she set the wind speed in the tunnel to 15 mph. At what speed can the plane fly with the wind turned off? (p. 1106)

The above problem would be coupled with a problem like the following:

> For Christas, Hilda gave each of her new grandchildren an equal amount of Money. One child put the money in a certificate. The other put the money in a Bond. The rate on the certificate is 2% higher than the regular savings rate. The rate on the bond is 2% lower than the regular savings rate. The certificate earned in 1 year (sic) the same amount as the bond did in 3 years. What is the regular savings rate? (Cummins, 1992, p. 1106)

Students were assigned to four experimental groups based on 4 different orientation tasks—recognition, verification, analogy and schema. Subjects then engaged in sorting tasks based first on topic and then later on the problem structure of the scenarios. Cummins (1992) found that

students given the verification/recognition tasks –which were all designed to keep students from spontaneously comparing problems—did poorly (about 50% correct response rate) when they were required to sort new problems based on structure of prior worked-out problems while students in the analogical and schema groups scored respectively at the 76% and 90% correct response rates for the same type of sorting task.

Likewise Catrambone and Holyoak (1989) found that subjects who were in a comparison group significantly outperformed those in the no-comparison groups in arriving at a solution to a target problem without a hint – 47% in the two-analog comparison group versus 16% in the two-analog no-comparison group. However, when there was a delay of 30-minutes or 1-week, most subjects failed to use the schema they had earlier induced beyond the baseline of 10%. When given a hint, subjects in the comparison, 30-minute delay group did substantially better than those subjects in the comparison, 1-week delay group (71% versus 47%). Finally, transfer was found to occur when subjects were given explicit cues to compare similarities in goal, obstacles, and method (Catrambone & Holyoak, 1989, p. 1153). Likewise, Kurtz, Miao and Gentner (2001) have found that comparisons between two partially understood examples that are structurally similar can be used to induce structural alignment and a schema to enhance learning and understanding.

In sum, comparison is a particularly effective measure to promote induction of schema, and a more directive-form of comparison enhances the induction of schema and its instantiation to solve newly encountered problems.

The next section will describe the first-year law school instruction, which focuses on teaching the structure of cases. The point here is that this method of instruction does in fact focus on the problem structure of a single case, but it is ineffective in inducing a schema because there

is no explicit instruction in how to conduct a comparison. However, a traditional case briefing when coupled with comparison with cases should be a stronger form of instruction that is more likely to induce a schema.

Formal Reading Structure of Cases

A prerequisite to reasoning across cases is the ability to negotiate and comprehend the text of an individual case **(**Stratman**,** 2002). If a person does understand the meaning of a court case, that person will not be able to extend the logic of that case onto a new set of facts. As Lundeburg (1987) found in her study of novice and expert readers of the law, novice case-readers failed to attend to relevant aspects of a case. Novice readers are unfamiliar with the legal terminology, and they usually lack the background knowledge to be efficient readers (Lundeberg, 1987). Moreover, because novices have not grasped the implicit text structure of legal cases, they slog through their reading of a court decision.

For that reason, the first days of pre-law and law school are focused on teaching the implicit text structure of case. The standard instruction on reading cases consists of breaking down a case into the following parts:

Facts. This consists of a description of the history by which the case found its way to the court-- that is, by writing the decision; procedural history describes the courts as well as administrative history underlying the case. For example, which court first heard this case and which other courts have reviewed the lower court's decision? The facts section also describes the parties and the events that led to the dispute between the parties. Under what circumstances did the case evolve from a dispute between the parties? (Lundeberg, 1987; Shapo, H. & Shapo, 2002; McKinney, 2005; Mertz, 2007).

Legal issues. This section is a statement of the legal issues that the court is required to resolve (Lundeberg, 1987; Shapo & Shapo, 2002; McKinney, 2005; Mertz, 2007). Legal issues are presented in sequential hierarchical format in which procedural and jurisdictional issues having to do with the power of the court to rule in the case is addressed while substantive legal issues are considered sequentially.

Arguments made by opposing sides. These are the dueling analogies that the attorneys propose before the court (Llewellyn, 1960; Weinreb, 2005). Attorneys may point to legal authority (cases, statutes, or regulations) as a basis for their argument; and they will propose how the other side's authority may not be applicable. Sometimes there is an express statement of the legal issues before the court, but as can be seen in the example below, frequently legal readers must infer what legal issue is from the facts and analysis of the court, and that ambiguity will be the core of the legal dispute.

Holding and result. The holding in a case is the court's decision with respect to the legal issue at hand (e.g. Is a person who is HIV positive constitute a person with a disability under the Americans with Disabilities Act?) The result relates to the question of who won. For example, was the defendant's motion to dismiss a case granted or not? If it were, the defendant would in some sense be considered the winner of the case.

Reasoning or rationale. This component asks the question: "What is the court's reasoning that connects the facts and fits them to the legal rule?" (Lundeberg, 1987; McKinney, 2005). Sometimes this is explicitly stated, but often a reader is required to read between the lines and reconstruct what could possibly be the reasoning behind the court's disposition in the case.

Although every case has these basic components (e.g., the facts, legal issues, holding and ruling and rationale or reasoning), cases may vary in the order and manner in which these

components are presented. Students are expected to write summaries called "*case briefs"* that focus on these various elements (McKinney, 2005; Mertz, 2007). Ideally, they write them as separate notes, but many students commonly write short notes in the margins of the case-book pages to save time. Although comprehending individual cases is necessary to being able to reason across cases, that skill alone is insufficient for being able to discern an underlying schemata that ties cases together (Stratman, 2002). However, these instructional guidelines do not provide much light on the procedures for reasoning across cases. Much of this instruction comes in the Socratic styled dialogues in which students are peppered with questions and hypotheticals (Stevens, 1983; Mertz, 2007). In the next section, there will be a description of how class dialogues and the use of hypothetical fact patterns to help student focus on the problem structure or problem-type schema of cases.

The Case Law Method and Legal Hypotheticals

Law school topics are organized along the lines of substantive legal areas (Mertz, 2007). In the first year, these areas are typically contracts, torts, civil procedure, and criminal law. The case-book consists of a compilation of court decisions arranged to illustrate doctrine in a systematic fashion. For instance, in contracts, sections are organized from beginning to end—contract formation, breach of contract, contract enforcement—and cases are the centerpiece of the learning experience (Neumann, 2001; McKinney, 2005; Mertz, 2007). The court decisions, usually appellate court decisions, are edited in order to serve as an exemplar of some aspect of the doctrine; material that is not germane to the point being made in the textbook is excised. Case notes and commentary are included to note the twists, turns, and variations in the doctrine being illustrated in the casebook.

The case law method has been much criticized and maligned. The case law method in action is exemplified by stereotypes of the Socratic dialogues portrayed by the imperious Dr. Kingsfield in *One L* (Turow, 1997) the account of a first-year of a law student. Lundberg (1987) described law school teaching as a form of "discovery learning," and she implies that it is an ineffective instructional method. But historically, the case law method was a revolutionary approach developed by Dean Langdell who founded Harvard's law school in the early 1800's (Stevens, 1983, pp. 51-72). Before the case law method, law was primary taught in lecture format with a focus on teaching broad legal principles that were exemplified by cases. In the old regime, court decisions were peripheral to the teaching of the course; cases were simply to illustrate aspects of the doctrine (Stevens, 1983, pp. 3-19). By contrast, under the new pedagogy, court cases were the centerpiece of instruction. Instead of telling students what the principles are and exemplify those principles through cases, the case-method made court decisions the centerpiece of first-year legal education. The case-method is the basic approach by which law is taught.

The principles of a case would unfold in a Socratic dialogue between a student and professor before a hundred or more of his peers in a lecture hall as illustrated by this exchange:

These dialogues between professor and student should be considered a form of reading instruction as to what is important to read in a case. Dialogues force students to focus on what the relevant facts of the case are and take students away from the typical narrative of everyday life.

> Prof.: Wait, wait, was there a contract for a delivery of wheat? No, for the sale of wheat, right? A contract for the sale of wheat.
>
> Student: Right.

Prof.: Okay, and who what was the price of the wheat?

Student: Well, the delivery to (price at the) time of delivery (.)

Prof.: When was the time of delivery?

Student: Specifically? Ah …

Prof.: Now, tell me about this mortgage that the defendant held on the plaintiff's land. What kind of a mortgage was it? In a minute, we'll try to figure out what the mortgage is.

Mr. K.: Um…What do you mean what kind of mortgage?

Prof.: What does it tell us in this case? What is it called?

Mr.K: Um…Well, it said that uh…it was a third mortgage ().

Prof.: What does that mean?

Mr. K.: I have no idea

Prof.: Third mortgage. That means there must have been three mortgages, right?

Mr. K.: Right.

Prof.: What's a first mortgage and what's a second mortgage; what's a third mortgage? You're lucky, Mr. K., you haven't yet had to have first, second, and third mortgages. [[laughter]] You haven't yet had to face the problem. Someday you may. Maybe you won't. Maybe you'll become a high-priced lawyer and this will never bother you. But there are folks out there dealing with third mortgages. (You) probably will never see a third
Mortgage, but this person strangely enough did. What's a third mortgage? Let's-unh, let's ask around a little bit. (Mertz, 2007, p. 68)

> Prof.: Hi. Um, can you start developing for us the arguments for the plaintiff and the defendant (.) Umn, Ms. N.?
>
> (Mertz, 2007, p. 69)

In these two foregoing class dialogues, the instructor focuses the student's attention on the components of the problem-type schemata. In the first dialogue, attention is paid to contract of sale of wheat and the various components of that contract—namely, the price of wheat and the time of delivery.

One key in-class instructional technique is the use of "hypos," hypotheticals that Mertz (2007) says provide "fine-grained exercises in analogizing" and provides the following dialogue to exemplify the technique.

> Student: Umm, this other one says that it's a real promise, that the father was making up this case of the mortgage and that the deed was really just a symbol of what he was actually going to do. And then when he died, he didn't um upkeep his promise, so that when the mortgage wasn't died paid. So that, um, if he's trying to protect his daughter, then he didn't keep up his end //of the promise //
>
> Prof.: //but, well // actually let me clarify, that wouldn't be enough. In other words, we will enforce promises against a mistake. So, the fact that he died without completing the promise would not be—would not be a factor in determining whether or not
>
> This is a umm gift. / . . ./ Um, so that that wouldn't indicate the seriousness, or not, uh, would it? I mean, what if he'd been struck by

lightning? [[class laughter]] Hit by a truck?

