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Judges, Expertise, and Analogy

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Abstract

Political scientists have shown that one can anticipate how a judge will decide a case more often than chance, or a reading of the facts, might allow by using various predictors such as party affiliation, gender, or the judge's own decisions on earlier similar cases. The simplest explanation for such behavior is that judges first decide what they want the outcome of the case to be, then go back to find the precedents that justify their opinions. This chapter considers a more nuanced version of the process: judges may choose relevant case analogies as better or worse, applicable or inapplicable, not because of any particular desired outcome but because of their own pre-existing knowledge. The influence of such knowledge on the decision process may be entirely unconscious; therefore, judges may, in fact, be following the idealized decision-making process to the letter, and be unmotivated toward finding a particular result, yet may usually still reach the predicted result.

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Introduction

One appellate case, three courts – and seven disparate opinions. Clearly, different judges reach different decisions based on the same facts and same legal doctrine. Why? Political scientists have shown that one can anticipate how a judge will decide a case more often than chance, or a reading of the facts, might allow. Using various predictors -- party affiliation, party of appointment, the judge's own decisions on earlier similar cases -- regression analyses can demonstrate that judges are behaving in a manner consistent with their explicit prior beliefs (e.g., Segal & Spaeth, 1993, 2002). The simplest explanation for such behavior is that judges first decide what they want the outcome of the case to be, then go back to find the precedents that justify their opinions.[1] The more complicated claim that I want to make is this: people (and judges) may choose relevant analogies (or precedents) as better or worse, applicable or inapplicable, not because of any particular desired outcome but rather because of their own pre-existing knowledge. The influence of such knowledge on the decision process may be entirely unconscious; therefore, judges may, in fact, be following the idealized decision-making process to the letter, and be unmotivated toward finding a particular result, yet may usually still reach the predicted result.

To understand this argument, I first present an overview of the analogical reasoning research done by cognitive psychologists. Next I address the question of whether judges are experts at analogical reasoning. If they are experts, then the large body of empirical analogy research conducted with non-expert subjects might not be relevant to judges' analogical reasoning. However, I conclude that although judges might be expert at many things, analogical reasoning is not likely to be one of them. Accordingly, I turn to other research – including some from analogy and some from other areas relevant to analogy like similarity and categorization -- to show how non-attitudinal and non-teleological factors (especially pre-existing knowledge) can

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[1] This position is the most extreme version of the "legal realist" view. A more nuanced view is that they are sensitive to both attitudinal and jurisprudential concerns (Lindquist & Klein, 2006).

affect analogy use. Finally, I link these arguments back to the initial question: whether judges, or anyone, can be making "predictable" decisions while still following an idealized analogical reasoning process.

I. Overview of Analogical Reasoning

Analogical reasoning is a core component of intelligence. Most intelligence tests, not to mention general standardized tests like the GREs and LSATs, incorporate some kind of analogical reasoning tasks. Performance on analogical reasoning tasks correlates very highly with performance on almost all other components of IQ tests (Salthouse, 2005; Snow, Kyllonen, & Marshalek, 1984).

On those tests, analogical reasoning often consists of verbal four-term problems (like lawyer:client :: doctor:?) and geometric versions of such problems. Although those simple tasks have been studied in the laboratory, research using more complicated real-world analogy materials has proven more informative.

Analogical reasoning involves taking a situation that is well understood (the "source") and using it to help explicate a situation that is less well understood (the "target"). Two very important distinctions are (a) between the processes of retrieval and mapping and (b) between the attributes and relations within analogs.

A. Steps in Using Analogies

Analogical reasoning typically involves several steps including retrieval and mapping. To illustrate: Suppose you are a lawyer and a potential client comes to you wanting to know whether she has a good negligence claim against a cruise line. She had been asleep in her locked cabin when someone reached through a window and stole her handbag including $500 in cash.

To figure out whether she has a good claim, you first need to retrieve – find potentially analogous source cases in memory (or by doing some legal research). First, you recall a case in which a businessman was asleep on a train berth in an open sleeping car and had his expensive cell phone stolen from the pocket of the coat he was using as a blanket. Second, you recall case in which a man in a resort hotel had his wallet stolen from his room while he slept. Third, you recall a case in which a woman on a cruise ship was hit by another woman on the ship who used her handbag as a weapon.

