

Lessons from Analogical Reasoning in the Teaching of Negotiation

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After two decades of spectacular growth in negotiation research, teaching, and application, it is appropriate to pause and consider how negotiators learn, a strikingly fundamental but infrequently examined issue. In this report, we present some initial and on-going research and thinking on learning about negotiation skills, providing one view of the relationship between negotiation pedagogy and negotiation practice.

A key goal of education is preparing students and managers to solve real-world problems. Given that most students learn in a classroom setting that is different than their ultimate work environment, it is implicitly assumed that students' learning will transfer to that future environment. Yet research on reminding (e.g., Gentner, Rattermann, and Forbus 1993; Ross 1987, 1989) has shown that differences between the contexts of learning and use decrease the likelihood of transfer. We believe that for a fundamental managerial skill like negotiation (Bazerman and Neale 1992; Lax and Sebenius 1986), which is needed across a large variety of business contexts

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and domains, we must question the implicit premise of transferability of knowledge.

Empirical evidence paints a rather gloomy picture of people's ability to learn by example and to retrieve relevant knowledge when solving a problem in a new context (see Reeves and Weisberg 1994 for a review). People's ability to solve problems in new contexts often depends on the accessibility of relevant knowledge, rather than a lack of information or a general capacity limitation. This is the "inert knowledge" problem: Information needed to solve problems is part of our cognitive repertoire, but fails to be accessed at the right time. In this report, we suggest that negotiators' ability to access and use negotiation skills depends crucially upon how they are trained.

In the effort to learn more about learning, we have conducted a series of intensive empirical investigations of how undergraduates, MBA students, executives, and consultants learn and apply negotiation skills (Loewenstein, Thompson, Gentner, in press; Thompson, Gentner, and Loewenstein, in press). Based on this research, we report the following propositions:

1. Transfer (or the application of concepts learned in one situation to a different, but relevant situation) is highly limited;
2. Making an analogical comparison among multiple, structurally-similar examples facilitates transfer; and
3. Recognizing when to make comparisons is not obvious.

Knowledge Transfer and the Limits of Learning

Transfer is the ability to apply a concept, schema, or strategy learned in one situation to solve a problem in a different, but relevant situation. It is important to distinguish surface-level versus deep (or relational) transfer. Surface-level transfer occurs when a learner attempts to transfer a solution from one context to a superficially similar context. However, in most situations it is desirable for learners to apply solutions and concepts that have deep, meaningful similarities, rather than superficial ones. Unfortunately, as we describe below, research has shown that this kind of transfer is difficult.

In typical negotiation training classes and seminars, people are exposed to cases and exercises that hopefully allow them to transfer principles to their own business situations. Yet, solving one problem barely improves the likelihood that one will solve a second problem in a different context (Reeves and Weisberg 1994). This is because people do not recognize the similarity between problems. Rather, people tend to access previous knowledge that bears surface, rather than structural similarity to the problem at hand.

Consider an example from Ross (1987). Participants studied examples containing principles of probability theory, and then attempted to solve problems requiring the use of those principles. If the study and test stories were from the same context, participants were more likely to be reminded of them than if the stories were from different contexts. However, just being

reminded of the appropriate training example was not sufficient for participants to use the embedded principle to solve the test problem correctly. If the same underlying principle was carried out in the same way in the two problems, participants performed twice as well as participants who received stories in which the principle was carried out in different ways in the two problems. Surface similarity can play a large role in the reminding and use of prior problems.