(Mertz, p. 73)

. . .

Prof.: . . . Well, this, uh, you known, () have hypothetical brief case, I like to use the hypothetical pole case. Uh, what's this thing? Here's—here's the conflict in the (). I promise to pay you one hundred dollars if you climb to the top of the flagpole and touch the golden eagle at the top, and you want a hundred dollars, and you start up there and just, you know, when you're at the top and you're—when you're at the top and you're—just as you're reaching to touch the gold eagle I yell at you, "I revoke!" [[class laughter (.04)]] And then laugh at you. (Mertz, p. 73)

Sullivan, Colby, Wegner, Bond, and Shulman (2007, p. 53) in their review of the class dialogue conclude that law students "by learning to pay attention to some aspects of the cases they read while discarding others are learning a new definition of what constitutes a fact." In other words, through hypotheticals and class dialogues, students are learning to determine which facts are capable of being mapped or matched with the facts of other cases.

Generating hypotheticals as a legal reading strategy. Problem construction was also found to be an instructional method used by expert legal readers in two experimental studies of legal reading conducted by Lundeberg (1987).

Lundeberg's (1987) study documented the types of strategies that expert legal readers engaged in while reading legal cases, and she tested the effects of an expert-strategies based intervention on first, second, and third year law students. Lundeberg (1987) identified the

following six reading strategies employed by expert readers: using context (looked at headings, parties, type of court, date, name of judge); previewing the decision, length of case, actions taken and facts; re-reading analytically (going back to check and marking the holding); and evaluation (judging whether one approved or disapproved of the decision) (Lundeberg, 1987, pp. 412-415). One other tactic was synthesizing. Synthesizing in part consisted of speculating on alternative outcomes if the facts had been different, which Lundeberg (1987, p. 414) dubbed as "hypothesizing." From this study, one can surmise that expert legal readers more easily grasped the problem structure—the legal issues and the facts relevant to them—and sought to test the boundaries of the underlying rules by slotting in different facts and situations. In other words, they were constructing other factual scenarios to test their understanding of the rule that was the basis for the court's decision.

Comparing cases in law school. Case comparison is used to carry out many fundamental legal tasks. For example, when constructing a legal argument from cases, a student will explicitly draw on cases he or she feels are similar and argue how those prior cases are similar to the facts in the present case before the student; moreover he or she will distinguish other cases that appear to be applicable by showing how they are different in relevant ways to the present case and thus inapplicable to the facts in the present case. In reading cases, students are constantly comparing or sorting out cases in order to classify the aspect of doctrine for which a case stands. Students are exhorted to use the Table of Contents of a textbook to determine where a case stands in the larger outline of legal doctrine. Comparison can also help students begin to develop a rudimentary schema that gets more refined as they are exposed to more and more cases. For instance, McKinney (2005) suggests that students engage in the following inner dialogue:

> So this court dismissed the plaintiff's case for battery against the defendant because it felt the defendant was just playing with the plaintiff and never meant to hurt him. I guess that means that you have to have meant to hurt somebody to have "intent" required to be liable for an intentional tort like battery. [After reading the second case]: Whoa. This court allowed a claim for the intentional tort of slander even though the harmful words that were sent over email to the listserv for the plaintiff's whole graduating class were sent by mistake. So, this court seems to think that the defendant is liable even tough she never meant to hurt the defendant. I wonder if the difference has something to do with the fact that the plaintiff in the other case was also playing when he got hurt, but the plaintiff here got blind-sided by this email. (McKinney, 2007)

Although case comparison is an effective method to promote the retrieval and induction of schemata, there is surprisingly little instruction in law school on comparing cases. Explicit instruction seems to be focused on briefing as a means to draw out the problem structure of a single case but not in multiple cases. Great emphasis is put on the act of reading a case, such as to understand its basic facts; when the actual rule of a case is opaque, students must discern the rule from the facts and the statement of law, form hypotheses about the rule and determine whether these hypotheses need to be changed, make a judgment of situations where this rule fits when there are other things are asked of students, such as comparison of cases.

Without explicit instruction, students can easily go awry in comparing cases. Without prompts, students may map too many irrelevant elements. However, with too many prompts,

instructors may make learners dependent on them and thus undermine self-regulation. Prompts based on the questions that students are asked to extract from a case appear to be an effective middle way. Individual summaries of cases based on these standard elements of briefing may not be an effective way to induce schema when they stand apart from each other; but schema is more likely to be induced when there is explicit direction to compare these individual summaries of cases.

Studies by Gick and Holyoak (1980, 1983) and Ross and Kennedy (1990) demonstrate that comparing worked out examples are better at inducing schema than writing individual summaries of worked out examples, and it is reasonable to propose that these same advantages will extend to comparing court decisions.

Without the benefit of research-based study or study of analogical reasoning, legal pedagogy through the posing of hypotheticals and case comparisons, has relied upon a time-proven method that helps students generate problem-schemas that in turn facilitate transfer of solution methods to similar cases and unsolved factual scenarios. There have been few empirical studies examining reasoning across cases. Stratman's studies (2002, 2007) are the only ones that examine inter-textual reading across cases. Stratman's (2002) study examined whether different reader purposes affected reader abilities to detect single-case as well as multiple case interpretative problems that he calls "indeterminancies." Stratman (2002) found that students who were assigned the role of advocate or advisor did better not only on questions that measured comprehension of a single case but also comprehension across cases. Students with a more undefined purpose –class recitation of a case—did poorly. His explicit finding was that the purpose of the legal role as defined by the assigned role had an effect on single- and cross-case comprehension. Stratman's (2002) findings are also important because the assigned role of

advocate or advisor required the legal readers to compare the cases. To argue for a particular side or to provide advice to a client requires a practitioner or a student to make a comparison between the cases. Stratman (2002) however did not use any of the analogical reasoning theories to describe the processes by which reasoning across cases take place, and he did not specifically look at the role of case comparisons or hypotheticals in promoting schema induction.

There are in fact different kinds of indeterminancies in the text of court cases. There are advocacy-related indeterminancies in the text. These are ambiguities in the text that advocates exploit to make their arguments; after all, the role of advocate is to gloss over parts of a case (facts, holding or both) that don't support his argument and emphasize those parts that bolster his argument. Advocacy related indeterminancies lead to alternative mappings that serve as a basis of an advocate's affirmative argument. There are also evaluative indeterminancies—ambiguities in the text that are found when a person assumes the role of critic or judge of a text—gaps or inconsistencies in the text that raise questions about the strength of a court's argument (e.g., court finds that a requirement that a party failed to meet a requirement of payment of a fee within a statutorily required deadline when in fact the party had partially paid the fee, albeit three days after the deadline). These ambiguities require the reader to go outside the text and to make a judgment about the quality and strength of an argument. Fajans and Falk (1993) refer to this evaluative act as "talking back to texts," in order to break away from the "tyranny of the paraphrase." Detecting these two types of indeterminancies are virtues, but these virtues are not equally advanced by the same purposes assigned to reading the text. If you assume the role of an advocate you are more likely to spot advocacy related indeterminancies than if you are assigned a different role or purpose; by contrast, assumption of the role of an evaluative critic of a court decision should result in being able to spot gaps or flaws in a court's argument. Indeed some

researchers such as Reznitskaya and Anderson (2002) argue that there are schemas that enable readers to evaluative the strengths of an argument. Instructors need to be clear about the purpose of their engagement when they identify ambiguities in a text; as Stratman (2002) points out, instructors as well as experimenters aren't clear about what the purpose is during a typical class recitation of a text – is it advocacy related, evaluative, something else? This lack of clarity may be confusing—especially when instructors shift from ordinary dissection of a case to understand what implications result from having to argue one side of an argument or the other to disserting a case for purpose of seeing the flaws in the reasoning of an argument. (Of course an advocate will use the role of critic/judge in order to deflect an adverse case or argument being made by the other side; but the point here is that the role of critic/judge does not lend itself to constructing an argument that is affirmative in support of her side.) The focus of this paper is the advocacy-related indeterminancy in which there can be multiple alternative mappings between a source case or cases and target cases.

Despite their usefulness, many questions about these techniques of case comparison and solving hypotheticals remain unanswered. What types of hypotheticals promote learning? Does it matter whether hypotheticals mirror the text structure of the source case analogy? Will transfer more likely occur when learners are first exposed to hypotheticals that share object similarity with the source? Or does this depend on whether the learner is a novice or an expert? Is guided case comparison effective in promoting induction of problem schema, and if so, what kinds of guidance is needed? Is simple side-by-side case briefing and directed comparison effective?

The Role of Interventions in Zimmerman's Model of Self-Regulation

In assessing the effectiveness of a cognitive intervention proposed here the author needed to examine the impact on motivational factors. Plainly put, a cognitive intervention is only as good as the level of motivation of the person to use and apply it.

To assess the effectiveness, this paper adopts the social cognitive-motivational model of self regulation set forth by Zimmerman (2000). Self regulation is formally defined as the process by which learners use their cognitions, affect, and behaviors to attain a specified goal (Zimmerman, 2000). It describes a strategic orchestration of thought processes, strategies, beliefs, emotions, and outward behaviors to reach a goal. Where does a cognitive strategy like case briefing or formulating factual hypotheticals fit within Zimmerman's theory of self-regulation?