The next step is to create a mapping – find a set of appropriate correspondences between elements of the source and target. You might think of your client as the business traveler, the cruise ship as the train, and handbag as the cell phone. Alternatively, you might think of your client as the man on vacation, the ship as the hotel, and the handbag as the wallet.

If you think your case is most like that of businessman on the train (who lost), you will expect the same outcome as in that case; if you think it is most like that of the vacationing man in the hotel (who won), you will expect that result. But despite the fact that the third case involves a woman, a cruise ship, and a handbag – just like your own – it probably doesn't seem very similar to your case because the objects that are the same don't stand in the same relations to each other – and relations are the key to analogy.

B. Similarity in Using Analogies

The second important distinction is between attributes and relations within the analogs (Gentner, 1983; Holyoak & Thagard, 1989). Attributes are objects or qualities of objects (or events or people); they are one-place predicates like: is-a-planet or is-valuable. Relations are two (or more) place predicates. Relations may link objects, for example: is-bigger-than, revolves-around, owns, has-a-duty-of-care-toward. But relations may also link other relations, for example, the relation "cause" is important in linking propositions like: (a) The sun is bigger than the earth and (causes) (2) the earth revolves around the sun. Or: (a) An innkeeper has a duty of care toward those who rent rooms (plus some other stuff) and (causes) (b) the innkeeper is liable for the theft.

Note that attributes are often referred to as "surface" or "superficial" features because they are usually physically visible or explicitly described whereas relations must often be inferred.[2]

The difference between attribute and relational features is illustrated wonderfully in an experiment in which subjects were asked to find similarities between pairs of pictures (Markman & Gentner, 1993). In one pair, the top picture showed a tow truck towing a car to the left along a road; the bottom picture showed a (very similar-looking) car pulling a motorboat to the right along a road. Subjects were asked which object from the top picture "matched" the car from the bottom picture. There are two obvious answers. Subjects who had to answer the question

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[2] The terms "surface" and "superficial" are often mixed both within and across articles.

quickly were more like to match the car on the bottom to the car on the top because those two objects were very similar in looks; that is an attribute match. Subjects who had more time were more likely to match the car on the bottom to the tow truck on the top because those two objects filled the same role (i.e., of pulling something else that could not move over the road on its own); that is a relational match.

Attribute similarities between the source and the target play a greater role in the retrieval of analogs whereas relational similarities play a greater role in mapping (Gentner, 1993; Holyoak & Koh, 1987). When people are asked to judge the "goodness" or similarity of analogies, the depth and structure of the relational similarities matters much more than the attribute similarities (Gentner & Kurtz, 2006; Gentner, Ratterman, & Forbus, 1993).

Note that the difference between attribute and relational similarity is key in the use of analogical reasoning in the law. A useful precedent is not usually one in which the parties themselves (or the property in question) are similar but rather one in which similar (legal) relations hold between the relevant parties or property.

So, in the earlier example of the theft on the ship, the relevant similarities are not whether the victim was a woman or man, whether it was a business or pleasure trip, or what was stolen;[3] rather what matters is the relation between the victim and the owner of the ship, train, or hotel. And although most people believe that a ship is more similar to a train than to a hotel, the court in Adams v. New Jersey Steamboat Company (1896) ruled that for liability purposes a ship's cabin is more like a hotel room, where there is an expectation of privacy and protection, than like an open berth in a sleeping car, where there is not.

Developing expertise in law is (at least in part) learning to ignore irrelevant attribute similarities, learning what counts as a relational similarity, and understanding which relational similarities are likely to matter in a given case.

II. Analogy and Expertise

What would it mean to say that judges at experts at analogical reasoning? Because analogical reasoning is a core component of IQ, and because judges are likely to be a more intelligent group than a random collection of folks, judges are more likely to be better than average at analogical reasoning. But are they experts? And why is it important?

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[3] Note that although irrelevant in this case, such factors could be relevant in other types of cases.