Gentner, Rattermann, and Forbus (1993) directly tested people's ability to be reminded of stories with either surface or structural similarities. For example, participants first read a story about a hawk giving feathers to a hunter. Participants were then given one of four stories resulting from the crossing of surface and structural similarity (i.e., a story with similar characters and plot, different characters but same plot, similar characters but different plot, or different characters and different plot). Participants were over four times more likely to recall this story when later shown a story with similar characters than when shown a story with different characters. There was little difference in reminding performance based on plot, and participants were equally rarely reminded of stories with just matching plot or no match at all. In sharp contrast to these findings for reminders, when asked to give ratings of the quality of match between two stories, participants gave far higher ratings for stories that had matching plots than matching characters. Simply said, when people encounter a new situation or a problem, they do not tend to be reminded of prior examples with the same, underlying relations and causal structure which they themselves would value, but of examples with the same surface features (Gentner, Rattermann, and Forbus 1993; Ross 1987, 1989).

In total, the results of several research investigations point to a striking dissociation between what's most accessible in memory and what's most useful in reasoning: We often fail to recall what is ultimately most valuable for solving new problems (Forbus, Gentner, and Law 1995; Gentner, Rattermann, and Forbus 1993). Upon being informed of the "correct" approach to a negotiation simulation, students often express regret: "I knew that, I just didn't think to use it." Unfortunately, negotiators in the real world typically do not experience regret because they are not told when they have just made learning and application errors.

Making Comparisons Facilitates Transfer

An obvious question arises at this point for the learner as well as for the teacher: Are there ways to enhance people's ability to retrieve structurally similar, rather than superficially similar, instances? We think so. The key is to create a problem-solving schema or strategy that is decontextualized and uncluttered by irrelevant, surface-level information. This way, the negotiator's knowledge is more accessible and more portable. Indeed, experts in such domains as math and physics have been shown to develop problem-solving schemas that are abstract and not cluttered by irrelevant information.

We believe analogical reasoning offers an efficient mechanism to instigate the development of these problem-solving schemas. Comparing examples can lead to focusing on their key commonalities and abstracting out a productive problem-solving schema. According to Gentner's (1983; Gentner and Markman 1997) structure-mapping theory, the mental act of comparison entails a structural alignment and mapping process that highlights the similar aspects of the two examples. Simply by focusing on shared aspects between examples that have different surface features, learners naturally abstract a common relational structure that is uncluttered with irrelevant surface information. Thus, making comparisons can inform students and managers as to which aspects of experience are relevant and which are causally irrelevant. Analogical encoding refers specifically to deriving an abstraction based upon the commonalities resulting from the process of comparing two or more examples (Loewenstein, Thompson, and Gentner, in press). Evidence indicates that comparison naturally leads to schema abstraction, which in turn leads to transfer (Gick and Holyoak 1983; Loewenstein, Thompson, and Gentner, in press).

To test this theory of learning by comparison, we have conducted research investigations into how MBA students, executives, and consultants acquire negotiation skills (Loewenstein, Thompson, and Gentner, in press; Thompson, Gentner, and Loewenstein, in press). Thompson, Gentner, and Loewenstein (in press) found that studying by comparing examples, much more than studying by providing advice on a case-by-case basis, enabled management students to abstract negotiation principles and later apply them to form agreements when actually negotiating. This effect was replicated and extended by Loewenstein, Thompson, and Gentner (in press), who found that the comparison effect remained even when all participants were asked to describe the solutions to the study cases (i.e., describing the common solution, or describing the solution to each case separately). Analogical encoding in these studies led to dramatic increases in transfer of a key negotiation principle – contingency contracts. The central conclusion from these studies is that analogical encoding, wherein people mentally compare and contrast cases to abstract a common principle, is a more effective means of learning than isolated case analysis, in which people analyze particular case situations independently of one another.

Recognizing When to Make Comparisons is Not Obvious

Based on the results of these experiments, we conclude that comparing cases is not automatic – even when the cases are physically and temporally juxtaposed. For example, in Thompson et al. and Loewenstein et al., less than a tenth of those studying cases individually mentioned the first example when discussing the second example, even when the two examples were on the same page. Thus, engaging the type of analogical reasoning process that we describe cannot be taken for granted in learners – even highly motivated

ones. Reading more than one case is insufficient; it is *comparing* multiple cases that prompts knowledge transfer.