Under Zimmerman's (2000) model, self-regulation consists of three phases — forethought, volitional control and self-judgment. A strategy to promote legal reasoning across cases or to promote the accurate reading of court cases (briefing) has a clear place in the forethought phase. This phase occurs before the learner undertakes a task. That phase consists of goal specification, choice of strategies to attain the goals, as well as self-efficacy beliefs. A strategy like briefing defines the task as well as a specific performance goal—read a court case in order to identify each of the four basic components of a decision—the parties, facts, issues and the ruling/disposition. With a defined task, the learner can engage in strategic planning—that is, to consider a range of strategies to undertake the task of case briefing—looking at the case caption and skimming the initial paragraphs of the case to see who the parties are, examining the subheaders to see where the facts, summary of the legal issues, etc. Moreover, a strategy-like

briefing assists the learner in setting a goal. Briefing for instance clearly is a proximal goal that is related to a distal goal of being a good and accurate reader of cases and getting a high grade in a law or pre law class. It is also a "process" goal because it affords the learner an opportunity to become personally invested in the use of the strategy, and there are clear markers as to making progress on identifying the different components of a court case. Among the motivational aspects of the forethought phase are self-efficacy beliefs, which are defined as "personal beliefs about having the means to learn or perform effectively" (Zimmerman, p. 17). A reasonably high level of self-efficacy is needed to undertake the task of case briefing. A strategy-like case briefing clearly has a place in the second phase of the self-regulatory cycle—performance or volitional control. A learner focuses her attention to the strategies and steps she needs to engage in to accurately identify the components of the case. She may draw a diagram to help her separate who is who in a case, for example. A person may engage in self-instruction and subvocally walk through the various steps he needs to go through to identify the components of a case and may use a mnemonic in order to remember the various steps. Moreover in this phase, a learner may go back and re-check what she has written to see whether the initial identifications cohere and make any sense—this what Zimmerman terms "self-observation." Self-observation—if it is an accurate depiction of what one is doing in real time—can produce immediate feedback, which can be basis for corrective action and adjustment in the reading to correct any problems with a case brief.

Finally, a strategy-like case briefing can benefit from self-regulatory control in the third phase—self-reflection, which occurs after performance has been completed. The key processes in this phase are self-evaluation and self-judgment. Self-judgment "involves self-evaluating

one's performance and attributing causal significance to the results" (Zimmerman, p. 21). Self-evaluation means that one compares oneself against a clear standard of performance—"did I do a good job of accurately identifying who were the plaintiffs and who were the defendants, did I describe them all with degree of specificity?" Moreover, an attribution of causal significance of the results is important because attributing successful results to the use or better coordination of strategies will sustain motivation whereas attributing nonsuccess to a belief in a fixed ability will lead to a downward spiral in motivation.

The self reflection phase in turn loops back into the forethought phase because attributions of failure in using the right strategies will lead to an adjustment in plans in redefining the task, deploy strategies differently, etc. Self-efficacy is in turn affected by the self-reflection phase since attributions of failure due to a belief in fixed ability will lower self-efficacy and motivation to undertake the task while attributions to a failure and focusing on what one did right the first time will help to sustain self-efficacy and motivation. In turn, the cycle of self-regulation runs again through each of the phases.

With the above description of how an intervention like case briefing fits within Zimmerman's model of self-regulation, we get a better sense of how the intervention that guides students to generate factual hypotheticals from their case brief fits. Like briefing, generating factual hypotheticals is clearly within the control of the student making it a perfect candidate for self-regulatory control. The above discussion strongly suggests the outlines of a design for a self-regulatory program of generating factual hypotheticals; however this is beyond the scope of the present study. As a preliminary matter, the present study is concerned with the impact that generating hypotheticals might have on self-efficacy and self-evaluation beliefs in case briefing

capability. Will the difficult task of generating factual hypotheticals affect these beliefs in the self reflection phase of self-regulation? Will difficulty in generating factual hypotheticals make students second-guess what they have written in their briefs of cases? Or will readers simply attribute their performance in generating hypotheticals to the novelty of the task and treat their performance of this task separately from what they believe about their ability to accurately brief cases? If generating factual hypotheticals does have a negative impact on self-efficacy and self-evaluation beliefs, then the cost of this new intervention may not be worth the benefit of any enhanced ability to reason across cases. My research was conducted to address these concerns.

CHAPTER 3

METHOD

Purposes and Rationale

The purposes of this investigation are 1) to describe legal reasoning as a process of analogical problem solving; 2) to test the effectiveness of an instructional approach in which students are guided to compare cases and generate hypotheticals; and 3) to determine the role motivational-cognitive variables (self-efficacy and self-evaluation) beliefs on comprehension of legal cases. The experiment extends prior studies by Gick and Holyoak (1980, 1983), which focused on inter-domain analogical transfer of the solution from a short narrative onto another unsolved narrative that shares the same narrative sequence. There is no study that has described the legal reasoning processes in the framework of prevailing models of analogical processes. So far, analogical problem solving models have been used to describe analogical processes in the fields of mathematical word problems (Weaver & Kintsch, 1992; Bernardo, 2001). By describing legal reasoning through these models, we will gain a better understanding of how current law school instruction promotes analogical reasoning and how that same instruction is deficient. This can lead to improvements in legal instruction; moreover law school instruction may also provide other areas of study with valuable lessons regarding the kinds of instruction that can promote analogical reasoning in other fields where this reasoning plays a prominent role.

Moreover, the present study builds on the work of Cummins (1992), which used comparison as a means of inducing schema as a basis for recognizing the problem structure of algebraic word problems. As noted earlier, comparison is the critical skill used by both students and practitioners of the law. However, there has been little instruction on how to structure a

comparison of cases. Catrambone and Holyoak (1989) have noted that such guidance will help students to discern the critical elements of the mapping Here, this study explores how the technique of comparison is used in a rich and complex domain of the law.

Moreover, few studies have used texts that differ in their styles of presentation. In previous studies, the texts to be compared involved the basic elements in the same sequence. In real life settings, texts present themselves in different sequences, although they may share common underlying cognitive elements. Thus, in real life, reasoning across cases requires students and practitioners to emphasize aspects of cases relevant to solving a legal problem—a far more difficult task than lining up two texts that are arranged in the same sequence in the presentation of their critical elements.

With the exception of Lundeberg's (1987) study, there is a paucity of studies that have looked at the role of motivational variables in the reading of legal cases. Lundeberg's study examined the role of post-performance judgments of performance but not pre-performance judgments like self-efficacy despite the widespread finding—almost truism—that motivational factors play a key role in academic performance.

This study also builds on Bernardo's study (2001), which examined the effect of problem construction on schema induction by looking at the effect of problem construction—self generation of hypotheticals—in the legal case reasoning. Lundeberg (1987) identified "hypothesizing" (here I refer to it as generating hypotheticals" as one of the strategies that separated expert legal readers from novices ones in the reading of individual cases. Bernardo's work used problem construction in mathematical word solving. The present study builds on Bernardo's study by extending it to legal reasoning while it builds on Lundeberg's study by extending it to reasoning between cases.

Problem construction and case comparison can be a powerful heuristic for experts and near experts; yet novices may not know what they are being asked to do when they are asked to compare cases or construct a new problem based on a previously worked out problem. Gick and Holyoak (1980, 1983) noted this very problem when he found that subjects performed structured comparisons performed significantly better than those who performed unstructured comparisons. Moreover, this problem arose when subjects were asked to generate new problems based on their reading of a previous worked-out case. In my pilot study of legal analogical hypothesizing, several subjects---who later apparently understood the previously worked out case—would describe a newly worked out problem partially. In other words, the effects of the intervention may have been watered down by the ambiguities of the demands of the task of generating hypotheticals. This study proposes to use templates to guide students in constructing hypotheticals from a case they have read. The templates to guide the generation of hypotheticals are similar to the format and content of briefing templates, and they are the first of their kind.

Finally, there is an issue of whether the generation of hypotheticals could interfere with the comprehension of other subsequent cases. It is possible that getting students to create more hypotheticals may prompt students to over-generalized what they have learned. Arguably, the intervention could interfere with their readings of other cases by inducing them to make inferences in the reading that would not otherwise happen but for the creation of hypotheticals. Neither Bernardo (2001) nor Wittrock and Alesandrini (1990) considered this possibility, and this study does to test the possible unintended side-effect of creating hypotheticals. Moreover, there has been no prior study of the impact of analogical reasoning interventions on students' self-regulation—specifically its impact on their self-efficacy and self-evaluation beliefs, and this study will be the first to examine these issues.

Research Questions

The following are the research questions of this study:

1) Is briefing (summarizing) coupled with generating hypothetical case comparisons training more effective than briefing-only training in creating an appropriate solution to a legal factual problem?

2) Does the generation of hypotheticals adversely affect the comprehension of other cases?

3) Does guided case comparison and the creation of hypotheticials induce higher levels of self-efficacy and self-evaluation judgments of comprehension of legal cases?

Hypotheses

- Students who create hypotheticals (hereinafter referred to as "hypotheticals group") will solve a legal problem more effectively than students in a briefing-only group. Creating hypotheticals will help students see the similarities of the problem structure of the cases to the factual problem, and that will help them come up with more effective legal solutions to the factual problem.
- Creating hypotheticals will not interfere with summarization in briefs of other cases. This adverse effect will not occur because generating factual hypotheticals from a brief of a case simplifies repeats or amplifies what was written in the brief.
- Students in both training groups will have similar degrees of self-efficacy as well as self-evaluation regarding their case comprehension processes. Both training groups are made up of pre-law students with varying degrees of previous case reading experience and will have comparable self judgments of comprehension because both groups received structured briefing training. Any difficulty that students experience in generating factual

hypotheticals will not affect self-evaluative beliefs about how one performed on their briefing a case. This is because the task of generating hypotheticals will be perceived as new and very different from the task of briefing cases.

Participants

Students were recruited from the pool of students and graduates who had taken at least one pre-law course at the senior colleges of City University of New York—Baruch, Brooklyn, City College, Hunter and John Jay College. Participants consisted of 37 college students in the New York City area who had taken at least one pre-law course at Baruch, Hunter and John Jay Colleges; pre-law programs routinely expose students to the reading and briefing of cases, but they seldom provide any training in reading across cases. The majority of pre-law students were in their sophomore to senior years.

On average, the students were juniors in college, and their interest in going to law school was high – (5.35 on a scale in which 6.00 denoted the highest interest). Moreover the average self-rating of their experience in reading court decisions was 3.11, which indicates reading at least 10-15 court decisions within the past two years of the experiment.

TABLE 2

Overall Characteristics of Participants from Baruch, Hunter and John Jay

Background variables	Hypo group		Briefing group		F-test	p	η^2
	Mean	SD	Mean	SD			
Combined variables					.62*	.61	.05
College grades	3.21	.38	3.26	.46	.11	.74	.003
Case reading experience	2.94	1.35	3.25	1.48	.43	.51	.01
Interest in law school	5.18	.88	5.50	1.00	1.07	.31	.03

* Multivariate F-value.

The gender distribution of the students was 16 men and 21 women.