A. What is an Expert?

Due to study, training, and practice – often in addition to talent and motivation -- experts are better than non-experts in some domain of performance. Expert chess and golf and bridge players routinely beat non-experts; expert surgeons perform difficult surgeries more successfully than non-experts; expert violinists create truer sounds and make fewer mistakes than non-experts.

One clear characteristic of expertise is that it is quite limited in domain. Expert golf players are not experts at all sports or even all sports requiring a swing or a ball. Expert neurosurgeons are not expert cardiac surgeons nor are expert violinists expert cellists. Much expertise involves being good at a procedure that involves a very specific content.

Within their domain of expertise, experts tend to be faster and more accurate than novices, tend to have superior short-term and long-term memories for information, see deeper relations in the structure of information, use less cognitive effort, and have more accurate monitoring skills (Chi, 2006; Glaser & Chi, 1998). These qualities are thought to reflect not just that experts have more knowledge but also that experts have a "qualitatively different representation and organization of knowledge" (Ericsson, 2006).

A potentially important characteristic of experts for the law is that, in a variety of domains, being an expert means seeing past attribute similarities to underlying relational similarities. For example, when shown index cards depicting different physics problems and asked to sort them into piles, novice physics students sort them based on the type of objects involved in the problems (e.g., pulleys, inclined planes) whereas expert physicists sort them based on the underlying principles involved (e.g., conservation of momentum) (Chi, Feltovich, & Glaser, 1981). When using analogies, experts are more able to retrieve previous analogs based on structural similarity and avoid interference by those exhibiting only surface similarity (Novick, 1988).[4] Thus, someone who is legally trained is less likely to be distracted by the hit-by-a-handbag-on-a-cruise-ship case than someone who is not.

Another general characteristic of expertise is that it only develops given specific conditions. One is that the person spends a lot of time at it – but, of course, time itself is not

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[4] When acquiring analogical skills, children parallel this development (Ratterman & Gentner, 1998).

sufficient. We all know people who have played golf or bridge for years, and who seem to enjoy it, but who aren't any better than they were years ago. More important than just the amount of time is how that time is spent: expertise develops out of a process called "deliberate practice" which involves thousands of hours of specific types of practice and training. Deliberate practice requires focused programmatic study with appropriate feedback about performance. It includes identifying errors and working on procedures to eliminate them (Ericsson, 2006; Horn & Masunaga, 2006).

B. Why Is Expertise Important?

In Chapter 2, Schauer poses the question: "Is there a psychology of judging?" His answer is pretty much "no". He states that so far all the experimental evidence shows that judges demonstrate the same cognitive failings as mere mortals. But he correctly points out that psychologists have not (often) studied what judges do when they are doing what judges often do. He argues that it is there – in their domain of expertise – where a psychology of judging would exist. Of course that is true of other experts – "special performance" is only found within the domain of expertise; thus it is ironic that Schauer perfunctorily dismisses most research on expertise as being irrelevant to his conjecture.

In the "first generation" of theories of expertise (Holyoak, 1991), psychologists believed that experts in any particular cognitive skill should be experts at general reasoning and, therefore, should be experts at other reasoning tasks. But the next wave of research consistently found that experts, despite specialized skills and virtuoso performances, made the same errors as non-experts on all sorts of general reasoning tasks; their expertise was limited to their domain of detailed knowledge. However, no one found that judges made those particular errors -- because hardly anyone studied judges.[5] And now they have (e.g., Guthrie et al., 2001; Wistrich et al., 2005).

Some people seemed surprised that judges show the standard errors and biases on the standard cannon of reasoning tasks; however, for those of us who believed the findings that doctors and Indian chiefs were not special with regard to all kinds of reasoning tasks, and were

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[5] But see Lawrence, 1988, for an early study of how Australian magistrates impose sentences; and, Dhami, 2003, with a larger data set showing that British judges' bail decisions can be well-described by a simple heuristic model.

only special with regard to tasks related to their expertise, the fact that lawyers and judges are not special with regard to those tasks is not the least bit surprising (or interesting).