Issues for the Future

We think it is enlightening to structure our discussion and conclusions around the questions we find that those people both on the transmitting and receiving end of professional training and education ask most often. Sometimes their questions are similar; often they are different because they have different goals.

What Instructors and Trainers Like to Know about Learning and Analogy

Negative transfer. By far, one of the most frequent questions we get concerns “negative transfer,” or false mapping (Novick 1988). Negative transfer occurs when a learner transfers a concept or principle to an inappropriate situation as in the Ross (1987) study described above. Novick (1988) found that mismapping is particularly likely for novices. Our experiences accord with these findings; it is very common for new students to retrieve surface-similar incidents and apply those to the problem at hand. For example, students involved in an “international negotiation” tend to retrieve international cases they’ve been exposed to and to try to apply them, even when there are (as far as we can tell) no real lessons to be learned through such transfer.

Perhaps the most widespread misapplication of principles students make is that they tend to fall back on what we term heuristic and biased thinking about negotiation (Bazerman and Neale 1992). For example, they assume a fixed pie, or they tend to compromise. We have substantial evidence that, in the absence of any training, students tend to compromise (Loewenstein, Thompson, and Gentner, in press; Thompson and Hastie 1990). Even after students and executives realize that compromise solutions tend to be sub-optimal, they often want to know which “trick” to use. The challenge is knowing which principles apply to which domains and situations. The key is to discern perceptible, though nonsuperficial, features of a situation (e.g., differences in parties’ future expectations can be an opportunity to form contingent contracts).

We have found that analogical reasoning is a powerful conceptual tool that helps people grasp critical features of a situation. Yet analogy is not a deductive method, but a psychologically powerful inference tool. Thus, there is no way to guarantee correct answers. One readily available practice for instructors is to provide good matches for students to compare. On the learners’ side, it is helpful to “push” the conclusions of an analogy by thinking through the comparison explicitly; by doing so, one can often catch inappropriate matches (Gentner, 1989).

Long-term transfer. Another question we frequently hear concerns the long-term transfer of knowledge. We have found short-term gains from

comparison on later transfer, but are these temporary or lasting gains? The current literature suggests that learning experiences that incorporate analogy can show differences in performance months later (e.g., Chen and Klahr, in press). Still, an important question for future research is whether analogical encoding, specifically, persists in its benefits over time. We should also point out that we consider normal learning to consist of acquiring more than simply one negotiation principle, but many. As negotiation principles rest on key aspects of a negotiation's structure, grasping these aspects is part of becoming an expert negotiator. Thus, learning negotiation principles should improve one's ability to parse negotiation situations. This kind of coherent system of knowledge in experts is related to durable and effective use of knowledge, i.e., long-term transfer.

Is the “case method” flawed? Professional educators in law, management, and medicine extensively use the case method, which involves analysis of individual situations. The case method is founded on the belief that people can and will abstract higher-order relations from individual examples. We question the generality of this assumption, although clearly there are some cases with such enormous precedential value (e.g., in constitutional law, *Brown versus Board of Education*) that students should learn them in detail via the case method. Our concern is with using the case method to learn abstract principles. Our research shows that the case method can be improved by comparing examples and drawing out the common underlying principles. Separating causally relevant from irrelevant information appears far more challenging for learners without the use of multiple cases.

If abstraction of a principle is the key to analogical problem-solving, why not learn solely via abstracted principles? This sounds reasonable. If principles are the key, why not simply give students abstract principles from which to learn (obviating the need for cases). However, this approach does not appear to be successful (Gick and Holyoak 1983; Ross and Kilbane 1997). For example, Gick and Holyoak (1983) found that providing learners with a principle was not as effective as comparing multiple examples. We suggest this is because it is critical for the learner to engage in the similarity mapping; principles presented alone may not be appropriately understood.