Students from City College and Brooklyn College were excluded because upon later investigation, I discovered that there were fundamental differences between pre-law programs at these two colleges and those at John Jay, Hunter and Baruch colleges.[4] At Brooklyn and City Colleges, the pre-law programs are housed within social science (political science or philosophy) departments, and many of the instructors tend to be social scientists with little if any experience with law school instruction. Although there is basic instruction on briefing a case in these programs, these social science oriented courses at Brooklyn and City College are much less law practice oriented and more oriented to examining court decisions and their impact on society or government. By contrast, instruction in the pre-law courses at Baruch, Hunter and John Jay reflect law school like instruction because the most of the instructors are taught by practicing attorneys and their approach is based on their law school training which is to connect court decisions and what factual circumstances they apply to. Thus, at Baruch, Hunter and John Jay,

[4] Telephone conversation with E.B. Jaffe, Esq., pre-law advisor at Hunter College.

hypotheticals and the application of cases are much more likely to be standard fare in pre-law courses whereas the focus is on the impact on societal and political structures at Brooklyn and City College. Therefore, studying the effects of treatment on only the students from Baruch, Hunter and John Jay would better ensure the effect of briefing with structured hypothesizing on more homogenously trained population than if the students from the other two colleges were left into the analysis.

Materials

Three court cases. The following three edited court cases were presented; they consisted of *Holmes v. New York City Housing Authority*, 398 F.2d 262 (2nd Cir., 1968*)*; *Soglin v. Kauffman*, 418 F.2d 163 (7th Cir., 1969); and *Altschuler v. University of Pennsylvania Law School*, 1998 U.S. Dist. Lexis 3046 (S.D.N.Y., 1998).

Holmes, Soglin, and *Altschuler* are the only cases with a common problem structure while the two other cases share only surface characteristics with *Holmes* or *Soglin*. *Holmes* and *Soglin* both speak to the issue of vagueness in a rule. *Soglin* was a case in which college students protesting the presence of Dow Chemical, had been suspended by the University of Wisconsin for "misconduct." The protestors had physically blocked the doorways and hallways and prevented others from attending job interviews with Dow. The court upheld the lower court decision throwing out the suspension. It found that the university had not set any standards for what constituted misconduct, and this failure made the academic infraction of misconduct to be too vague and inadequate to meet basic due process requirements.

The issue of vague standards also came up in *Holmes*. In that case, applicants for public housing claimed that they never had a fair chance for getting an apartment because of the absence of any clear rules on how applications were reviewed and how applicants for apartments

were being selected. Superficially, *Holmes* differs from *Soglin* in that *Holmes* involves vagueness in the dispensing of a benefit while *Soglin* concerned vagueness in the determining who should be punished.

The third case *Altschuler* on its surface seems more like *Soglin* they both took place on universities – a law school for *Altschuler* and a law school for *Soglin*. In *Altschuler*, a law student had brought a defamation action against his professor and law school based on negative statements contained in an academic evaluation. Thus, *Altschuler* served as a distractor case while *Holmes* and *Soglin* share a common problem structure.

Detail on secondary issues was eliminated from the cases, which were also shortened to be read within 12 minutes. An earlier pilot study on two of these three cases and a more difficult case was performed—showed that six to eight minutes was a sufficient amount of time for college students with experience in reading cases to read each case in its entirety.

Each of the three cases were all of approximately the same length. *Holmes* contained 1357 words; *Soglin,* 1568; and *Altschuler* had 1307. With respect to readability as measured by the Flesch Reading Ease scale, *Soglin* was rated a 28.2 while *Holmes* was scored a 29 and *Altschuler* is rated a 36. Scores from 0 to 29 indicate "very difficult" text while scores 30 to 49 indicate "difficult" text.

The cases contain the same structural elements—parties, fact statement, legal issue and ruling/rationale—but the sequence and length of paragraphs in each sequence of components is not always the same. *Holmes* and *Soglin* are both appeals so there is a lengthy description of the procedural history from the lower court, a description of what the lower court ruled, followed by a description of the facts that gave rise to the dispute between the parties as well as a description of the lower court's ruling, discussion of the relevant law, and a conclusion from the discussion

that shows a decision of which party wins and the application of the law to the facts. By contrast, *Altschuler* is not an appeal, has no extensive procedural history and contains subheadings for its sections Unlike the source and target analogs in Holyoak and Glick experiment, the cases are not exact mirror images of each other either by structure or paragraph sequence.

Excerpts of the three cases. In order to permit students to make self-efficacy judgments, the first 2-3 paragraphs of each case were extracted to an excerpt from a court decision so that readers had an idea of what the case was about in order to make a self-efficacy judgment.

Pre-performance self-efficacy questionnaire. This consisted of a series of questions that asked readers to rate their level of self-efficacy in being able to comprehend the basic components of the case. Ratings were on a 0 (no confidence) to 100 (total confidence) scale. The prompt to rate self-efficacy posed the following: "If you were given the entire case to read, circle how confident you are that you will correctly answer the following question…." And the question related to one of the four components of the case (identifying the parties, facts legal issue and legal rule/disposition of case.

Case briefing questions: A series of question designed to provide a structured summary of a case decision. Specifically the questions were:

- Who brought the lawsuit and who (what) is being sued?
- What are the facts that led to the dispute between the parties?
- What are the legal issues in this case?
- Which party won the case? What were the reasons underlying the court's ruling?

A copy of the case briefing questions and the corresponding self-evaluation questions is attached hereto as Appendix A.

Sentence recognition task form: A recognition task was devised using a method that Cummins (1992) employed to minimize the possibility of spontaneous, undirected, comparison between analogs. These questions require students to distinguish verbatim repetitions from paraphrases. They are designed to draw attention to the superficial structure of the text.

Here is an example of a sentence recognition task:

Questions 1:

a. Defendants raise several preliminary issues that challenge the power of the district court to entertain this action.

b. Defendants raise several preliminary issues that contest the power of the district court to entertain the action.

Questions 2:

a. On October 18, 1967, plaintiffs and others were protesting the presence of recruiting representatives of the Dow Chemical Corporation on the Madison campus.

b. On October 18, 1967, plaintiffs and others protested the appearance of recruiting representatives of the Dow Chemical Corporation on the Madison campus.

Students choose from one of the two alternatives and score a 1 for picking the correct alternative and a 0 for the incorrect one.

Structured hypotheticals template. This is designed to prompt students in the hypothesizing group to self-generate factual hypotheticals from the court decision they just read. It directs the reader to go back to the brief that had just been completed and to fill in a template with like examples.

TABLE 3

Structured Hypotheticals Template

Subject: Who or what did something that is alleged to cause the dispute?	**Predicate**: What event is being disputed and causing the legal hurt or harm?	**Object:** What is the thing or person being acted on by the objet that is causing the dispute?	**Legal issue**:

A copy of the hypothetical template grid is attached hereto as Appendix B.

Hypotheticals instructional guide. This is a short presentation that exemplifies how to formulate hypotheticals from a short court decision (not related to any of the three cases in this experiment) using the structured hypotheticals template.

Case briefing guidelines. These present guidelines on how to brief a case, using the short court decision as described in the above section. These guidelines are based on those developed by Lundeberg (1987) in her study of expert and novice legal readers.

Post-performance self-evaluation questionnaire. A series of questions that asked readers to rate their level of self evaluation of how well they briefed the case. Ratings were on a 0 (no confidence) to 100 (total confidence). The questions prompt students to rate self-evaluation and asked how confident they were in accurately briefing the case. And the prompt was posed to get a self-evaluated judgment about the four components of the case (identifying the parties, facts legal issue and legal rule/disposition of case).

Factual hypothetical. A fact pattern was devised based on the case *Nicholas v. Kahn,* 24 N.Y.2d 24 (N.Y.Ct. of Appeals, 1979), in which an employee of a public utility agency had been denied an exemption to the prohibition against the ownership of stock in utilities that are being regulated by the agency. In the case, the New York Court of Appeals struck down the denial because there were no standards for the granting of exemptions for which a court could use to measure decisions on exemptions. Various extraneous surface elements were added to the story to increase its difficulty. Although the fact pattern is derived from *Nicholas*, it was written in a way to raise a central legal issue regarding the validity of the Commissioner's decision not to grant an exemption from the rule requiring divesting stock held by a company regulated by the Commission.

Transfer Task Questionnaire. Questions were designed to elicit:

- A response as to which if any of the three cases—*Altschuler*, *Holmes* or *Soglin*—reminded them of the factual hypothetical.
- A description of how a court would apply the reasoning from the previous cases. More specifically, these descriptions identify the legal rule that seems to apply to (a) the facts of this case, (b) which party is more likely to win based on the rule, and the (c) reasons based on the rule.

A copy of the transfer tasks is attached as Appendix B.

Procedure

Students were recruited from those who attended the following senior colleges of the City University of New York (Baruch, Hunter, and John Jay College of Criminal Justice) and preference was given to those who had previous experience reading a court decision or had taken pre-law courses. The students were randomly assigned to a classic briefing training control

group (hereinafter referred to as "briefing-only group") or briefing plus structured hypothesizing group (hereinafter referred to as "hypothetical group.") The briefing-only group is given the following minimal treatment: guidelines that remind students of the steps in briefing, the briefing template and a sentence recognition task. The briefing guidelines and template constitute minimal but necessary treatment in order to ensure that students in this group were undertaking the standard method that participants in both the briefing only and hypothetical group already use in briefing a case. Moreover, the sentence recognition task that was presented only to the briefing only group was used to minimize the possibility that briefing only students spontaneously compare the cases.

The experimental sessions were held in November 2009 as well as throughout the spring 2010. Due to the constraints on the students' and the experimenter's availability, many different sessions were held; some sessions held 1-2 students and a few greater than 10, but most consisted of 5-9 students. The sessions were usually held on the home campus of the student or graduate.

Counterbalancing of presentation of the cases. *Holmes* and *Soglin* are the only cases with a common problem structure while the two other cases share only surface characteristics with *Holmes* or *Soglin*. The order of the cases—*Soglin, Altschuler and Holmes* —will be counterbalanced with the constraint that one of the structural related cases (*Soglin* or *Holmes*) appears first and *Altschuler* always appears as the 2nd case. The two structurally related cases were separated by the structurally unrelated case in order to require a higher level of abstraction. Thus there are only two possible combinations in which *Soglin* or *Holmes* case is read first.