However, as Schauer argues, if we can define what judges' expertise is, we can (a) begin a smarter inquiry into the psychology of judging and (b) argue that within their limited domain(s) of expertise, judges should show the kinds of enhanced performance of experts and should not fall prey to the errors that non-experts would generate. Clearly, one candidate for judges' expertise is analogical reasoning.

C. Are Judges Experts at Analogical Reasoning?

Elsewhere others and I have argued that judges are *not* experts in several tasks that might be viewed as components of judging. For example, it could be argued that judges are neither expert fact-finders (Robinson & Spellman, 2005) nor expert at appropriately weighting evidence (Spellman, 2007). One reason for the theorized lack of expertise is that although (some) judges may often do those tasks, they are not trained to do them with extensive supervision and feedback.

In contrast, law school does train students (whether explicitly or implicitly) to do analogical reasoning. In law school we had the pleasure of years of reading cases, abstracting rules and similarities, drawing analogies to other cases or hypotheticals, and being given corrective feedback about our analyses.[6] And, in fact, law schools often (explicitly or implicitly) use techniques in teaching that have been shown to improve analogical reasoning in the laboratory. Thus, it seems as though the conditions for developing expertise at analogical reasoning might be met.

1. Law school techniques and the possibilities of improving analogical reasoning.

Although the psychology literature is fairly glum about people's ability to take what they have learned in one domain and use analogy to transfer that knowledge to another domain (see Barnett & Ceci, 2002, for a review), there are, in fact, ways to improve people's performance on analogical reasoning tasks. In the laboratory, bad performance on analogical reasoning tasks is

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[6] In a sense, when lawyers write briefs, and when judges read and rule on them, they are engaged in a similar activity. Of course, the kind of "feedback" that lawyers and, especially, judges get is much more erratic and sporadic than that of the law student.

often to due a failure to retrieve – subjects trying to solve a problem do not find relevant analogs in memory; however, once they are told that a prior experience might be relevant, they are good at mapping.

In a basic laboratory procedure for studying analogical reasoning, subjects first learn about a way of solving a hypothetical problem. For example, a general wants to attack a well-guarded fortress but if he sends his entire army down one road, land mines will explode and significantly deplete his forces. A better plan is to send smaller groups of soldiers down different roads towards the fortress simultaneously. This divide-spread-and-converge approach is called the "convergence solution" (e.g., Gick & Holyoak, 1980, 1983; Holyoak & Koh, 1987).

Time passes and subjects are later asked to solve an analogous problem, typically Duncker's Radiation Problem (Duncker, 1945). A man has an inoperable tumor in his stomach. A type of radiation can destroy the tumor but if it is used at sufficiently high strength to destroy the tumor it will destroy the healthy tissue that it passes through and the man will die. What can be done?

There is a convergence solution to the radiation problem: use many less-powerful rays simultaneously from many different angles. About 10% of subjects will come up with that solution – and that is the same percentage whether or not they have previous read the fortress problem. Why doesn't having seen the obvious analogy help?

The main obstacle to using the earlier solution is that people do not think of it – that is, they fail to retrieve it from memory. However, if people are reminded of it – for example, if the experimenter tells them to think back to something they did earlier in the study – then most will think of the source analog, easily draw the mapping, and solve the radiation problem. Without explicit reminding (or expertise), however, people are only likely to think of superficially similar source analogs (Holyoak & Koh, 1987)

Laboratory studies that demonstrate ways to increase or improve the use of analogical reasoning therefore tend to address the accessibility of source analogs. But, of course, the source analog is a given; how can it be made more accessible? Although the analog is fixed, people's mental representations of the analog can differ. For example, rather than storing the fortress problem in memory as a "story about a general attacking a fortress", people could store it more abstractly, as a story about how a too-strong force can be split up into smaller forces and then converge to accomplish a goal. Later, when a new target situation comes along that has a

similar abstract relational structure, the abstract version of the source analog is more likely to be retrieved because the two analogs seem more potentially related (e.g., if they are both about "converging forces" rather than one being about an army and the other about radiation).