How does analogical reasoning compare to other learning techniques? We know that asking people to make analogies can yield better learning than a completely didactic approach (from Gick and Holyoak). We have also examined this issue, pitting four types of learning against one another: feedback, repetition, observation and analogy (Nadler, Van Boven, and Thompson 1999). We found that analogy and observation were effective and efficient methods – at least for learning negotiation skills. Still, there are many other kinds of learning techniques whose relative efficacy is not known.

Questions Students and Managers have Asked Us

Is expertise a “shield” against the problems with transfer? To some extent, yes. We define an experienced person as someone who has had some natural (i.e., real-world) experience but has not received formal training; we define an expert person as someone who has had many years of natural experience perhaps coupled with formal training. Although experts show somewhat more appropriate retrieval than novices do, they too retrieve many surface-similarity cases. For example, in Novick's (1988) study described above, expert's showed greater transfer and less vulnerability to negative transfer than novices. Part of the reason for experts' greater performance was their ability to dismiss inappropriate cases quickly. Still, although experts performed better than novices did, they did not retrieve appropriate cases in all instances (Novick 1988).

The question concerning the optimal level of training is a difficult one and requires further research. It often takes ten or more years of experience to become expert in a particular domain, even for an obvious genius such as Mozart (Ericsson and Smith, 1991). Training in analogical reasoning offers the prospect of shortening the length of time needed to achieve expert levels of performance.

Don't surface and structural similarity go together in the real business world? Often, yes. Retrieving surface-similar cases is helpful to the extent that there are also structural similarities. It is true that many cases that share surface properties share structural properties as well, and experts pick up on these regularities (Blessing and Ross 1996). For example, if a manager is preparing an account statement, it is typical (and indeed optimal) to be reminded of last quarter's account statement. Such reminders have even been shown to be linked to some scientific discoveries and breakthroughs (Dunbar 1994). Finally, professionals often express a strong preference for learning negotiation through in-depth, single-case study in domains that are highly similar to their own (e.g., finance executives like learning about negotiation cases that involve finance, etc.). If surface and structural similarity go together, then their request is valid.

Yet, surface and structural similarity do not always go hand-in-hand. As we argued at the outset, multiple principles of negotiation can be used in any given business context. There is evidence that if there are multiple possible structures in a given context, simply being reminded of the context will not directly lead to effective transfer (Ross 1984). That is, noticing surface similarities is not a guarantee of being able to notice and use a structural similarity. Surface similarities can lead people astray. For example, Gilovich (1981) found that sportswriters and football coaches gave high ratings to young players described as being from the same home town as a famous football player, or who had won an award with the name of a famous football player. The writers and coaches gave somewhat lower ratings to players from different hometowns or who had won an award with a different name.

The bottom line is that negotiations occur in a wide variety of business settings. Thus, it is worth learning negotiation principles in ways that maximize the likelihood of their being used across contexts.

Is learning only about finding the right analogy? Of course not. In many negotiation situations, the problem is not trying to figure out what principle or strategy is most optimal; rather, the challenge is to get parties to agree to *apply* a principle or strategy. For example, in the Middle East dispute between Israel and the Palestinians, both sides are well acquainted with the broad conceptual idea of integrative bargaining based upon differences in interests and priorities; to the extent that Israelis are more concerned about long-term safety/security and the Palestinians are concerned about land, the possibility exists for a mutually beneficial logrolling trade, as was done earlier in the Egyptian/Israeli dispute over the Sinai desert. In cases such as these, the difficulty is certainly not about finding the right analogy or accessing inert knowledge, but involves issues such as learning to trust the other party and learning how to set aside past animosities. In sum, our focus on analogy in this paper should not be taken as an indication that there are no further aspects to learning.

In Conclusion

Our central conclusion is that analogical reasoning, which involves comparing and contrasting cases, enables people to access what they learned from those examples when later confronted with a novel situation. This is because comparing examples makes explicit the relational structure explicit during the original encoding. Analogical encoding offers a cost-effective and conceptually simple technique for improving the negotiating skills of students and managers.

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