Both groups will be presented with the pre-reading and administered the pre-test. The procedures are summarized by the following figure and are detailed below:

TABLE 4

Comparison of Procedures for the Treatment Groups

Hypothetical Group	Briefing-Only Group
Skim case and rate self-efficacy for each component of a case brief	Skim case and rate self-efficacy for each component of case brief
Read case	Read case
Complete briefing template	Complete briefing template
Rate self-evaluation judgment for each component of case brief	Rate self-evaluation judgment for each component of case brief
Complete structured hypothesizing template	Sentence recognition task
Repeat above tasks for the remaining cases	Repeat above tasks for the remaining cases
Read fact pattern that asks for a legal solution (transfer task)	Read fact pattern that asks for a legal solution (transfer task)

Skim case and rate self-efficacy for each component of a case brief. Students are directed to skim an excerpt of a case for one minute and then rate their level of self-efficacy in being able to accurately describe the parties, the relevant facts, issues, and ruling/rationale.

Reading and summarizing cases. The briefing group will read and write summaries of each of the three cases. The summaries are the answers to questions asking the student to identify each briefing component of a case. These questions asked are the following:

- Who brought the lawsuit and who (what) is being sued?
- What are the facts that led to the dispute between the parties?
- What are the legal issues in this case?
- Which party won the case? What were the reasons for the court's ruling?

After providing each response to each briefing question above, students were asked to rate their level of confidence (self-evaluation) that they correctly answered the question.

The hypothetical group will likewise read and brief the each of the same three cases in the same manner as described above. However, in contrast to the briefing group, students in this group will be directed to read a guide on how to generate hypotheticals. The guide identified the various components of the hypothetical that they need to change, and they were required to change at least one object and a structured relationship by filling in a hypothesizing template. Both groups were given no more than 12 minutes to read and write a brief for the cases.

Treatment. After briefing the cases, students were presented with case briefing guidelines and example in order to check on whether they had followed proper briefing procedures and to remind them how to write a brief.

After reading the guide on creating hypotheticals, the students in this group were directed to generate more examples of the previous case by filling in a hypothetical template. The hypothetical formation task was presented each time after the student finishes reading and briefing each of the three cases.

Problem-solving task. After completing all tasks relevant to the third test, students in both experimental groups would be presented with the hypothetical fact pattern, which poses a problem in need of a solution. Students are told that they have 20 minutes to read the fact pattern and answer the questions that follow it. At the end of the fact pattern passage, students are asked to "check off" names of the cases (specifically *Holmes v. New York City Housing Authority*, *Altschuler v. University of Pennsylvania* and *Soglin v. University of Wisconsin*) they just read that seem to be most similar to the facts in the above story. They are allowed to go back to the court decisions or their briefs to answer to question. After completing this question,

Describe how would a court apply the reasoning in the case or cases you identified above (Note: the cases that were perceived to be similar to the fact pattern)

Readers were then prompted as to what this description should have:

*Describe the rule(s) in the other case(s) that seems to apply to the facts of this case
* Which party is more likely to win, and why.

The principal investigator or his assistant orally reminded the students to be as complete and thorough as possible in their description and to go back to the readings and briefs that they had written to answer the question: How a court would apply the reasoning in the cases to solve the fact pattern.

Measures

Average case briefing score. This score measured the students' ability to brief a case and as such indicates the subject's case reading comprehension ability. The score assesses the correctness of each test item that is derived from the following widely accepted components of a court decision: parties, facts leading to the dispute, legal issues, result and reasoning underlying it. The scale ranges from 1 (very poor) to 5 (exceeds expectations). Answers were rated first on the basis of their level of correctness and second on their level of specificity and clarity. Internal consistency reliability will be established through agreement among raters who are blind to the students' data. The average case briefing score is the sum of the briefing scores for each subcomponent—identifying the parties, facts, issue and ruling/disposition—divided by four, the number of subcomponents.

Case briefing subprocess score. This is the score (1 to 5) for each subcomponent of the brief; the subcomponents are identification of the parties, facts, issues and ruling/disposition A response identifying the parties would be given a 1 if the reader demonstrated little or no

understanding of who brought the lawsuit and who was sued; the reader would have failed to identify any party to get a 1. By contrast, a party would receive a 5 if the reader demonstrated a greater understanding of all the parties by naming all or most of the parties including primary and secondary parties.

A response describing the facts of the case would score a 1 if the reader showed no understanding of the basic gist of the facts that were relevant to the case while a 5 would be awarded if all the relevant facts were identified with a connection to the legal claim.

A response would receive a 1 if the answer showed little or no understanding of the legal issues whereas a 5 would be awarded if each and every one of the primary and secondary legal issues were identified.

A ruling/rationale response would get a 1 if one could not discern any rule upon which the case was decided and could not identify who won the case while a 5 would be given if the reader could describe accurately what party won, what the court ruled and one can discern the underlying reasons for the legal rule.

Content validity of these tasks can be established by the fact that identifying the parties, facts, issue, and ruling/rationale are all commonly understood components of case comprehension and that being able to describe these components specifically and thoroughly is almost a truism in the practice of law. Inter-rater reliability was established by two raters who established a clear rubric. Inter-rater agreement on each of the comprehension subcomponents is reported in Table 6 below. Differences in ratings were resolved through discussion.

TABLE 5

Inter-rater Reliability (Kappa Values) of Comprehension Subcomponents

Source	Kappa	*p*
Altschuler		
Parties	.83	<.001
Facts	.77	<.001
Issue	.70	<.001
Ruling	.73	<.001
Holmes		
Parties	.73	<.001
Facts	.85	<.001
Issue	.86	<.001
Ruling	.82	<.001
Soglin		
Parties	.92	<.001
Facts	.81	<.001
Issue	.67	<.001
Ruling	.88	<.001

Comprehension subprocesses score. This is the sum of each subcomponent across each of the three cases. There are subprocess scores for identifying the 1) parties, 2) facts, 3) legal issue, and 4) ruling/rationale. Each score ranges from 1 to 15.

Other background measures. These measures include students' cumulative college grade point averages, year in college, college attended, and gender.

Case reading experience. This is a measure of the students' perception of their own experience on a 1 to 6 scale based on their perception of the number of cases they had read within the past two years denoted no experience; 2, 1-5 cases read; 3, 6 -10 cases; 4, 11-30 cases;

5, 31-49; and 6, 50 or more cases read.

Interest in applying to law school. Measure of interest in applying to law school in which a 1 denoted no interest; 2, a little interest; 3, undecided; 4, more than likely will apply to law school; 5, very interested in applying to law school; 6, no doubt about applying to law school.

Self-efficacy comprehension (pre-performance) scale. These scores reflect students' self-rating of their confidence in providing a response to each item in the briefing template. This scale is a task-specific assessment of how students perceive their case-reading comprehension. . Before reading each the case, the participants in both of the experimental groups will be told to skim the case for a one-minute and then rate their level of confidence in their ability to comprehend the case. On a scale of 0 to 100, with 0 standing for no confidence and 10 for total confidence, students are asked, "If you were given the entire case to read, circle how confident you are that you will correctly the question." As self-efficacy measures are taken for each component of the lawsuit, this self-efficacy rating is made with respect to the following questions:

- Who brought the lawsuit and who (what) is being sued?
- What are the facts that led to the dispute between the parties?
- What are the legal issues in this case?
- What party won the case? What were the reasons for the court ruling?

After being briefed on each case, students in both experimental groups will be asked to rate their level of confidence that their brief is an accurate representation of the case they just read. They will be asked: "On a scale of 1 to 8 with 1 standing for no confidence and 8 for total

confidence, how confident are you that your brief is an accurate reflection of the case you just read?"

Each respondent was asked, "How confident are you that you can provide a correct answer to this comprehension question? " These scores were rated on a scale of 0 (zero confidence) to 100 (absolute confidence) and were adapted from a scale designed to assess self-efficacy in solving mathematical test items in Chen (2003) and Pajares and Graham (1999). For these prior studies, Cronbach's alpha coefficients , a measure of internal consistency reliability, were .94-.93 (Pajares, et al.) and .89 (Chen). In the present study, Cronbach's alpha coefficients of .83 for self-efficacy of case reading comprehension was found.

Post-performance self-evaluation scale. This is a self-rated score reflecting a subject's confidence in the correctness of her/his answer after she/he has performed a task. This scale is an assessment of one's perceived effectiveness after performing each task. Self evaluation will be on a scale of 1 (no confidence) to 10 (total confidence).

Transfer task score. This score consists of two sub-components: 1) a case certainty score or the degree to which students identified *Soglin* the most difficult case exemplar to identify as similar to the fact pattern and 2) a rule identification score or the degree to which students are able to derive a legal solution to the unsolved fact pattern.

The first subcomponent of the transfer task (the case certainty score) is based on identification of *Soglin* as a case whose fact is most similar to the fact pattern. Although both *Holmes* and *Soglin* are structurally similar to the fact pattern, *Soglin* is much more difficult to identify than *Holmes*. *Holmes* involves the denial of a benefit (housing) while the fact pattern ostensibly involves the denial of a benefit—namely a waiver of a rule against ownership of stock in a company regulated by the party's agency. (*Altschuler* is similar only in surface facts to

Holmes.) By contrast it is harder to perceive *Soglin* as similar to the fact pattern—*Soglin* does not involve a denial of benefits, instead it is about the meting out of punishment or suspension. *Soglin* thus requires a mapping that is focused on the basis (or rather lack of basis) of the decision making. Scoring for *Soglin* was thus calibrated on the basis of certainty that *Soglin* was similar to the fact pattern. Three points would be awarded if a student identified *Soglin*, however a deduction of 1 point each would be made for any other of the two cases. For example, a student would get 3 points if s\he named *Soglin* but no other case, whereas a student would get only 1 point if *Altschuler* and *Holmes* cases were named also (i.e., 3 -1 -1= 1).