Note that in some ways this characterizes the task of the law student, lawyer, or judge searching for relevant precedent – when facing a new fact pattern to find good analogous cases in memory. However, the legal task is also different. For one thing, in the legal arena people know that they should be trying to find an analogous case. For another, except for law students on an exam, the search for such cases is not just a search through memory but rather a search through a database or through cases presented as relevant in legal briefs.

Below I describe three techniques that were designed to improve reminding in the laboratory but are similar to techniques used in law school pedagogy. They are also what is needed for developing expert knowledge within a content area – making important similarities more obvious – in particular, making relational features as obvious -- and as "superficial"-- to experts as attribute features are to novices.

a. Creating more abstract source representations indirectly by comparing analogs.

One way to improve analogical reasoning in the laboratory is to have subjects compare and abstract from multiple analogs. For example, subjects who read both the fortress story and a story about firefighters (who used many small hoses simultaneously from different directions) before trying to solve the radiation problem were more than twice as likely to come up with the convergence solution as subjects who had read only one source analog. In addition, if subjects are asked to explicitly compare the two analogs to each other, those who abstract the convergence solution from the comparison are more likely to use it later than subjects who do not have a good representation of the relational similarities between the stories (Catrambone & Holyoak, 1989; Gick & Holyoak, 1983). This compare-and-abstract technique has been shown to benefit business school students in negotiation classes who, like law students, participate in case-based learning (Loewenstein, Thompson, & Gentner, 1999). In law school, hypotheticals may provide the grist for comparing analogs.

b. Training people to abstract principles from single analogs.

Another way to improve analogical reasoning is to train people to represent single source

analogs at an abstract level. Mandler and Orlich (1993) had subjects read the fortress story and then describe the story at one of three different levels of abstraction: summarizing the story details; summarizing the main points by stating the general's goal, dilemma, and solution; or abstracting a general solution principle. When subjects later tried to solve the radiation problem, those who had produced a good abstract solution were much more likely to use the convergence solution and solve the radiation problem than subjects who had not. (Note, however, that very few subjects actually succeeded in creating a good abstract summary, suggesting that such a representation is hard to create without either training or practice.) In law school, students learning to extract abstract rules from singles cases.

c. Teaching the names of relations.

A third way to improve analogical reasoning is to use consistent relational labels when people learn the analogs. Although the laboratory data with adults is sparse, the idea is consistent with various kinds of developmental and anecdotal evidence. People tend to use the same labels for objects (e.g., car, tow truck) but different labels for verbs and relations (e.g., pulls, tows, drags) – making it easier to use objects/attributes in retrieval and also making relations more difficult to learn (Gentner & Kurtz, 2007; Gentner & Loewenstein, 2002). Relational categories seemed to be learned by "progressive alignment" – by first comparing examples that are similar than comparing more distant ones (Gentner & Kurtz, 2007).

Law students learn the names of many legal relations: contracts, torts, negligence, standing, jurisdiction – all are about the relations between parties and/or actions that create legal rights or obligations. Certainly, there are some legal categories that are "attribute-based": there are laws that apply only to people over 18 years old and there are laws that apply only to ships. However, much of law school is about learning, by contrasting many examples, the requirements and limits of legal relations.

2. But does law students' analogical reasoning actually improve?

In effect, all of the above techniques – comparing multiple analogs, abstracting from single analogs, learning the names of legal relations – are techniques used in law school to teach the content of the law. Psychologists, however, do not have any measures that demonstrate that law school improves general analogical reasoning. In a study of the effects of graduate training

on reasoning, law students, medical students, and graduate students in psychology and chemistry took tests involving statistical, methodological, conditional, and verbal reasoning during the first and third years in the programs (Lehman, Lempert, & Nisbett, 1988). The verbal reasoning test included verbal analogical reasoning (as on the GRE or LSAT). The first-year law students had higher initial verbal reasoning scores than the other groups – suggesting self- (or law school) selection. However, after three years of schooling, the law students improved only about 5 percent on average (a statistically non-significant difference) in verbal reasoning; all of the other groups' average scores improved more.

Granted, these data showing no improvement in analogical reasoning are not the best –– among other flaws they only include law students (at the University of Michigan) after three years of training rather than experienced judges and, of course, the verbal reasoning tasks are not the same as the type of full-blown analogical reasoning done when reasoning about cases. However, these data are consistent with a wide variety of other data showing limitations on both the transfer of training and the generalization of expertise.

3. Expertise and the process/content interaction.

The best way to think of what judges may have developed is that it depends on both process and content: it is using analogy in a domain in which they have specialized knowledge – knowledge that enables them to quickly understand which features of a case are the relevant ones for analogical mapping. Thus, within the legal context (or, more likely, within a subset of that context), judges are experts at using analogy; however, when reasoning outside their knowledge base, although they may be more fond of using analogy than most people (because of practice or precocity), they will not be any better than equally intelligent and informed others.

To return to the cruise ship example, probably no one who was legally trained would think that the sex of the victim, the nature of the trip, or the particular items that were stolen would matter in that case; even if those features bring to mind similar cases, those that do not have an underlying structural similarity (e.g., the women being hit by the handbag on the cruise ship) would be easily rejected as irrelevant. And those who are legally trained should be less flustered by the surface similarity that boats and trains move whereas hotels do not. Rather, those who know that the law protects those who are justified in expecting privacy and security – whether passengers or hotel guests – would be more likely to recall, recognize, and use the

analogy between the obligation of a ship to a passenger in a private cabin and the obligation of a hotel to a guest in a private room.

III. Non-Attitudinal (Unintentional) Factors Affecting Analogy Selection and Use

To the extent that judges are not any different at analogical reasoning from non-judges, their use of analogical reasoning should be affected by similar extra-logical influences. Below I describe several factors that influence the selection and interpretation of analogies that are *not* driven by a conscious motivation to find one analog more relevant or persuasive than others. I focus here on knowledge and representation; that is, how what someone knows, and the relations they consider between the things they know, affects analogy use. However, there are other cognitive factors that might also work to make the choice of precedent seem teleologically motivated.[7]

A. Knowledge and Unconscious Reminding

People may show unconscious influences of irrelevant parts of the source analog on selecting and using analogies. (Of course, that assumes that people are familiar with the source analog.) For example, when subjects read about a hypothetical political crisis and were asked whether they thought the United States should intervene, those who read a version with several superficial reminders of World War II (e.g., a briefing in Winston Churchill Hall) made more interventionist recommendations than those who read a version with superficial reminders of Vietnam (e.g., a briefing in Dean Rusk Hall). Thus, the superficial features (unconsciously) affected the retrieval of similar analogs and those (unconsciously) influenced the interpretation of the target analog. Interestingly, however, when the subjects were later asked to explicitly rate how similar the hypothetical crisis was to both World War II and to Vietnam, the differences in superficial details had no effect (Gilovich, 1981).

B. Knowledge and Interests

A person's knowledge or interests can unconsciously influence which of several equally

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[7] Other potential factors include context effects (see Hunter, 2001); whether people set out to look for similarities or differences between cases (see Gentner & Markman, 1994, and Medin, Goldstone, & Gentner, 1990); and beliefs about the causal structure of relevant legal categories (see Kim & Ahn, 2002).

good analogical mappings will be chosen. For example, subjects read a science fiction story describing two different planets (Spellman & Holyoak, 1996). Planet 1 had three countries: Afflu was economically strong and gave economic aid to Barebrute; Barebrute was economically weak but militarily strong and gave military aid to Compak; Compak was militarily weak. Planet 2 had four countries: Grainwell was economically strong and gave economic aid to the economically weak Hungerall; Millpower was militarily strong and gave military aid to the militarily weak Mightless.

Planet 1:

Afflu	--> aids -->	Barebrute	--> aids -->	Compak
(economically strong)		*(economically weak; militarily strong)*		*(militarily weak)*

Planet 2:

Grainwell	--> aids -->	Hungerall	Millpower	--> aids -->	Mightless
(economically strong)		*(economically weak*	*(militarily strong)*		*(militarily weak)*

Figure 1. Representation of materials from Spellman & Holyoak, 1996.