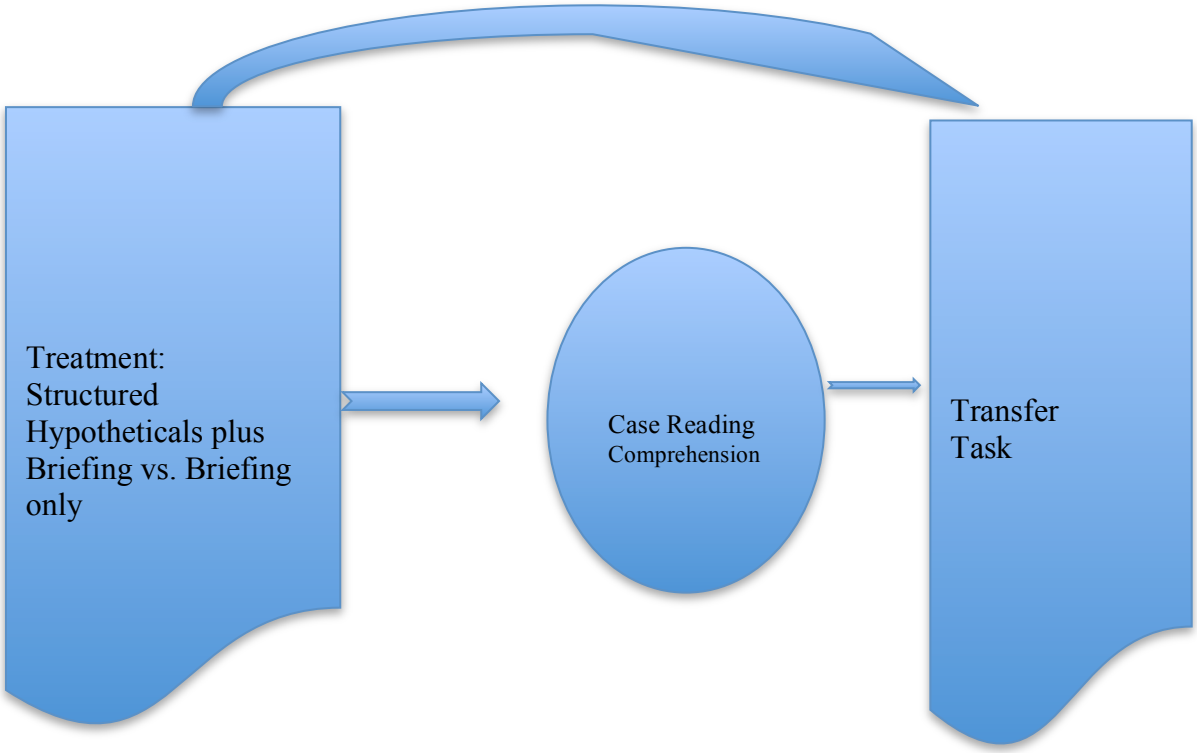
Regarding the rule identification score, 1 to 5 points were awarded based on an evaluation of the short answer response to the single question that asked students to apply the relevant legal rule to solve the factual hypothetical. One point indicated that the short response was unresponsive while a 5 indicated a very clear, specific identification of the relevant legal rule and application of the rule to resolve the legal problem set forth in the factual hypothetical. For instance, a 1 would be awarded for an answer that stated that the "Commissioner should win because he is right." By contrast, a 5 would be awarded for an answer that said that the employee should win because the Commissioner made his decision not to grant the exemption was based on unclear or absent standards as in *Holmes* and this violates notions of basic fairness (due process). Inter-rater reliability was established by agreement on scoring rubric that went through weeks of formulation and any differences in scoring were resolved through a discussion between the raters. There is content validity of the task of transferring knowledge from one or more cases upon a fact pattern is grounded on the fact that this task is demanded in the vast majority of law school exams; validity was further established in previous studies in which two law faculty members reviewed the transfer task and judged it as consistent with a range of law

school tests. The inter-rater reliability was Kappa = .73, $p < .001$; differences were resolved through discussion.

To produce a single index of transfer, a discriminant function analysis was conducted to ascertain the size of the two subcomponents—the solution score and the *Soglin* certainty score--in discriminating between the two legal training group scores. The unstandardized coefficients for the solution score was .620, and the coefficient for the certainty score was .309. The formula was: (Solution raw score * .309) + (Certainty raw score * .620) = Transfer score.

FIGURE 1

Model of Briefing and Analogical Mapping Processes Affecting Transfer Task Performance



The above figure depicts the theoretical model underlying the hypothesizing and briefing process on the transfer task. Briefing by itself affects case reading comprehension by assisting the reader in organizing the essential parts of a case; and case comprehension affects transfer because failure to understand the case will mean that transfer will be based on an erroneous foundation. Creating hypotheticals exert an influence on briefing by focusing attention on the problem structure of the case.

CHAPTER 4

RESULTS

Effects of Background Variables

A single factor MANOVA was conducted to determine whether the two legal training groups varied significantly on the background variables of college grade point, law school interest and case reading experience, with background as dependent variables and treatment group as the independent variable. No significant differences were found. See Table 2. As noted in Table 6, college grade point averages, law school interest and case reading experience were not significantly correlated with either the transfer task score or average case comprehension scores at a .05 level (2-tailed); thus, no covariate was used in determining whether there were any significant differences between the training groups in comprehension of the three cases or in performance in the transfer task.

TABLE 6

Correlations between Average Case Comprehension Scores, Continuous Background Variables and Transfer Task

	1	2	3	4	5	6
1. Average Holmes comp		.11	.27	.10	.04	.34
2. Average Soglin comp.			.42*	.37	-,13	.13
3. Average Altschuler comp.				.13	.05	.27
4. Case reading experience					-.20	.13
5. Interest in law school						-.01
6. Transfer task						

* Correlation is significant at the 0.05 level (two-tailed)

Finally, a nonparametric test was used to test whether the treatment groups varied in any significant way with respect to college attended, gender, and college year. A Pearson Chi-Square for college attended showed no significant differences on these variables, as presented in Table 5. Thus, the students did not vary significantly based on the college they attended, gender and year in college.

TABLE 7

Chi-Square Test for Legal Training Group Differences

Based on Categorical Background Variables

	College Attended				
				X^2	*p*
	Baruch	Hunter	John Jay		
Hypotheticals Group					
Observed	5	5	7		
Expected	4.1	5.5	7.4		
Briefing Only Group					
Observed	4	7	9		
Expected	4.9	6.5	8.6	.45	.80

	Gender			
			X^2	*p*
	Male	Female		
Hypotheticals Group				
Observed	8	9		
Expected	7.4	9.6		
Briefing Only Group				
Observed	8	12		
Expected	8.6	11.4	.19	.67

	College Year						
						X^2	*p*
	Fresh.	Soph.	Jr.	Sr.	Grad.		
Hypotheticals Group							
Observed	2	3	6	4	2		
Expected	9	4.1	6.0	4.6	1.4		
Briefing Only Group							
Observed	0	6	7	6	1		
Expected	1.1	4.9	7.0	5.4	1.6	3.52	.46

Effects of Counterbalancing

A 2 (treatment groups) X 2 (sequences) univariate analysis of variance was employed with transfer scores as the dependent variable. Although there were significant effects of treatment group, F (1, 35) = 4.98, $p < .05$, $\eta^2 = .15$, there was no significant difference in connection with case sequence on the transfer task, F (1, 35) = .68, $p > .05$, $\eta^2 = .02$. Moreover, there was no significant interaction between treatment group and case sequence, F (3, 33) =.02, MS=.02, $p > .05$, $\eta^2 = .00$. Thus, concerns about case sequence effects were unwarranted but were nevertheless controlled experimentally by counterbalancing in the research design.

Analyses of Comprehension Subprocesses

As indicated by Table 6, there was no overall significant difference between the two legal training groups as indicated by a MANOVA test. Univariate follow-up tests revealed that the two legal training groups did not differ significantly when each subprocess was analyzed separately

TABLE 8

Univariate Means, Standard Deviations, and F-tests of Legal Reasoning Training on Comprehension Subprocesses

Source	Hypo Group Mean	SD	Briefing Group Mean	SD	*F*-test	*p*	η^2
Combined variables					1.85*	.15	.24
Identify parties	9.83	2.48	10.81	2.81	.92	.35	.03
Identify facts	11.08	1.31	11.50	1.50	.59	.20	.02
Identify issue	8.75	2.53	8.19	2.10	.41	.53	.02
Identify ruling	10.00	2.04	8.88	2.47	1.64	.21	.06

* Multivariate F-value

With respect to correlations between comprehension subprocesses in Table 9, there was one significant correlation: identifying facts and rulings/rationale. Overall, the comprehension subprocesses were largely independent of each other. The correlation between transfer task performance and legal reasoning training was significant.

TABLE 9

Correlations Between Comprehension Subprocesses, Transfer, and Training Group

	1	2	3	4	5	6
1. Identify parties		.03	.04	.30	-.11	-.25
2. Identify facts			.21	.43*	.18	-.15
3. Identify issues				.32	.36	.09
4. Identify ruling/rationale					.31	.25
5. Transfer task						.39*
6. Treatment group						

* Correlation is significant at the 0.05 level (2-tailed)

Effect of Legal Case Content on Comprehension

With regard to the role of the various legal cases (i.e., *Holmes, Soglin*, and *Altschuler)* on training outcomes, a 2 (training group) MANOVA indicated that the treatment had no significant differential effect on students' average comprehension scores of the three cases, $F = 2.17$, $p > .05$, $\eta^2 = .25$. However, separate univariate tests for each of the three cases revealed a significant effect for the *Holmes* case, $F(1, 24) = 5.96$, $p < .05$, $\eta^2 = .21$, with the hypotheticals training group (M = 12.00) surpassing the briefing-only group (M= 14.50).

Because the multivariate analysis of average comprehension scores for the *Holmes* case revealed a significant effect of legal training on comprehension, I conducted follow-up univariate analyses of each of the comprehension subprocesses to better understand their role. The results are presented in Table 10. Students in the hypothetical training group scored significantly higher than the briefing-only training group on the identifying ruling/rationale subscores regarding the *Holmes* case.

TABLE 10

Univariate Means, Standard Deviations, and F-tests for Comprehension Processes in the *Holmes* Case for Each Legal Training Group

Source	Hypo Group		Briefing Group		*F*-test	*p*	η^2
	Mean	SD	Mean	SD			
Identify parties	4.43	.65	4.38	.50	.07	.80	.002
Identify facts	3.93	.73	3.44	.96	2.42	.13	.08
Identify issue	2.57	1.50	1.88	.62	2.88	.10	.09
Identify ruling	3.14	.86	2.19	.91	8.61	.007	.24

Effects of Legal Training on Transfer

To test the effects of generating hypotheticals versus briefing-only on the performance of the transfer task, a one-way ANOVA was conducted. As predicted, the students in the hypothetical training group (M = 2.35) performed significantly better, F (1, 36) = 6.13, p = .018, η^2 = .15, on the transfer task than the students in the briefing-only group. (M = 1.53).