Subjects first made military or economic recommendations for each country. Then they matched the countries of Planet 2 to the countries of Planet 1. Which country was like Afflu? Easy, Grainwell. Like Compak? Also easy, Mightless. But which was like Barebrute? There are reasons to pick both Hungerall and Millpower.

Subjects' mapping choices depended on the recommendations they made. Subjects who made military recommendations saw Barebrute as more like the militarily strong Millpower; in contrast, subjects who made economic recommendations saw Barebrute as more like the economically weak Hungerall.

Thus, knowledge or interests may drive mappings within an ambiguous analogy.

C. Incorporating Structure in Levels of Abstraction

Which (of many potential) analogs one regards as best may depend on how much of the abstract analogical structure one incorporates (Hofstadter & Mitchell, 1994). Consider the following question:

If the string of letters *abc* is changed to *abd*, how would you change *kji* in the same way? This question is, in effect, a four-term analogy question (like lawyer:client :: doctor:patient): find the relations in the first pair of letter strings, map *abc* to *kji*, and then apply the relations to create the fourth term.

The following two solutions are based on superficial features and are very literal – and people find them very unsatisfying: *kji* could be turned into *abd* or into *kjd*. The first ignores all internal properties of both *abc* and *kji* (and ignores how *kji* might be similar to *abc*); the rule is: turn any letter string into *abd*. The second also ignores all internal properties of *kji* but does consider the relation between *abc* and *abd*; the rule is: change the rightmost letter to *d*.

A less literal solution is to turn *kji* into *kjj*. That solution means considering the relation between *abc* and *abd* and also understanding that *c* is part of an alphabetical sequence and that *d* is one step lower in the sequence; the rule is: change the rightmost letter one step lower.

People generally prefer the two analogical solutions that incorporate the internal relational structure of the letter strings. Generating the answer *kjh* means seeing that *abc* is a downward sequence from which the rightmost letter is moved one more step down; however, *kji* is an upward sequence, therefore, the rule is: move rightmost letter one step more in the direction of the sequence. Generating the answer *lji* also means seeing that *abc* is a downward sequence and *kji* is an upward one. Then *abd* means changing the lowest (rightmost) letter down one; *lji* means changing the lowest (leftmost) letter down one.

One of the fascinating things about the Hofstadter letter-string analogies is how many different ones can be sensibly generated from such seemingly simple stimuli. Legal cases are similarly complicated in that they may contain relations that are or are not incorporated in to the litigants' arguments and that analogies may be drawn at very literal or abstract levels. For example, the same case may be viewed as being about "the right to engage in homosexual sodomy" or "the right to be let alone" (Bowers v. Hardwick, 1986).

D. Coherence

The selection of a particular analog, or relevant precedent, might also (unintentionally) emerge out of a general pressure for cognitive coherence—that is, the tendency for people to be consistent in their reasoning. As a consequence, people's views of the applicability of a source analog changes in line with other changes in their opinions (for overviews of this research see Simon, 2004; Simon & Holyoak, 2002). In the basic study (Holyoak & Simon, 1999), subjects (undergraduates) read a semi-fictional legal case. The plaintiff, a software company named Quest, sued Jack Smith, an investor in the company, for libel. Smith had posted a negative message about the company on an electronic bulletin board directed at investors, and soon after the stock's price dropped drastically and the company went bankrupt.

Before reading the case, subjects were asked whether they thought messages posted on electronic bulletin boards should be treated like items published in newspapers or like messages sent over a telephone network. Later, as part of the case, subjects learned that defamatory messages published in a newspaper could give rise to a cause of action for libel whereas those transmitted by telephone could not.

Subjects were about equally divided in verdicts. But whereas *before* reading the case, subjects found the newspaper and telephone analogies equally compelling, *after* rendering their verdicts, they widely diverged. Those who found for Quest believed that the newspaper analogy was much better than the telephone analogy; the opposite was true for those who found for Smith. Thus, belief in the quality of an analogy shifted coherently along with other beliefs that led them to their decision.

E. Legal Knowledge

An experiment comparing law students to undergraduates demonstrates how legal knowledge can affect analogical reasoning (Braman & Nelson, 2007, Exp. 2). Subjects (96 undergraduates and 77 law students) read an article summarizing the target case facts (but not the result) of *Wazereud-Din v. Goodwill Homes and Missions* (1999) in which the plaintiff, an Islamic man, was denied admission to a Christian-administered drug treatment program. They also read about a potentially relevant previously decided case. The precedent case varied in its similarity to the target case and involved one of three different plaintiffs: Islamic man, gay man, or black man; one of three different types of defendant: religious treatment program, community

service organization, or insurance company; and one of two holdings: discrimination or not. Subjects rated how similar the precedent was to the target case. They had also previously been asked whether they agreed that faith-based organizations should have the right to exclude people who did not share their beliefs from receiving their services.

Several findings demonstrate the effects of legal knowledge: (1) overall, undergraduates rated the precedents as more similar to the target case than did the law students, and (2) undergraduates treated precedents involving Islamic and gay plaintiffs similarly whereas law students tended to treat precedents involving Islamic and black plaintiffs similarly. These results suggest that the law students were using their prior knowledge -- of the difference between "strict scrutiny" and "rational basis" tests -- in their judgments.[8]

But Braman and Nelson (2007) want to go further than merely stating that *knowledge* matters to analogy use; they argue that there was (sometimes) evidence that subjects' prior *beliefs* mattered: in general, those who opposed exclusion based on religion were more likely to rate the target case as similar to the precedent when the holding was that there was discrimination but those who favored exclusion were more likely to rate the target case as similar to the precedent when the holding was that there was no discrimination. This pattern was stronger and more consistent for the law students.

Therefore, Braman and Nelson (2007) also conclude in favor of "motivated reasoning" -- that people's policy preferences (e.g., regarding exclusion) "influence legal decision making" (p. 954). However, the causal conclusion that preferences *influence* reasoning, and, especially, that it might have influenced reasoning in a consciously motivated way, is not justified. Subjects are not randomly assigned to favor or oppose exclusion – thus, subjects who start out holding different beliefs may differ from each other in other systematic ways (creating a so-called "third variable" problem). For example, subjects who are more tolerant of different groups and less likely to see differences between them might both (a) be more likely to oppose exclusion and (b) more likely to see similarities between the cases. Other types of pre-existing knowledge -– not necessarily directly related to the case -- could have similar effects.

Note that the authors "hasten to add than nothing we have found suggests a *conscious* effort to twist the law to serve one's preferences" (Braman & Nelson, 2007, p. 954). It is easy to

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[8] Under current constitutional doctrine, actions that treat people differently based on race and religion merit strict scrutiny whereas those based on sexual orientation do not.

see how these results could emerge simply from different knowledge and from the (unconscious) pressure for coherence in reasoning.

IV. Judges and Analogy

What can we conclude? Judges have had lots of practice using analogy; yet, they might not actually be "experts" because just as there is no real generalized expertise in "problem solving" it is not clear that there can be a generalized expertise in analogy use. More important, however, judges (like laypeople) know that when using analogies it is important to look for relational similarities and – because of their specialized training in legal content – they know which relational similarities matter within their domains of expertise.

Many of the limitations on using analogies described above have to do with "finding" or retrieving the proper analogs to use. Judges don't have to try to retrieve from memory – they have briefs and law clerks to find the relevant sources. Yet, as the WWII/Vietnam study shows, unconscious reminders of known analogs that are not present can affect judgments even though, when made explicit, the analogs are not viewed any better or worse than other ones. In addition to this automatic retrieval of analogies, judges' knowledge and interests may influence how they mentally represent and use different analogs. When judges know more about some issues than others, or, in the past, have drawn analogies to one kind of outcome, they might be more likely to unintentionally find in a direction consistent with past judgments – in part because of what they see as more (or less) similar, in part because of the level of abstraction (i.e., how deep the relations) they use, and in part because of an effort to maintain coherence in their beliefs.

Thus, although judges might decide consistently with predictions, it is possible that they do so not for any of the intentional (and sometimes seemingly "nefarious") reasons suggested by legal realism. Regression analyses can reveal *that* it happens but understanding how analogical reasoning works, and how judges might use it, is necessary for understanding *why* it might happen.

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