Effects of Legal Training on Self-Efficacy for Comprehension Subprocesses

A MANOVA of all the of self-efficacy measures across cases was performed to determine whether there were any significant differences by training group, and none was found, $F = .89$, $p = .48$, $\eta^2 = .13$ (see Table 11).

TABLE 11

Means, Standard Deviations, and F-tests for Self-Efficacy Beliefs Regarding Comprehension Subprocesses

Source	Hypo Group Mean	SD	Briefing Group Mean	SD	*F*	*p*	η^2
Combined variables					.89*	.48	.13
Self eff. parties	277.69	40.03	264.71	42.88	.72	.41	.03
Self eff. facts	271.54	38.05	252.94	42.69	1.53	23	.05
Self eff. issue	264.52	37.33	239.41	37.33	2.94	.10	.10
Self eff. ruling	253.85	74.22	232.94	58.28	.75	.39	.03

*Multivariate F-value

To examine the interrelations among the four measures of self-efficacy and transfer, Pearson correlations were computed, and the results are listed in Table 12.

TABLE 12

Correlation Matrix of Self-Efficacy for Comprehension Subprocesses, Transfer and Training Group

	1	2	3	4	5	6
1. Self-efficacy id parties		.85**	.82**	.79**	.40*	.11
2. Self-efficacy id facts			.86**	.69**	.46**	.22
3. Self-efficacy id issues				.77**	.42*	.28
4. Self-eff. id ruling/rationale					.36*	.16
5. Transfer task						.39*
6. Treatment group (2-hypo;1 briefing)						

* Correlation is significant at the 0.05 level (2-tailed)
** Correlation is significant at the 0.01 level (2-tailed)

Self-efficacy beliefs regarding the comprehension subprocesses were quite highly inter-correlated. Self-efficacy for comprehending the parties, facts, and issues were also significantly correlated with transfer performance. Higher self-efficacy was associated significantly with performance on the transfer task (.40, .46, .42 and .36).

Self-Evaluation Beliefs Regarding Legal Case Comprehension Subprocesses and Transfer

A MANOVA for the four self-evaluation measures across cases was performed to determine whether there were any significant differences by training group, and none was found, $F = 1.94$, $p = .14$, $\eta^2 = .24$ (see Table 13).

TABLE 13

Means, Standard Deviations, and F-tests for Self-Evaluation Beliefs in Connection with Comprehension Subprocesses

Source	Hypo Group Mean	SD	Briefing Group Mean	SD	*F*	*p*	η^2
Combined variables					1.94*	.14	.24
Identify parties	284.29	31.06	272.67	36.93	.83	.37	.03
Identify facts	290.00	52.77	242.00	51.85	6.10**	.02	.18
Identify issue	266.43	43.61	234.67	51.39	3.20	.09	.11
Identify ruling	262.14	53.09	244.67	45.96	.90	.35	.03

*Multivariate *F*-value
** Significant at the .05 level (2-tailed)

To examine the interrelations among the four measures of self-evaluation and transfer, Pearson correlations were computed, and the results are listed in Table 14.

TABLE 14

Correlations between Self-Evaluation for Comprehension Subprocesses; and Transfer and Training Group

	1	2	3	4	5	6
1. Self-eval. id parties		.21	.78**	.58**	.29	.13
2. Self-eval. id facts			.45*	. 31	.01	.41*
3. Self-eval. id issues				.87**	.30	.31
4. Self-eval. id ruling/rationale					.23	.20
5. Transfer task						39*
6. Treatment group						

* Correlation is significant at the 0.05 level

** Correlation is significant at the 0.01 level

Self-evaluation of comprehension subprocesses were mildly inter-correlated. None of the self-evaluation measures were significantly correlated with the transfer task. Self-evaluation beliefs regarding identification of facts were correlated significantly with legal training. As noted in prior tables, legal training status was significantly correlated with transfer.

CHAPTER 5

DISCUSSION

Legal Training to Form Hypotheticals: How Effective Is It?

Students in the hypothetical creation group performed significantly higher on the transfer task, thus providing support for the main hypothesis. This finding is particularly significant because of the scarcity of prior research on legal reasoning involving drawing inferences from multiple case sources. During the creation of hypotheticals, students were taught to insert new facts (actors/objects and relationships) in a template (hereinafter referred to as "hypothesizing template") that was the same as briefing grid of the case they had just read. Moreover, students in both the treatment and comparison groups were not provided any hints as to which case(s) were similar to the fact pattern presented in the transfer task. Nevertheless, students in the hypotheticals generation group were better at providing a transfer solution to the legal fact pattern.

What does this finding say about the processes that lend themselves to integrating information across cases and legal problem solving? The results can be explained by analogical encoding (a.k.a. mutual alignment) theory. According to this theory, learning takes place when there is mutual alignment between actors /objects and relationships in one analogy and another analogy (Kurtz, Miao., & Gentner, 2001; see also Gentner, Loewenstein, & Thompson, 2003). In the classic situation, a learner uses a familiar analogy to gain insight regarding a less well-understood analogy--a process that I describe as "analogical leapfrogging." However, when a learner is confronted with two or more analogies, none of which are well understood, Kurtz, et al., (2001) have proposed that "analogical bootstrapping" becomes necessary. During this process, a learner compares two or more poorly understood cases and aligns their common

structural aspects in order to gain further insight. Noticing that one analogy is similar or even relevant to another is seldom spontaneous. Studies have shown that learners are unlikely to notice similarities unless there are specific prompts or directives (e.g., side by side comparisons of written summaries, questions that ask readers to compare various elements, etc.). Simply reading separate legal cases in a single setting is rarely sufficient to induce bootstrapping of an analogy. In prior research, there has had to be a specific prompt to compare and align the structural characteristics.

In the present study, the effects of comparison appear to be seen during the transfer task phase. In this phase, both training groups were directed to compare and rate the similarity of the factual properties of the previous three cases and to draw aspects of the prior cases to come up with a solution to the factual problem. In that instance, the hypothetical generation group outperformed the briefing only group in coming up with appropriate legal solutions that were based on the prior cases. The hypothetical training appeared to promote greater mutual alignment of the elements of the three cases in order to come up with a solution. The creation of hypotheticals for all of the three cases appeared to prepare students better to bootstrap their understanding of the cases to propose a solution to the factual problem.

Based on mutual alignment theory, the advantage of hypotheticals is that it guides students to focus on the problem structure in order to fill in the hypothetical grid. To fill in the grid, students must reflect on the position of the actors/objects and their relationships in the briefing template and replicate their positions in the hypothetical grid. By contrast, briefing alone may help the student organize aspects of a case based on the generic text structure of court decision, but this may be insufficient to focus a student on the problem structure of a case. Briefing plus hypotheticals when combined with comparison instruction is more like the detailed

comparison directive in Catrambone and Holyoak (1989). In that study, there were two major treatment groups –one given less detailed and the other detailed comparison instructions. The less detailed instruction told students to compare goal, obstacle and method similarity while the more detailed instruction isolated even further aspects of the problem states and methods. Students who were given detailed instructions to focus on the goal and method structure of the problem transferred at higher rates with and without a hint (Catrambone,, et al., 1989, at p. 1152).

Likewise, in the present study, briefing with comparison was more like the less detailed instructions in the Catrambone, et al., (1989) study—it helped students derive an appropriate solution, However the hypothetical generation group seemed to provide greater depth of processing by helping students focus on key aspects of the problem structure of the cases. Thus, hypothesizing students were more likely than the briefing-only ones to retrieve the appropriate cases—*Holmes* and *Soglin*. Moreover, students who created hypotheticals were more likely than the briefing-only students to align the actors/objects and relations of the cases and the factual problem, and they were less likely than the briefing-only students to be distracted by irrelevant surface characteristics of the prior cases and the factual problem.

Why Was There No Effect of Training on Comprehension Subprocesses?

The absence of a training effect on comprehension subprocesses can be largely attributed to the fact that these processes were assessed on the basis of students' knowledge of individual legal cases. Briefing training was expected to assist comprehension, but both legal training groups were given briefing training. A second issue involves sequential effects legal case reading. When reading the first case, creating hypotheticals could not affect comprehension because creating hypotheticals happened afterward. Only the second and third case

comprehension could have only been affected by generating hypotheticals of the case that came before it. In other words, there was no opportunity for students to see the effect of creating a hypothetical of a case on the comprehension of that same case. Hypothetical comparison training may have helped a student understand the case better after s/he had read and briefed that same case, but there was no carryover effect of the generating hypotheticals on the following case. The students may have simply disregarded the relevance of the created hypotheticals on another case that had a different set of facts and issues. In research by Hayes and Tierney (1982), they used an analogy to test the effect of hypothetical training after reading a text. Generating analogies of that text was as good as summarizing the text in promoting recall (Hayes & Tierney, 1982). Thus, it is not surprising that training had no effect, since the differences between briefing-only and adding hypotheticals training to briefing were not directly tested in this study.

Why Wasn't There a Legal Training Effect on Self-Efficacy and Self-Evaluation?

The self-efficacy ratings were very high for each of comprehension subcomponents. On a scale of 1 to 100, the students' self-efficacy ratings averaged between .80 to .90, and there were significant inter-correlations among the self-efficacy ratings. However, self-evaluation ratings were also very high but not as inter-correlated. It appears that that the students were not self-monitoring accurately and that did not lead to any downward adjustments in their post-performance self-evaluation ratings. The absence of a hypothetical comparison training effect on self-efficacy may have been due to the lack of inclusion of other self-regulatory processes, such as self-monitoring Schunk and Ertmer (2000) found that student self-efficacy can be increased by simply creating greater self-monitoring of the tasks in which they are engaged in. Internal and external monitoring of the number of workbook pages completed improved student self-

efficacy compared to the self-efficacy in no-monitoring condition. Filling in the briefing grid may have created greater awareness of their ability to comprehend court decisions. But as there were no specific prompt to examine their completed briefing grid, there was no systematic method by which self-monitoring could be enhanced.

Moreover creating hypotheticals in addition to briefing is unlikely to engender greater self-monitoring of case comprehension because of two reasons. First, the hypothetical comparison training was conducted *after* the self-efficacy measure was taken for the case brief grid and after the briefing was completed. If hypothetical comparison training were to boost self-efficacy of comprehending cases, it would have to come from the hypothetical creation the case that came before the case upon which a self-efficacy judgment was being made. Second, generation of hypotheticals about a case is a distinctly a novel task compared to briefing, which most students had some familiarity, and any problems with generating hypotheticals would be more likely attributable to the novelty of the task, rather than any problems in their comprehension of the case.

There were no significant differences between the training groups with respect to self-evaluative judgments. This result is not surprising since the self-evaluative judgment for briefing was measured after the briefing of the case at hand was performed; the two groups did not engage in their intervention tasks (the matching or creating hypotheticals) until *after* the self-evaluation judgments were expressed. If there were an effect on self-evaluative judgments, it would have been because of the generating hypotheticals of other cases. But generating hypotheticals is a task that was relatively novel to the students, and it is highly unlikely that students would have thought that any feedback from hypothetical creation would have been relevant to their case briefing.

Study Limitations and Suggestions for Further Research

First, the sample in the present study is limited to students who are enrolled in pre-law programs taught by lawyers who base their curriculum heavily on court cases, but it remains unclear whether the briefing plus creating hypotheticals would be as helpful to law students after they enter law school. Additional studies should also be performed to determine whether structured hypothesizing and briefing are as useful to pre-law students attending programs where the instructional influence of practicing lawyers is much weaker and the curriculum broader in scope.

Second, the study is also limited to analogical reasoning and comprehension that pertain to structurally similar cases from different areas of the law. For example, *Holmes* and *Soglin*, though sharing a similar problem structure came from different areas of the law. *Soglin* comes from a class of cases that fall within the area of constitutional law regarding freedom of speech because it concerns itself with the validity of punishment imposed on freedom of expression. By contrast, *Holmes* more easily falls within the area of administrative law since it is about the validity of a governmental agency's decision-making. They were deliberately taken from different legal areas in order to minimize overly obvious similarities in objects or actions as well as in similar language cues. For example, the more common classroom hypothetical arising out of *Soglin* would be located in a school setting (university, elementary/middle school, etc.) in which members of the school (students, staff members or instructors) were being punished for something they did on campus (protest, disrespectful behavior to others on campus, etc.) Moreover this study does not cover other ways in which cases and other legal materials are used to construct arguments based on the rationale (policy or reasons underlying the legal rule) expressed in one or more cases, other legal rules or statutes/regulations. Finally, it does not cover

disanalogies[5]—similar cases in which the application of the legal rule leads to a result that is different from the source cases.

A third limitation of the study is the relatively small size of the sample (37 students). The original sample had to be narrowed when it was discovered that the curriculum of pre-law programs at various colleges within the City University of New York differed in ways that affected their exposure to briefing. This restriction in sample size reduces the power of the statistical analyses. Replicating the study with a larger number of pre-law students would provide greater assurance to the initial findings of no treatment effects with respect to comprehension processes as well as self-efficacy and self-evaluation judgments.

A fourth limitation is the restriction of instructional time. Although the tasks in the present study required nearly two hours to complete, it is a relatively brief time to convey an abstract strategy, such as generating hypotheticals. In regular classroom contexts, multiple class meetings would be devoted to training during an academic semester. There are benefits when learning is spaced over a semester. Delay is an important issue in analogical transfer. In Catrambone, R. and Holyoak, K.J. (1989), the effects of highly detailed instructions to compare were particularly strong when students were tested on the transfer task, with a one-week delay. As the present study showed the effect of delay of 20 or so minutes, future studies should be done to determine what the effect of the hypothesizing plus comparison treatment is a more substantial delay --for example one week.

Finally another area for future research suggested by this study concerns using instruction to boost student motivation. In the present study, two key motivational variables, self-efficacy and self evaluation were not affected by the differences in the treatment group, in large part,

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[5] Disanalogies are analogies that are similar to the original or source analogies to which they are

because there was no express feedback on the qualities of their written briefs. Future research should be done on the effects of more detailed feedback on briefing and briefing plus hypothesizing: Can it help students develop better self-regulation of their reading and studying. Self-efficacy for the comprehension of legal cases is important because having a reasonably high level of self-efficacy is needed in order to perform at a high level. Yet student self-efficacy for law school tasks has been shown to be low. Christensen, L.M. (2009) has attributed low self-efficacy to the performance-based nature of law school academic curricula. Law schools are known for their highly competitive environment that makes students highly self-conscious of their performance; for example, in law classrooms, students are frequently asked, without warning, to recite answers to instructor-posed hypotheticals in front of their classmates. Christensen, L.M. (2009) and others have argued for instructional approaches that put more focus on mastery-oriented goals. Techniques that focus on building self-efficacy would help to foster more a mastery approach to learning (as Christensen argues, borrowing language from Dweck's theory) rather than a performance-based approached to learning.

Educational Implications

This is the first known study to describe the legal reasoning process through analogical models. The results of this experiment have several educational implications for pre-law and law school instruction. Teacher guided instruction and modeling could be used to facilitate student understanding of how to properly construct a hypothetical and modeling can provide students with a more refined sense of what makes a good hypothetical. Of course, for students to benefit from it, they should already have the basic skills of being able to adequately brief a case and have some familiarity with applying legal rules of one case onto a new fact pattern.

Second, this finding shows that the pairing of court cases used as source analogs can be made more helpful in their retrieval and application to solve a factual hypothetical. This is particularly important because "issue-spotting" – identifying legal issues based on source cases and application of legal rules from the source cases is commonly tested in law schools. In the present experiment, three cases were read and briefed prior to the presentation of the factual hypothetical. Two of the cases had similar problem structures but were different in their surface characteristics while the third case was similar to the surface characteristics of one of the two prior cases. This suggests possible changes to law textbooks. These books typically provide an edited excerpt of a case to illustrate a legal concept or issue. Usually this decision is followed by very short summaries of decisions that help further illustrate the legal concept or issue set forth in the excerpt. For example, in one contracts textbook (Macaulay, Kidwell, Whitford, Galanter,, 1995), there was a case concerning the legal issue whether a dance company – Arthur Murray— had defrauded a widow by inducing her to enter into contracts was followed by several other cases involving the same company regarding dance contracts were used to illustrate a disanalogy to the main case. The experimental finding suggests that the illustrative summaries should touch on a broader range of objects or actions that go beyond the main case; doing this would help to illustrate how the legal rule applies in situations that differ from the main case, and that would help to promote better retrieval of the case when presented with a factual hypothetical that differs from objects/actors of the main case.

Moreover there should be short summaries that are similar to the surface characteristics but differ in structure from the a target case; this helps students to distinguish the facts of a case that look similar but are truly different in problem structure. Supplying a broader range of cases

to illustrate the point is not a stretch for the authors, who themselves asked whether a theory on contractual fraud applies to contracts for lessons at a dancing or martial arts studio or health club.

Third, the present study suggests that explicit comparison instructions that focus the reader on the problem structure of cases can help build deeper processing of case decisions. Instructors as well as texts could be more explicit about the various strategies can be employed to conduct the comparison—side by side comparisons, comparisons of similar and different cases that focus on the similarity (or dissimilarity) of the legal issue and result, for example.

Fourth, the present research also serves to inform research in developing artificial intelligence systems to mimic case base legal reasoning and instruct lawsuits. Ashley (1991), a professor at the University of Pittsburgh School of Law and senior scientist at the Learning Research and Development Center, has developed HYPO "a case-based reasoning system that evaluates problems by comparing and contrasting them with cases…" Ashley (1991) at 753. He has now developed a Legal Argument Graph Observer (LARGO) to help students to understand hypothetical legal reasoning, and preliminary results show that the system helps students who are lower achievers on the Law School Admission Test (LSAT). The present study provides further insight on what kind of hypotheticals promote learning and importance of comparison directives in promoting understanding across cases.

APPENDIX A: CASE BRIEFING QUESTIONS

Now that you've read the case, please answer the questions below. You can go back to the decision to find the answers.

Who brought the lawsuit and who (what) is being sued?

Circle the number that indicates how confident are you that you correctly answered this question?

0 10 20 30 40 50 60 70 80 90 100

No Confidence Whatsoever — Totally confident

What are the facts that led to the dispute between the parties?

Circle the number that indicates how confident are you that you correctly answered this question?

0 10 20 30 40 50 60 70 80 90 100

No Confidence Whatsoever — Totally confident

What are the legal issues in this case?

Circle the number that indicates how confident are you that you correctly answered this question?

0	10	20	30	40	50	60	70	80	90	100
No Confidence Whatsoever										Totally confident

What party won this case? What were the reasons for the court's ruling?

Circle the number that indicates how confident are you that you correctly answered these questions?

0	10	20	30	40	50	60	70	80	90	100
No Confidence Whatsoever										Totally confident

APPENDIX B: STRUCTED HYPOTHETICALS TEMPLATE

STEP 1: Go back to your answers to the "briefing questions" and now use them to fill out the briefing chart. Try to fill in the boxes so that you have a "hypothetical" that is similar to the court case (the court decision before the Christmas crèche case).

Subject: Who or what did something that is alleged to cause the dispute?	**Predicate**: What event is being disputed and causing "legal" hurt or harm?	**Object**: What is the thing or person being acted on by the subject that is causing the dispute?	**Legal Issue:**

Now substitute the different boxes with different but similar items **so that you have a hypothetical that is similar to the case (Holmes) you read and briefed.**

HYPOTHETICAL #1

Subject: *Who or what did something that is alleged to cause the dispute?*	***Predicate:*** *What event is being disputed and causing "legal" hurt or harm?*	***Object:*** *What is the thing or person being acted on by the subject that is causing the dispute?*	***Legal Issue:****What is the thing or person being acted on by the subject that is causing the dispute?*
			Same as above.

One more time, create another 2nd hypothetical by substituting different but similar items in each of the boxes.

HYPOTHETICAL #2

Subject: *Who or what did something that is alleged to cause the dispute?*	***Predicate:*** *What event is being disputed and causing "legal" hurt or harm?*	***Object:*** *What is the thing or person being acted on by the subject that is causing the dispute?*	***Legal Issue:*** *What is the thing or person being acted on by the subject that is causing the dispute?*
			Same as above.

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